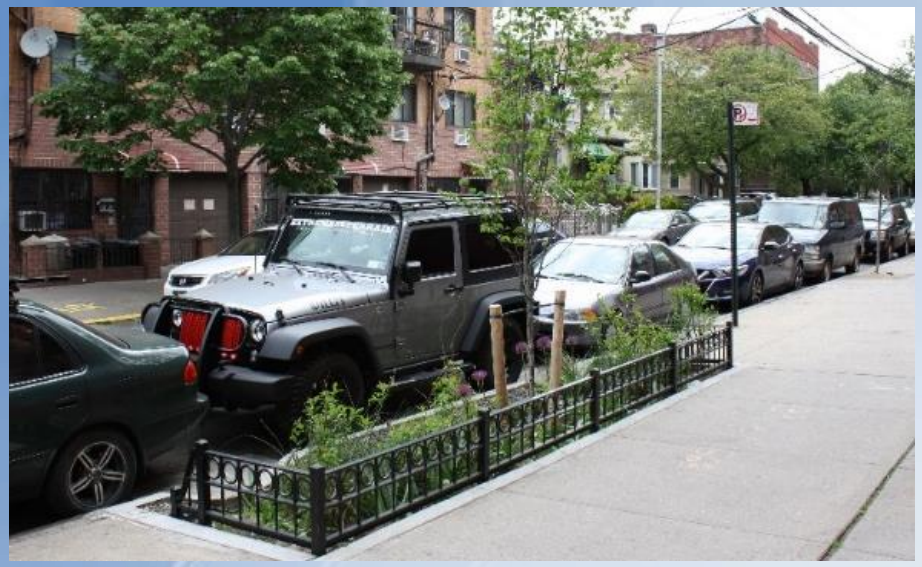

The Metropolitan District Status of LTCP Update

January 9, 2017

Agenda

- CH2M Hill LTCP Peer Review/Water Quality Analysis
- CDM Smith LTCP Update & CSO Meters
- Affordability Analysis

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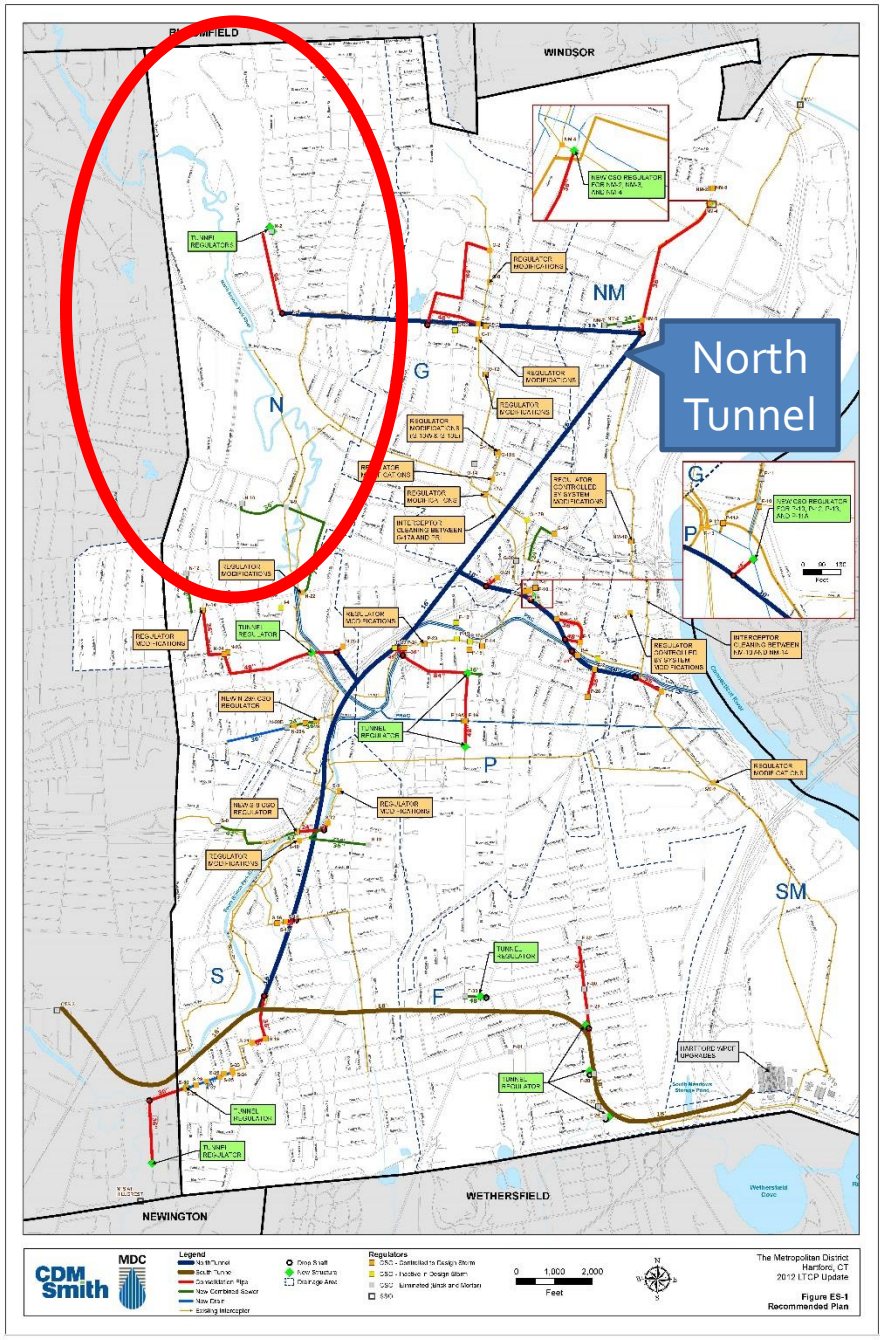
the choice is clear

Hartford MDC - LTCP Peer Review
Water Quality Monitoring & Assessment

Analysis of Data:
Characterization of Impairment
CSO Contribution to Impairment

North Tunnel

- North Tunnel starts at N-2 on the North Branch Park River
- CH2M focus on North Branch Park River watershed above Farmington Avenue



