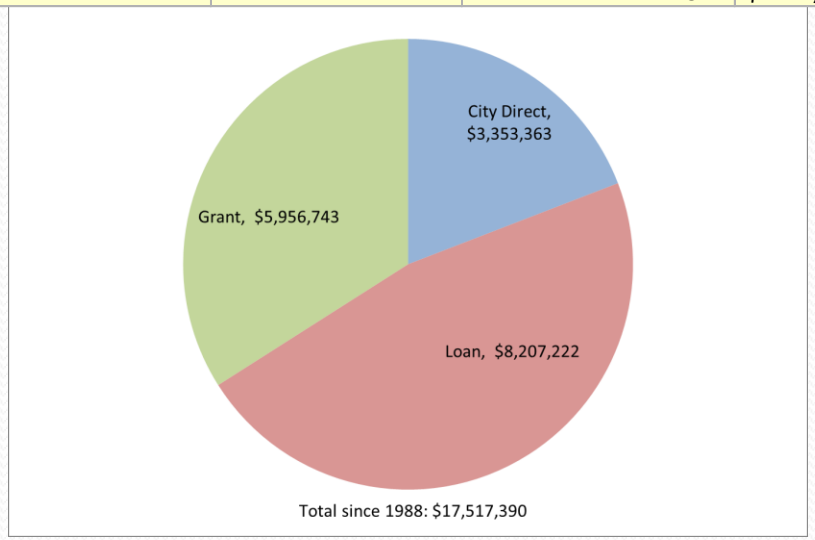
Senate Natural Resources Committee Hearing September, 19, 2018

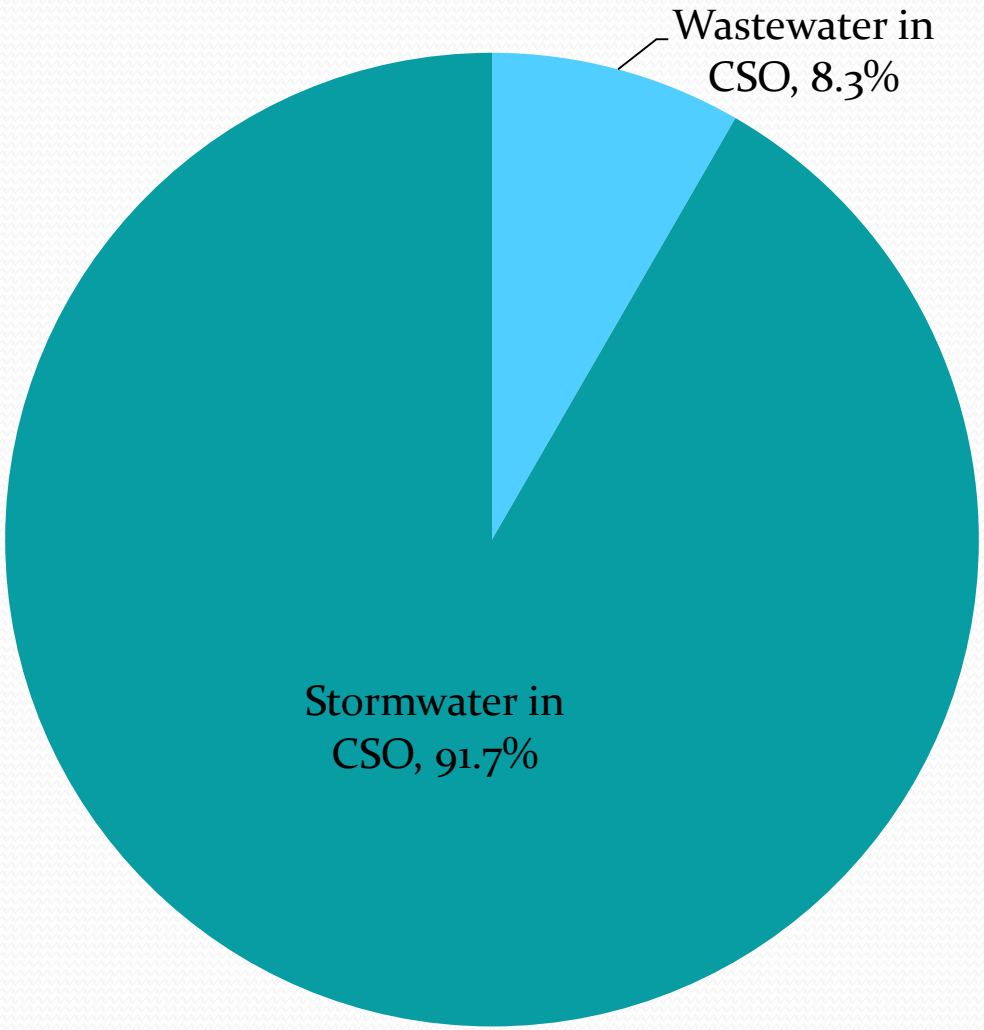
Jeffrey Wennberg
Commissioner of Public Works
City of Rutland

