

Wastewater Collection System Recommended Improvements

Town Warrant Articles 11 & 12

DPC Engineering, LLC

Justin Skelly, P.E., Project Manager



March 14, 2020

Annual Town Meeting

Town of Enfield, NH



TOPICS

- **Existing Sewer System**
- **2019 Wastewater Asset Management Plan – Findings & Recommendations**
- **Town Warrant Articles 11 & 12**
- **Discussion & Questions**

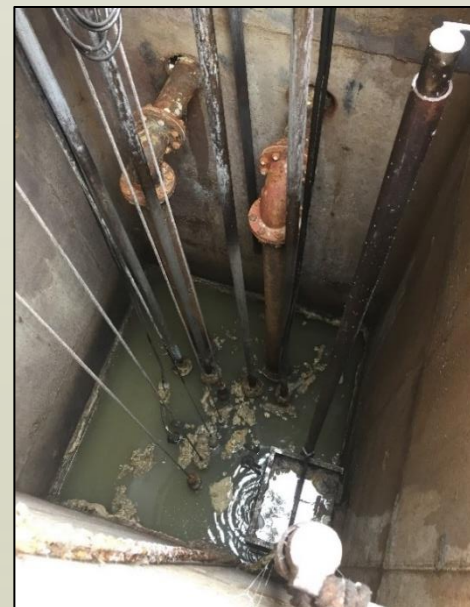
Existing Sewer System

3



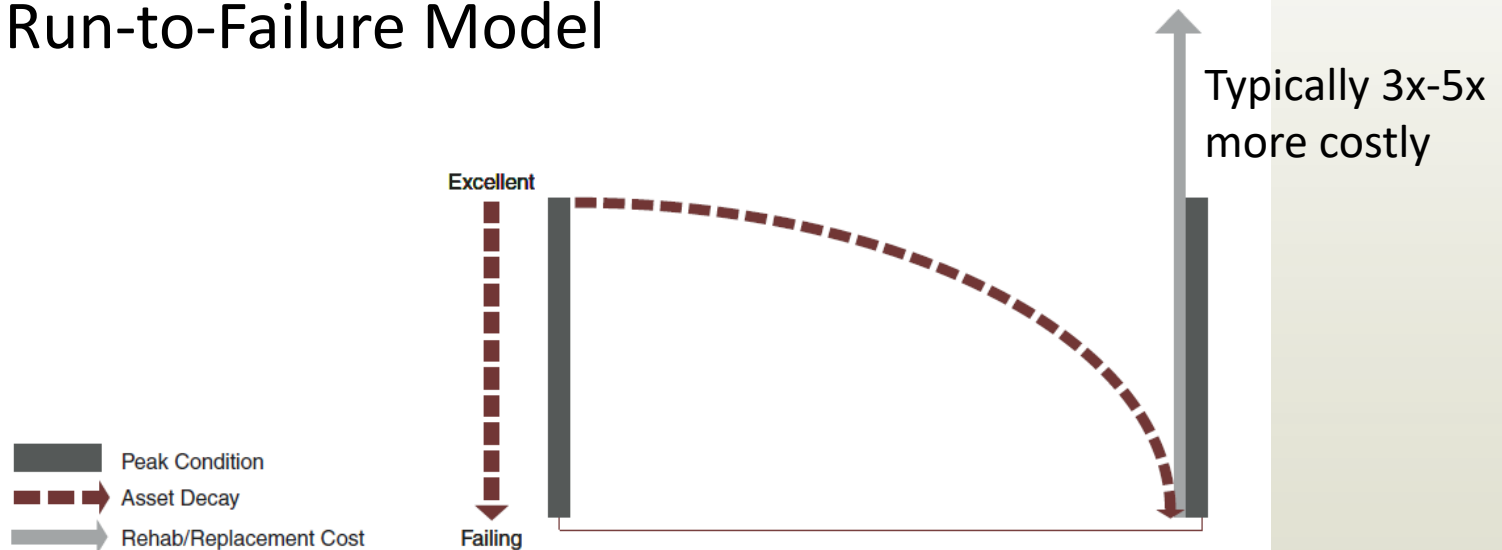
Existing Sewer System

- Eight (8) miles of gravity sewer
- ~230 manholes
- Six (6) pump stations and force mains
- Estimated asset value ~\$40M in present day replacement costs

