

# Beyond the Report

Integrating Town-Wide SSES w/ District LTCP and CMOM Program

Josh MacCulloch, PE  
Metropolitan District

Katelyn Biedron, PE  
CDM Smith

John Harper, PE  
CDM Smith

*January 28, 2020*



**CDM  
Smith**

# Presentation Overview

Introduction  
MDC Clean Water Project  
SSES Program

Bloomfield SSES Approach  
Bloomfield SSES Results  
Integrating Bloomfield into LTCP  
Lessons Learned

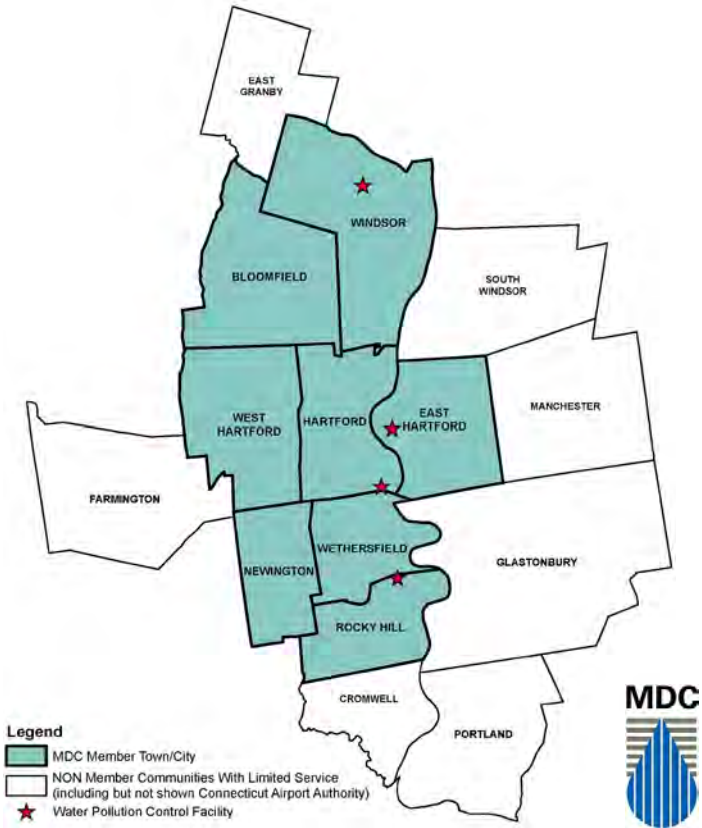


# Introduction

The MDC is a nonprofit municipal corporation chartered by the CT General Assembly in 1929.

MDC mission is to provide our customers with safe, pure drinking water, environmentally protective wastewater collection and treatment and other services that benefit the member towns.



MDC provides water, sewer and household hazardous waste collection to its member towns and treated water to portions of non-member towns.

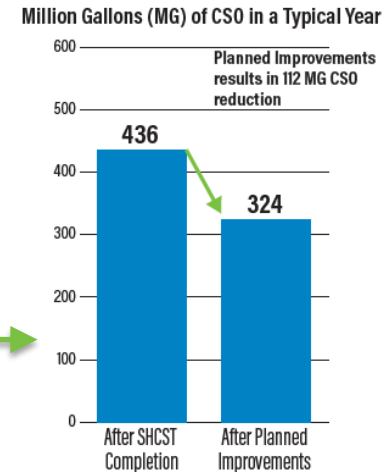
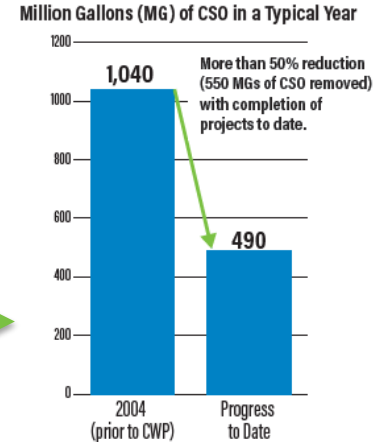


# MDC Clean Water Project

- 2006 Consent Decree (USEPA) & 2007 Consent Order (CTDEEP)
- Main Goals
  - Eliminate Sanitary Sewer Overflows (SSOs)
  - Reduce Combined Sewer Overflows (CSOs) to Connecticut River
  - Reduce Nitrogen Released to Connecticut River
- Clean Water Project Components
  - WPCF Improvements
  - Sewer Separation
  - Storage and Conveyance Tunnels
  - Relief and Consolidation Pipe
  - **Inflow and Infiltration (I/I) Reduction**