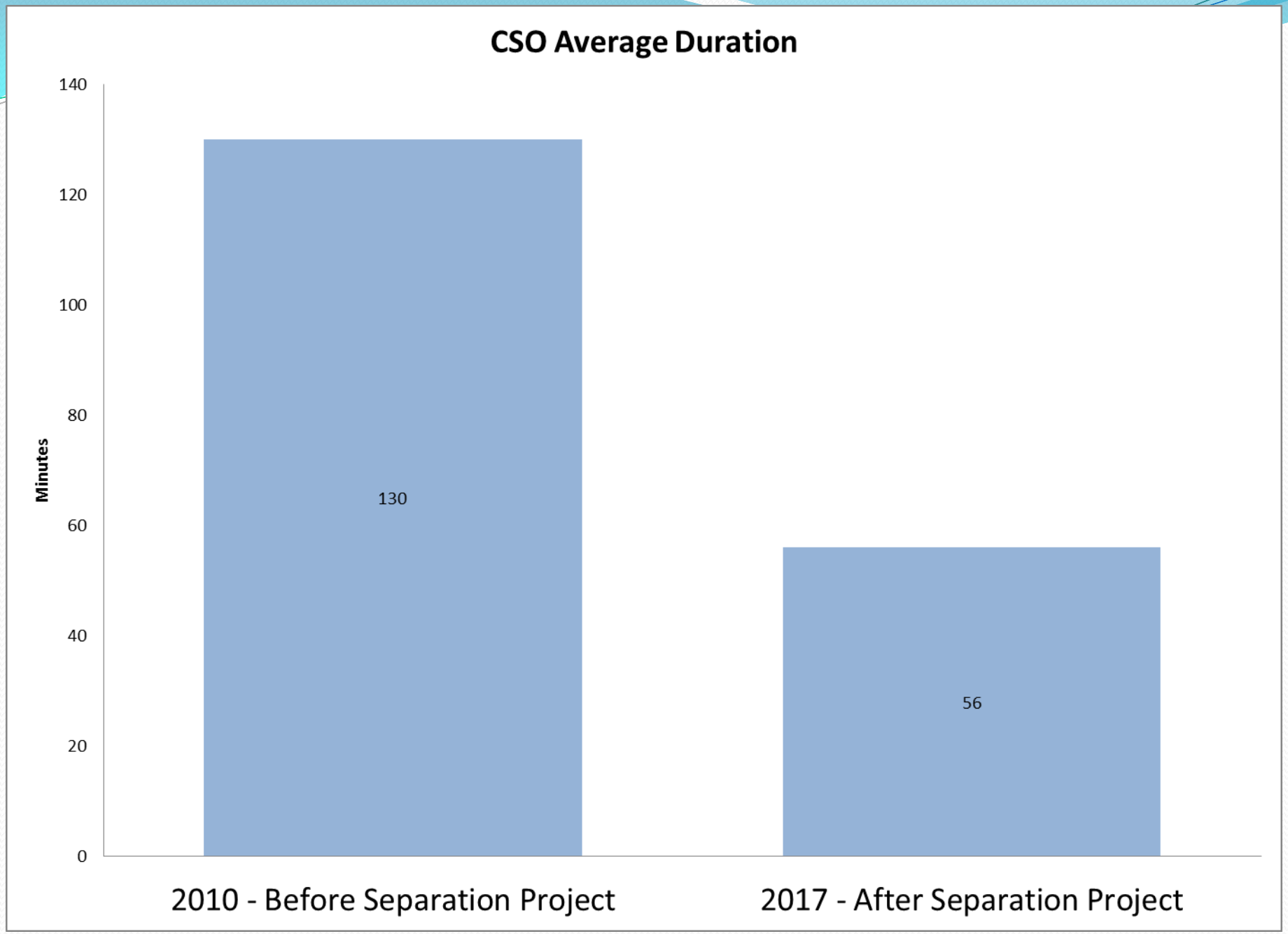
City of Rutland CSO Planning and Work Since 1988

