NEWEA 2023 Annual Conference

Cohas Brook Sewer Project – Phase III
Lessons Learned from a 13-year, $40 million Sewer Expansion Program in Manchester, NH

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January 25, 2023

CITY OF MANCHESTER
ENVIRONMENTAL PROTECTION DIVISION
DEPARTMENT OF PUBLIC WORKS

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WORKING FOR WATER QUALITY

Agenda

- EPD Organization
- Manchester's Wastewater System
- Cohas Brook Sewer Master Plan
- Phase I
- Phase II
- Phase III
  - Contract 1
  - Contract 2
  - Contract 3
  - Contract 4
- Lessons Learned
- Questions

City of Manchester Facts and Figures

- Settled in 1725
- Evolved from agricultural to industrial 1725 to 1810
- Amoskeag Mills – Largest single mill in the world 1915
- Post industrial depression 1930 to 1980's

EPD's Organization Structure

- Created in 1975 – City's wastewater utility
- Division of Manchester's Department of Public Works
- An "enterprise"
- Staff of 44
- 15-acre campus – 10 Buildings
  - Administration
  - Operations
  - Maintenance

Manchester Wastewater Infrastructure

- 1975: 26 mgd
- 1994: upgrade to 34 mgd
- 2016: upgrade to 42 mgd
- Serves four communities
  - Bedford (4.4%)
  - Goffstown (4.2%)
  - Londonderry (10.2%)
  - Manchester (81.4%)
- Metro population 172,000
- Investing $75 million over 15 years

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Manchester's Wastewater Infrastructure – Pipelines

- 385 miles of sewer
  - 50% "combined" system
  - 11,000 SMHs
  - 15 CSO outfalls
- 100 miles of pipe, 100 years old or older

Manchester's Stormwater Infrastructure – Pipelines

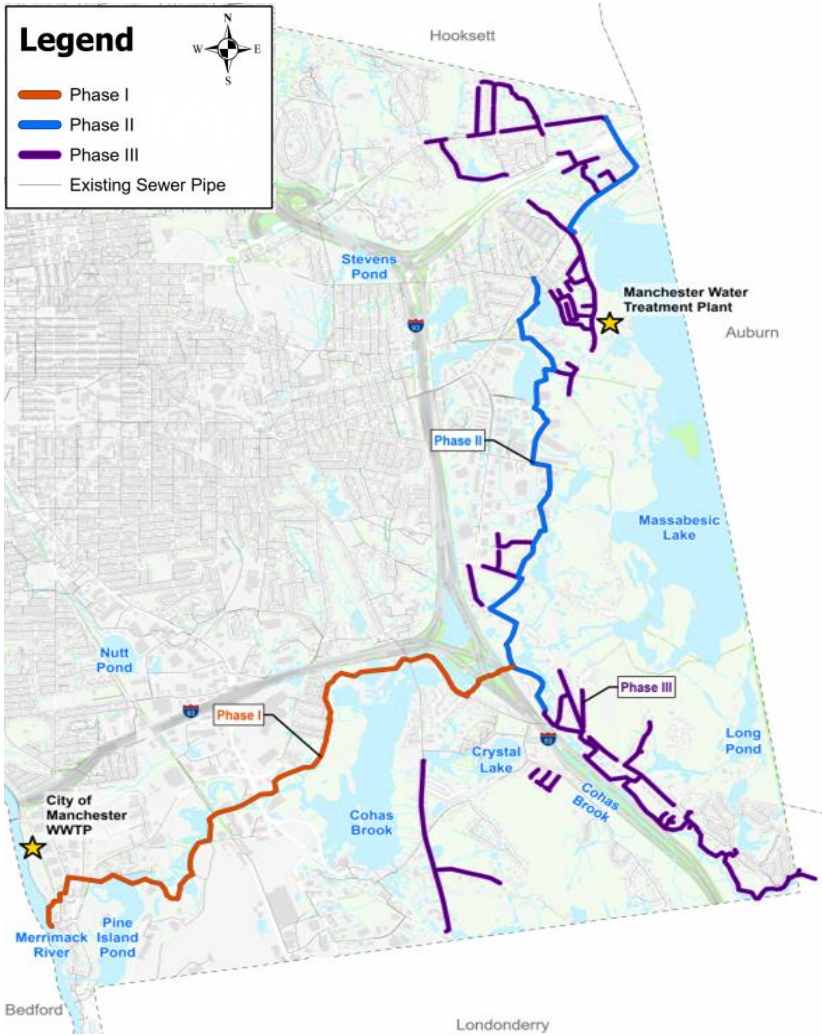
- 180 miles of drains
  - 14,000 CBs
  - 3,000 DMHs
- Six Urban Ponds

Manchester's Wastewater Infrastructure
Pump Stations

- 11 pump stations
- Constructed from 1973 to 2014
- 68 GPM to 25 MGD
- $6.0M Upgrade from 2011 to 2014