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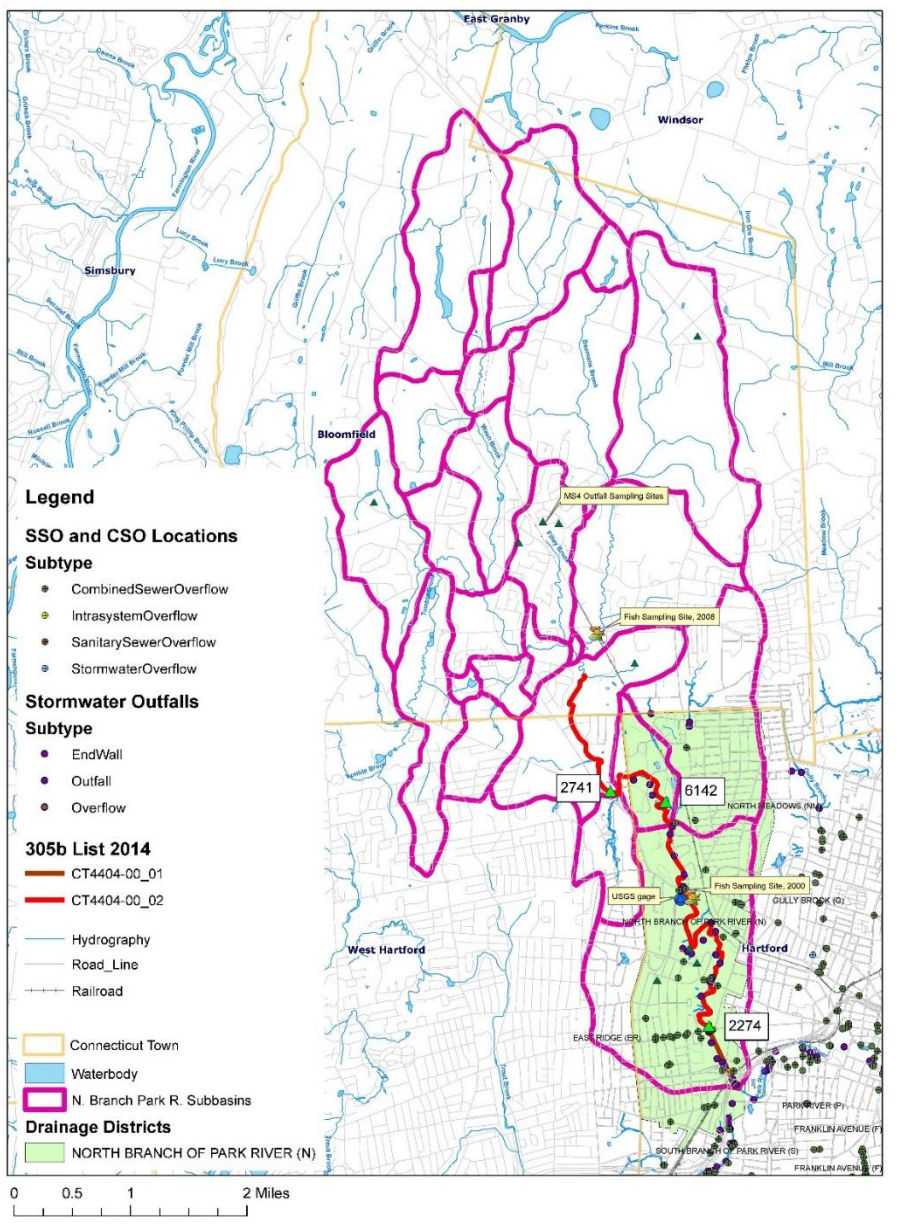
Water Quality Assessment of North Branch Park River

- NBPR watershed components:
  - Hartford
  - West Hartford
  - Bloomfield

- Watershed much larger upstream than section with 4 CSO outfalls



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Water Quality Classification

- Part of rationale for zero discharge (complete elimination of CSOs) was NBPR's status as a Class A stream
  - Initial development of standards in 1967
  - Most recently updated and approved by EPA in 2013
  - No use attainability study completed
- Is this appropriate? What's different about Class B streams?
  - Class B streams:
    - Carry same set of designated uses, minus potential for public water supply
    - Shall have good to excellent aesthetic value
    - Have less restrictive allowances for discharges
- Class B streams have 1-year level of control

NBPR at entrance to Farmington Ave culvert

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Goal of Review

- To summarize available information on water quality impairment of North Branch Park River (NBPR) including DEEP's own data and 2010 study
- To complete a preliminary assessment of the contributions of CSOs toward use attainment of NBPR with currently available data
- To identify additional studies and/or data gaps required to complete a more rigorous assessment
- To implement a seasonal water quality assessment

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Historical Data: Indicator Bacteria

Indicator Bacteria Sampling Data: 2008 - 2010, 2016

Station Name*	Station Location	Year(s)	Wet Events sampled	Dry Events sampled	**Geometric Mean**	Wet Only Mean	Dry Only Mean
2741	Sunny Reach Drive	2010	2	3	**776**	3164	304
6142	University of Hartford	2010	1	3	**824**	N/A	307
2274	Behind Woodland Street	2008 2009 2010	11	18	**656**	1459	402

Source: CTDEEP, 2012

*Sites listed upstream to downstream

Geomean standard: 126 MPN/100 mL

Geometric mean: Commonly used with bacterial water assessments, which often show a great deal of variability. Unlike the arithmetic mean, a geometric mean reduces the effect of an occasional high or low value on the average

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Historical Data: Indicator Bacteria (cont.)

DEEP's in-depth study showed the upstream issues as well

Indicator Bacteria Sampling Data: 2008 – 2010, 2016

	Station Name*	Station Location	Year(s)	Wet Events Sampled	Dry Events Sampled	**Geometric Mean**	Wet Only Mean	Dry Only Mean
Upstream of CSOs	2741	Sunny Reach Drive	2010	2	3	**776**	3164	304
	6142	University of Hartford	2010	1	3	**824**	N/A	307
Downstream	2274	Behind Woodland Street	2008 2009 2010	11	18	**656**	1459	402

Source: CTDEEP, 2012

*Sites listed upstream to downstream

Geomean standard: 126 MPN/100 mL

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Final CH2M Hill Sampling Locations

Stream Sampling Sites:

- S1: CTDEEP 2741 – Sunny Reach Drive
- S2: NBPR Bridge at the University of Hartford
- S3: USGS Gage at Albany Avenue
- S4: Asylum Avenue – South Side
- S5: CTDEEP 2274 – Upstream of Farmington Avenue Conduit
- S6: Tributary at Hartford Golf Club