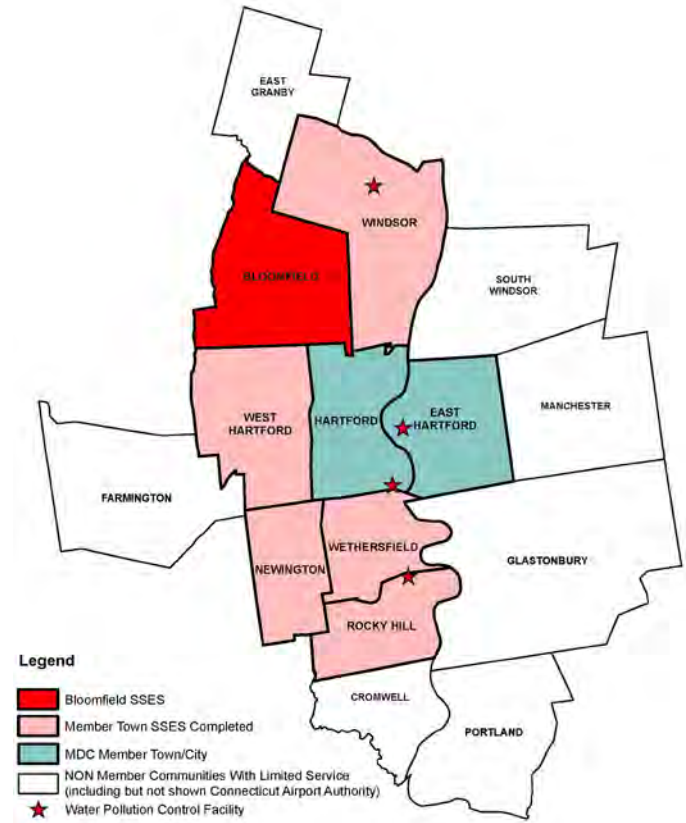
# Clean Water Project Progress

- \$2.5 Billion CWP
  - Since 2005 Spent/Committed = \$1.7B
- Completed Projects >50% CSO Reduction 
  - Hartford WPCF Improvements \$490M
  - Sewer Separation & System Improvements \$270M
  - SSO Abatement Program \$190M
    - Completed Sewer Rehabilitation > 200 Miles!!
  - South Hartford Conveyance & Storage Tunnel \$550M
- Aging Infrastructure
  - \$17.5M Emergency Repairs in 2017-2019
- LTCP Planned Improvements \$385M 
  - CMOM & Sewer Rehabilitation Program (All Member Towns)



# SSES Program

- W. Hartford/Newington: 2005-2008
- Windsor: 2006-2008
- Rocky Hill/Wethersfield: 2006-2010
- **Bloomfield: 2016-2018**
- SSES Implementation 2008-Present
- SSES Program Evolution
  - Segment-by-segment Approach
    - Implementation Easier
    - Prioritization Harder
  - Comprehensive Approach
    - Maximize I/I Reduction
  - CMOM and LTCP Integration



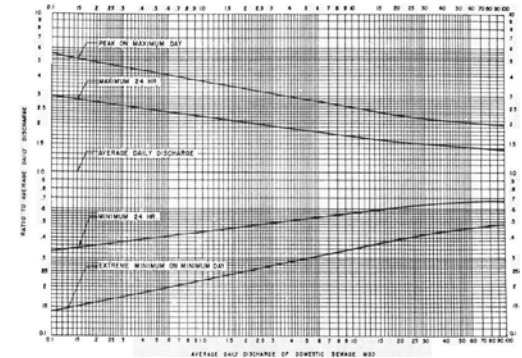
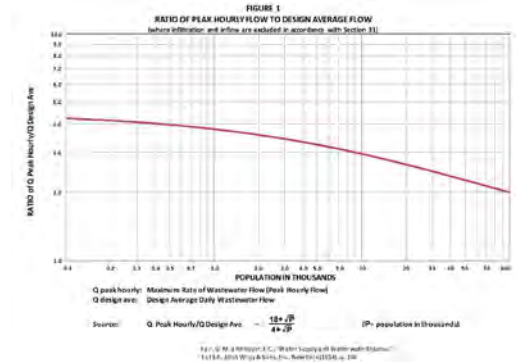
# Bloomfield SSES Approach

