

## New Construction Helical Piles

**Project:** Swimming Pool and Pool Deck

**Location:** Aspen, CO

### Challenge

A 20 foot by 40 foot in-ground swimming pool with surrounding concrete deck was planned. The pool would have a sloped bottom to provide water depths ranging from 4 to 6 feet. Typical of soil profiles along slopes in the Colorado Rocky Mountain Region, the upper native soils consisted of silty sandy clay with cobbles and boulders. Up to 10 feet of fill was also brought to the site to create the level area for the construction of the pool. The fill was comprised of similar silty sandy clay with hard fractions. The pool and deck would be designed with deep foundation support to penetrate the fill and weaker native soils.

### Solution:

Helical piles were determined to be an economical and practical solution for the project. The original design for the pool and deck included 41 Model 288 (2.875-inch OD by 0.276-inch wall) and 14 Model 350 (3.50-inch OD by 0.340-inch wall) round shaft helical piles with 8"-10"-12" triple-helix lead sections. The piles would support design working loads ranging from 14 to 40 kips. With the presence of the fill and weak native soils near the original ground surface, a minimum helical pile depth of 15 feet, as measured from pool deck subgrade elevation, was specified.

A Caterpillar 312 track excavator was fitted with a custom mounting bracket to support the drive head with a rated output torque of 12,000 ft-lb. Cobbles and boulders were encountered during the helical pile installation, hindering pile advancement and affecting location accuracy. Piles were removed and relocated where they could not pass obstructions and reach the minimum specified depth. Seven additional Model 288 and seven additional Model 349 helical piles were required where pile relocation distances were beyond structurally-tolerable limits. The piles were advanced to depths ranging from 15 to 27 feet to achieve torque-correlated ultimate capacities of at least twice the design working loads ( $FOS \geq 2$ ). The tops of the piles were cut to design elevation and fitted with new construction brackets to be cast into the poured concrete slabs. The 69 helical piles were installed in six days.



Installing helical piles for pool support



Preparing to advance 10-foot extension



Piles installation complete for pool

## Project Summary

<b>Architect:</b>	Design Workshop
<b>Structural Engineer:</b>	KL&A, Inc.
<b>Geotechnical Engineer:</b>	Hepworth-Pawlak Geotechnical, Inc.
<b>General Contractor:</b>	Tenant Improvement Specialists, Inc.
<b>Pile Installer:</b>	Foundation Repair of Western Colorado, LLC.
<b>Products Installed:</b>	(48) HP288 Helical Piles and (21) HP350 Helical Piles, 8"-10"-12" Lead Section, Installed Depths From 15 to 27 feet, Design Working Loads of 14 to 40 kips



Advancing helical piles for proposed deck