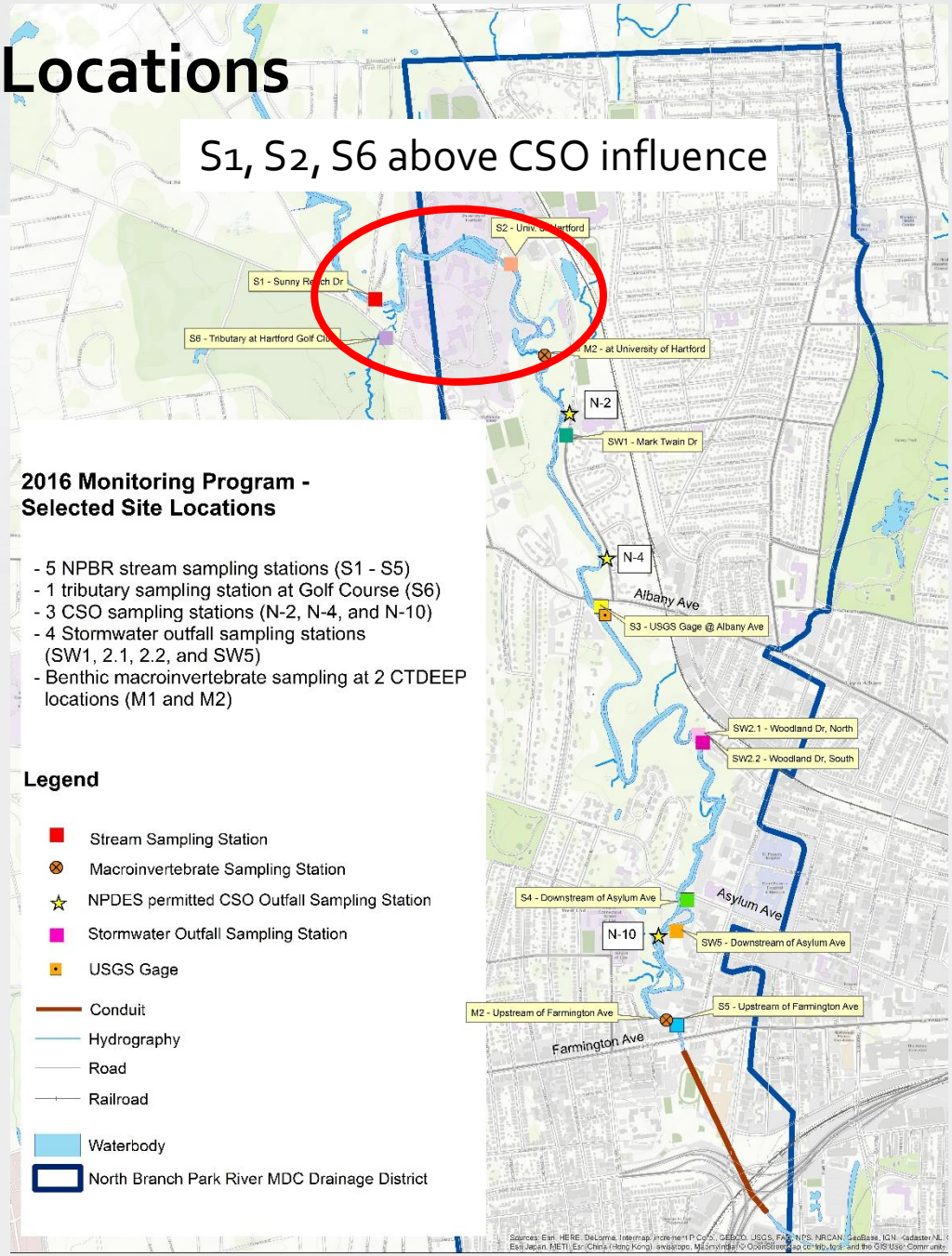
Stormwater Outfall Sampling Sites:

- SW1: Mark Twain Drive
- SW2.1: End of Woodland Drive (North)
- SW2.2: End of Woodland Drive (South)
- SW5: Asylum Avenue South Side

(other sites identified, but difficult to obtain clean samples)

CSO Sampling Sites:

- N-2, N-4, N-10



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Water quality standard violated at all sites and in all years

Summary: Bacteria Data (Historical Data Plus CH2M Hill Data)

Indicator Bacteria Sampling Data: 2008 - 2010, 2016

	Station Name*	Station Location	Year(s)	Wet Events sampled	Dry Events sampled	**Geometric Mean**	Wet Only Mean	Dry Only Mean
Upstream of CSOs	2741	Sunny Reach Drive	2010	2	3	**776**	3,164	304
			2016	8	6	**762**	2,074	200
	6142	University of Hartford	2010	1	3	**824**	N/A	307
			2016	8	6	**1066**	3,638	207
Downstream	2274	Behind Woodland Street	2008 2009 2010	11	18	**656**	1,459	402
			2016	8	6	**305**	700	118

Source: CTDEEP, 2012

*Sites listed upstream to downstream of CSO influence

Indicator bacteria water quality standard: 126 MPN/100 mL

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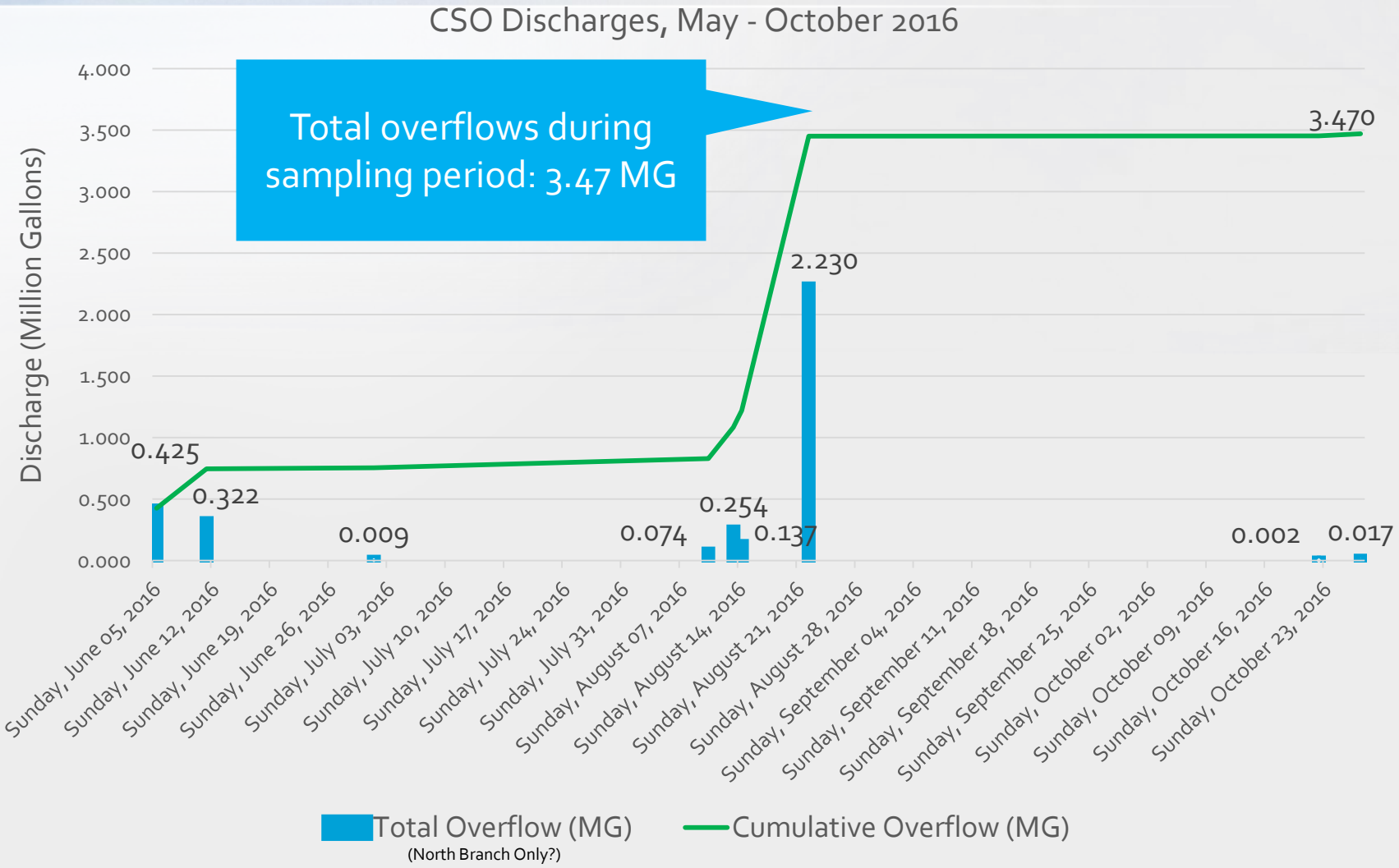
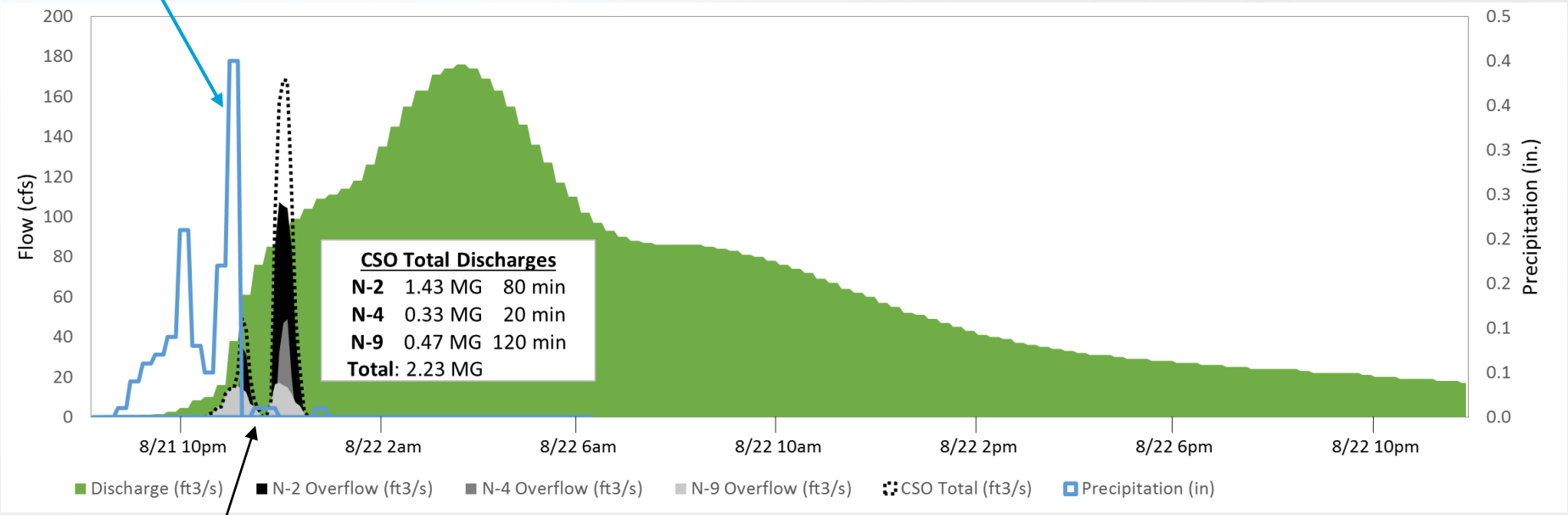
Characterization of Impairment