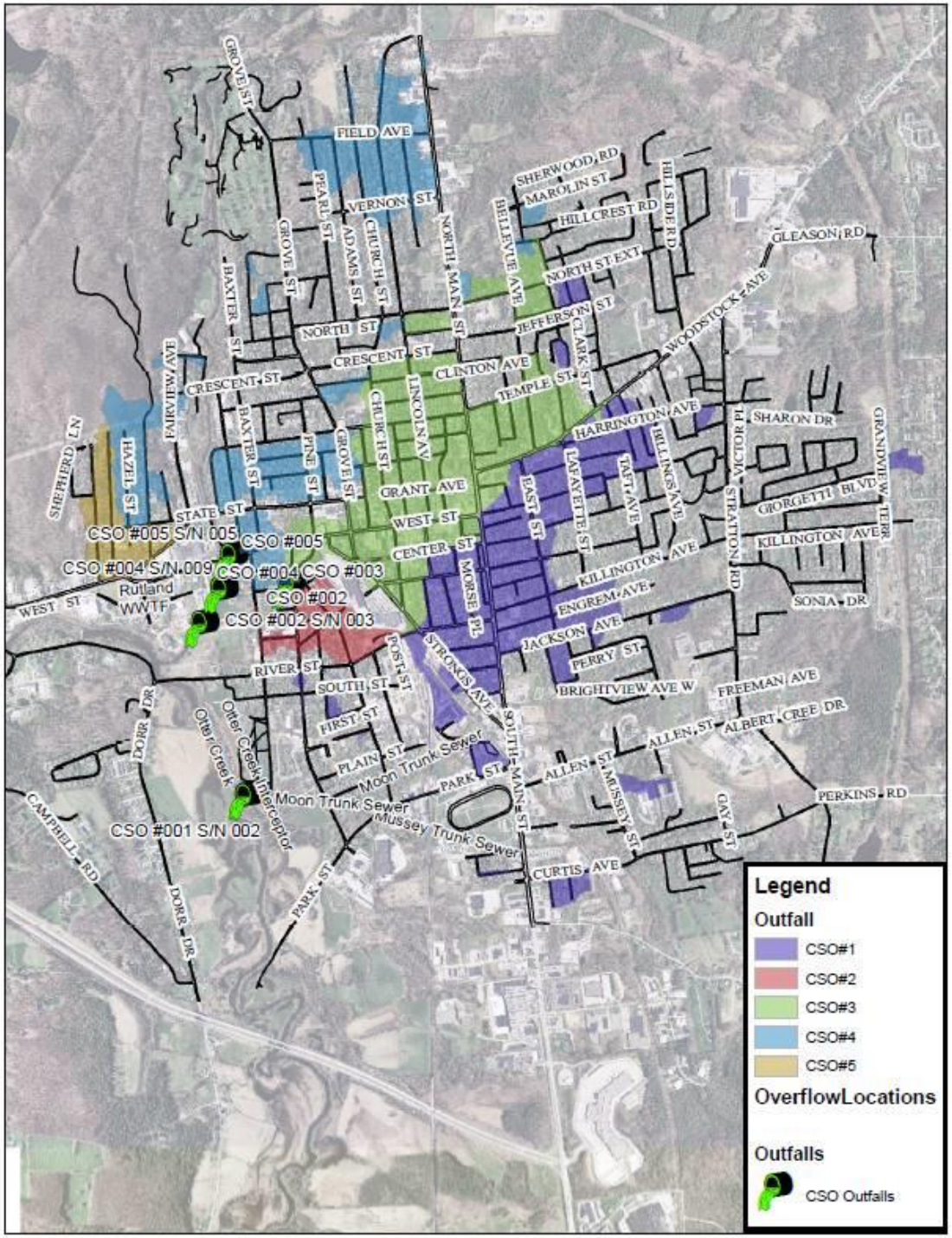
Year	Project	Contractor	Funding Source	Cost	City Direct	Loan	Grant
1988	CSO Planning Study	Dusfrene-Henry	CWSRF Planning Advance	$ 175,033	$ 10,612	$ 164,421	
1989	Storm sewer separation - Shedd Place	DPW	City of Rutland	$ 13,390	$ 13,390		
1990	Storm sewer separation - Eastview Court/Hillcrest Road	DPW	City of Rutland	$ 22,767	$ 22,767		
1990	Storm sewer separation - Robinwood Lane	DPW	City of Rutland	$ 7,136	$ 7,136		
1992	Storm sewer separation - State Street	Daniels Construction	FhWA - Vtrans	unknown			
1993	CSO Phase I Completed - New force main, CSO Headworks	Belden	CWSRF	$ 1,223,615	$ 433,085	$ 611,807	$ 178,722
1995	Storm sewer separation - North Main Street	Don Weston Excavating	Town of Rutland	unknown			
1997	Storm sewer separation - School, Forest, and Union Streets	DPW	City of Rutland	$ 386,368	$ 386,368		
1998	Storm sewer separation - Spruce St Ext.	Casella Construction	City of Rutland	$ 274,749	$ 274,749		
2006	CSO Phase IIA Design/Construction	Penta Corporation	Bond/CWSRF/Grant	$ 5,606,106	$ 1,401,206	$ 2,801,226	$ 1,403,613
2006	I&I Smoke testing project	Green Mountain Pipeline	LCIF?	$ 3,000			$ 3,000
2006	Storm sewer separation - GE Roof Drains	GE	GE	unknown			
2008	Storm sewer separation - West Street/Crescent Street	M&M Excavating	ARRA Grant/CWSRF Loan	$ 1,234,640	$ 312,014	$ 462,500	$ 460,126
2009/2012	Storm sewer separation - Stratton Road	DPW	City of Rutland	$ 48,014	$ 48,014		
2010	Storm sewer separation - Allen Street	DPW	City of Rutland	$ 40,000	$ 40,000		
2013	Storm sewer separation - River Street	DPW	City of Rutland	$ 29,033	$ 29,033		
2014	Storm sewer separation - Main Street	Casella Construction	FhWA - Vtrans	$ 2,888,418	$ 288,842		$ 2,599,576
2015	Northwest Neighborhood Sewer Separation Project completed	Kingsbury Construiction	Bond, CWSRF	$ 5,170,670		$ 3,886,016	$ 1,284,654
2016	Storm sewer separation - Adams Street (swirl separator)	DPW	ERP	$ 47,000	$ 33,948		$ 13,052
2016	Storm sewer separation - NNSSP Phase IA Design	Otter Creek Engineering	CWSRF	$ 20,252		$ 20,252	
2017	West Street bypass pump	DPW/Belden	City of Rutland	$ 33,000	$ 33,000		
2017	CSO monitoring program	Ayyeka	City of Rutland	$ 19,199	$ 19,199		
2017	Storm sewer separation - Vernon Street Design	Dubois & King	ERP	$ 14,000			$ 14,000
2018	Hydraulic and Hydrologic Study Completed	Weston & Sampson/DPW	CWSRF Planning Advance	$ 261,000		$ 261,000	
			TOTAL	**$ 17,517,390**	**$ 3,353,363**	**$ 8,207,222**	**$ 5,956,743**