- Bloomfield (82%) and West Hartford (18%)
- Comprehensive Rehabilitation
  - Identify + Prioritize Subareas
  - 80/20 Rule
- Initial SSES Investigations
- Flow Metering Program
  - Fall 2016 ☹️
  - Spring 2017 😊
- RDII Investigations
- Cost-Effective Analysis



# Bloomfield SSES Background

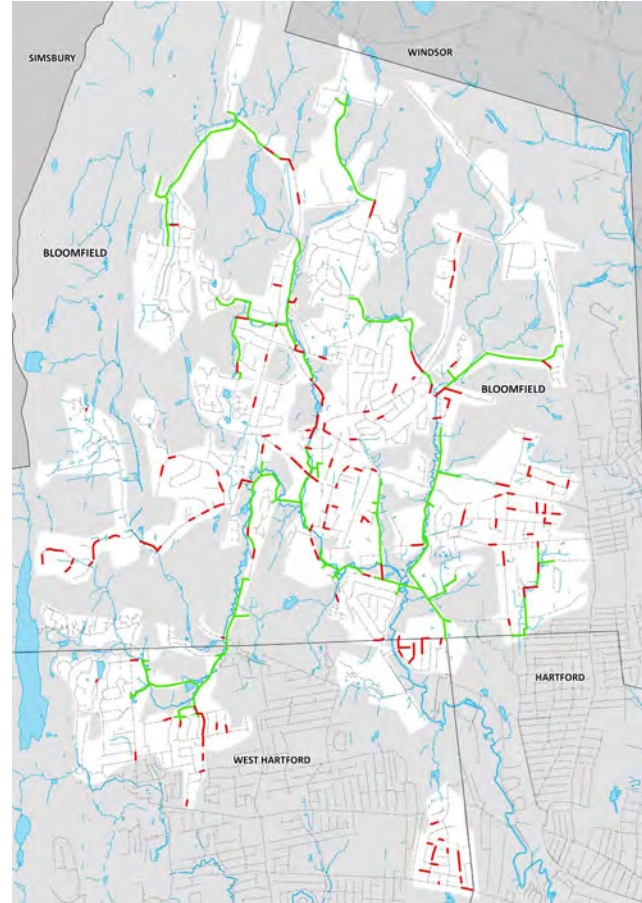
- Sewer Service Area = 5,500 Acres
  - Sewer Pipe = 120 miles
  - Population = 15,614
  - Buildings = 6,730
- Flows into Hartford CSO System
  - North Branch Park River CSOs (Elimination)
- Preliminary Flow Analysis
  - USEPA, TR-16, Merrimack Curve
  - Permanent Meter Data (2012-2015)
  - **Excessive I/I (Dry and Wet Weather)**
  - **High Peaking Factors**





# Initial SSES Investigations

- Study Area Delineation
- Historical Complaint Records
- SSO Annual Reports
- CMOM Program
  - CCTV Inspection Data
  - Easements/Access →
  - Infiltration and Inflow →



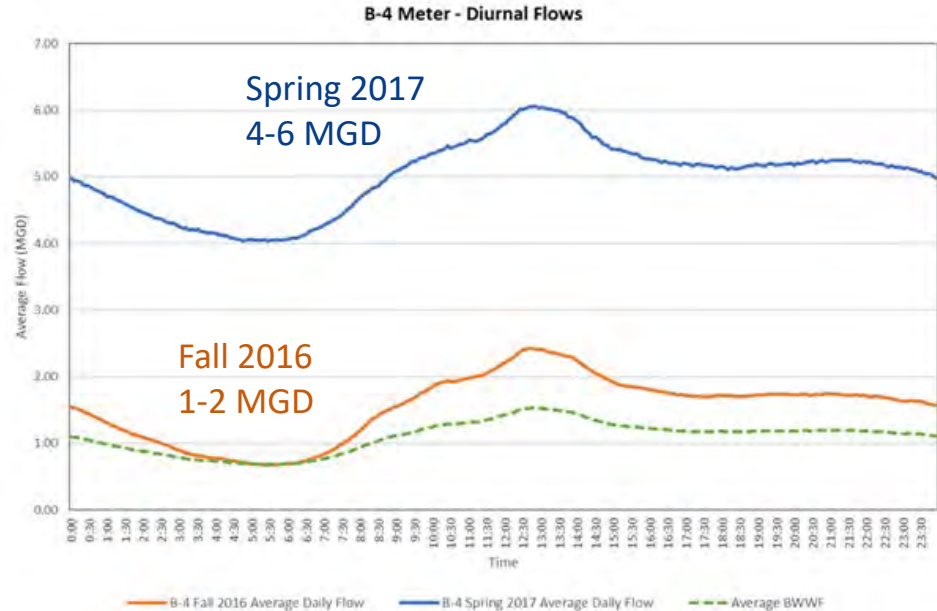
# Flow Metering Program

## Fall 2016

- 29 meters for 12 weeks
- Not optimal conditions 😞
  - Below average precipitation
  - Low groundwater (drought)