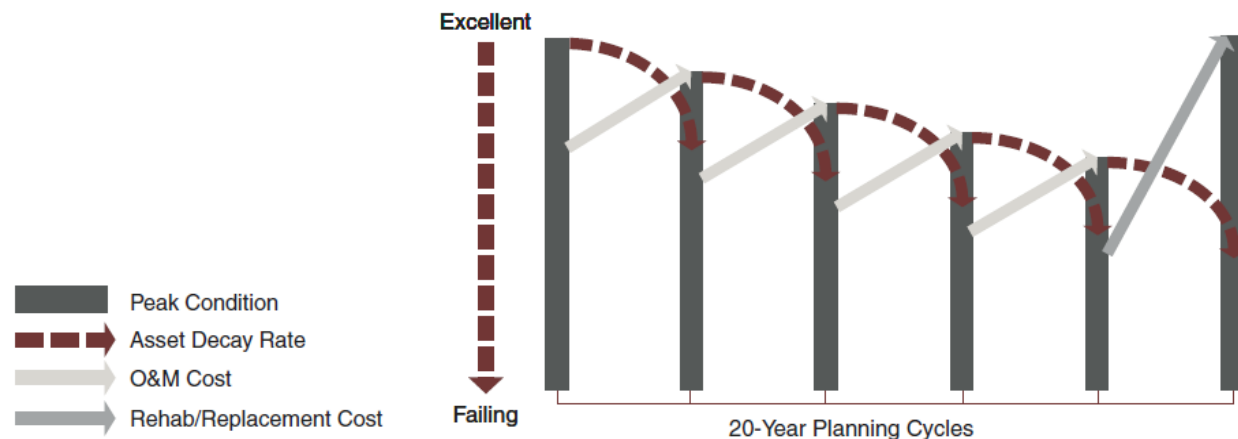


What is Asset Management?

Run-to-Failure Model



Asset Management Model



Asset Management Process

(completed as part of 2019 project, utilizing NHDES Principal Forgiveness Program)

- 1. Inventory of Critical Assets**
- 2. Evaluate Condition and Performance of Critical Assets**
- 3. Determine a Sustainable Level of Service**
- 4. Develop Capital Improvements Program**
- 5. Develop Implementation Plan**

