

Utilizing two trenchless rehabilitation technologies to reduce wet weather flows in the BEAR BROOK watershed.

Howard Carter – City of Saco, Maine
Matt Timberlake -Ted Berry Company, Inc.
Shawn Ready -Ted Berry Company, Inc.

2017 Annual Conference
Boston, Massachusetts
January 22-25, 2017



CITY OF SACO

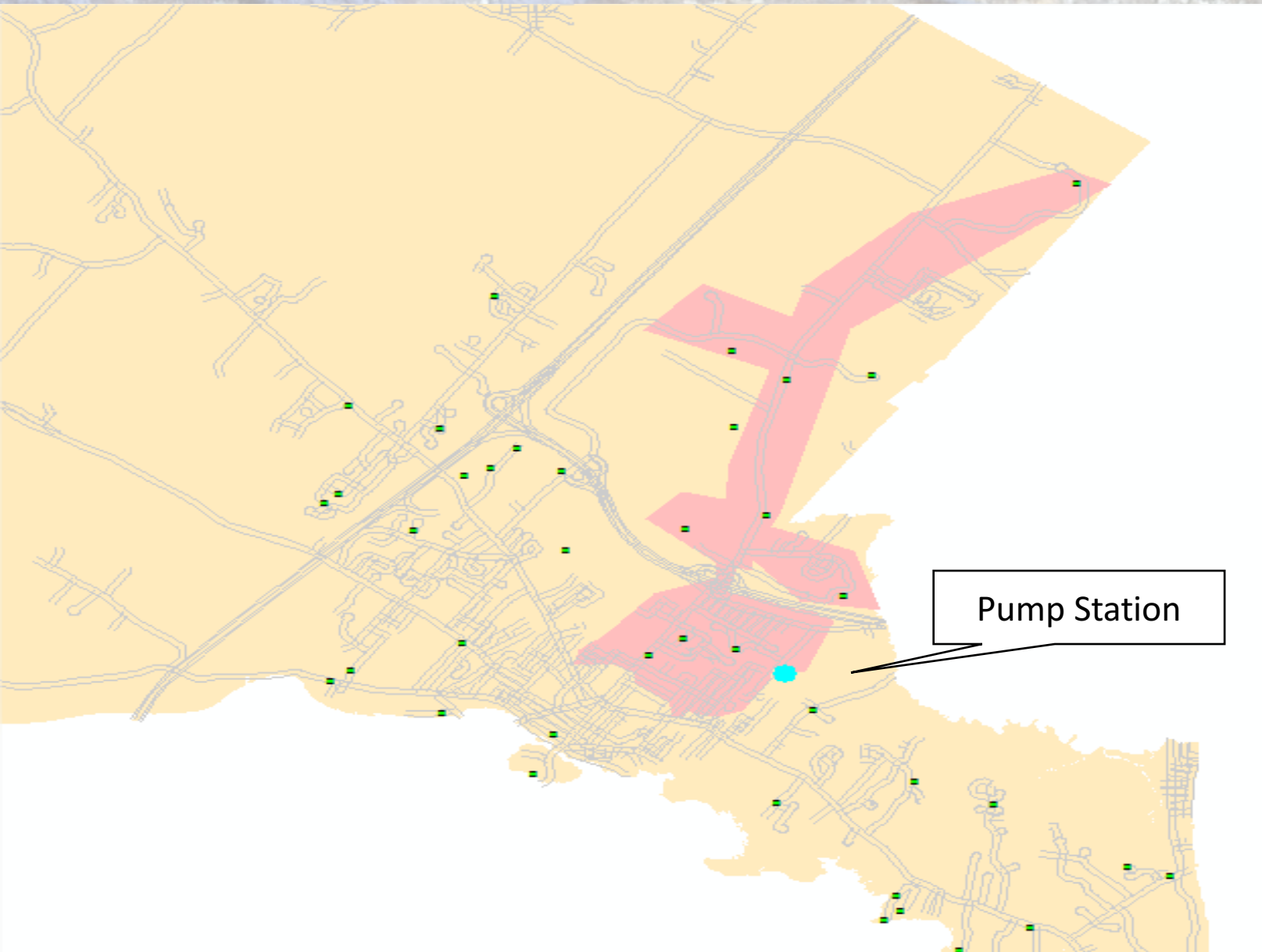


The City of Saco is located on Maine's southern coast, approximately 14 miles south of the City of Portland. Saco is an attractive destination for both residents and visitors due to Saco's beautiful beaches, the Saco River, and the historic downtown and shopping district.