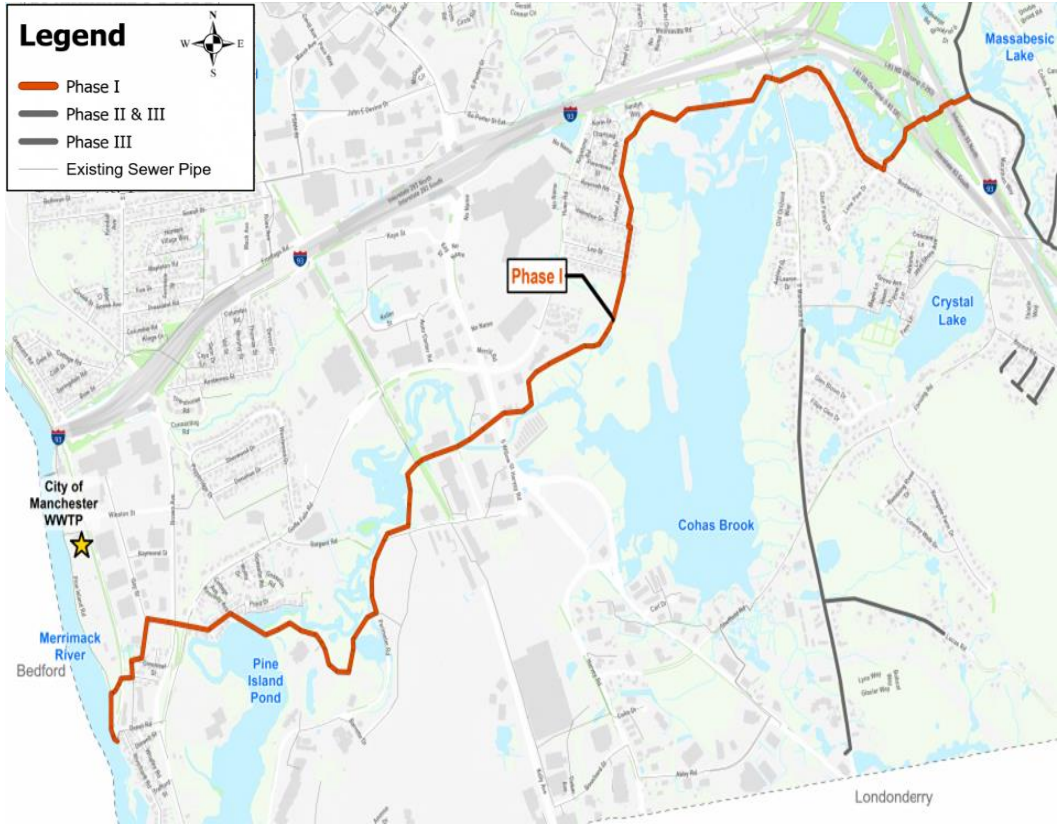
Cohas Brook Sewer Master Plan: Overview

- Cohas Brook "Interceptor Feasibility Plan" (1996)
  - Phase I & II
  - Three (3) Contracts per Phase
- Cohas Brook Master Plan (2010)
  - Phase III
  - Four (4) Contracts



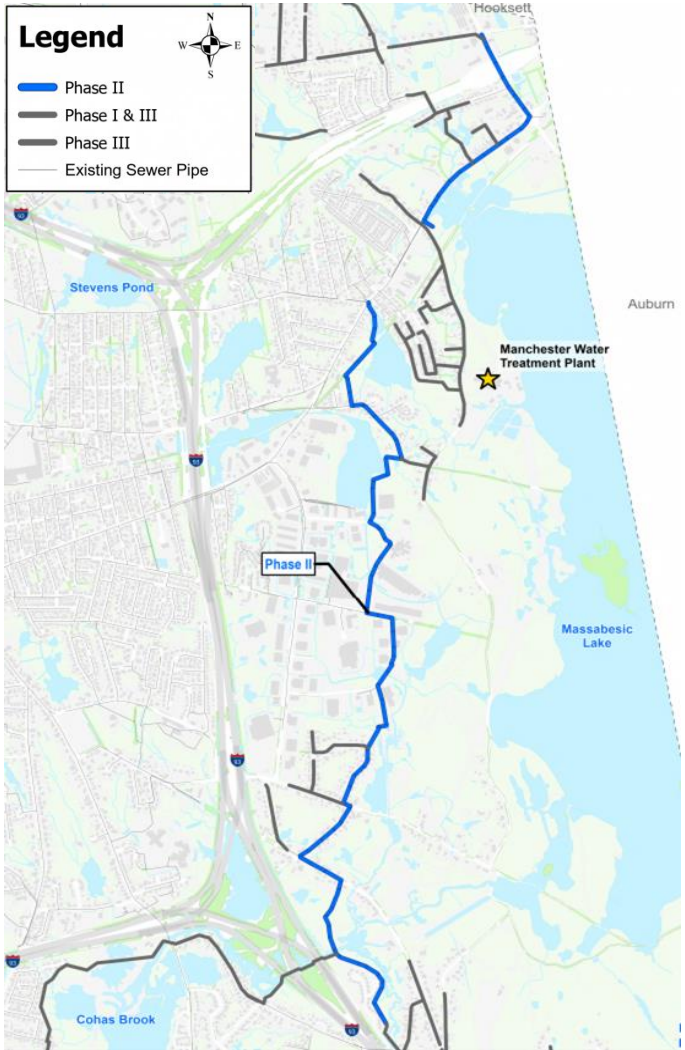
Phase I

- Location
  - WWTP to I-93
- Project Duration
  - 1998 to 2006
- Total Length
  - 21,000 LF
- Total Cost
  - $19.0M
- Unique aspects
  - Microtunneling under Pine Island Pond
  - Three (3) siphons under Cohas Brook
  - Used existing box culvert under 293/93 split