Wastewater v. Stormwater in CSOs
2017




CSO Average Duration
140
120
100
80
60
40
20
0
Minutes
130
56
2010 - Before Separation Project
2017 - After Separation Project


CSO #005 S/N 005
CSO #005
CSO #004 S/N 009
CSO #004
CSO #003
CSO #002
CSO #002 S/N 003
Rutland WWTF
CSO #001 S/N 002
Otter Creek Interceptor
Moon Trunk Sewer
Mussey Trunk Sewer
Otter Creek
GROVE ST
FIELD AVE
PEARL ST
VERNON ST
ADAMS ST
CHURCH ST
NORTH MAIN ST
BELLEVUE AVE
SHERWOOD RD
MAROLIN ST
HILLCREST RD
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GLEASON RD
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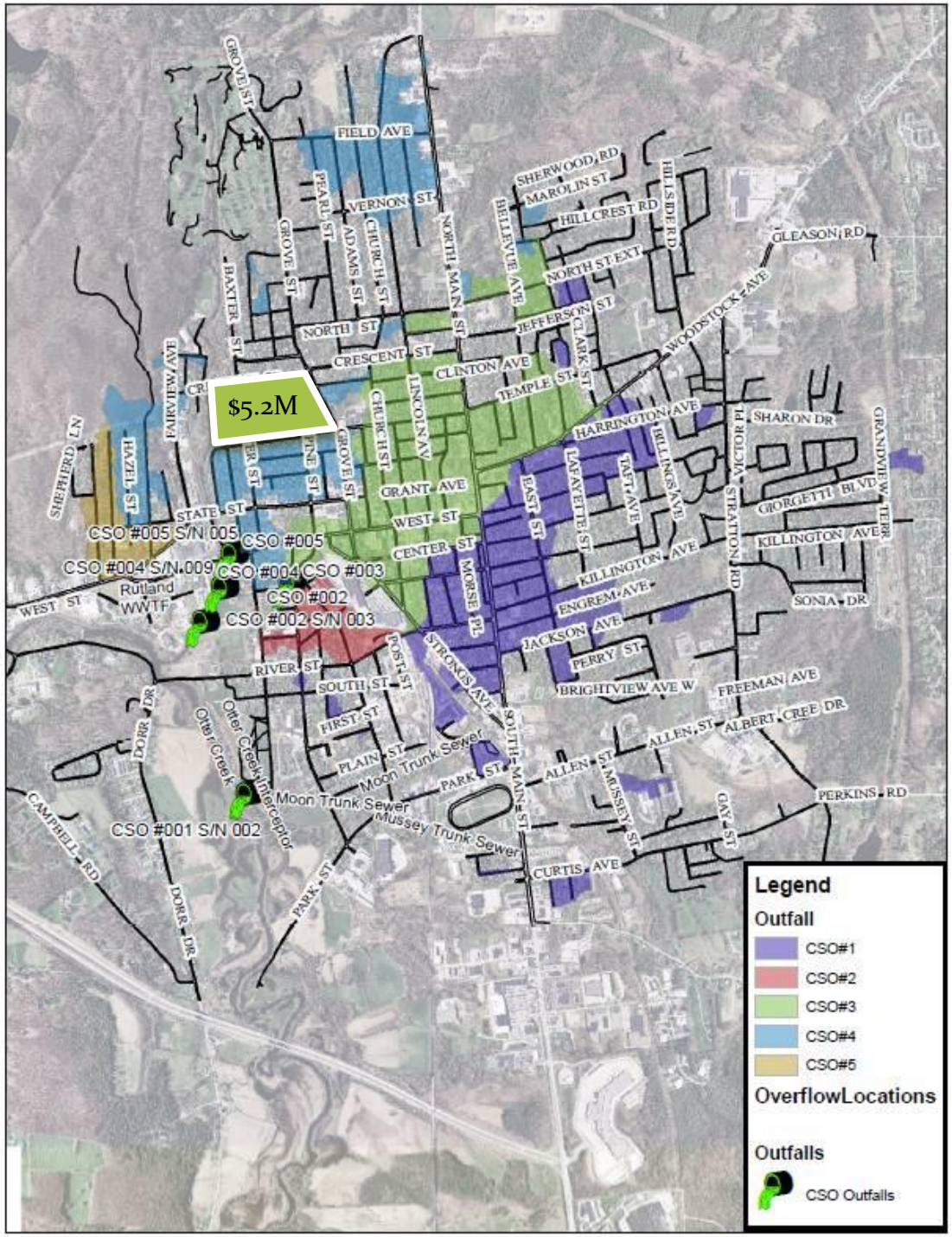
OverflowLocations
Outfalls
CSO Outfalls


