

CASE STUDY

MICROTUNNELING | SLURRY MICROTUNNELING



Project Name:
Superior Stones Canal CSO Improvement Project

Prime/Sub Contractors:
Super Excavators, Inc.(SEI)

Location:
Cleveland, OH

Owner:
Northeast Ohio Regional Sewer District (NEORS)

Ground Conditions:
Glacial lacustrine and glacial till deposits, sandy silts, stiff to hard clays

Akkerman Equipment:
SL60C MTBM, AZ100 TGS

Pipe:
48-in RCP

Total Length/Longest:
765-ft

PROJECT OVERVIEW

The project involves the construction of two force mains and a gravity sewer, a new wet weather pump station and upgrade to an existing pump station to increase capacity and reduce an annual estimate of 13-million gallons of raw sewage discharge into the Cuyahoga River.

Of particular sensitivity within the project region is the eight-floor wedge-shaped Western Reserve Building, constructed in 1891 and listed on the U.S. National Register of Historic Places.

While the original project design called for a straight tunnel just under the Western Reserve Building and several large diameter water mains, Super Excavators saw an opportunity to reduce some long-term risk for the NEORS.

THE CHALLENGES

- Complex DTA: 1,500ft radius and curve with -5.5% grade
- Critical Structures: Western Reserve Building listed on U.S. National Register of Historic Places
- Logistical challenges
- Curved microtunneling
- Difficult ground conditions

THE SOLUTION

The original project called for a straight tunnel just under the Western Reserve Building and several large diameter water mains, Super Excavators Inc. (SEI) saw an opportunity to reduce some longterm risk for Northeast Ohio Regional Sewer District (NEORS) by using a curved alignment. This moved the alignment 34-ft away from the historic building. The revised tunnel design was broken down into a 60-ft straight to 336-ft. curve culminating with a 368-ft. straight section. The completed microtunneling would house two 12-in. force mains and an 18-in. gravity sewer

carrier.

The pipe for this project was manufactured with 6,000 psi concrete to tolerate 800-tons of jacking force. European in style, the pipe features a profiled gasket to ensure sealed joints for a successful curved tunnel that was able to house the two 12-in. force mains and 18-in. gravity sewer carrier pipes with specialty designed casing spacers.

The 43ft deep, 24ft diameter launch shaft was done along West Superior Avenue in downtown Cleveland withing a tight corridor of bus and automobile routes, surrounded by many buildings including several high rises.

SEI used an Akkerman SL60 MTBM system equipped with a mixed-face disc cutter head, increased to excavated 62-in. diameter. The MTBM and lube and jacking can were advanced with an 800-ton capacity jacking frame. All microtunnelling functions were remotely operated from the control container. To maintain line and grade tolerance, AZ100 TGS for tunneling navigation was used.

KS Associates, Inc. (KS) performed the initial survey for the AZ100 TGS setup and surveyed the tunnel alignment control point at the ground surface and transferred the information down to the launch shaft level. Periodically surveying the station units to ensure that everything was working accurately.

OUTCOME

Due to the competency of KS and effectiveness of the AZ100 TGS system, the tunnel was completed with minimal downtime for surveying and the pipe emerged in the launch shaft within an eighth of an inch on line at exact elevation.

The 48-in., 765-ft. microtunnel was successfully completed in just 14 days of mining while abiding by a 12-hour a day construction ordinance.

source: Akkerman News



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