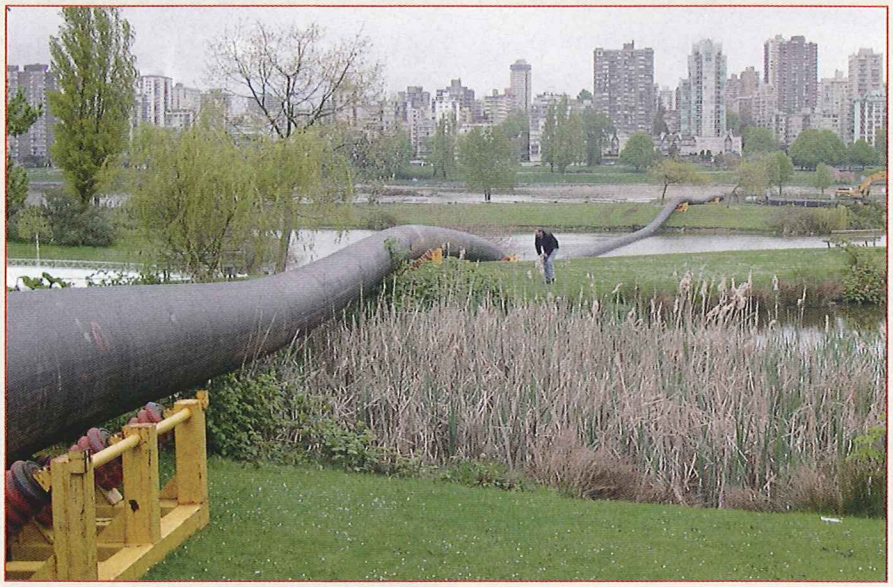
Vancouver Sewer Drill Riddled With Complications

by Tonia Jurbin ■ Contributing Editor

A nail biter down to the end, the Greater Vancouver Regional District (GVRD) recently finished most of Phase I of a three phase project to move all the sewage from downtown Vancouver into an existing large interceptor near the crossing.

However, this article isn't about perfect tender documents and a project where everything is running on time and on budget. Originally, the project was supposed to start in October 2006 and end three weeks before the opening of Vancouver's 30th International Children's Festival on May 14. But just two months from the drop dead finish date, the GVRD was considering pulling the plug and postponing the job.

By opening day, the pipe string was cut into pieces and stored well away from the festivities. The infamous Murphy's Law scenario seemed to be in play throughout the project. With multiple broken drill rods, cones wearing off, a drill string that actually became undone in the bottom of the hole, record snow and rain in November, record winds in December, record rains again in March, this project has had more than it's share of bad luck.



The original Jervis Forcemain constructed in 1936 is a single 1,300-foot-long, 48-inch crossing under False Creek. Originally constructed as a water main, it was converted to a sewage force main in 1971 when the Jervis pump station was commissioned. This is the last single crossing in the GVRD system so it poses maintenance and operational challenges because it cannot be taken out of service for inspections or maintenance. As a result, the condition of the steel and concrete composite pipe is unknown, and in the event of a failure there is no means of diverting the flow to prevent a spill into English Bay or Burrard Inlet.

Slim information

A request for proposals for a new 40-inch HDPE sewer with a drilled length of 1,380 feet was issued in September 2006 as not much more than a base document with construction standards, a geotechnical report based on a 6-inch water and 10 land-based boreholes, and a recommended drill path. With a crossing that had entry and exit pits located in very popular parks, the entry pit at Sunset Beach to the east and the exit pit at Vanier Park to the west, there were many constraints. Other challenges included a cobbley upper layer and archeological concerns.

Two proposals came in at $4.6 million and $5.25 million (Canadian). The GVRD went with the low bid. Paul Wilting, senior engineer with the GVRD elaborates on the RFP: "We had also instructed the contractor to come up with a method for dealing with the loose cobbles on both sides of the crossing that we knew were there because this was an issue when the nearby fire protection crossing was installed in 2002. The First Nations archeological concerns also had to be addressed, so we shifted the drill path and moved the exit pit into a random fill area. Our project deadline was critical because of the set up time needed for Children's Festival organizers."

The channel close to this crossing is navigable with a nearby Coast Guard base,

a public boat launch and parks so the contractor was required to maintain existing pedestrian, bike and roller blade paths and that detours must not introduce trip hazards.

Jack Maloney president of Directional Mining & Drilling Ltd. out of Langley, BC, explains that "we had a lot of difficulty with dewatering and supporting the excavations. We were unable to place sheet piles at the exit pit because of the chunks of concrete and boulders. The other big issue was dewatering. We had three 6-inch pumps going that would suck the water down but the water pressure from the nearby inlet about 300-feet away would push the sands back up into the excavation."

Wet weather

Flooding during one of Vancouver's wettest winters, with record snow and rains exceeded many times from November to March, caused a lot of grief for the contractor and, in fact, for every utility in the province. Maloney continues, "Finally, we placed some shoring cages, pumped them out as best we could, pumped 20 MPa concrete into pit and drilled through it while it was still green. We also pushed in a 60-inch casing to receive the drill string. We didn't anticipate hauling so much but the record rains contributed to the hauling cost and we couldn't wait for the weather because of the schedule. Also, being that we were in a park, we didn't have much lay down area so our pricing for removal of 7 to 8 percent will probably be about 15 percent. We spent an extra $40 to $45 thousand on the dewatering and extra hauling, but we probably won't claim that."

Other less pressing challenges were the small lay down area, and the allowable hours of operation: 6 a.m. to 10 p.m. was finally agreed upon, but Maloney recalls that he had to work out three different prices for different allowable hours. To try and keep the noise from the mud pump, generator and exhaust systems low, they were "housed" in make-do lock block shacks covered in tarps with bails of hay placed on top.

The entry angle was set steeply at 19 degrees to get into the bedrock at about 43 feet in depth before hitting the park seawall. The exit angle was only about 15 degrees with the path itself being about 65-feet below the mudline. Jack explains, "For the most part, the drilling was good with the occasional coal seam taking the drill off course – at one point we were off line horizontally by almost 13 feet but we were able to correct this throughout the rest of the length. We've had two really big issues at this site which also happen to be the two issues in informal dispute, the excavation and the dewatering. We've worked through similar issues before with the GVRD so I'm hopeful we'll be able to work things out again."

Wilting agrees with most of Maloney's assessment. "DMD is very well versed in drilling. However, I think the work would have gone smoother had they retained an experienced civil contractor to install the conductor casing pipes at the entry and exit pits because this has eaten a huge proportion of the project time.

"In retrospect it may have been better to tender this project as a contract because there appears to be some disagreement on the limits of the contract. We finally had to suspend the project to accommodate the Children's Festival and they will still require easy access for several days after closing to remove everything. There will be about a one week window before the local Shakespeare Festival starts in the same location – so stay tuned. We may get that pipe in this summer, or we may have to wait until the fall," Wilting observed. ■