$5.2M
CSO #005 S/N 005
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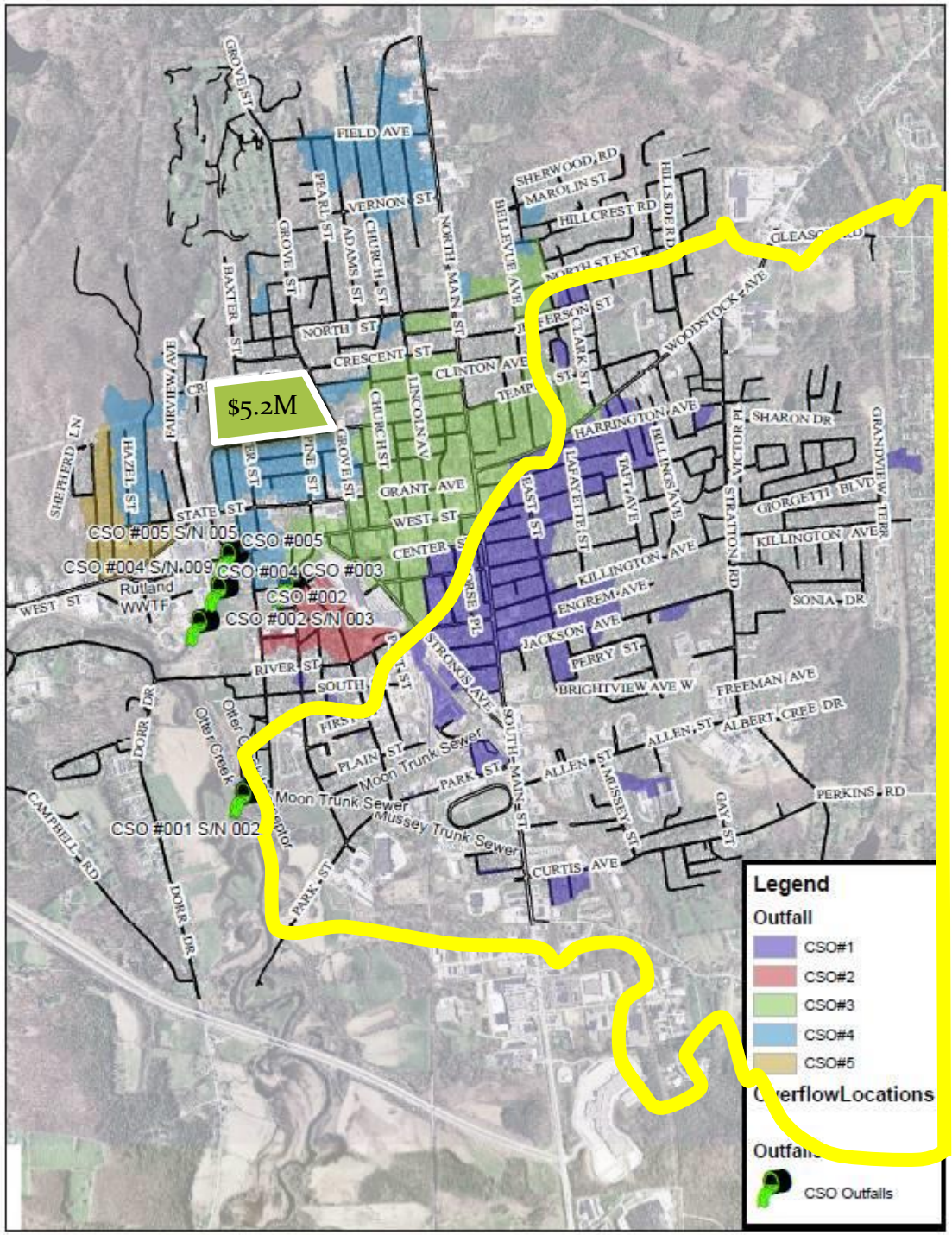
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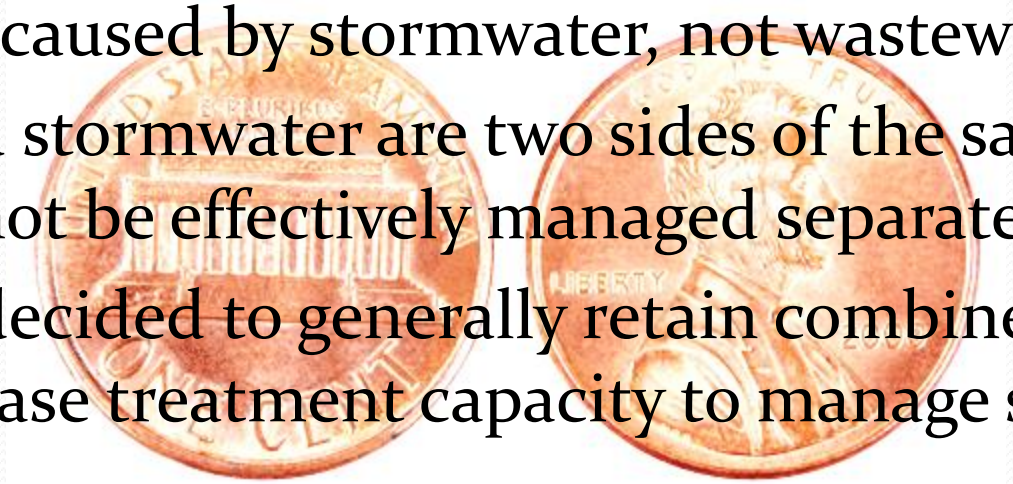
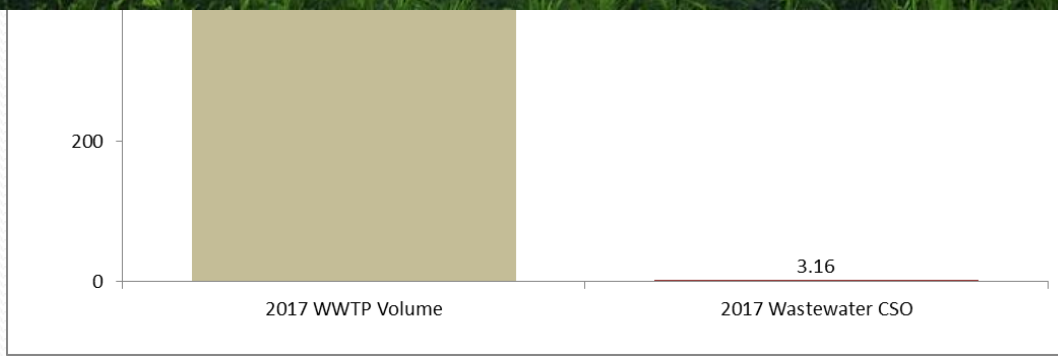
Rutland's Strategy