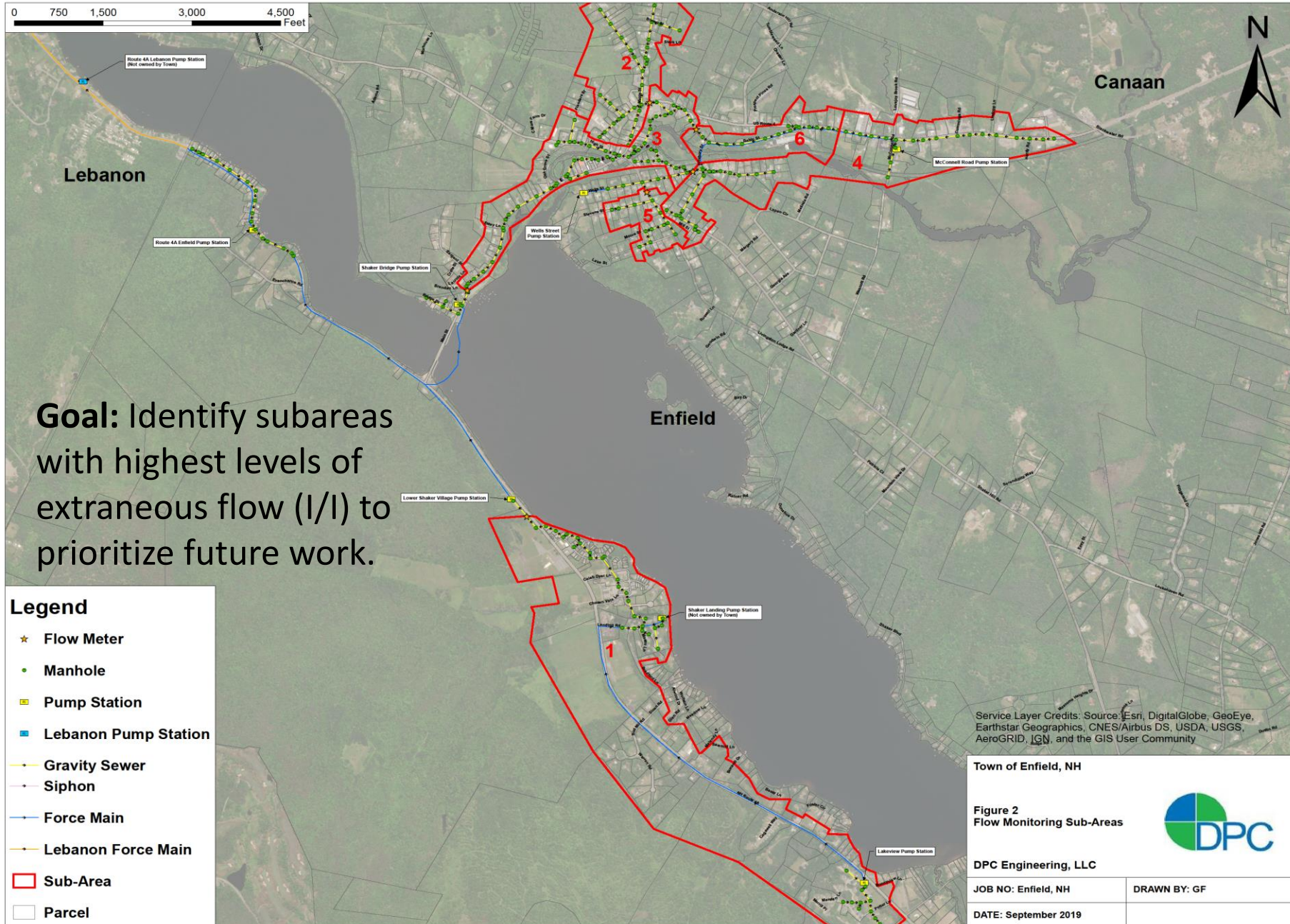
Field Work Completed

- Pump Station Evaluations
- Continuous Flow Monitoring of Sewers
- Manhole Inspections
- Sonar Testing of Sewers



