



# RAILWAY

# FOUNTAIN SLIDE DESIGN - BUILD FAST TRACK MITIGATION PROJECT

## CN Fountain Slide

### CANADA



#### Owner

CN Railway

#### Engineer

Nicholson/McNabb Consulting

#### General contractor

Soletanche Bachy Canada

#### Period of works

June 2016–November 2016

### Main figures

#### Geotechnical specialties

250 micropiles, 30 strand anchors, installation of concrete



### Project description

Micropiles and anchors installed with Casagrande C-14 hydraulic crawler drill rigs equipped with Numa hammers and a down the hole hammer overburden drilling system. A total of 2 drilling units were employed

Total installed quantities are listed below

Phase 1 consisted of:

- Installation of 250 micropiles. Diameter = 346mm, lengths ranged from 24.4m to 30.5m

Phase 2 consisted of:

- Installation of 30 strand anchors. 18 strands per anchor. Length = 36m each

- Installation of concrete waler at base of existing beam and lagging retaining wall



### Ground conditions

Upper colluvium above slip surface consists of loose sand and gravel with occasional sandy clay and clayey sand layers. Lower colluvium below slip surface consists of compact to dense sand and gravel.

### Solution

A two-part solution was employed to arrest the slide movement and improve the global slope stability.

This first part of the solution involved the installation of battered and fully grouted micro piles. These piles acted as ductile shear piles having the potential to bend and possibly even shear given the rate of slope movement during the installation process.

The second part of the solution involved the installation of passive anchors through the existing retaining wall and connected by a cast in place concrete waler.

In addition to the micropiles and anchoring work, a considerable amount of controlled earthworks was required to establish site access and maintain safe working platforms.

Ongoing slope monitoring during the execution of the work was accomplished using slope inclinometers and real-time surficial monitoring using a CYCLOPS™ integrated survey network

© Soletanche Bachy photo library