WATER RESOURCE RECOVERY DEPARTMENT



- Total Customers: 4700
- Design Capacity: 4.2 MGD
- Peak Flows: 8.4 MGD
- Annual Budget: \$2.4 Million
- 31 Pump Stations
- 73 Miles of Gravity Line
- 21 Miles of Force Main



The Bear Brook Pump Station & Sewer Shed

- 106,850 LF of Sanitary Sewers
- Sizes from 8 to 14 inch
- Permitted CSO on-site



Micro Metering Two Tier Strategy

- The Bear Brook pump station had experienced severe I&I flows and sewer overflows have occurred in heavy rains. Part of the sewer shed parallels Bear Brook and it was assumed that most of the I&I was originating in that section of sewer.
- Instead of using the traditional smoke testing and CCTV in the 109,000 linear foot sewer shed, the City elected to deploy a two-tier mini-basin metering strategy. ADS Environment Services was selected to conduct the metering and I&I analysis.

Tier Two Results

- Tier 1 metering was conducted in five sub basins (average of ~ 14,000 lf of pipe).
- Two of five sub areas produced low I&I and were eliminated from further examination leaving 43,103 LF to study. Tier 2 metering involved relocating and installing additional meters to create 8 smaller micro-basins in the three worst Tier 1 basins at an average size of 5,388 LF.
- It was found that during a 2.13-inch storm, 88% of the I&I was generated in three of the micro-basins. The three basins contained 22,397 LF or 20% of the total system size.

