CARTEL

Underground Coverage and Millennium Line Extension

With the opening of Translink's Millennium Line extension, Metro Vancouver now has the longest, fully automated, driverless, rapid-transit system in the world.

The extension of the Millennium Line (formerly known as the Evergreen Extension) connects the Tri-Cities (Port Moody, Coquitlam, and Port Coquitlam) to the existing SkyTrain system, regional bus network, and West Coast Express. The 10.9 km extension is made up from a 5 KM of elevated guideway, 2.2 KM of bored tunnel, and 4 KM of at-grade track. It supports seven new stations (including Lougheed Town Centre Station, Burquitlam, Moody Centre, Inlet Centre, Coquitlam Central, Lincoln Station, Lafarge Lake–Douglas, and Moody Centre Station).

Budgeted at 1.4 billion dollars, this massive infrastructure project was made possible through a Private Public Partnership (P3) agreement signed on December 2012 between the Province of British Columbia, the BC Transportation

Financing Authority, and Evergreen Rapid Transit Holdings Inc.

As part of their public safety communications strategy, and to connect to the rest of the Skytrain's operational communications, the extension required a two-way radio communication system for the 2.2 KM underground tunnel.

Having worked underground with New Gold at the New Afton mine, and having accumulated extensive experience working in the Public Safety sector, getting emergency communications underground for the Evergreen was a natural fit for Cartel Communications Systems.

Life is better when we communicate. Read more to find out how that is proving true for the Millennium Line.

From Mountaintop to Underground

Police, fire, and ambulance personnel must have access to clear, strong, uninterrupted emergency communication (700/800 MHz E-Comm) signals.

If you were to look on top of the Skytrain Moody Center station, you'd see a small, but critical diamond-shaped antenna mounted on a pole mast, orientated, line of sight, to the base station on Burnaby Mountain.

Cartel designed emergency communication signals to be caught with this off-air antenna (which is protected by a surge protector) and moved through the roof into the station.

Inside the station, the headend for the operational (400 MHz) and the emergency communication (700/800 MHz) systems is placed in Seismic Certified rack. Even in the worst weather conditions, the critical public safety system will continue to broadcast above ground and below.

Underground

Working underground adds a new layer of complexity to a project. Trades often work in three shifts to complete a construction effort as ambitious as the extension.

Something as routine as carrying a ladder back to the work truck at the end of a shift might mean carrying it uphill and backwards, at night, in the wind and cold, and alongside 600 Volt DC electrified tracks. These were the kinds of conditions that made it essential that Cartel's technology, and the technicians who installed and tested it, were best of class.

Below grade, the system works through a triple-band (400/700/800 MHz) RF distribution network designed to broadcast the public safety band and the operational SkyTrain radio signal through the tunnel.

To accomplish this, two fibre BDA's are fixed in three locations, amplifying the 2 kinds of signals throughout the tunnel.

The very nature of the Skytrain system also made the distribution of radio and cellular signals challenging. Beyond the sheer mass of earth above the tracks (at times the tunnel is 55 meters or 180 feet deep), the materials that make up the Skytrain cars, and the tunnel they run through (concrete, metal, and insulation), contribute to the attenuation of the signal.

To offset these conditions, Cartel engineered the radiating cable to run along the partition wall adjacent to the upper half of the train window. This simple, elegant solution allows the signal to be broadcast easily, right at the riders' height, through the clear glass windows of the moving cars.

At Grade

Before buildings are built, designs for radio frequency are based on a best guess. After the stations were built, EGRT Construction discovered that the emergency communications for two stations needed enhancement.

To do this enhancement, they likewise turned to Cartel. To make sure the strongest signals possible passed through the Skytrain tunnels, Cartel procured and installed additional 700/800 MHz equipment to support the public safety communications systems underground, at Inlet Station, and, at grade, at Moody Station.

The Cartel Way

Cartel taped into the stream of radio frequency, catching it from the top of the mountain, bringing it down through the ground, and keeping flowing through the tunnel to the above grade stations. From early sketches of the tunnel to a final enhancement of the Public Safety system inside Moody and Inlet Stations, we had the experience and products to get the emergency communication signals for Skytrain's Millennium Line where they don't go naturally.

If your project requires a Public Safety Network, or if you need communications enhancement, above or below ground, please give us a call. Cartel will find a solution to fit your requirements.

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