

Case Study

Micropile Test Project

Date: August 22, 2002

Job Name: Kangley - Echo Lake Micropile Test Project

Owner: Bonneville Power Administration

Location: BPA Transmission Lines from Kangley to Echo Lake,
King County, Washington

General Contractor: Henkels & McCoy

Micropile Contractor: Northwest Cascade Inc.

Engineer: Shannon & Wilson, Inc.

The Kangley – Echo Lake Transmission Lines are located in the Cascade foothills within King County, Washington and supply power to a large portion of Pierce County, Washington. Because of an increased power demand, it was deemed necessary to run additional lines. To support the new towers, designers and engineers looked into micropiles to reduce the design size of the required footings. Before construction could begin, environmental concerns needed to be settled.

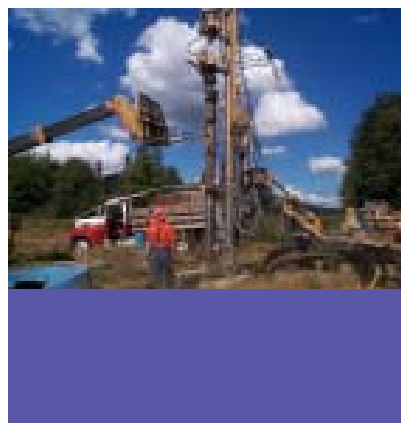
A portion of the new towers would need to be installed within the Cedar River Watershed, an environmentally sensitive area near Hobart, Washington, which is owned by Seattle Public Utilities (SPU). Therefore, a test program was devised to evaluate the environmental impact of installing three test piles at four different locations along the existing line including a site within the watershed. Northwest Cascade was given the opportunity to prove the technology and installation process would be suitable for the project. On August 22, 2002 mobilization began under the watchful eyes of the evaluation team comprised of representatives from Bonneville Power Administration, Seattle Public Utilities, Henkels & McCoy, Duke Energy, Shannon & Wilson Inc. and Northwest Erosion Control.

One of the most challenging aspects of the work was moving men and equipment up to several miles along single-vehicle-access logging roads to and from remote locations in the Cascade foothills leaving little trace behind. All drill spoils were collected and hauled off site, all equipment and materials were contained while on-site with fabric matting and/or heavy-weight plastic sheeting, and all vehicles and equipment required to be on-site were inspected to meet cleanliness requirements.

Once set-up was completed at each site, drilling and installation of the three piles began. The program specified that two 15 Kip lateral test piles and one 75 kip vertical pile be installed for the testing program. All three piles were drilled to a depth of 25 feet. A 2-3/4-In Grade 150 high strength threadbar was set in the vertical test pile for reinforcement and square steel tubing was set in the lateral test piles to facilitate deflection measuring equipment during testing. The drilling and installation needed to have as little adverse impact on the environment as possible. Therefore, spoils were contained during drilling and disturbed earth was covered with fabric and plastic sheeting and corralled with straw wadles to control erosion and runoff into nearby streams until re-seeding could take place.

The testing program followed shortly after de-mobilization of a site and included two separate test set-ups. The first, to test lateral deflections, was comprised of heavy wood matting and 4" X 12" boards to level the testing equipment. A specifically designed steel frame on rollers was used to translate the load to each pile and support the hydraulic jack. Inclinometers to measure pile deflections were suspended down each of the square steel tubes of the lateral test piles. The second test for vertical deflection utilized the same mats, jack and steel frame with an additional frame to facilitate the vertical load applied to the remaining pile. A frame was erected to isolate two dial gauges measuring the vertical movement of the Grade 150 reinforcing steel during testing. When testing was completed, all three piles were cut off below finish grade and back-filled.

Controls on the mobilization, drilling, installation and testing process itself were implemented to protect personnel, equipment and environment alike. Constant consideration was directed towards factors such as high-voltage wires, equipment clearance in heavily wooded areas, safety on the small access roads and site safety for the large evaluation team and drill crew during operations. All parties considered the program a major success.



Northwest Cascade Inc.
www.nwcascade.com
800/ 444 - 2371