CSO Contributions: Analysis of wet weather flows
August 21-22 Wet Weather Event

Rainfall Total: 1.21 in



CSO patterns match rainfall patterns, but are quick to end compared to stream flow response to each rainfall event.

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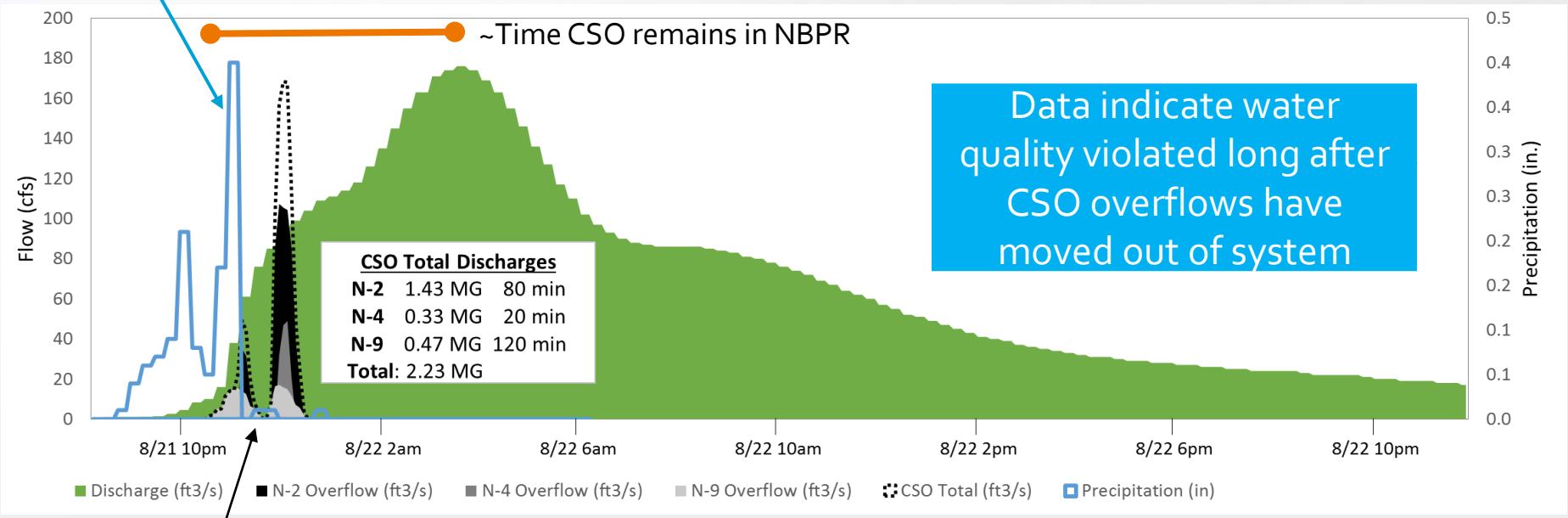
the choice is clear

CSO Contributions: Analysis of wet weather flows
August 21-22 Wet Weather Event

Rainfall Total: 1.21 in



CSO patterns match rainfall patterns, but are quick to end compared to stream flow response to each rainfall event.

At flow of 100 cfs, takes approximately 2.4 hours for overflows from N-2 to enter the Farmington Ave conduit

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Key Conclusions: Peer Review and Sampling Results

Results indicate that bacteria levels are more due to land uses and stormwater runoff than CSOs alone.