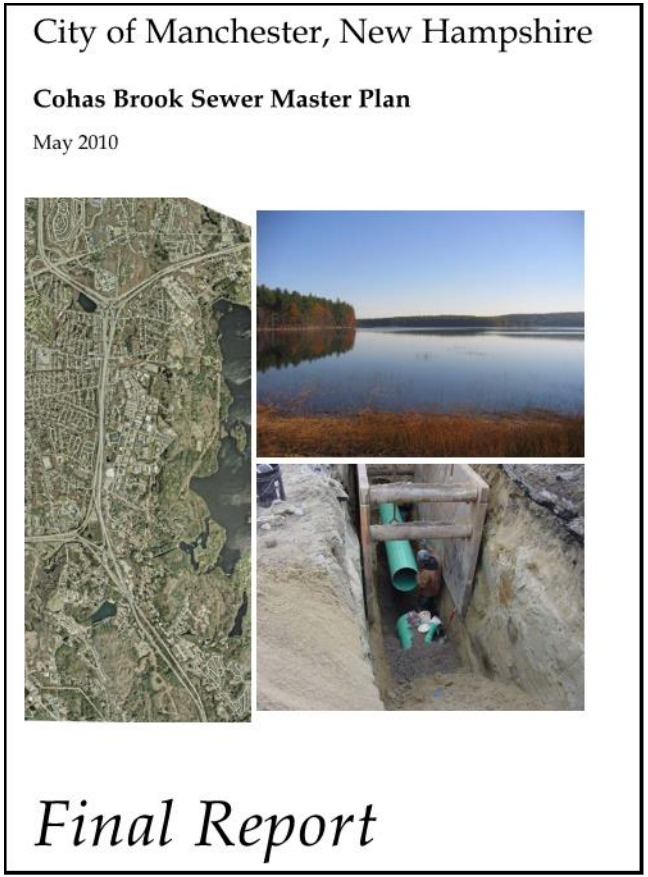
Phase II

- Location
  - I-93 to Wellington Rd. (State Route 101)
- Project Duration
  - 2007 to 2011
- Total length
  - 25,200 LF
- Total Cost
  - $12.0M
- Unique Aspects
  - Rt. 28 Bypass under Rt. 101, rolling roadblocks on Rt. 101 for Blasting
  - Deep sewer 30-35'
  - Sewer along and across abandoned railroad bed
  - Candia Rd. Pump Station



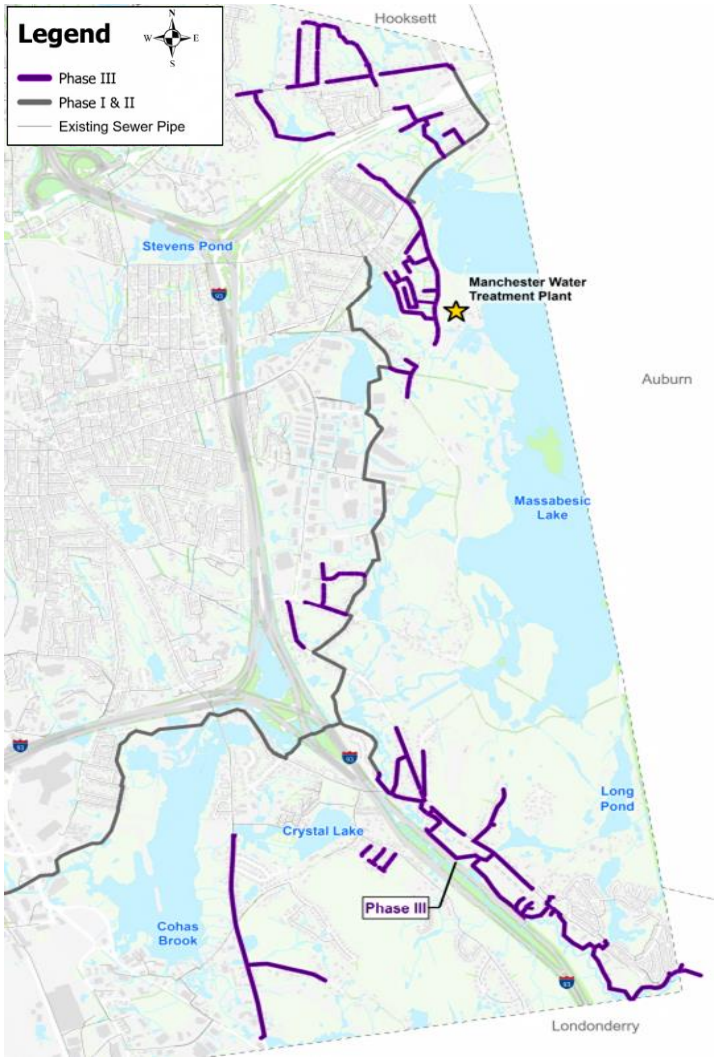
Sewer Master Plan

- Completed in 2010 by CDM Smith
- Goals
- Sewer alternatives
- Phase III
  - 12 watershed areas → **Four (4) Contracts**