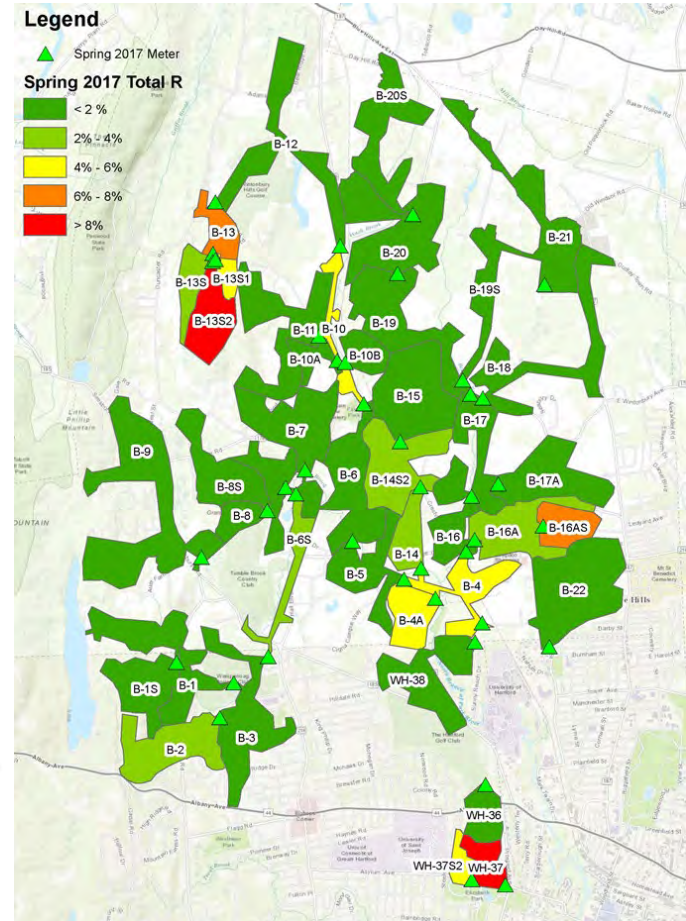
## Spring 2017

- 41 meters for 13 weeks
- Optimal conditions 😊
  - Above average precipitation
  - High groundwater (normal)



# RDII Investigations

- Above Ground Survey
- Manhole Inspections
  - 1,900 MH Cover Inspections (65%)
- Smoke Testing
  - 86,000 LF
- Dye Water Testing
- Building Inspections
  - 4 Subareas w/ Highest Total R →
  - Completed 288 of 390 (74%)