- **Weather Conditions**: Results show water quality impairment for the recreational standard in both *dry* and *wet* weather
- **Watershed-wide Issue**: Wet weather water quality results are similar across stream sites, regardless of location upstream or downstream of CSO influence
  - Water quality standards are not being met upstream of MDC's jurisdiction either
  - Whole watershed approach required to make progress towards water quality standard

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CWP Requires a Long Term Control Plan

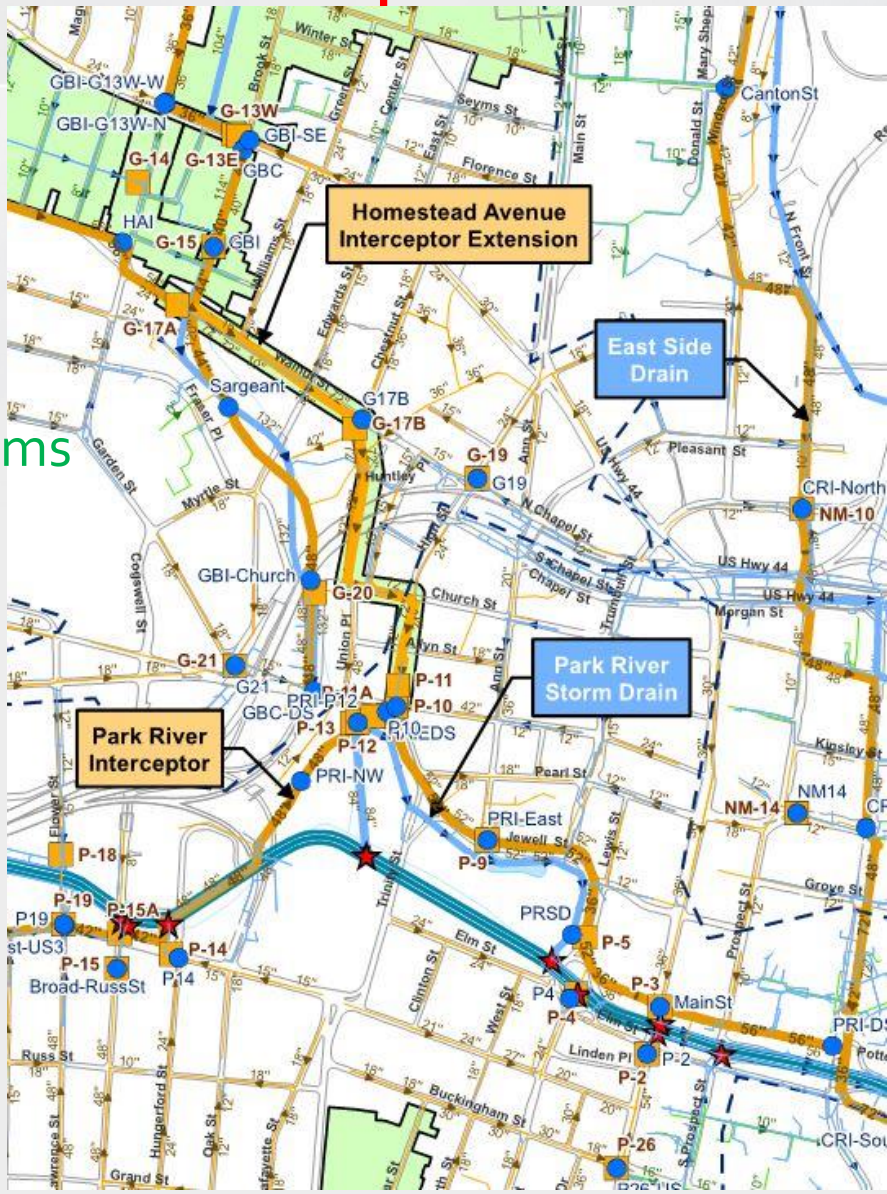
- LTCP required to be updated every 5 years
- Original LTCP
  - Originally submitted by the MDC in 2004, revised in 2005
  - Approved by DEEP in 2007
- 2012 LTCP Update
  - Originally submitted 12/2012, revisions through 12/2014
  - Approved by DEEP April 2015
- Next 5-year LTCP Update
  - MDC suggested 5 yrs from 2014 submission – due 12/2019
  - DEEP 11/2015 letter notes 5 yrs from 2012 submission – due 12/2017
  - Includes evaluation of effectiveness of work completed to date

2017 LTCP Update could incorporate

2017 LTCP Update could not incorporate

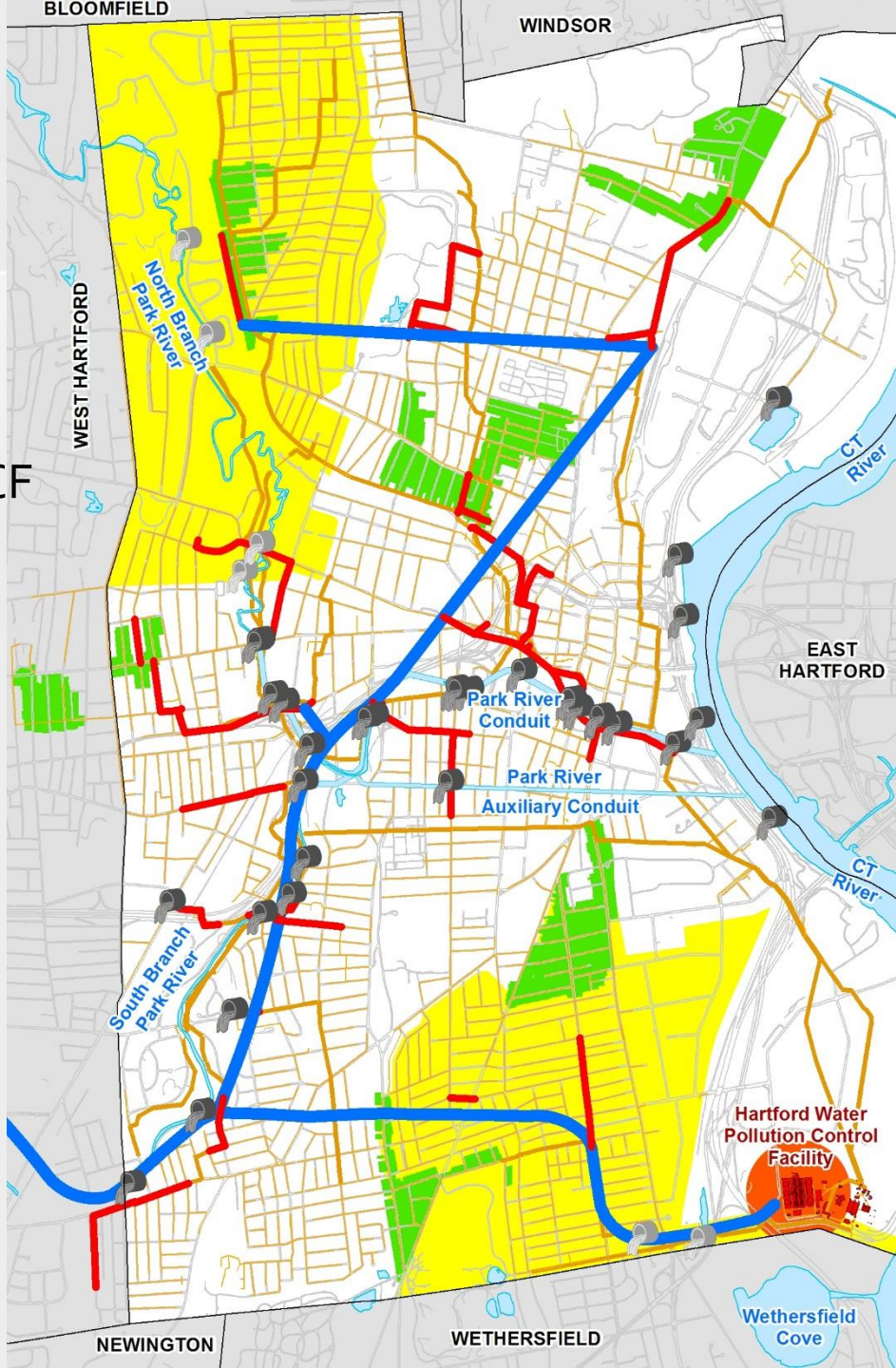
- ✓ 132 flow meters in 2016
- ✓ Large sewer pipe inspection
- ✓ Field inspection of CSO regulators
- ✓ Survey of interceptor rims/inverts