Meter Installation





Rat's Eye View of a Meter Installation

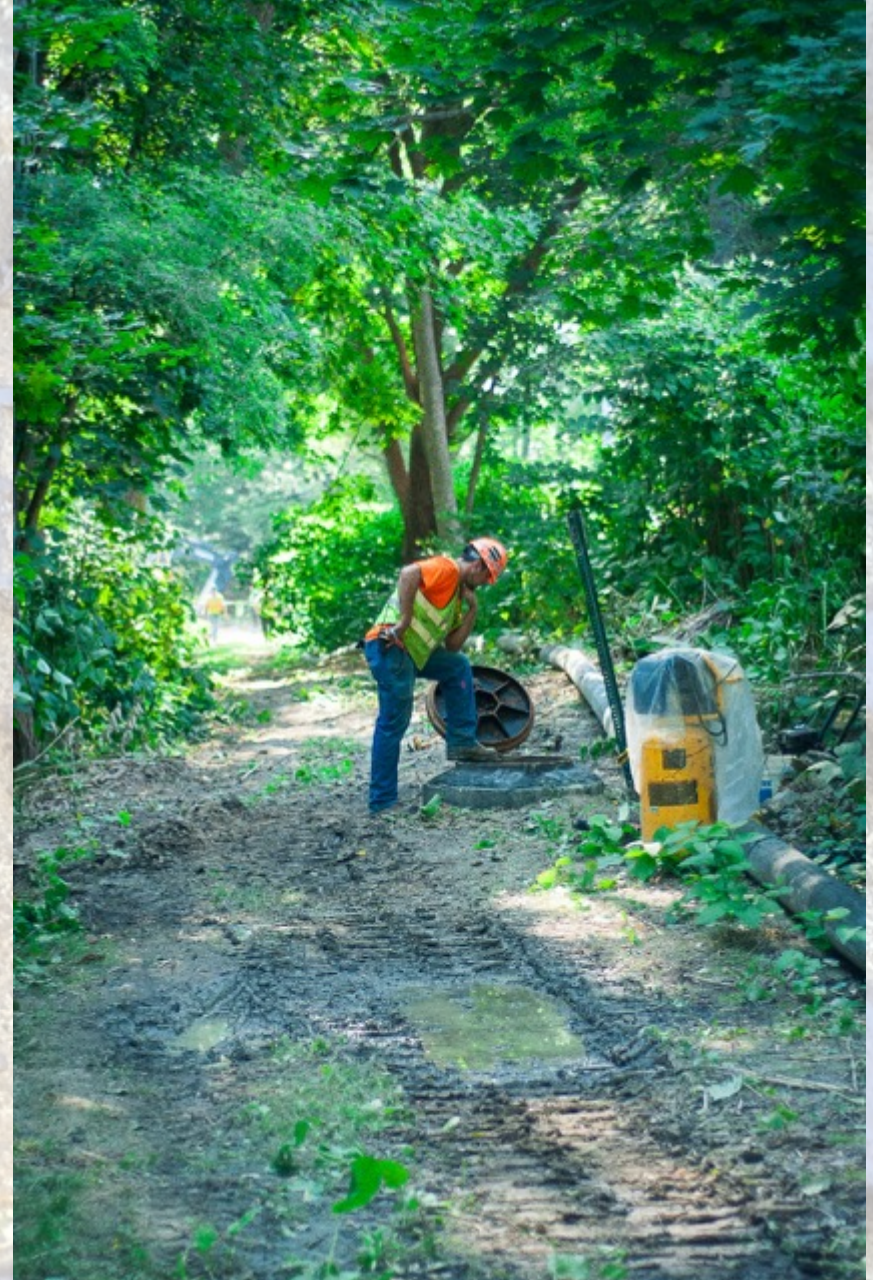


Project Planning – Bear Brook Project

- Collaboration between the Saco WRRD, the Saco DPW, and the Ted Berry Company
 - CCTV Assessment to confirm existing pipe materials/conditions
 - Site assessment
 - Replace/Rehabilitate approximately 1,760' of existing 12", 15" and 16" gravity sewer
 - Evaluation of trenchless alternatives
 - Hydraulic considerations
 - Site Access
 - Bypass pumping
 - In-house excavation capabilities
1. MH 1068.109 and 1068.108 (481')
 2. MH 1068.108 and 1068.107 (308')
 3. MH 1068.107 and 1183.114 (382')
 4. MH 1183.115 and 1388.107 (Estimated 50')
 5. MH 1388.107 and 1388.108 (39')
 6. MH 1388.108 and 1388.110 (Estimated 120')
 7. MH 1388.110 and 1203.108 (Estimated 190')
 8. MH 1183.114 and 1183.106 (Estimated 133')
 9. MH 1203.108 and 1203.101 (57')

Project site challenges

- Remote project site and easements
- Limited access
- Crossings under brook
- Heavy groundwater infiltration
- MH's and access across private property and close proximity to homes



CCTV Inspection and cleaning

- Pipe inspected to confirm condition and geometry
- Pre-cleaning performed prior to lining



Recommended Rehabilitation

- Pipe Bursting
 - 1,570 feet of 16-inch IPS DR 17 HDPE pipe bursting
 - Burst lengths ranged from 39 feet to over 450 feet
 - Insertion and Burst pits located at existing brick manholes
- CIPP
 - 190 feet of UV CIPP

By-pass



- Remote bypass
- (2) 6" self priming trash pumps
- HDPE fused discharge main
- Isolation daily using pneumatic pipe plugs and overseen by dedicated technician

HDPE pipe handling



- Use McElroy “Polyhorse” fusion racks – increase efficiency of operator and reduce handling costs
- 16-inch IPS DR 17 HDPE
- Pull into woods and easement using winches, pulleys, and Yankee ingenuity



Pipe bursting

- Selected static pipe bursting system
- Replace existing 12", 15" and 16" pipe with new 16" HDPE
- Ted Berry owned HB100 ton rod system (Hammerhead)
- Upsize existing mains (combined into (5) bursts)
 1. MH 1068.109 and 1068.108 (481') 16"
 2. MH 1068.108 and 1068.107 (308') 16"
 3. MH 1068.107 and 1183.114 (382') 16"
 4. MH 1183.115 and 1388.107 (Estimated 50') 12"
 5. MH 1388.107 and 1388.108 (39') 12"
 6. MH 1388.108 and 1388.110 (Estimated 120') 12"
 7. MH 1388.110 and 1203.108 (Estimated 190') 15"

UV CIPP



- Use pull in place method for (2) runs (ASTM F2019)
 1. MH 1183.114 and 1183.106 (Estimated 133') 16" pipe
 2. MH 1203.108 and 1203.101 (57') 16" pipe
- CIPP material design (ASTM F1216 design appendix)
 - Multiple spiral wound layers of composite
 - Woven pulling bands
 - Inner film (Styrene barrier)
 - Outer film (preliner) (Styrene barrier)
 - Manufactured in USA by Reline America
- CCTV prior to curing / Real time telemetry during cure

UV CIPP



Calibration of UV cure "train"

Conclusion:



“ The project provides an excellent example of both interdepartmental cooperation by the Water Resource Recovery Department and the Public Works Department, coupled with Ted Berry’s expertise in trenchless technologies to save the community scarce rehabilitation monies.

The City of Saco could not be happier with the outcome of the project.”

Howard Carter- Director Saco WRRD
City of Saco, Maine

Questions

Howard Carter

City of Saco, Maine

Water Resource Recovery
Department, Director

(207) 282-3564

hcarter@sacomaine.org

Matt Timberlake

Ted Berry Company Inc.

Office (207) 897-3348

Cell (207) 754-4282

www.tedberrycompany.com