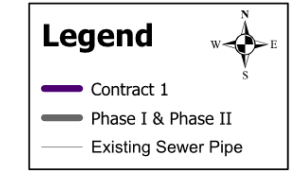
Phase III

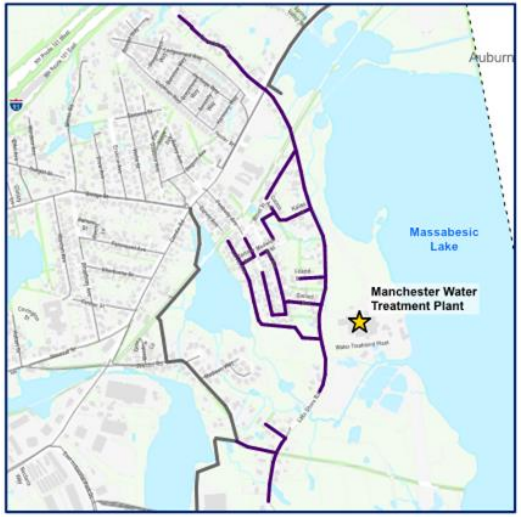
- Project Duration
  - 2010 to 2023
- Total Length
  - 78,800 LF
- Total Cost
  - $40.0M
- New Customers
  - Contract No. 1 – 200
  - Contract No. 2 – 180
  - Contract No. 3 – 200
  - Contract No. 4 – 1,000



Contract No. 1 – Overview

- Total Length – 20,500 LF
- Total cost – $7.0M
- 2010 to 2011
- Engineer –
  - CDM Smith
- Contractor –
  - Albanese Brothers
- 200 new customers
- Unique Aspects
  - Narrow streets and ledge
  - Proximity to a major drinking water source
  - Water main replacements





Contract No. 1 - Lake Massabesic

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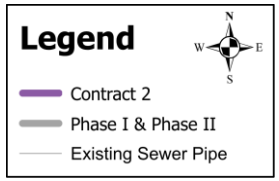
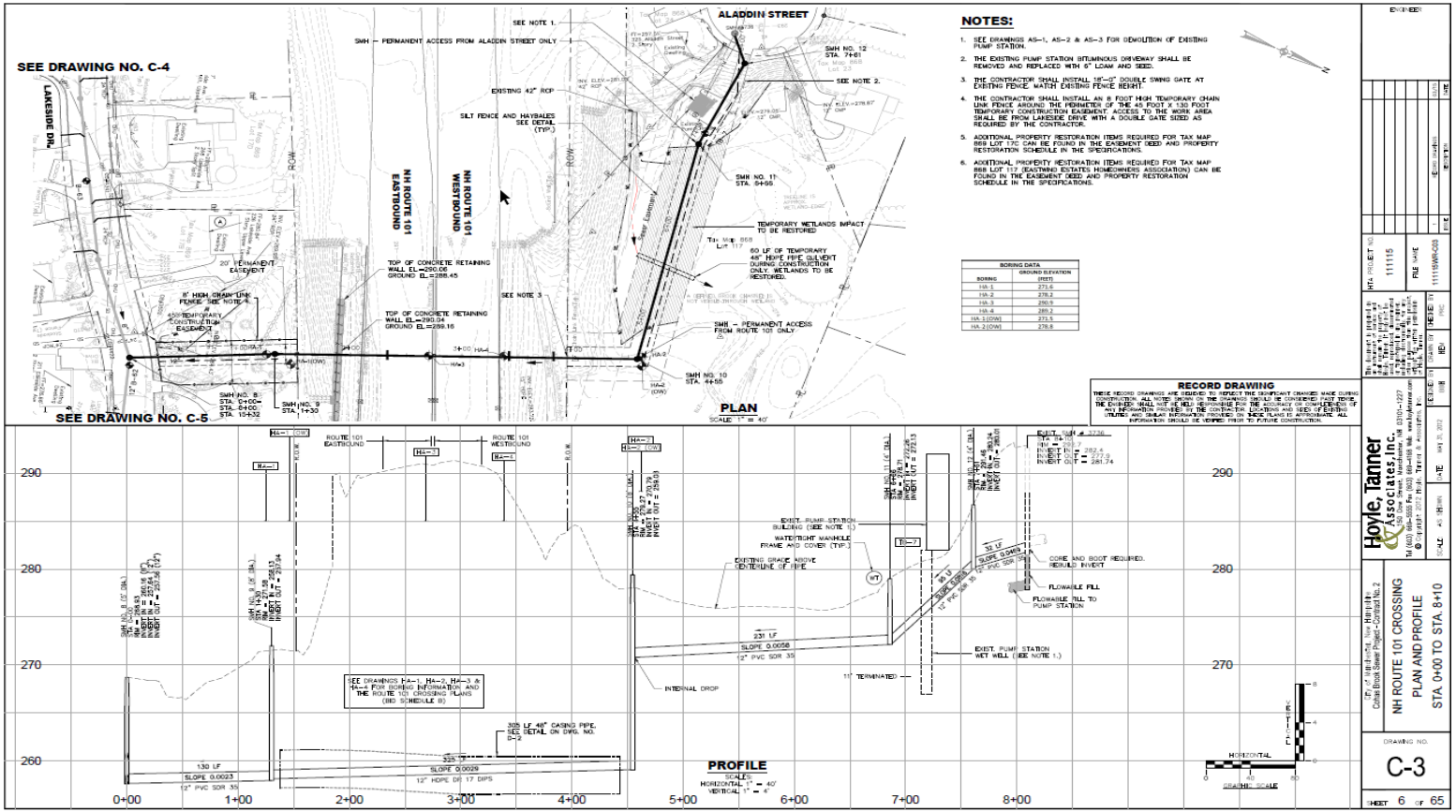
Contract No. 2 – Overview