- Review other CSO communities programs that have been approved by EPA
- More metering in 2017 due to drought
- Cleaning priority interceptors/siphons and corresponding sewer performance improvement
- Update to hydraulic model
- Assess how projects completed to date helped system operations
- Alternatives analysis
- Develop updated plan moving forward



DEEP's Current Expected Schedule
Consider Engaging DEEP now

- 2017: Model re-calibration
  Submit next 5-yr LTCP Update
- 2018: Complete improvements to HWPCF
- 1/2019: Start North Tunnel BODR
- 2021: Eliminate 2 of 4 CSOs to NBPR
  (N9 and N10)
- 1/2024: South Tunnel online (eliminate CSOs to Cove)
- 2029: North tunnel online
  Primary reasons for tunnel:
  1) Eliminate CSOs to NBPR
  2) Capture remaining CSOs up to and including 1-year storm



Next LTCP Update

- Consider Integrated Planning
  - CSO Consent Order -DEEP approval
  - SSO Consent Decree - EPA approval
  - ~$450M CMOM program initiatives not part of CWP (inspections, easement clearing, repairs)
  - $35M/yr Sewer asset mgmt./CIP
  - Stormwater (i.e., MS4)
  - Green infrastructure
- Consider all in affordability analysis
- Engage DEEP staff during 2017 to get consensus of possible changes to current LTCP

EPA United States Environmental Protection Agency

National Pollutant Discharge Elimination System (NPDES)

Integrated Planning for Municipal Stormwater and Wastewater

On this page:

- Overview
- Resources
- Technical Assistance

Overview

EPA, states, and municipalities have achieved real progress in implementing the Clean Water Act (CWA) (PDF) (234 pp, 571 K, About PDF) and protecting public health and the environment. However, today there are many factors stressing the implementation of CWA programs. Stressors include population growth, aging infrastructure, increasingly complex water quality issues, limited resources, and other economic challenges. Currently, EPA, states, and municipalities often focus on each CWA requirement individually. This may not be the best way to address these stressors and may have the unintended consequence of constraining a municipality from addressing its most serious water quality issues first.

An integrated planning approach offers a voluntary opportunity for a municipality to propose to meet multiple CWA requirements by identifying efficiencies from separate wastewater and stormwater programs and sequencing investments so that the highest priority projects come first. This approach can also lead to more sustainable and comprehensive solutions, such as green infrastructure, that improve water quality and provide multiple benefits that enhance community vitality.

The integrated planning approach is not about changing existing regulatory or permitting standards or delaying necessary improvements. Rather, it is an option to help municipalities meet their CWA obligations while optimizing their infrastructure investments through the appropriate sequencing of work.

Resources

- Memorandum: Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans
- Integrated Municipal Stormwater and Wastewater Planning Approach Framework – Provides guidance for EPA, states, and local governments to develop and implement effective integrated plans under the CWA. This framework was finalized after extensive public input including a series of workshops across the country.
- Combined Sewer Overflows - Guidance for Financial Capability Assessment and Schedule Development (FCA Guidance) – Provides an aid for assessing financial capability as part of negotiating schedules for CWA requirements for municipalities and local authorities.
- Financial Capability Assessment Framework – Provides greater clarify on the flexibilities built into

Purpose of Affordability Update

- MDC faces significant capital improvement requirements for CWP and Sewer (prior slide/integrated plan) PLUS Water CIP
- Funding those requirements will:
  - Impact the District's customers (water bill)
  - Impact member town appropriations (Ad Valorem)
  - Impact District's ability to borrow (debt cap)
- Develop/update long-term financial model and project potential impacts (both water and sewer)

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What is Considered "Affordable"??

- EPA Affordability process identifies an average dwelling unit sewer cost exceeding 2% of median household income (MHI) as high burden
- Affordability based on a per dwelling (single family, multi family, mobile home) unit cost, so differs from MDC definition of residential customers
- Does include sewer CIP ($35M/year), stormwater, green infrastructure
- Does not include water CIP ($25M/year) nor impact on water rates due to SSSC -> reduced water consumption

- If collectability is low due to non payment, everyone else pays more

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Affordability Evaluation will Include:

- All sewer expenditures (integrated plan) plus stormwater expenditures from 8 member towns
- Specifically look at Hartford, and areas of Hartford, affordability vs. the average of all MDC member town MHI
- Assess impact of Hartford potentially not being able to pay
- Impact of SSSC on water bill thus reducing water consumption which impacts water CIP
- Consider with and without water CIP/cost of service