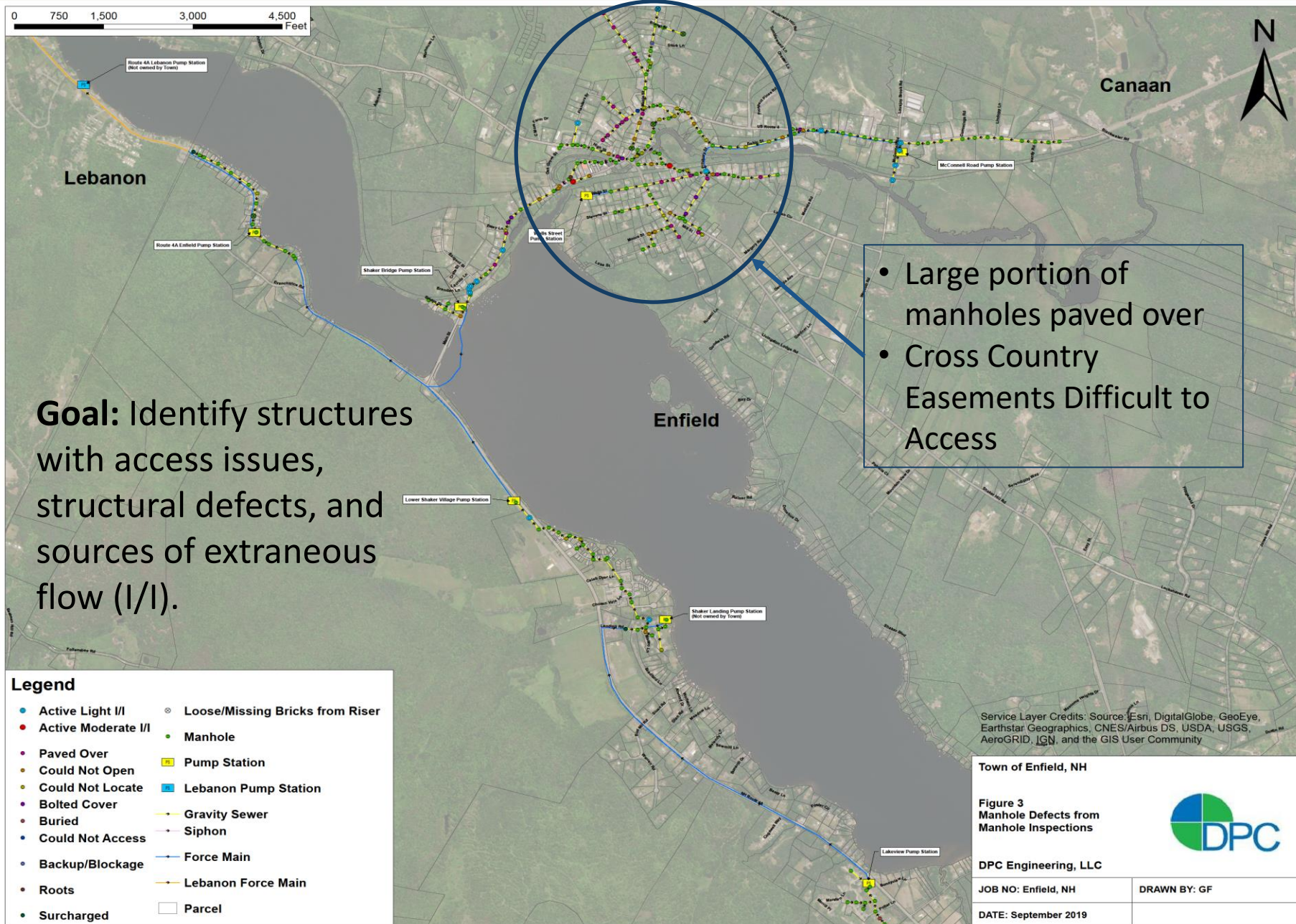
Flow Monitoring

8

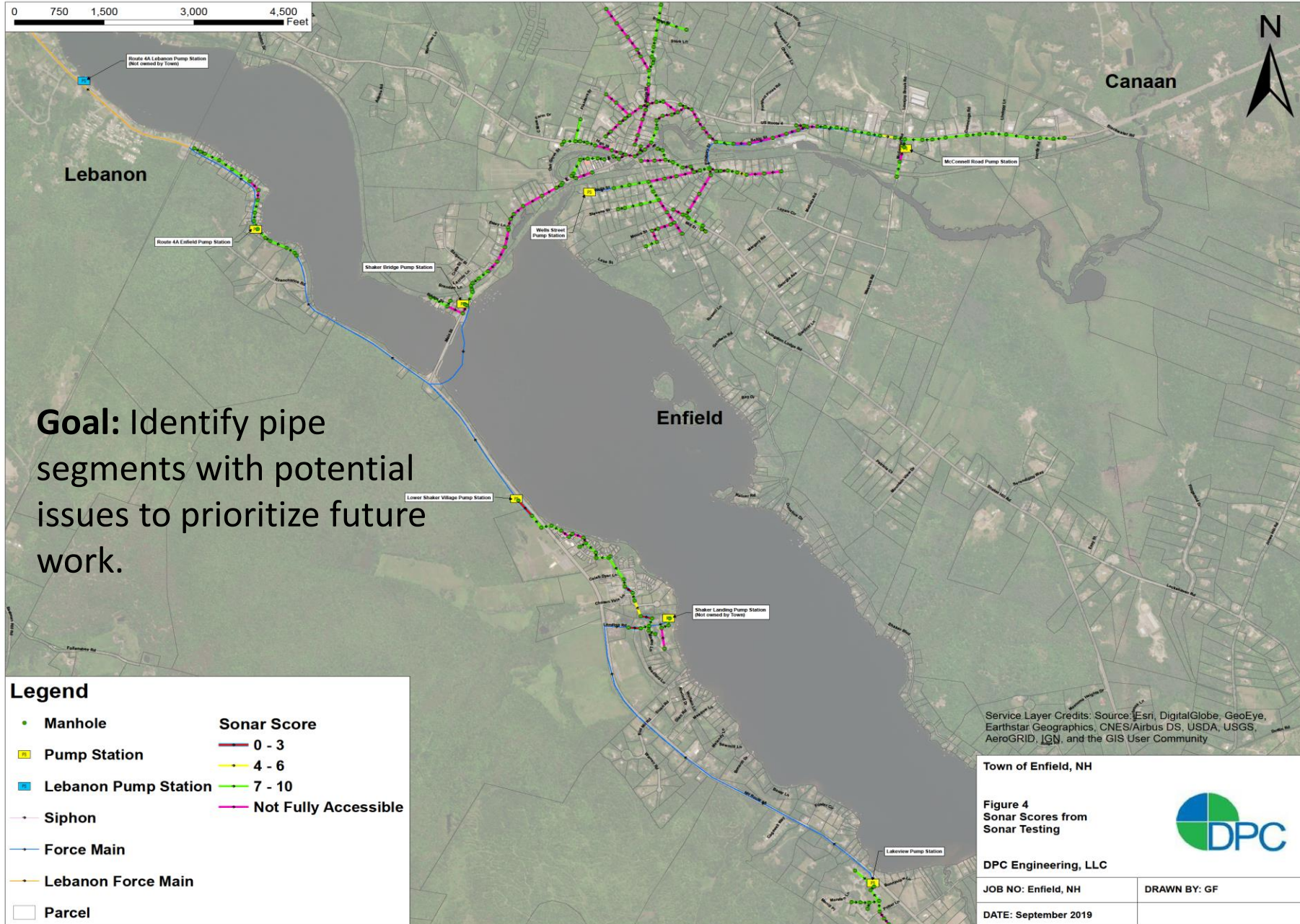


Manhole Inspections

9



Sonar Testing



Asset Management Database

Appendix E

Pump Station Asset Management Database

Town of Enfield, New Hampshire

Prepared on November 7, 2019

										Color Index	Color Code General Assessment Rating	Asset Criticality & Scoring							
												Age	Energy Efficiency / Return on Investment	Function / Impact on Downstream Sewers	Operations & Maintenance	Access	Safety	Percent of System Served	Asset Criticality Score
												1-5	1-5	1-10	1-5	1-5	1-5	1-10	7-45
Area ID	Pump Station	Location	Component	Year Built	Last Upgrade	In Operation	Equipment Operable	Equipment Replaced	Condition Assessment	Observations and Comments									
LV	Lakeview	Electrical/Control Building	Electrical/Controls	2016	N/A	Yes	Yes	N/A				1.00	2.00	10.00	1.00	1.00	1.00	1.00	17.00
LV	Lakeview	Site	Fencing	2016	N/A	Yes	Yes	N/A				1.00	1.00	1.00	1.00	1.00	2.00	1.00	8.00
LV	Lakeview	Site	Access Driveway	2016	N/A	Yes	Yes	N/A		Gravel access drive		1.00	1.00	1.00	1.00	1.00	1.00	1.00	7.00
LS	Lower Shaker Village	Steel Prefabricated Can Drypit	Pump #1	1987	N/A	Yes	Yes	N/A		20-HP non-clog vertical centrifugal pump. Designed for 425 gpm at 104 ft TDH. The pump operates via a radar level sensor system based on the liquid level within the wetwell.		5.00	4.00	10.00	5.00	5.00	3.00	2.00	34.00
