The Power of Trenchless Technology

BY TONIA JURBIN

Imagine a city growing so fast that 28 new residents arrive daily. This is the reality facing the City of Surrey, British Columbia. Measuring over 300 km2 with a population of more than 600,000, it is the fastest-growing municipality in the province. So fast in fact that Surrey is on track to outpace Vancouver by 2040. With growing population comes the need for growing and upgrading the existing infrastructure.

Enter "Guilford the Greatest," an ambitious development that's creating a great opportunity to upgrade and grow the capacity of Surrey's aging sewer system. This 20-unit townhome development is just one of the many new developments in the area that will need to be serviced by upgraded and new municipal infrastructure. In this case the challenge is to figure out where and how the new sanitary capacity should be built?

Initially, the developer pitched a new 350mm sewer main in a new alignment in the road along 148th Street. A main arterial, 148th Street, is already congested with underground services. Fearing months of traffic disruption to both residents and businesses, the city didn't want to dig up the road and suggested their consultant to look at alternatives.

PW Trenchless Construction offered an innovative proposal to double the capacity of the existing pipe without digging up the road using pipe bursting technology. Picture a large high-tech bursting head burrowing through the old 200mm asbestos cement pipe, simultaneously splitting it and pulling a new 400mm HDPE pipe into place along the same alignment. All this happening 3 metres below the bustling street above, with only a few strategic excavations needed.

CHALLENGES: UNDERGROUND AND OVERHEAD

The prime contractor sole-sourced PW Trenchless to pipe burst the existing 200mm (8") asbestos cement pipe and replace it with a 400mm (16") HDPE pipe over a length of about 130m (425') with minimal excavation.

Before the work could begin a sewer bypass was installed using 2 — 150mm (6") hoses under pressure to contain the contents of the existing 200mm (8") pipe. The second hose was used as a standby bypass in case something went wrong. PW Trenchless also had to bypass one 200mm (8") gravity sewer that intersected the existing main, which happened to be located along an easement that was not abandoned but had been forgotten about because it was hidden under vegetation on private property. The crews found the service connection and redirected the contents from the unexpected 200mm (8") gravity sewer to the upstream end of the pipe bursting project so that the contents of the pipe was treated with the rest of the contents of the existing AC sewer.

Even though all the work trucks have an M-Scope utility locating device, it was still necessary to retain a subsurface utility engineering (SUE) contractor because of the large number of services and the fact that the M-Scopes that are used cannot pick up the fiber optic cables.

There were three manholes along the existing alignment and several light standards, the sidewalks, a major driveway to a park, and hydro poles that had to be managed. Even though the project was a trenchless pipe bursting project, excavations are necessary at the entry and exit pits; these are usually located at existing manholes. The existing pipe was buried over 3m (10.5') deep, so the excavations of the entry and exit pit were about 14m (45') long. A third excavation was necessary to access the centre manhole. This centre manhole was initially going to be replaced; however, the contractor was able to jackhammer 2 - 1050mm (40") holes into the sides of the existing middle manhole to accommodate the new HDPE pipe. The excavation for the middle manhole was about 2 metres (6') long and just over 3 metres (10') deep.

Additionally, because the pipe size was being doubled, some heaving was expected, and a few of the lamp standard foundations had to be adjusted after the pipe bursting work was complete.

Another challenge along the alignment was the height of the communications conductors that were under-built on the B.C. hydro poles. The wires were only about 5.5 meters (18') at the project's north end. Threading the layout through all the obstacles, both below and above the ground, required careful placement and staging of the excavators supporting the HDPE pipe during the actual pipe pulling stage of the work.

THE RESULTS

For this project, the developer considered both open-cut and trenchless methods. In the end, the trenchless method proved not only less disruptive but also more cost-effective than traditional open-cut techniques. More importantly, the prime contractor liked handing it over to PW Trenchless, knowing there would be less restoration necessary with the sidewalks, hydro poles, and light standards.

The developer was also attracted to PW Trenchless because of their excellent relationship with the City of Surrey which led to smoother sailing through the inevitable hurdles of urban construction. There was also a high confidence that PW Trenchless would capably manage the sewer bypass, traffic control and all other construction-related issues — which they did. Offering a predictable lump sum to carry out and manage the work was the cherry on top.

As Surrey continues its impressive growth, the tale of "Guilford the Greatest" stands as a testament to the power of trenchless technology in solving the growing and the aging pains of a booming city. **CB**

Tonia Jurbin, P. Eng. (retired) is a geotechnical engineer and freelance writer in Greater Vancouver www.toniajurbin.com