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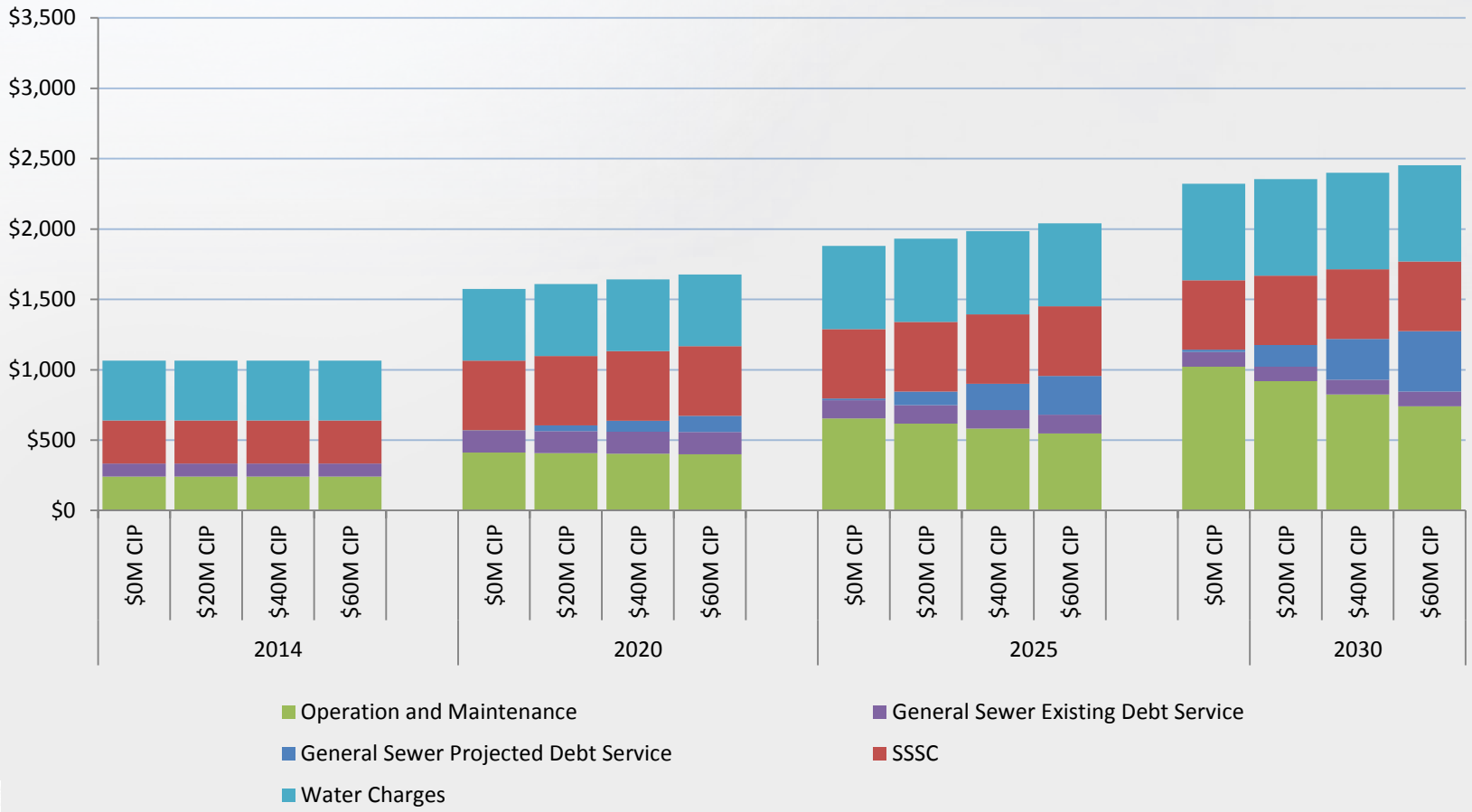
District Wide Projected Total MDC Cost Per Household (from 2014)



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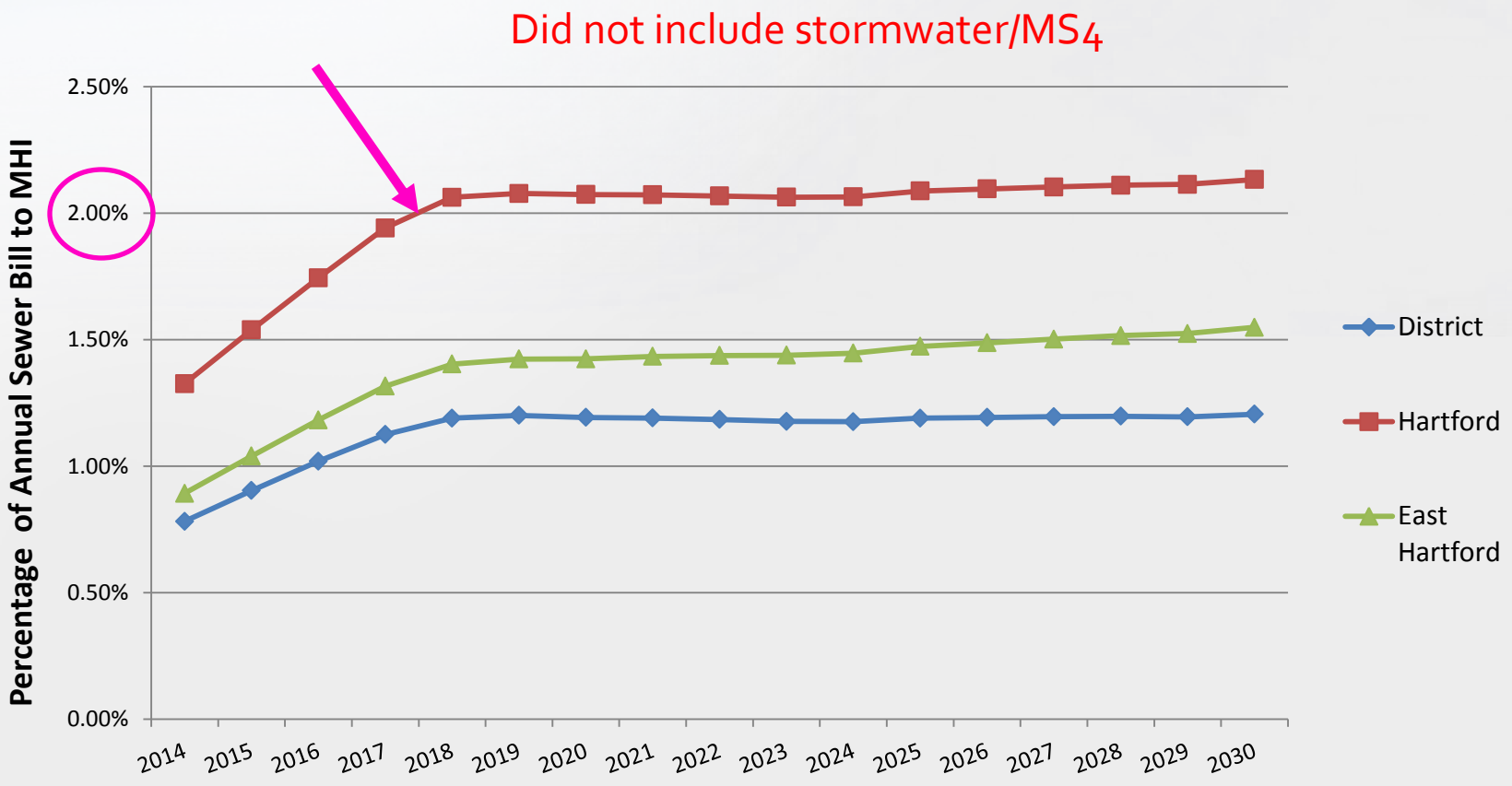
Projected Household Burden--$20M CIP based on Average Cost Per Dwelling Unit (from 2014)