LS	Lower Shaker Village	Steel Prefabricated Can Drypit	Pump #2	1987	N/A	Yes	Yes	N/A		20-HP non-clog vertical centrifugal pump. Designed for 425 gpm at 104 ft TDH. The pump operates via a radar level sensor system based on the liquid level within the wetwell.		5.00	4.00	10.00	5.00	5.00	3.00	2.00	34.00
LS	Lower Shaker Village	Steel Prefabricated Can Drypit	Pump Discharge Piping	1987	N/A	Yes	Yes	N/A		4-inch DI discharge piping		4.00	1.00	10.00	3.00	5.00	2.00	2.00	27.00
LS	Lower Shaker Village	Steel Prefabricated Can Drypit	Flow Meter	1987	N/A	Yes	Yes	N/A		4-inch magnetic flow meter		5.00	1.00	1.00	3.00	5.00	2.00	2.00	19.00
LS	Lower Shaker Village	Steel Prefabricated Can Drypit	Sump Pump	1987	N/A	Yes	Yes	N/A				5.00	2.00	1.00	2.00	5.00	3.00	2.00	20.00
LS	Lower Shaker Village	Influent Screening Tank	Manual Bar Rack	1987	N/A	Yes	Yes	N/A				3.00	1.00	8.00	5.00	3.00	2.00	2.00	24.00
LS	Lower Shaker Village	Wetwell	Level Sensing Equipment	1987	N/A	Yes	Yes	N/A		Radar level sensor with backup high/low alarm floats		3.00	1.00	10.00	2.00	3.00	2.00	2.00	23.00
LS	Lower Shaker Village	Wetwell	Pump Suction Piping	1987	N/A	Yes	Yes	N/A		4-inch DI suction piping		4.00	1.00	10.00	3.00	5.00	2.00	2.00	27.00
