
To: Ron J. Wiedeman, City Engineer (City of Crest Hill) Date: October 3, 2023

From: David Barnas / John Beissel

Subject: Project U.S. 30 (Plainfield Road) 10-Inch Watermain Lining Maintenance Project No. 22-R0541

During recent weeks of construction, the contractor [Sheridan Plumbing & Sewer] has encountered unexpected field conditions en masse due to undocumented vertical adjustments to the City's 10-inch watermain which appear to have occurred during prior infrastructure project(s). Our office has been working with the contractor to identify the extent of these changes and related anticipated costs.

During the process of cleaning and televising the 10-inch watermain, vertical offsets of 45° or 90° were discovered on either side of storm sewers installed under Plainfield Road. It appears these watermain adjustments were performed during an IDOT roadway widening project in the 1990s to accommodate placement of storm sewers that conflicted with the existing watermain. Lining watermain through a 90° bend is not possible, and lining watermain through 45° bends is not practical. Since the process does not allow for the liner inversion to be steered, twisting of the liner can result, leading to restricted water flow and/or additional future expense to repair. The bends encountered were not delineated on any record drawings or data available from IDOT or Crest Hill. Therefore, the bends could not be identified until the watermain was removed from service and the Contract work in progress.

During project design, typical resources were used to obtain readily available information:

- City records from watermain breaks/GIS did not note watermain lowered at storm sewer crossings.
- Field topography for existing infrastructure cannot identify underground watermain bends and tees.
- Our team obtained IDOT as-built drawings/record drawings to confirm existing infrastructure information; information on the record drawings was utilized as part of our design and bid package.

Subsurface utility exploration (SUE) equipment, had it been used at additional design expense, would similarly not have identified the vertical 45 and 90 degree bends encountered. Furthermore, even if the lowering of watermain was noted on City or IDOT records, the level of detail needed to predict the magnitude of these field changes may not have been available.

As a result of these findings uncovered through the watermain televising, significant scope changes with associated additional costs are needed to complete the watermain lining. We are working with City Staff and Sheridan to minimize these costs for additional access pits at the bends that need to be installed for proper lining. We are evaluating, on a case-by-case basis, if the existing watermain installed horizontally, between the lowest bends at each offset can be left in place or what additional accommodations need to be made.

The Contract, with original Bid Price of \$2,831,319.50, is now projected to have an approximate final contract amount of \$2,968,000.

The major cost elements related to the unexpected watermain vertical bends total approximately \$650,000:

- The original contract drawings estimated eleven (11) access pits to be installed for optimal length of lining segments. However, there are nine (9) additional pits still being investigated, which may total 22 additional pits.
 - As a result, we estimate that ten (10) additional lining set-ups, double the original contract quantity. Each lining run results in additional set up time, curing and testing.
 - An additional 13 access pits to complete the lining at an estimated \$25,767.85 each.
 - An additional 9 access pits that may be needed at an estimated cost of \$27,682.35 each.
 - There will be additional setup time by the lining installer for additional pipe runs, at estimated cost of \$34,635.40.
 - There will be additional cleaning costs at an estimated cost of \$15,910.64.
 - Additional CCTV work at an estimated cost of \$13,600.

- It is also noted that there is a reduced credit of \$148,993.38 from \$241,962.00 for value engineering work outlined in Change Order #1 for revised phasing and pit quantities/locations.
- Other additional costs for the project already accounted for in the Unit Price items, are approximately \$240,000:
 - Repairs to the 10-inch existing watermain on Greengold and Parkrose Streets one block north and one block south, respectively, from Plainfield Road. Fire hydrants on these streets were used to supply the Temporary Water Service Main. During the hydrant repairs, adjacent main was found to be corroded and was repaired. This main, appurtenances, and roadway was repaired at a cost of \$56,667.28.
 - Additional cost for open cut installation of deteriorated watermain and appurtenances at Sweetbriar Road was completed at a cost of \$97,133.15.
 - Additional 2-inch diameter temporary water service main was needed to provide water service to customers in areas where the City lacked enough detailed information. This resulted in an additional cost of \$83,790, per contract unit prices.

In Summary:

Contract Amount	\$2,831,319.50	
Adjustment to Unit Price Items	- \$362, 366.82	
Subtotal	\$2,468,982.68	
Estimated Cost Savings	- \$148,993.38	Per Summary from Sheridan Plumbing
Subtotal	\$2,319,989.30	Reflects efforts to reduce the overall cost to below the Contract amount
13 Additional Pits	+ \$334,982.05	Costs relating to “skip” watermain bends
9 Additional Pits	+ \$249,141.05	
Additional Lining Install Set-Up	+ \$34,635.40	
Additional Cleaning Costs	+ \$15,910.64	
Additional CCTV Work	+ \$13,610.00	
Total	\$2,967,818.54	

Despite the unforeseeable circumstances resulting from the vertical bends, watermain lining still appears to have provided the most economical and least invasive alternative to repairing this portion of the City’s watermain and extending its useful lifetime. Completing the required additional work under the current contract will allow the City to utilize competitively bid contract unit prices where possible. In the current construction environment, we believe this action will help the City avoid expected cost increases likely to result from deferring this work to a future budget year.