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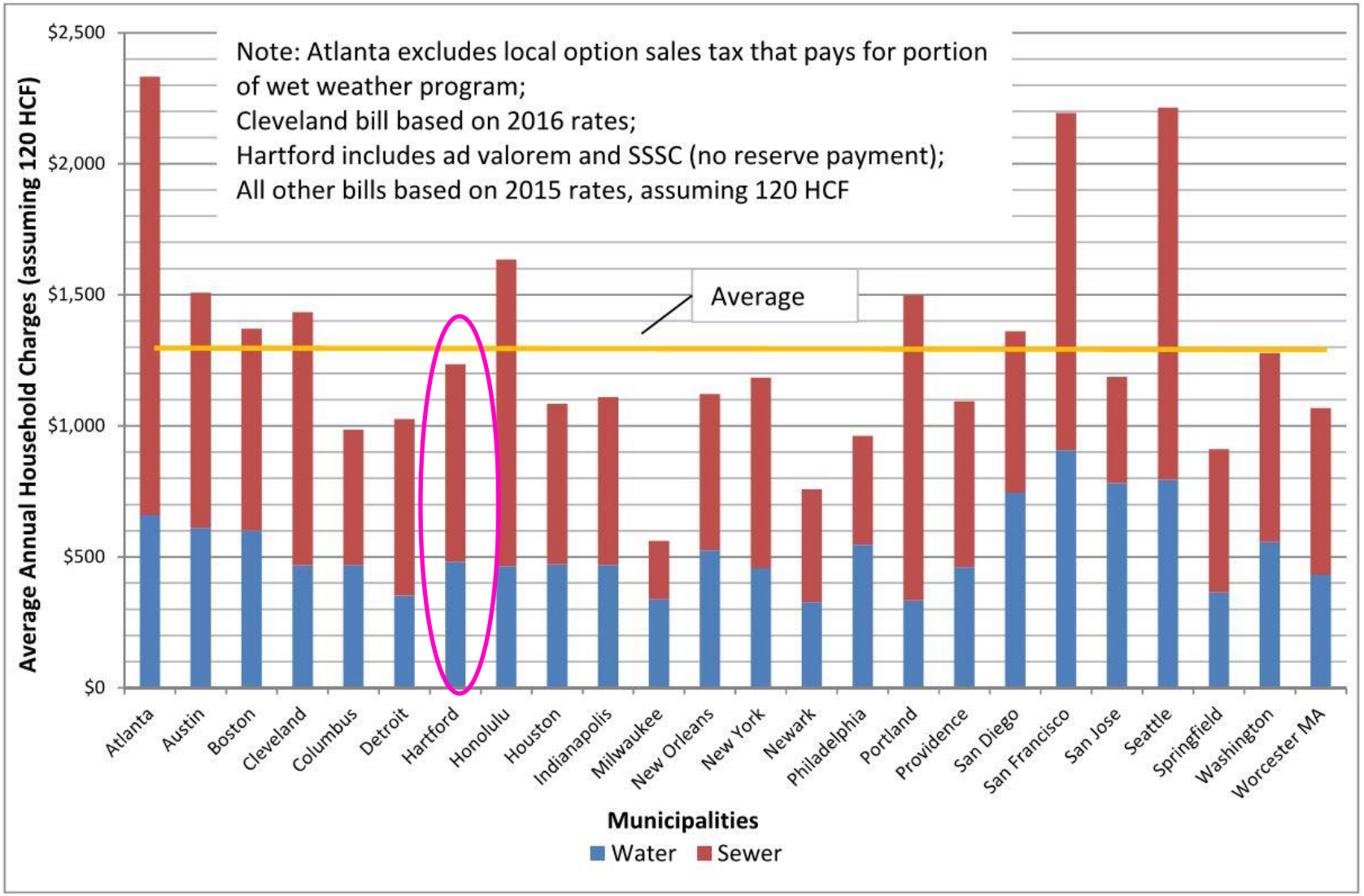
Comparison of Current MDC Rates to Other Wet Weather Communities



What are other Communities Doing? What is their CSO Level of Control?

Summary of Compiled Information Related to CSO LTCPs
(prepared 12/17/2013)

Community	State	Approximate Population Served	Approximate Service Area (area or miles of pipe)	CSO LTCP Approval / Status	Approximate % Complete (cost spent / total cost)	Estimated Completion Date	Approximate Total Program Cost	CSO Level of Control	Notes
Chicago	IL	10 million residents	880 square mile service area	1994	30%	2029	$3.4 billion	approx 3-month (84% capture)	phase 1 of tunnel system built (109 miles of tunnels that capture 84% of loads, 2.3 billion gallons of storage); $1B spent to-date, GI
New York City	NY	8 million	6,000 miles	LTCP update to be submitted in 2017	35%	2030	$5.7 billion		Seeking to subsitute GI projects for grey projects included in 2005 Consent Order; $1.8B spent on grey to-date
Detroit	MI	3 million	950 square miles, 3,400 miles	being revised; 1993/2011	<50%	2034	$1.6 billion	<3 month	Financial hardship has limited implementation; $1.5 billion tunnel cancelled in 2009; alternative Rouge River control plan focuses on GI to reduce CSO by 10-20%; original plan sought to reduce CSO by 85%; some facilities implemented including satellite facilities
Kansas City	MO		2,800 miles	2010	<10%	2030+	$2.5 billion	<1-yr (88% capture)	GI, other
MWRA	MA	Over 2 million residents, 5,500 businesses	5,100 miles	1998 / 2006	91%	2015	$860 million	less than 1-yr system-wide (0.4 BG/year target); 25-yr for South Boston beaches	
Baltimore	MD	1.6 million people	3,100 miles	2002	90%	2016	$900 million	elimination of overflow structures	separation, pump station improvements
Atlanta	GA	1.5 million	2200 miles	2001	100% for LTCP implementation; 2029 for other wet weather plan components	2008 for LTCP Implementation	$759 million for LTCP components; $3 billion for other wet weather components; spent $1.5 billion to-date	4 treated overflows/yr (screening, disinfection and dechlor)	95% reduction in CSO volume, limited overflow events annually; tunnels, separation, storage
Seattle and King's County	WA	1.5 million	420 square miles	2012; revised plan approval expected in 2015	20-40%	2030	$1.5 billion	1 overflow/yr	system upgrades, GI, storage, treatment facilities, storage tanks
Philadelphia	PA	1.5 million	3,000 miles	LTCP approved in 2011	20%	2030	$1 billion	approx 3-month (85% capture)	GI; 85% reduction
Washington	DC	1.3 million	1800 miles,725 square mile service area	2004	67%	2025	$2.6 billion	1 overflow/yr to 4 overflows/yr depending on location	in-line storage, expanded WWTF and pumping capacity, three sotrage tunnels (11 miles long), GI
St. Louis	MO	1.3 Million	525 square miles, 9,600 miles	2011	25%	2036	$2.4 billion	4 overflows/yr in some areas, elimination in others, meaningful reduction in CSOs to Mississippi River	separation, treatment, tunnel, storage, GI; lower levels of control on urban streams where CSO reduction doesn't affect WQ (i.e. Mississippi River)
Indianapolis	IN	400,000 homes	3000 miles, 280 square mile service area	2009 revised	<15%	2025	$1.7 billion	3-month on White River and two tribs, 6-month on one trib, 640 MG/yr	based on affordability, tunnel, GI, other

Conclusions

- Process of updating LTCP is underway
- 2017 submittal will be status without updated plan
- Integrated plan to include all sewer costs
- Affordability analysis critical to understanding overall impact to poorest areas and Water CIP
- Engage DEEP in discussion
  1. NBPR water quality discussion
  2. Flow metering results
  3. Address aging infrastructure (water and sewer)
  4. Affordability analysis

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Conclusions (cont.)

- Next Steps
  - 2017 Flow Metering
  - 2017 Sewer Cleaning (Large Diameter)
  - 2017 Additional Water Quality Analysis Sampling

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