

Pipe Jacking and Microtunneling: A Story of Rivers and Poor Ground Conditions Gus O'Leary, PE

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Springfield, MA



- Springfield Water and Sewer Commission (SWSC)
- Two collection systems Main Intercepting Sewer, and the Connecticut River Interceptor
- ACO driven IWP for CSO volume and frequency reductions
- Phase 2 deadline of December 2022





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The Project

- Phase 2 of SWSC's Integrated Wastewater Plan (IWP)
- Project executed under Ch149A (MGL) (Construction Manager at Risk alternative delivery method)



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Recommended Alternative



- 62 MGD pump station on the east side of the river
- River crossing using open cut cofferdam construction
 - Two 36-inch diameter force mains to convey CRI system flows,
 - And a 72-inch diameter siphon to provide redundancy for MIS system flows.

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The Site



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Pump Station



The Underground Utilities Event Underground Construction Technology | January 28-30, 2020 | Fort Worth, TX **River Crossing Refinement** CONNECTICUT RIVER WATER LEVEL EXISTING RIVER BOTTOM (TYP) 21 1.40 DEPTH VARIES, REFER TO TECHNICAL BASELINE REPORT STOCKPILE AND REPLACE EXCAVATED BENTHIC DOM: N BAND LAYER REP RAP 050 = 5" ARTICULATING CONCRETE REPER TO BLOCK REVETMET MAT IN SPECIFICATION 02211 GLADAL TEL ACCORDANCE WITH PRECAST **RECEICATION SECTION 1921** PPE BECOND IN CONCRETE ACCORDANCE WITH SEVETMENT MAT 42" HOPE PN SPECIFICATION SECTION 02211 CTYPE OF J APPROVED 72" POOP SPHON (COMM) SUBGRADE 7.0* P.11 NOTES 1. BLOPES SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY. TRENCH EXCAVATION AND INDE BLOPES ARE THE RESPONSIBILITY OF THE CONTRACTOR. IN NO EVENT MIALL EXCAVATION EXTEND BEYOND THE LIMITS SHOWIN ON THE PLANS. REVETMENT MAT EDGE DETAIL TYPICAL BOTH SIDES RIVERINE TRENCH DETAIL

Dredged Crossing:

- ✓ Geotechnical Conditions
- Regulatory and Environmental Considerations

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Influent Structure Expansion & Levee Crossing



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East Bank Crossing



- Short run ~150ft
- 3 bores 96", 2x 48"
- Active AMTRAK Rail
 - Must remain in service
- Army Corps Flood Damage Reduction System – Flood Wall



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Geotechnical Information



- Poor soil\groundwater conditions
 - Alluvial clay primarily
 - Some alluvial sands and silts, hydraulically connected to the Connecticut River at top and bottom of bore
 - Potential for glacial till outcroppings at bottom of bore

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Initial Approach - assumed Jack and Bore

- Jacking Pit east of FDRS\RR
- Access pit above MAHW in slope
- Ground improvements to handle
 water
- <u>Less expensive</u> than MTBM, <u>higher risk</u>
- Ended up issuing as "Trenchless Installation" – open to proposer method



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Proposal Feedback

- Riverside access pit is expensive and substantial – slopes and permit constraints.
- Eliminating the pit ("blind jack") difficult and expensive
- Ground improvements are expensive and risky – risks of over improvement, frac-out, missing a sand seam



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Alternate Proposal

- Proposer preferred MTBM approach:
 - Lower risk of ground loss, mitigates groundwater issues, eliminates ground improvements
- Proposed for roughly equivalent price
- Design team identified possibility to eliminate river side access pit by "daylighting" in river



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Status of Project

- Design-Bid => Construction Manager at Risk (CMAR)
- Two phase project:
 - GMP1 York Street Sewer Pump Station and Springfield Regional Wastewater Treatment Facility
 - Construction On-going through May 2021
 - GMP2 Connecticut River Sewer Force Mains and Interceptor Crossing
 - Currently in proposal phase received
 - Anticipated Award February 13, 2020
 - Construction anticipated to begin: May 2020
- Project to be fully completed by December 2021



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Questions?

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