

# Canada



**Name:** Tunnelling Association of Canada (TAC)

**Type of Structure:** Federally incorporated not-for-profit society

**Number of Members:** 412 (310 full, 45 corporate, 9 retired, 48 student)

**Board of Directors (2019):**

**Officers:** Erik Eberhardt - President, Rick Lovat - Immediate Past President, Bruce Downing - Vice President West, Steve Skelhorn - Vice President East, Michelle Richards - Treasurer, Derek Zoldy - Secretary

**Directors:** Stephanie Robillard - BC Region, Remco Kleinlugtenbelt - Alberta, Jason Mann - Manitoba and Prairies, Dan Ifrim - Ontario, Jean Habimana - Québec and Maritimes, Nichole Boulton, Andrew Caruana, Mark Diederichs, Connor Langford, Boro Lukajic, Andre Solecki, Seamus Tynan

## ASSOCIATION ACTIVITIES DURING 2018 AND TO DATE

### 2018 TAC/NASTT-NW Tunnelling and Trenchless Conference - Innovation in Underground Infrastructure

Over 300 tunnelling and trenchless technology professionals met November 8 and 9 in Edmonton to participate in keynote lectures, concurrent technical sessions, and panel discussions on:

- Case Histories - Lessons Learned
- Condition Assessment and Rehabilitation
- Ground Characterization and Ground Improvement
- Planning and Design
- Procurement and Delivery
- Research and Innovation
- Urban and Environmental Challenges.

The conference was preceded by a Design Considerations and Case Studies workshop on November 7.

### TAC 2018 Awards Dinner

The Tunnelling Association of Canada presented achievement awards in 2018 recognizing deserving individuals and projects in the Canadian tunnelling industry. TAC's Canadian Lifetime Achievement Award was presented to long-time TAC member and former TAC President, Garry Stevenson. The Eisenstein Scholarship (value of \$6,000 CAD) was presented to Pasquale Basso Trujillo of Université Laval. Full 2018 TAC Achievement Awards details are posted on the TAC website at [http://www.tunnelcanada.ca/awards\\_2018.php](http://www.tunnelcanada.ca/awards_2018.php).

### Chapter Activities

TAC's Ontario and British Columbia chapters continue to be very active

running up to eight meetings (each) annually and featuring presentations on Canadian and international tunnelling projects. The BC Chapter opened the year in January with a combined meeting with the Vancouver Geotechnical Society. The Ontario Chapter closed the year with a December social. Both functions were attended by over 100 members.

### TAC Young Members

TAC had a successful year running student and young member events. The number of Young Members (<35 years of age) is steadily increasing, with an active Facebook page and groups in BC and Ontario. Student membership in 2019 is expected to increase to over 70, and total YM's is estimated to increase to over 200.

### CURRENT TUNNELLING ACTIVITIES

The Canadian market is seeing steady activity. A sampling of current projects across the country, from the east to west coast, includes:

- Coxwell By-pass Tunnel, Toronto, ON: Construction of a 10.6km long, 6.3m diameter tunnel at a depth of 55m in soft rock, together with 5 tunnel shafts/chambers, 11 drop shafts/adits and 2 diversion chambers. The tunnel is being constructed using a single-shield/EPB dual mode TBM.