- Total Length – 19,000 LF
- Total cost – $9.0M
- 2012 to 2014
- Engineer
  - Hoyle, Tanner & Associates
- Contractor
  - Park Construction
- 180 new customers
- Unique Aspects
  - Rt. 101 Crossing - Auger Bore with Rock Head
  - Precast Bridge and Box Culvert for stream crossings
  - Gained ownership and utilized existing private sewers
  - Old Sawmill



Contract No. 2 – Auger Bore with A Rock Head under Rt. 101



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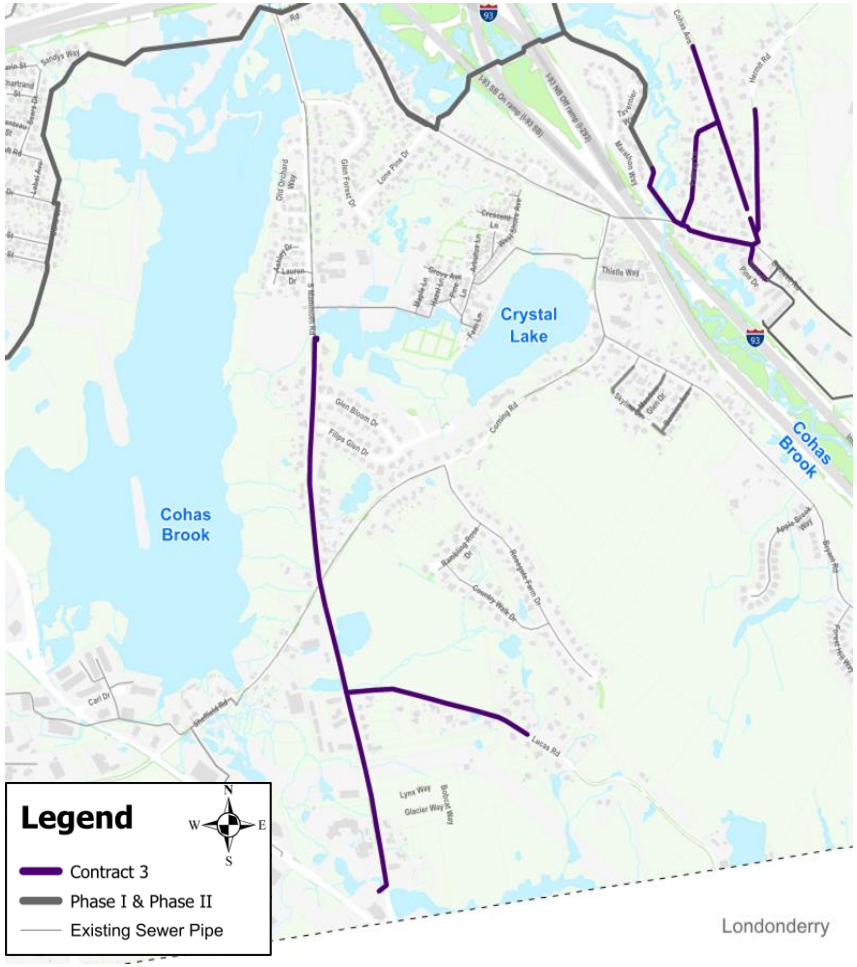
Contract No. 2 – Auger Bore with A Rock Head under Rt. 101