Missing Puddle Cap on Shelf



Dye Water Testing at Catch Basin



MH Cover Defect




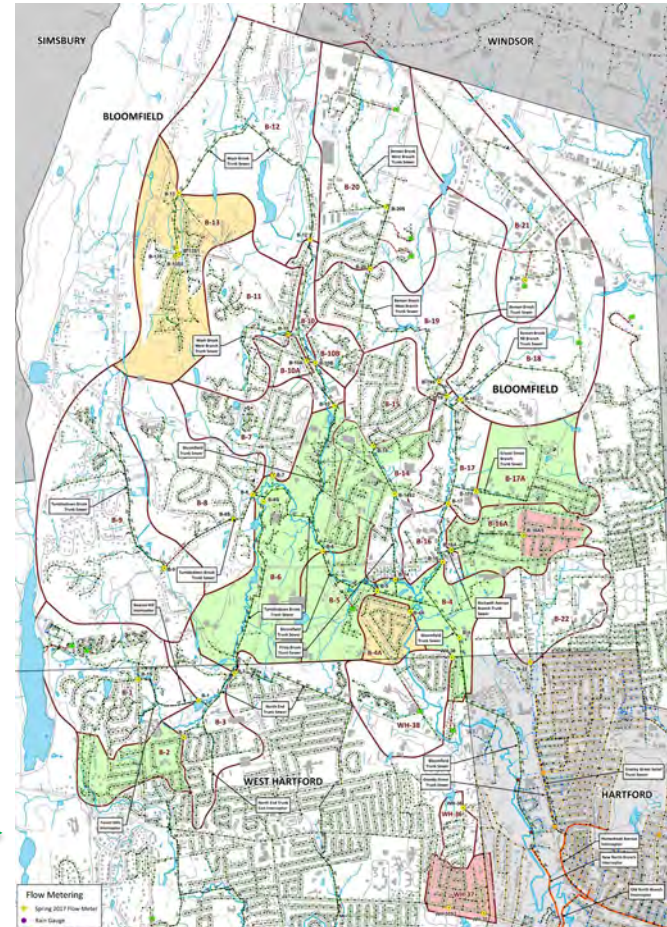
MH Cover Defect with Smoke Testing

# Bloomfield SSES Results

- Priority Subareas (14 of 41)
  - 73% RDII from 20% Area (~80/20)
- CMOM Program Recommendations (All Subareas)
- Cost-Effective Analysis (50-year Annualized)
  - Spring 2017 GWI and RDII Volumes
  - Rehabilitation Costs vs. Treat/Transport Costs
  - Emergency Repairs + Chronic Sewer Cleaning Costs
  - I/I Reduction Scenarios (0-10-30-50%)
  - **Bloomfield CWP Costs (LTCP)**
- Prioritization and Implementation

# Cost-Effective Analysis

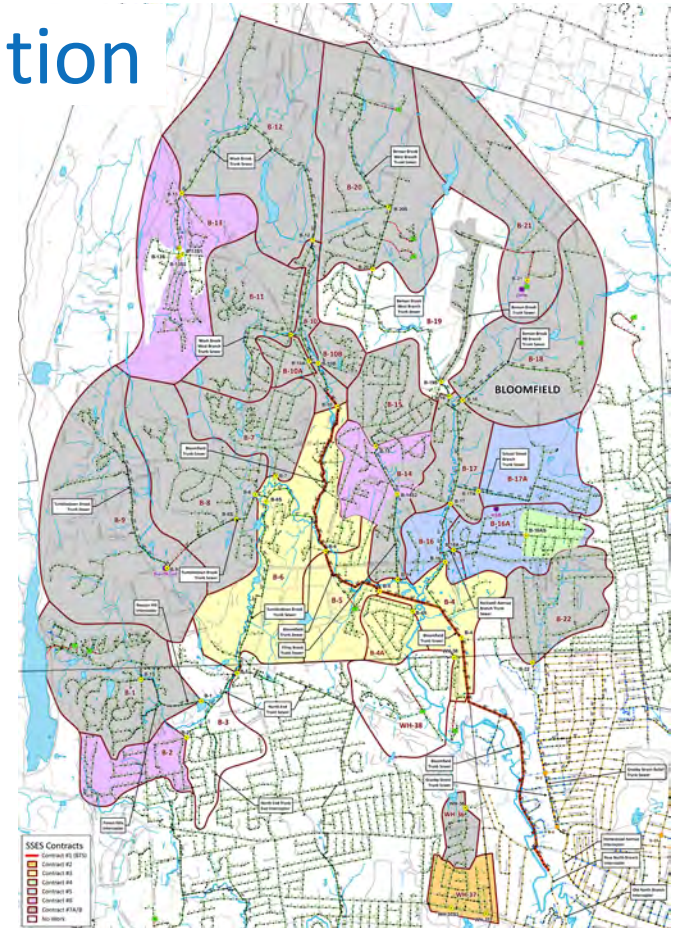
- 0% I/I Reduction \$1.7M
  - Confirmed Inflow Source Removal
- 10% I/I Reduction \$30.5M
  - Sewer Main Rehabilitation (Most)
- 30% I/I Reduction \$66.8M
  - Sewer Main Rehabilitation (All)
  - Manholes and Laterals
- 50% I/I Reduction \$111.0M
  - Sewer Main Rehabilitation (All)
  - Manholes and Laterals
  - Private Inflow Removal
- **Recommendations \$58.3M** 
  - **>20% I/I Reduction Goal**



# Prioritization and Implementation

- 7 Contracts for Bloomfield
  - 14 Priority Subareas
  - Bloomfield Trunk Sewer + Small Dia. + Styrene
- LTCP Ranking for Bloomfield 53-95 ☹️