LS	Lower Shaker Village	Wetwell	Sluice Gates	1987	N/A	Yes	Yes	N/A		Three 10-inch cast-iron sluice gates on influent pipes and between split wetwell		4.00	1.00	3.00	3.00	4.00	2.00	2.00	19.00
LS	Lower Shaker Village	Wetwell	Access Hatches	1987	N/A	Yes	Yes	N/A		Two access hatches. There is no integral fall-protection installed.		4.00	1.00	1.00	1.00	1.00	4.00	2.00	14.00
LS	Lower Shaker Village	Wetwell	Concrete Structure	1987	N/A	Yes	Yes	N/A				2.00	1.00	10.00	2.00	2.00	4.00	2.00	23.00
LS	Lower Shaker Village	Sewage Holding Tanks	Concrete Structures	1987	N/A	Yes	Yes	N/A		Three concrete emergency holding tanks		2.00	1.00	3.00	2.00	2.00	3.00	2.00	15.00
LS	Lower Shaker Village	Electrical/Control Building	Building Architectural	1987	N/A	Yes	Yes	N/A				2.00	2.00	1.00	1.00	1.00	1.00	2.00	10.00



I/I Impacts on Sewer Rates

- **What are Infiltration and Inflow?**
 - Wastewater = sanitary flow + I/I
 - Infiltration sources are from groundwater
 - Inflow sources are from rainfall
 - All sewer systems have I/I
- **Enfield I/I Estimates**
 - Enfield I/I (4/27/19-6/27/19) $\approx$ 64,000 gpd
 - $\approx$ 60% of Enfield's annual sewer costs are payments to Lebanon – Every gallon counts!
 - Goal of reducing extraneous flows by 10% over a 5-year period