- **Holistic approach – *consider the overall impacts on water quality***
- CSOs are caused by stormwater, not wastewater
- CSOs and stormwater are two sides of the same coin; they cannot be effectively managed separately.
- Rutland decided to generally retain combined sewers and increase treatment capacity to manage stormwater flows.
- Undertaken multiple WWTP expansions – 22.5mgd capacity today, 7 times dry weather flows

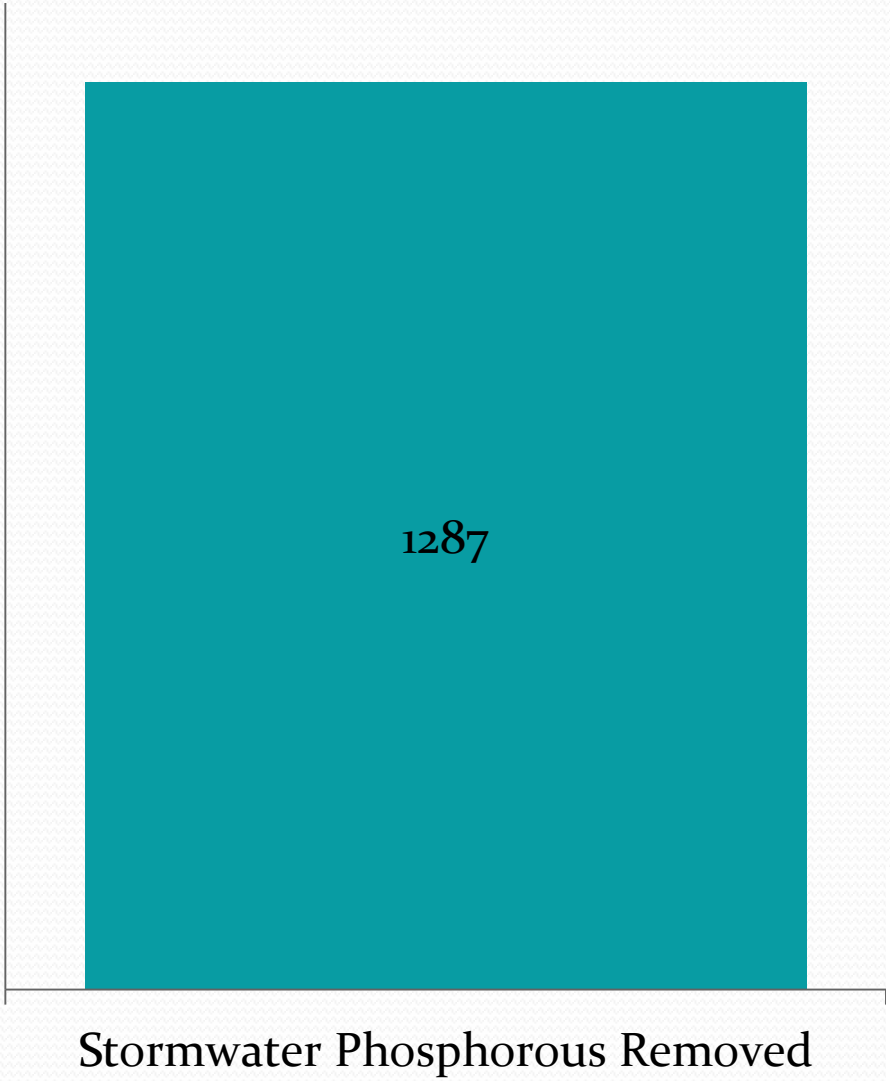



2017 Rutland City Wastewater & Stormwater Treatment Flows vs. Wastewater CSOs
Million Gallons
1800
1600
1400
1200
1000
800
600
400
200
0
Stormwater treated at WWTP
643
Wastewater treated at WWTP
1071
3.16
2017 WWTP Volume
2017 Wastewater CSO

2017 Rutland City Wastewater & Stormwater Treatment Flows vs. Wastewater CSOs



Rutland WWTP 2017 Pounds of Phosphorous Removed from Stormwater vs. Wastewater Phosphorous Released During Overflows



