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CASE STUDY:

SUCCESS IN DIFFICULT SOIL CONDITIONS WITH FLOW-CRETE™

Microtunneling at the Edmonton Big Lake Sanitary Sewer Project

Changing the world one pipe at a time.

- **City saves by choosing microtunneling for large gravity sewage pipe installation**
- **Soft soil conditions and a high water table make Flow-Crete™ a safe, cost-effective solution**
- **Project chosen as the NW NASTT Project of the Year 2014**

CHALLENGE

The Edmonton Big Lake (W14) Sanitary Trunk Sewer is one of 14 large-diameter trunk sewers designed to provide sanitary service to Edmonton's Big Lake neighborhood and the future Winterburn industrial park. It comprises almost 1.5 miles of 48" gravity sewer.

This project was designed to be installed using a traditional direct-bury installation method. This posed a challenge as the subsurface conditions within the pipe zone varied considerably, and included extremely soft water-bearing peat, fill, saturated silt and sand. To address this variability, the original design called for special bedding and embedment to ensure adequate support for the pipes and prevent structural failure. In addition to the poor soil conditions, the entire area has a high groundwater table, so there was a need for initial dewatering and imported backfill to counteract the upward force of displaced water.

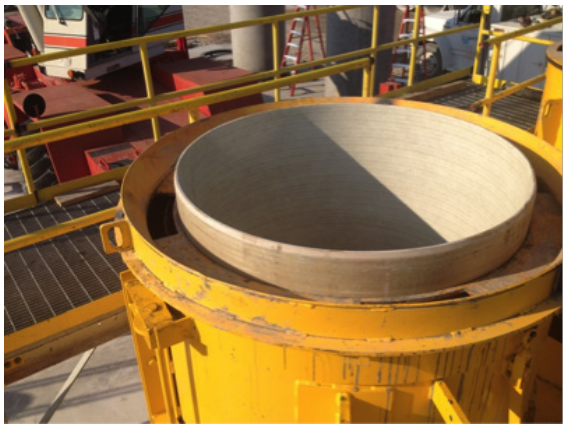
The corrosion potential was high due to extended sewage retention times within the force main feeder and the possibility of sulfide generation in the proposed pipeline. For this reason, the design team selected two pipe materials with corrosion-resistance characteristics: HDPE lined concrete pipe and PVC pipe.

During the bidding process, Michels Canada proposed an alternative microtunneling installation solution using two materials which were not included in the original design: FRP jacking pipe and steel jacking pipe with an FRP carrier pipe inside. These two materials were approved for use by the City of Edmonton.

SOLUTION

The Michels trenchless proposal was selected as being the most cost-effective over the original direct-bury installation methods. Michels used the FRP jacking pipe for the first three microtunneling sections, and then steel casing pipe with the FRP carrier pipe for the next two runs. However, after further evaluation of the soils for the next microtunneling sections, Michels proposed a switch from regular FRP to Flow-Crete™ pipe, a concrete pipe with an FRP liner. This change in material was prompted by the poor soil conditions in which the next tunnel sections were to be installed. These conditions caused concerns about steering the microtunneling equipment through the soft soil. This would be a challenge with a flexible FRP jacking pipe. The use of a rigid jacking pipe, such as Flow-Crete™, would deliver a better solution.

In addition, Flow-Crete™ is resistant to the corrosive environment of a sanitary sewer, and it offers greater strength and more rigidity than FRP jacking pipe. The FRP liner and concrete pipe are integrally cast and thus address both corrosion and strength concerns. Flow-Crete™ has been used with great success in Europe and the Middle East, and is now produced in the U.S. by Thompson Pipe Group.



FLOW-CRETE™ COMBINES THE STRENGTH OF CONCRETE AND THE CORROSION-RESISTANCE OF FRP IN AN INTEGRAL PIPE MATERIAL THAT CAN BE USED SUCCESSFULLY FOR MICROTUNNELING PROJECTS.

For the remaining pipe sections, Flow-Crete™ pipe was installed using Akkerman SL52 MTBM equipment which was skinned up to 60" to match the outside diameter of the Flow-Crete™ pipe.

OUTCOME

Among the lessons learned, it was confirmed that microtunneling with a rigid jacking pipe such as Flow-Crete™ offered the necessary characteristics needed to install a large-diameter sanitary trunk sewer in difficult ground conditions (blow counts 2 to 10) on line and grade. This trenchless approach provided a cost-effective solution to the challenging soil conditions. For the contractor, the switch to Flow-Crete™ meant that pipes could be installed successfully using a trenchless technology method. This made the entire project more cost-efficient. In addition, the Flow-Crete™ pipe and joint system provided the owner with a corrosion-resistant pipe material with a watertight joint system that resists the high groundwater conditions that were a factor on this project. So by using an experienced microtunneling contractor and Flow-Crete™, the City of Edmonton was able to address these challenges in a cost-effective manner.

In 2014, the Edmonton Big Lake (W14) Project was recognized by the Northwest Chapter of NASTT's Trenchless Journal as Project of the Year.

FLOW-CRETE™ IS A COST-EFFECTIVE SOLUTION FOR TRENCHLESS INSTALLATIONS, AND WILL PROVIDE THE CORROSION-RESISTANCE AND STRENGTH TO BE INSTALLED FOR SANITARY SEWER AND POTABLE WATER APPLICATIONS.

FLOW-CRETE™ CAN BE PROVIDED IN PIPE DIMENSIONS UP TO 36" AND LENGTHS UP TO 144".