Typical Sources of I/I

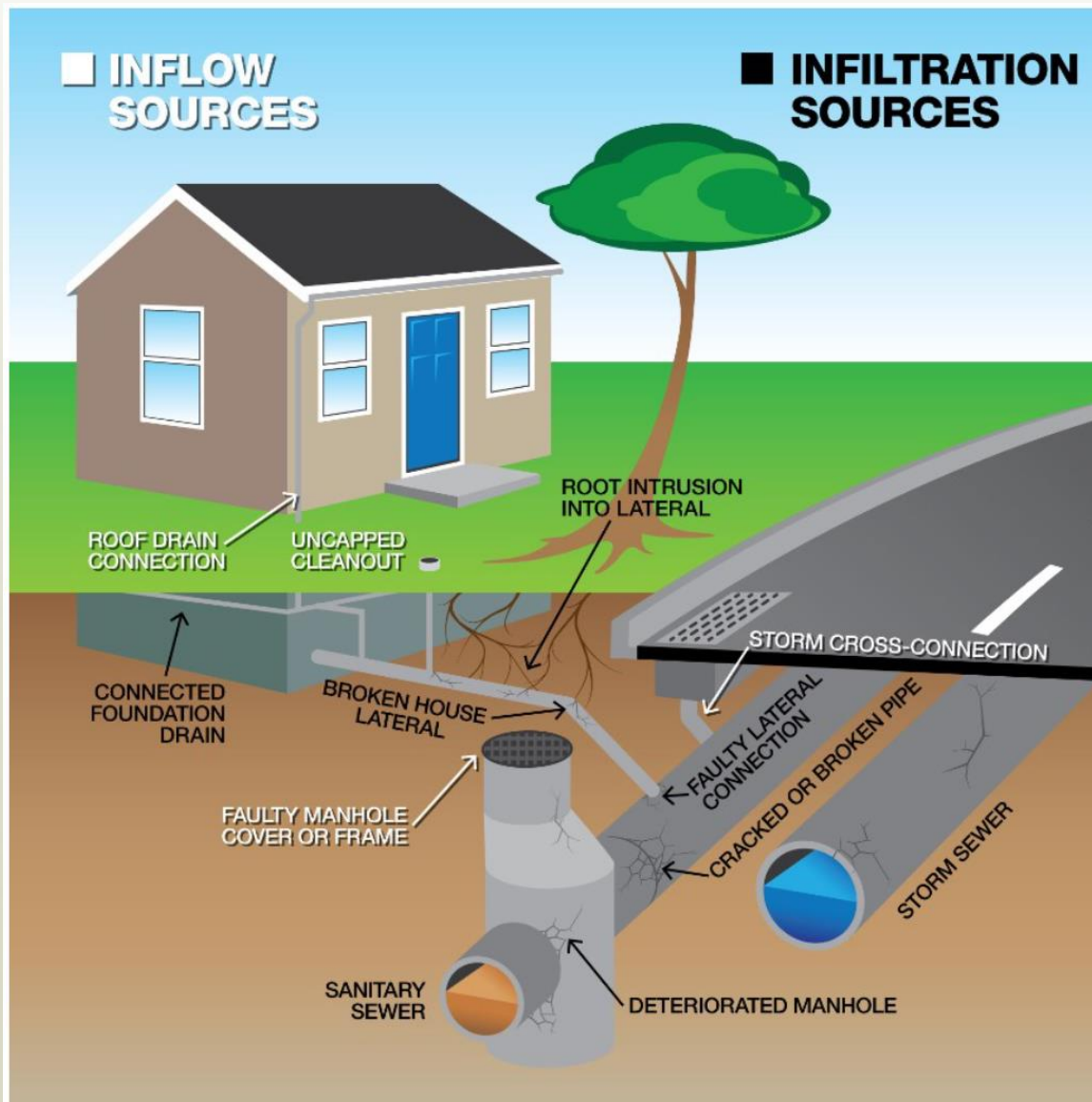


Figure 1: Typical Sources of I/I in Sanitary Sewer Systems
(Image from WEF, 2017)

