



## Beach House Foundation Washed Out Repaired with Helical Torque Anchors Newburyport, Ma

Helical Torque Anchors™ were selected to provide supplemental support along with anchorage against scouring of the sand and wind uplift on this beach front home. Atlas Systems of New England contacted the engineering department of Earth Contact Products to assist with design attachments to connect to the existing twelve inch diameter concrete foundation columns



and to the girder beams under the structure. The system was required to support a 30,000 pound service load even if eight to ten feet of sand was displaced from below the structure.

The engineer required that the helical pile system embed into the coarse to fine cemented sand stratum that was located approximately 20 feet below existing grade. Standard Penetration Test values for this stratum ranged from 50 to 75 blows per foot.



This photo shows the configuration of the helical pile and custom bracket designed by ECP.

The helical anchors selected for this project consisted of a 4-1/2 inch diameter tubular shaft that would provide maximum buckling strength through a possible eight to ten feet of unsupported column height should scouring occur around, and under, the structure. Attachment of the helical piles were



This is a view of the Model 450-WM (12" Dia.) bracket that connects the 4-1/2 inch tubular pile shaft to the 12 inch diameter concrete column.

planned to the existing twelve inch diameter concrete column supports attached to spread footings buried just under the surface.

Two types of brackets were used for load transfer. One was a specially designed bracket that would surround the existing concrete column supports and was clamped in place. The other bracket mounted under the structure where timber brackets were secured between the existing laminated girder beams and the piles.

Project Summary

Installer:	Atlas Systems of New England, Norwood, MA atlassystemsnewengland.com
Products Installed:	TAF-450D-60 8s – 10 Torque Anchor™ PPB-450-WM (12" Dia) Custom Column Bracket TAB-450 TB Custom Timber Bracket
Number of Placements:	17 Column Brackets 6 Timber Brackets
Average Depth:	19 ft
Install Torque on Exterior:	12,700 – 13,500 ft-lb
Ultimate Pile Capacity Rating:	160,000 lb
Estimated Buckling Load:	81,600 lb
Average Working Load:	30,000 lb
Factor of Safety	2.7 : 1 Shaft Buckling at 10 ft to Working Load

Installation of the helical piles under the structure was a challenge for Atlas Systems of New England technicians. They had to work with low overhead clearance, but were able to install the piles using portable equipment and by using short extension shafts. Once the interior piles were installed and trimmed to proper elevation they were fastened to the laminated girder beams using a custom timber bracket.

All of the piles were driven until refusal into the stratum of cemented sand

located approximately 20 feet below grade. The average installation torsion on the perimeter placements was 13,000 ft-lbs, which empirically calculates to an ultimate compressive capacity of 80,000 pounds, providing a factor of safety of 2.7. This value corresponds to the buckling load estimate of 81,600 pounds.

Once the piles were installed, they were attached to the structure with either the custom column bracket or the timber support bracket. A portion of the structural load was transferred to each pile as directed by the engineer on site.

Upper left photo shows the technician completing a pile installation by cutting the extra shaft length to proper elevation. Center and left are photographs of the completed helical pile and bracket installation. The load has been transferred to the piles in these photos.



The photographs above show the pile installations being completed in the tight conditions under the structure.



Earth Contact Products, LLC  
ECP Helical Torque Anchors™  
“Designed and Engineered to Perform”