- Burnhamthorpe Water Project, Peel Region, ON: Includes a 3.7km, 1,500mm diameter tunnel to house a watermain, constructed using conventional tunnelling, and a 1.5km, 600mm diameter microtunnel for a sanitary sewer.
- Ashbridges Bay Outfall Tunnel, Toronto, ON: Construction of a 3.8km long, 6.8m diameter tunnel in soft rock using a shielded TBM, together with tunnel shafts and over 50 risers into the lake.
- Réseau Express Métropolitain (REM), Montreal, QC: Construction of 67km of automated light rail to link the south shore to the city centre as well as the airport and western suburbs (Fig. 1). Works include tunnelling underneath the airport and integrating the 100yr-old Mont Royal tunnel.
- Garage Cote Vertu, Montreal, QC: Involves 2.5km of tunnels and caverns, excavated using roadheaders, to house an underground maintenance facility connected to an existing metro station.
- Lavigne Retention Pond Tunnel, Montreal, QC: Construction of 2km of tunnels and a 40m wide, 25m deep storage shaft to control and avoid wastewater runoff during major storm events.
- Northeast Interceptor Sewer River Crossing, Winnipeg, MB: Includes shaft construction and a 900mm diameter sewer siphon crossing below the Red River, via microtunnelling in carbonate rock.
- Cockburn and Calrossie Sewer Relief Works, Winnipeg, MB: Involves 500m of drainage sewers ranging from 1.5 to 2.1m diameter and 1.4km of new land drainage laterals 300 to 750mm in diameter, installed via trenchless methods to provide sewer separation.
- Inglewood Sanitary Trunk, Calgary, AB: Construction of a 3.5km microtunnel in coarse gravels and boulders under the

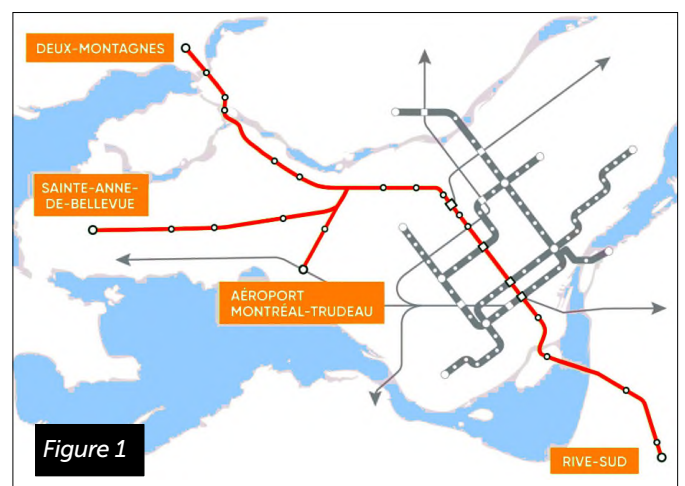


Figure 1



Figure 2

water table using microtunnelling and open cut construction.

- St. Albert North Interceptor Sewer, Edmonton, AB: Involves a 3km long microtunnel with 1.5m diameter to add sewage capacity.
- Kemano T2, Kitimat, BC: Completion of the remaining 7.6km of a 16km secondary power tunnel for Rio Tinto's Kemano Generating Station, using a combination of drill and blast and TBM tunnelling.
- Site C Diversion Tunnels, Fort St. John, BC: Construction of two diversion tunnels for BC Hydro's Site C Dam (figure 2), with diameters of 12 to 15m, excavated by roadheader.
- South Surrey Interceptor - Johnston Road, Surrey, BC: Includes an 800m long section with 3m diameter being constructed using an AVN microtunnelling machine.
- Douglas Trunk Sewer, Burnaby, BC: Includes three microtunnels with a combined length of 1km through silts, sands and gravel with some of the trenchless sections in lean clay and fills.
- North Shore Conveyance, Vancouver, BC: Construction to link the new North Shore Waste Water Treatment Plant

with the existing outfall below the Lions Gate Bridge, including 9 microtunnels: 3 at 1,500mm diameter, 5 at 2,400mm and 1 at 3,000mm. Project challenges include a 420m curved microtunnel alignment for the 3,000mm MTBM.

**FUTURE TUNNELLING ACTIVITIES**

The outlook for Canadian tunnelling continues to be strong. Examples of projects on the horizon include:

- West Vaughan Sewage System Project, York Region, ON: Currently in design, will involve a 14km tunnel with 3m diameter to be constructed by TBM. Expected dates for start of tunnelling range from 2022 to 2024.
- Massey Creek Tunnel, Toronto, ON: Will consist of 6km of 4.4m diameter soft ground tunnelling with depths from 12 to 60m. Two shielded TBMs are envisioned to be used. The project is currently in design; the RFQ is expected in 2021 and construction in 2024.
- Louis-H. La Fontaine Tunnel, Montréal, QC: Major safety upgrades and rehabilitation work to a 1.5km long double tube immersed tunnel, using a Design-Build-Finance delivery method. Preliminary design was completed in Fall 2017 and responses to the RFQ were submitted in September 2018. The RFP for the tender design is expected in early 2019.
- Blue Line Extension Project, Montréal, QC: Will add five more stations and maintenance facility to the city's metro system. The civil contract will be procured under a Design-Build-Finance delivery method, while the system contract will be procured by a Design-Bid-Build contract. The project will extend the existing Blue Line to the eastern part of the city for approximately 6km.
- Cockburn and Calrossie Sewer Relief Project (Contract 5), Winnipeg, MB: Will involve installation of 1.2km of tunnels with diameters of 2.1 to 2.4m.
- Green Line LRT (City Centre), Calgary, AB: Will add 4km of tunnels and underground stations to the city's LRT network. Funding from various government levels is in place, and is

expected to begin construction in 2020. The RFQ will be issued in Q2 of 2019 under a Design-Build-Finance model.

- Millennium Line - Broadway Extension, Vancouver, BC: Will add 6km of TBM tunnel and 6 underground stations to city's subway and SkyTrain network (Fig. 3). The RFQ is anticipated in early 2019 as a Design-Build-Finance project, with the start of construction expected in 2020.
- Second Narrows Water Supply Tunnel, Vancouver, BC: Metro Vancouver's next major marine crossing to secure its water supply in event of a large earthquake. Will include a 1.1km long, 6m diameter tunnel under the Burrard Inlet. Access to the tunnel will be via a 70m deep shaft in complex soils on the north side of the inlet and 100m deep rock shaft on the south side. Set to begin in 2019.
- Stanley Park Water Supply Tunnel, Vancouver, BC: Will replace a section of the Capilano water main through Stanley Park via a 1.4km rock tunnel that includes 3 shafts and 2 tunnel drives through weak sandstone. Detailed design began in mid-2018 and construction is to begin in 2021.
- Eagle Mountain Gas Pipeline, Greater Vancouver, BC: FortisBC and Woodfibre LNG are undertaking the construction of a 47km gas pipeline. Will include a 6km long tunnel, of which, 3km will be in soft ground with a pressurized face and 3km in hard rock. The project is currently under design with RFP to be released in 2019, and construction to start in 2020.

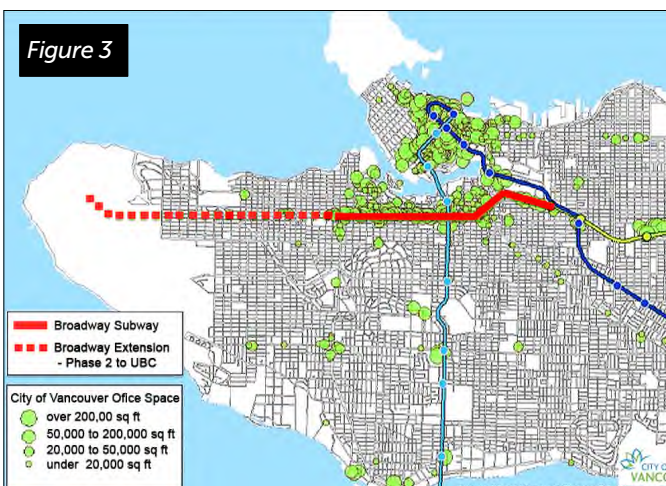


Figure 3

**EDUCATION ON TUNNELLING IN THE COUNTRY**

- McGill University - MIME521: Stability of Underground Openings
- Queen's University - GEOL873: Tunnelling and Advanced Rock Engineering
- Univ. of Alberta - EXGEN4800: Geotechnical Consideration for Underground Trenchless Construction
- University of British Columbia - EOAS547: Tunnelling and Underground Construction
- University of Toronto - EdTech (Online): Tunneling Methods
- Western University - GRC71414: Tunnels and Underground Structures in Rock