Contract	Project Description	2018 LTCP Ranking	Opinion of Probable Cost (\$M)
#1	Bloomfield Trunk Sewer Large Diameter Rehabilitation	53	\$16.4
#2	WH-37S2 and WH-37	93	\$5.6
#3	B-4, B-4A, B-5, and B-6	94	\$7.6
#4	B-16AS	95	\$6.6
#5	B-16, B-16A, and B-17A	81	\$4.9
#6	B-2, B-13, B-13S2, and B-14S2	82	\$5.0
#7A	Bloomfield Styrene	64	\$2.6
#7B	Bloomfield Small Diameter (CMOM)	95	\$9.6
<b>Totals</b>			<b>\$58.3</b>

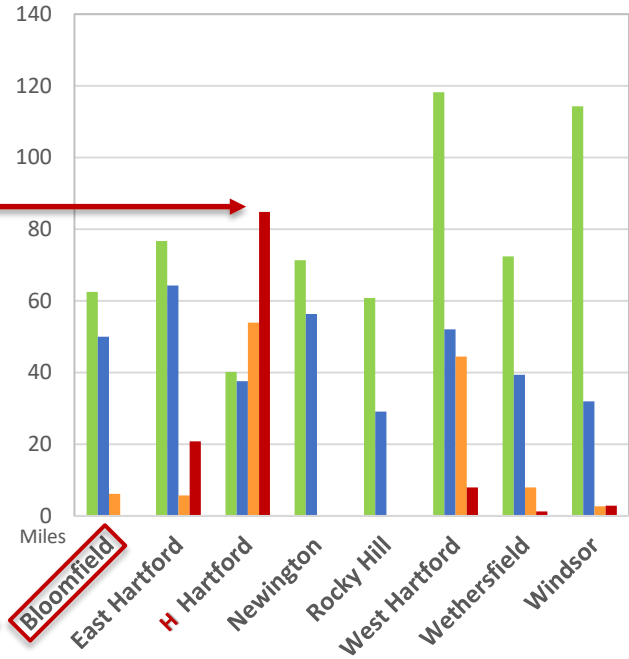


# Integrating Bloomfield into LTCP

- 160 LTCP Projects
  - Project Scoring and Ranking System
- 44 Sewer Rehabilitation Projects
  - Hartford Highest Ranked (Oldest)

Sewer Pipe Age

■ Less than 50 years old     ■ 50 - 75 years old  
■ 75 - 100 years old     ■ Greater than 100 years old



Project Reference	Opinion of Probable Cost (\$M)	Yr 1 - 10	Yr 11 - 20
<b>Projects Focused on Large Diameter Rehabilitation</b>			
H Farmington/ Homestead Ave.	\$8.4	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Cemetery Brook	\$3.8	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Broad Street	\$14.2	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Gully Brook Interceptor	\$14.5	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Franklin Ave and Downtown	\$16.6	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
Newington	\$6.4	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H North and South Meadows	\$6.7	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
West Hartford North	\$4.7	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Granby Street	\$16.3	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Connecticut River Interceptor	\$12.8	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
West Hartford South	\$11.1	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
Bloomfield Trunk Sewer ☹️	\$16.4	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■
H OSBI and NSWBI	\$15.8	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
H Jefferson Street Interceptor	\$12.0	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	

YEAR 11-13



# Lessons Learned

- Proactive Sewer Rehabilitation Program
- Comprehensive Approach vs. Segment-by-Segment
  - Identify + Prioritize (80/20)
  - Sewer Mains + Manholes + Laterals + Private Inflow Removal
- Town / Subarea / Neighborhood = Variable Approach
- Accurate Data and Analysis
  - Metering, Groundwater (GWI) and Rainfall (RDII)
  - Antecedent Moisture Conditions
  - Calculations or Hydraulic Modeling
- **OUTREACH, OUTREACH, OUTREACH!!**

**Metropolitan District**

Josh MacCulloch, PE, BCEE

555 Main Street

P.O. Box 800

Hartford, CT 06142

(860) 278-7850 x3393



# Questions??

**CDM Smith**

John Harper, PE

670 North Commercial St.

Suite 208

Manchester, NH 03101

(603) 222-8382

**CDM Smith**

Kate Biedron, PE

670 North Commercial St.

Suite 208

Manchester, NH 03101

(603) 222-8374