



GEO-FOUNDATIONS Contractors Inc.

Meno-Ya-Win Health Centre



Date: 2008

Technology: Micropiles

Meno-Ya-Win Health Centre is a new hospital development situated in Sioux Lookout, Ontario. When completed in 2010, the new hospital will service northwest Ontario with 60 beds accompanied by emergency, surgery and other acute care facilities. The new hospital structure is framed by cast-in-place concrete founded partly on spread footings on rock and partly on drilled, rock-socketed piles.

Due to the highly varying and erratic elevation of the bedrock at this site, use of strip footing foundations over the entire footprint of the structure was neither economical or practicable. The tendered foundation package prescribed the installation of 305mm rock-socketed piles drilled a minimum of 2.5 metres into sound rock to support individual pile service loading of 1000 kN compression. Recognizing that the extreme hardness of the basalt bedrock was the defining factor in the pile installation's challenge and risk, Geo-Foundations submitted two prices at time of tender – one price for the drilled piles as specified, and a second price for a performance-based, one-for-one substitution of smaller-sized piles. The alternative pile proposal was ultimately selected and the structure's deep foundations consist of 178mm diameter drilled pipe piles socketed 1 metre into rock.

Drilling of the piles was completed using a single-head, shoeless, percussive, rotary-duplex drilling process employing NUMA T150 Superjaws tooling. Immediately after being tremie grouted, each pile was pressure grouted to force grout into the annulus between the outside pipe wall and the inside of the rock socket. A premium grout blend, complete with superplasticizer and shrinkage compensating agents, was used.

The principle challenge to the successful installation of piles at this site was the varying and erratic elevation of the top of bedrock. In many instances, depth to bedrock was found to differ as much as 6 metres within a lateral distance of just 2 metres. Added to this difficulty was the hardness of the bedrock which consumed several drill bits over the course of installing the production piles and load test tie-down anchors.

To validate the alternative pile design, two pre-production, static compressive load tests were completed to cyclically applied loading of 2000kN static compression. After load testing clearly demonstrated the adequacy of the alternative pile design, the balance of the piles were installed over the subsequent 4 weeks in July and August of 2008.



Drilling of piles at The Gathering Area — note bedrock outcropping in near background



Piles cut down and awaiting welding of top plates at a typical PC-5 Pile Cap