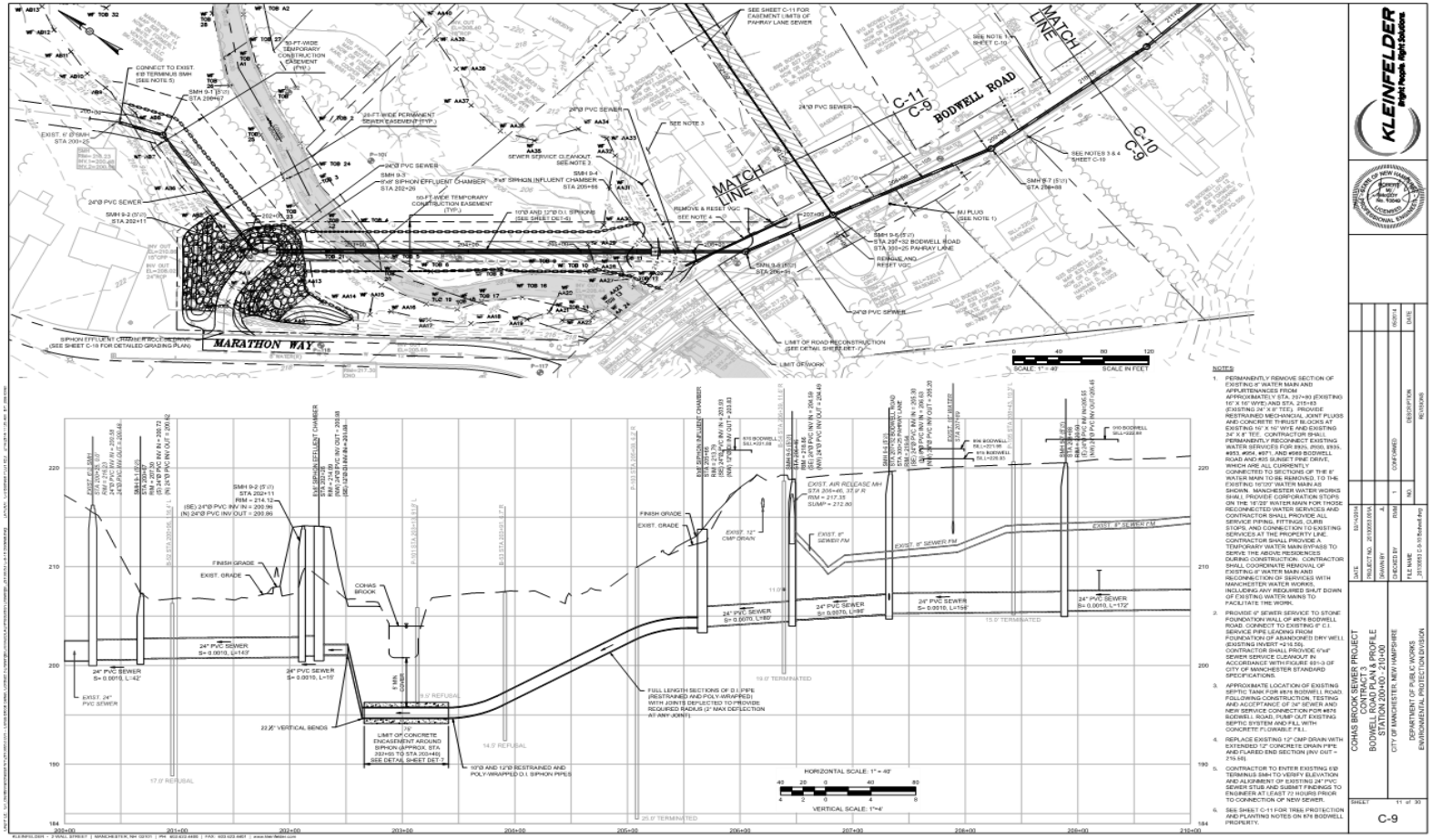
Contract No. 2 – Precast Bridge

Contract No. 3 – Overview

- Total Length – 14,300 LF
- Total cost – $8.0M
- Engineer –
  - Kleinfelder
- Contractor –
  - Park Construction
- Construction duration –
  - 2014 to 2016
- 200 new customers
- Unique Aspects
  - Siphon under Cohas Brook
  - Construction on a State Road