Warrant Article 11

Task	Description	OPPC
USDA-RD Funding Application	Prepare a preliminary engineering report (PER), environmental report (ER), and funding application to be submitted to USDA for the proposed work.	\$ 70,000
Uncover/Raise Manholes	Uncover and raise 23 manholes that have been paved over, provide access to 20 manholes that could not be opened.	\$ 120,000
Confirmed Manhole Rehabilitation	Perform Rehabilitation on 24 manholes, including grouting, lining, and root treatment.	\$ 80,000
Clearing of Cross-Country Easements	Clear and establish approximately 1,650 LF of cross-country easements and improve access for O&M	\$ 210,000
Restoration of Lawn Easements	Restore approximately 7,500 SY of lawn easements.	\$ 150,000
CCTV Inspection	CCTV inspect approximately 43,000 LF of gravity sewer mains. Provide recommendations for rehabilitation.	\$ 140,000
Allowance for Manhole Rehabilitation	Allowance for manhole rehabilitation following the inspection of manholes that could not be accessed or located during Phase 1.	\$ 80,000
Allowance for Pipe Rehabilitation	Allowance for in-situ rehabilitation of sanitary sewer piping following CCTV inspection.	\$1,050,000
Total =		\$1,900,000

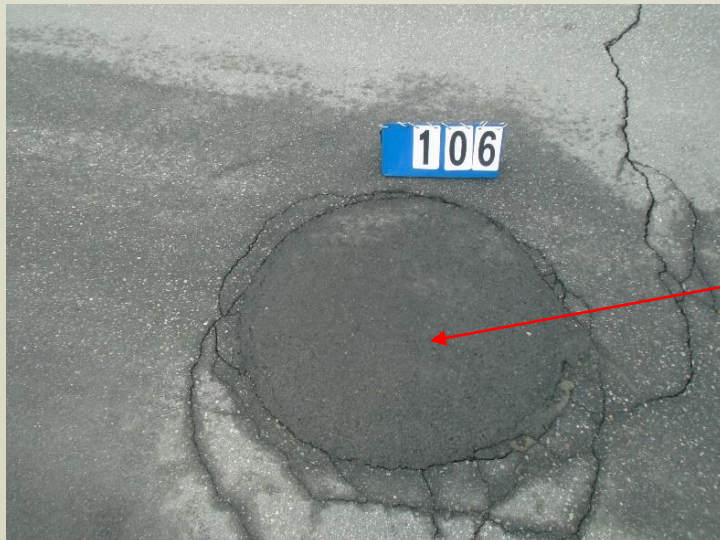


Typical Manhole Defects in Enfield



Active Infiltration

Root Infiltration



Buried Manholes

Manhole Rehab Pipe CCTV/Rehab



Estimated Financial Implications for Rate Payers

- 619 metered users on the system
- \$1.9 million loan (maximum, could be \$1.05 million if 45% USDA grant funding is secured)
- 30-year term; anticipated 2.5% interest rate
- Annual debt service payment = \$91,000
- Average annual cost/user = \$147 (\$37/quarter)

Warrant Article 12

- **NHDES CWSRF 100% Principal Forgiveness Program – up to \$75,000**
- **Communities must receive authority to borrow for the entire loan amount**
- **Applications are submitted - scored and ranked by NHDES**
- **Competitive program, with little risk to Enfield for the potential benefit to reduce overall costs of improvements**

Discussion & Questions

Town of Enfield's Vision Statement for Asset Management

Meet the standard of care for current sewer customers, facilitate opportunities for additional sewer customers, and balance annual program needs with sustainable customer costs.