



CASE STUDY

Project: Reifel Bird Sanctuary Delta, B.C.	Geotechnical Engineer: Geopacific Consultants	Structural Engineer: Somerset Engineering Pile&Pile Cap Design	Contractor: Trevi Construction Ltd., Burnaby, B.C.
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Job Description:

Placement of the foundation assemblies on an environmentally sensitive bird sanctuary site near the Fraser River estuary in Delta, B.C.

The Reifel Bird Sanctuary had the need of a new wooden walkway and boardwalk for viewing in this especially popular bird sanctuary near Vancouver, B.C. Unfortunately access to the site was through a very narrow brush choked roadways with environmentally sensitive marshland areas. There were 15 foundation assemblies to this walkway which needed to be removable and must be placed with minimum contamination to the site, no allowable discharge of any materials into the river or the estuary itself. The wooden deck itself measured approximately 20' X 30' with access walkways measuring 40' X 5' consistent with wheelchair access to the elevated platform.

Soils:

The soil profile beneath the site was 1' or 2' of top soil, 4' of peat and approximately 20' – 24' of soft silts and progressing into dense sands by 28-30 feet below site grade.

Production Piling and Installation:

Helical PULLDOWN™ micro piles were selected for placement of the foundations because they can be done with either hand held portable equipment or a small hydraulic auger equipment set on a very small tracked excavator or a bobcat (skid steer) type machine, yet achieve high capacity piles. The helical PULLDOWN™ micro piles in this project were made from 8-10-12 triple helix 1 ½ " square shaft pile leads with a 6" grout column extending approximately 30' into dense sands. The upper 3 metres of column were sleeved with 6" PVC to reduce negative skin friction or "down-drag" forces from affecting pile capacities.



All of the production piles were placed using a small tracked excavator with a small rotary hydraulic drive bit powered by the excavators pump and controlled through the auxiliary foot pedal in the usual way. Continuous torque monitoring was done by differential pressure gages across the input and output lines of the hydraulic feeds to the drive motor. The resultant differential pressure can be reliably converted into foot pounds of torque, using the algorithms as supplied by the manufacturer of the drive head. 15 piles in total were placed between 32 and 36' foot overall depth at a minimum torques of 3500 foot pounds insuring a pile whose ultimate capacity exceeds 30,000 lbs or a design load of 15,000 lbs.

The grout mix consisted of type A PULLDOWN™ pile grout as manufactured by Basalite Concrete Products Ltd., of Vancouver, BC. The grout was reinforced with one pound of polyfibre mesh per cubic yard of grout . The grout was mixed in drum containers on the site in a contained fashion. As a result of this innovative technology no construction contaminants were allowed to access the estuary.