Contract No. 3 – Siphon



Contract No. 3 – Cohas Brook Bypass

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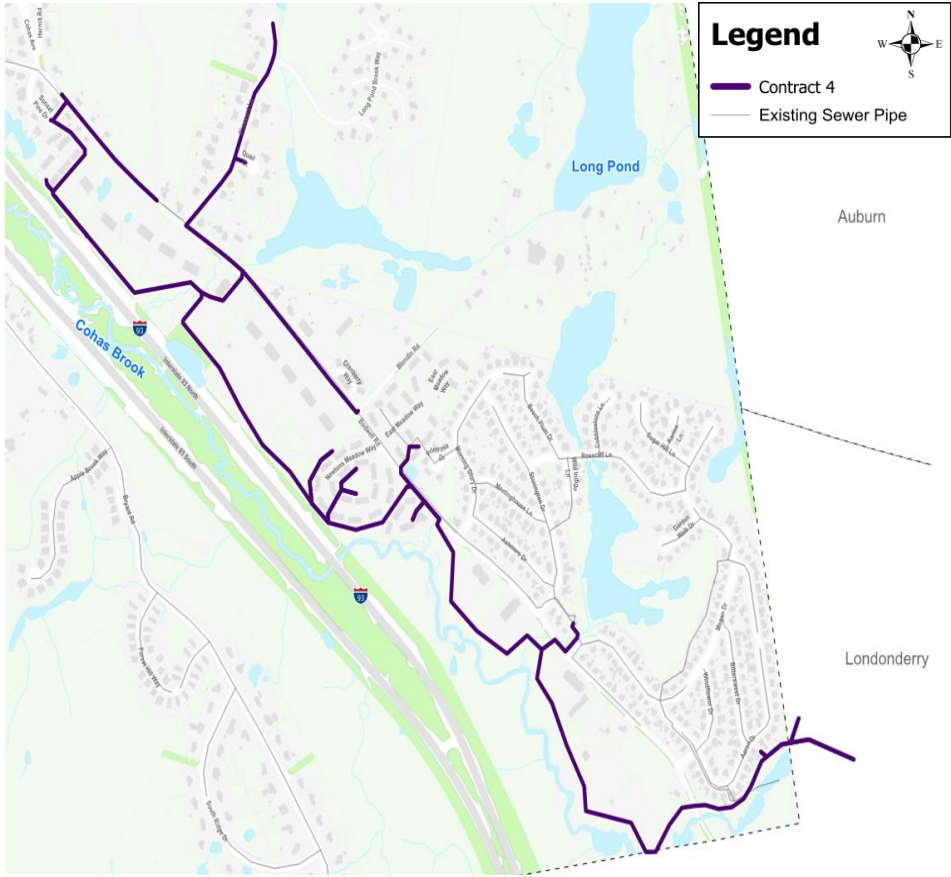
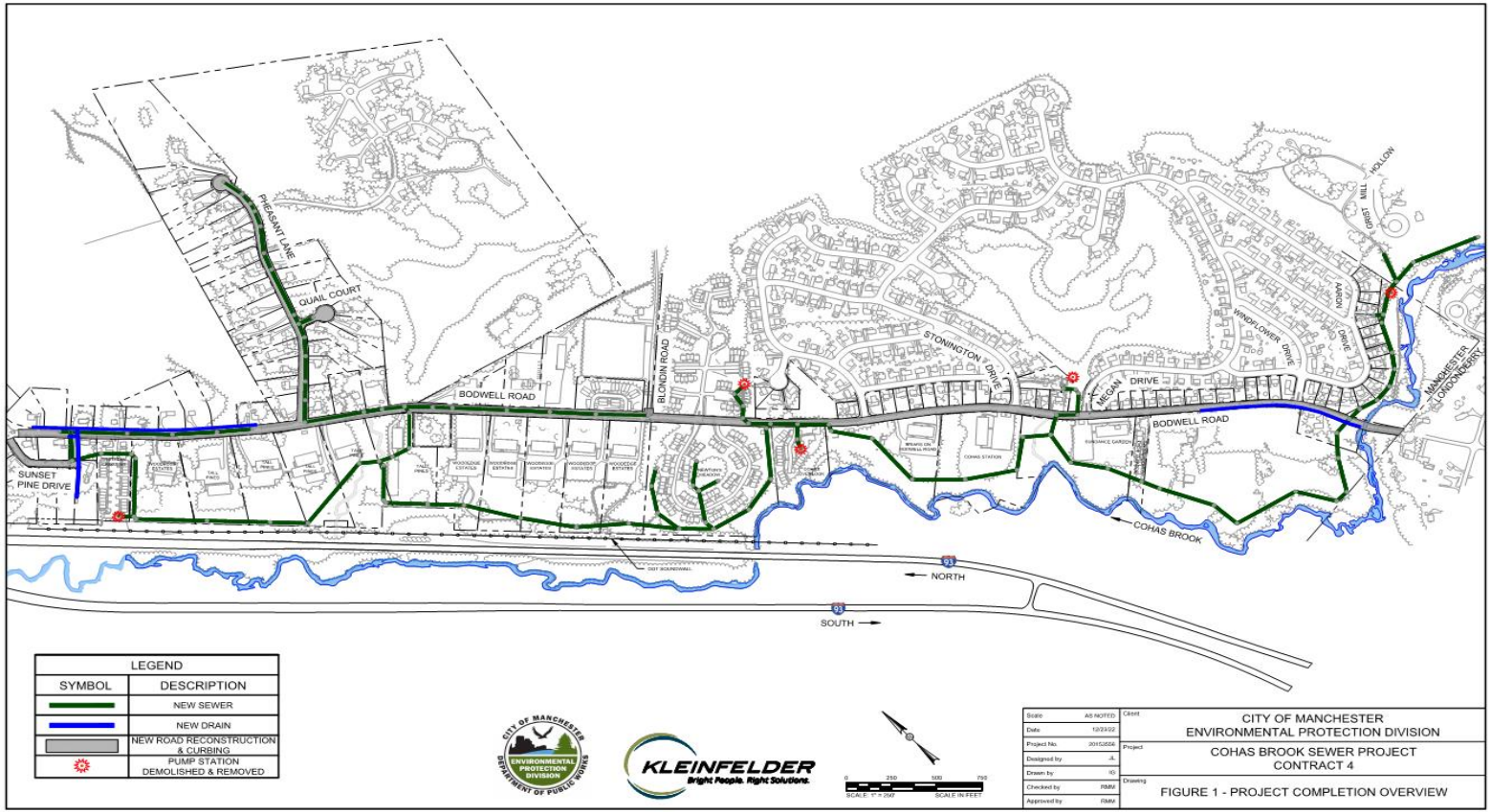
Contract No. 3 – State Road (NHDOT)

