

Model 287 Helical Piers

Project: Westminster Bradenton Manor

Location: Bradenton, FL

Challenge:

The Westminster Bradenton Manor was built in 1961. Planned renovation to the five-story, 250-foot long south wall of the building included a new stucco exterior with Mediterranean detailing, hurricane resistant windows and a new mansard roof feature. The entire façade would be removed and replaced to be compliant with current building codes. The renovation would generate additional loading to the existing wall footing. The design team was concerned that the new structural load, when transferred through the existing footing, would overstress the bearing soils and result in building settlement. The foundation design would include widening the existing spread footing to support a new reinforced concrete foundation wall and exterior wall framing. The new footing and foundation wall would be doweled into the existing footing and slab-on-grade. The existing footing would first be stabilized with a deep foundation to prevent settlement. Four borings completed for the geotechnical exploration encountered loose to medium dense sand from the surface to a depth of 13 feet. Standard penetration test N-values within the sand ranged from 4 to 19 blows per foot. Underlying the sand was a five to ten-foot thick layer of weathered limestone with N-values ranging from 26 to 100 blows per foot. Groundwater was encountered at depths of 6 to 8 feet below grade.

Solution:

Helical piers were selected as the ideal deep foundation system for this project. Benefits of helical piers specific to this project include: helical piers can be installed with smaller equipment to minimize disturbance to the property, they are installed without vibrations induced to the structure, they can be installed through groundwater without the need for casing or pumping pre-drilled holes, and they can be installed relatively quickly with attachment to the footings with pre-manufactured retrofit foundation brackets. The foundation design included 54 Model 287 (2.875-inch OD by 0.203-inch wall) hollow round shaft helical piers with 8"-10" double-helix lead sections to support the design working load of 20 kips per pier. The piers were spaced at 4.5 feet center to center. The piers were installed to an average depth of 14 feet for bearing on or within the weathered limestone. With the retrofit brackets installed, hydraulic cylinders were connected to each pier and used to apply a uniform seating load. When complete, the retrofit brackets and the tops of the helical piers were encapsulated by the concrete of the new footing and foundation wall.

Project Summary

Architect: James E. Toth Architecture

Structural Engineer: McElroy Engineering

Geotechnical Engineer: Nodarse & Associates

Construction Manager: Hennessey Construction

Pier Installer: LRE Ground Services, Inc.

Products Installed: (54) Supportworks® Model 287 Helical Piers, 8"-10" Lead Section, Installed to an Average Depth of 14 feet, Design Working Load of 20 kips



Westminster Manor before renovation



Advancing helical piers next to prepared/notched footing



Hydraulic cylinders connected to brackets



Uniform seating load applied to the piers



Westminster Manor after renovation