



## GEO-FOUNDATIONS Contractors Inc.

### Edmonton South LRT



Date: 2003

Technology: Soil Permeation Grouting

Geo-Foundations, in joint venture with Soletanche Inc., completed a \$1.6M contract for soil permeation grouting as part of the Edmonton South LRT extension in 2003. Grouting was incorporated into the tunnel construction scheme to consolidate deposits of outwash sands prior to their intersection by the tunnel excavation.

Although tunnel excavation was completed using two adjacent passes with a tunnel boring machine, all of the 2600 lineal metres of delivery pipe used for grouting were installed using drill rigs working from surface on the grounds of the University of Alberta. Grouting was required at three locations along the 850 metre long tunnel extension: at the tunnel launch wall where 720m<sup>3</sup> of soil was treated; beneath the utility corridor and the southwest corner of the U of A Education car park where 470m<sup>3</sup> of soil was treated with access to some of the work from the middle of 114th Street and access to the rest from inside the confines of a utility tunnel; and at the northeast corner of the car park where 400m<sup>3</sup> of soil was treated with access from within the low-headroom ground floor of the parking garage.

A total of 650,000 litres of sodium silicate based solution grout, of varying formulations, was injected through 230 sleeve pipes. In addition to this pre-treatment prior to tunnel boring, 67 compensation grouting pipes were installed as deep as 13 metres under the utility corridor and footings of the education car park. Each of these pipes was injected with cement-based

grout as a pretreatment of the ground prior to tunneling, then left for later access in the event that excavation-induced movements required their use as compensation grouting conduits to densify and stabilize the soil between the surface structure and the tunnel excavation. In March of 2004, tunneling was successfully completed without any further need for these delivery pipes.



*Grouting in progress from inside the utility tunnel*



*Tunnel boring machine launch shaft south of 87th Avenue*



*Installation of grout delivery pipes from 114th Street*