Contract No. 4 – Overview

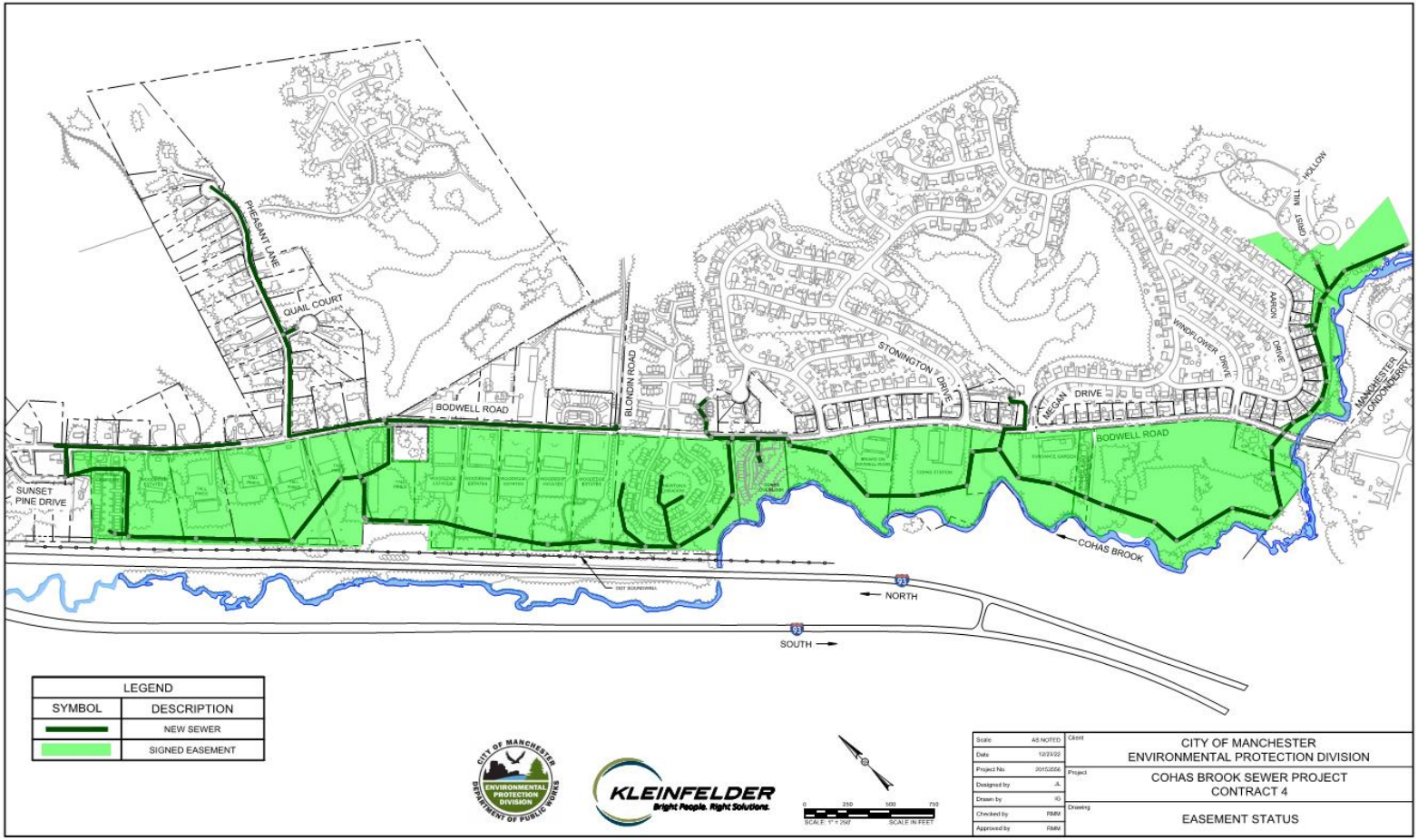
- Total Length – 19,000 LF
- Total cost: $16.0M
- Engineer
  - Kleinfelder
- Contractor
  - Park Construction
- Construction duration
  - 2021 to Present
- 1,000 new customers
- Unique Aspects
  - Existing private sewer utility
  - New metering station



Contract No. 4 – Overview (cont.)



Contract No. 4 – Easement Acquisition



Contract No. 4 – Construction Challenges

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Contract No. 4 – Aaron Drive Metering Station

- Prefab concrete structure
- Below grade vault
- Parshall flume

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Contract 4 – Roadway Restoration

Phase III – Summary

New Customers		Costs (Millions)
Contract No. 1 – 200		$7.0
Contract No. 2 – 180		$9.0
Contract No. 3 – 200		$8.0
Contract No. 4 – 1,000		$16.0
Total	**1,580**	**$40.0**

Lessons Learned

1. Easements
2. Leveraging of Funds
   - Bike Lanes
   - Drainage Improvements
   - Roadway Reconstruction and Curbing
3. Be prepared and Plan for the unexpected
   - Crossing under Rt. 101
   - Private utilities and sewer systems
4. Maximize gravity sewers to try and eliminate or not construct pump stations
5. Seek public input and learn to listen

Lessons Learned (Continued)

1. Long-term Vision
   - Financing
   - Engineering
   - Political and Public Support
   - Resources
2. Long-term Investment
   - Time
   - Rate Increases
   - Internal Staffing

Acknowledgments

Frederick J. McNeill, P.E.

Robert McCoy, P.E.

McKenna Dunn

Aaron D'Amario

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Thank you for your time