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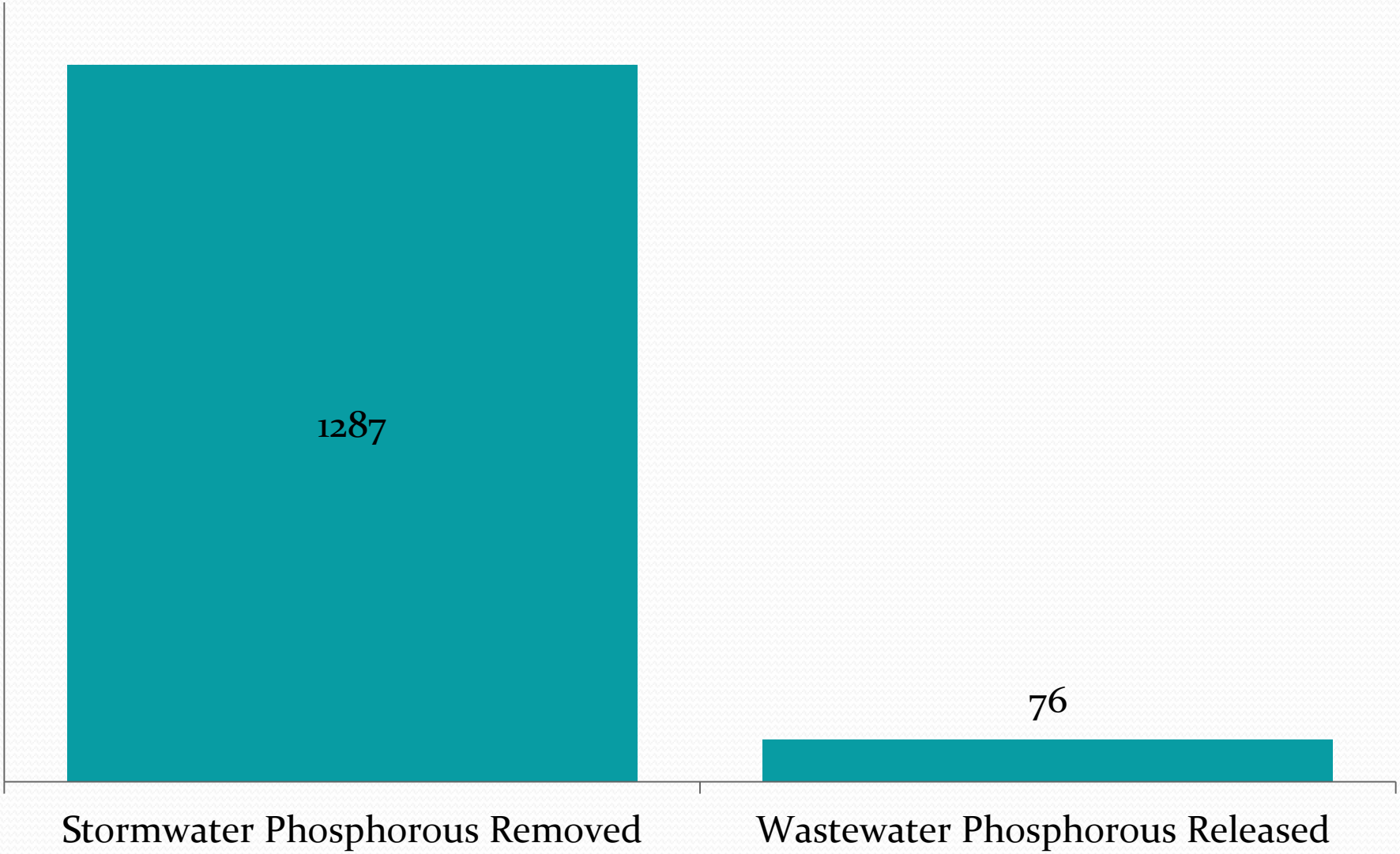
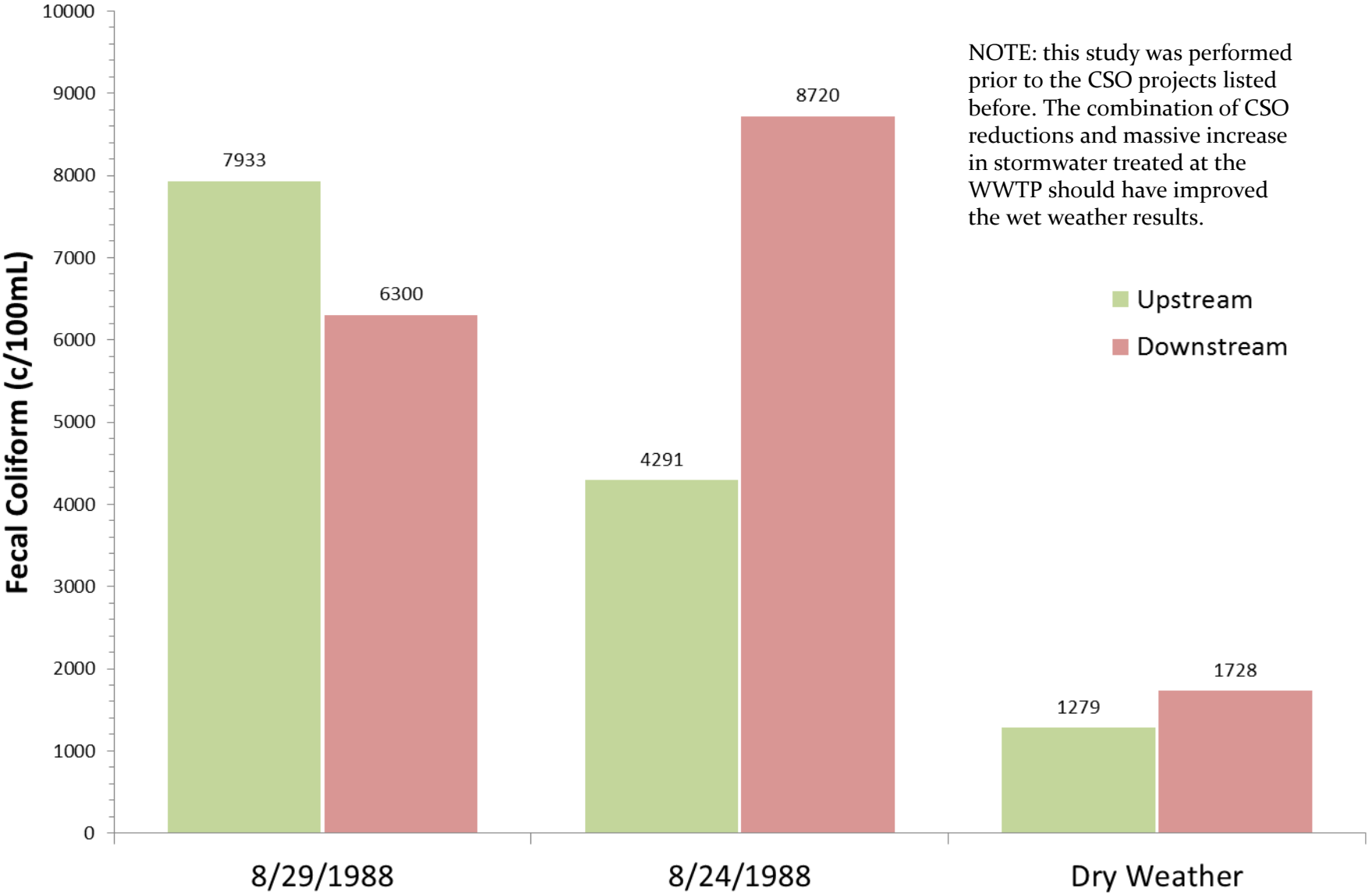


1988 Study of Fecal Coliform in Otter Creek - Average of Multiple Hourly Samples During two Storm Events and Dry Weather



NOTE: this study was performed prior to the CSO projects listed before. The combination of CSO reductions and massive increase in stormwater treated at the WWTP should have improved the wet weather results.

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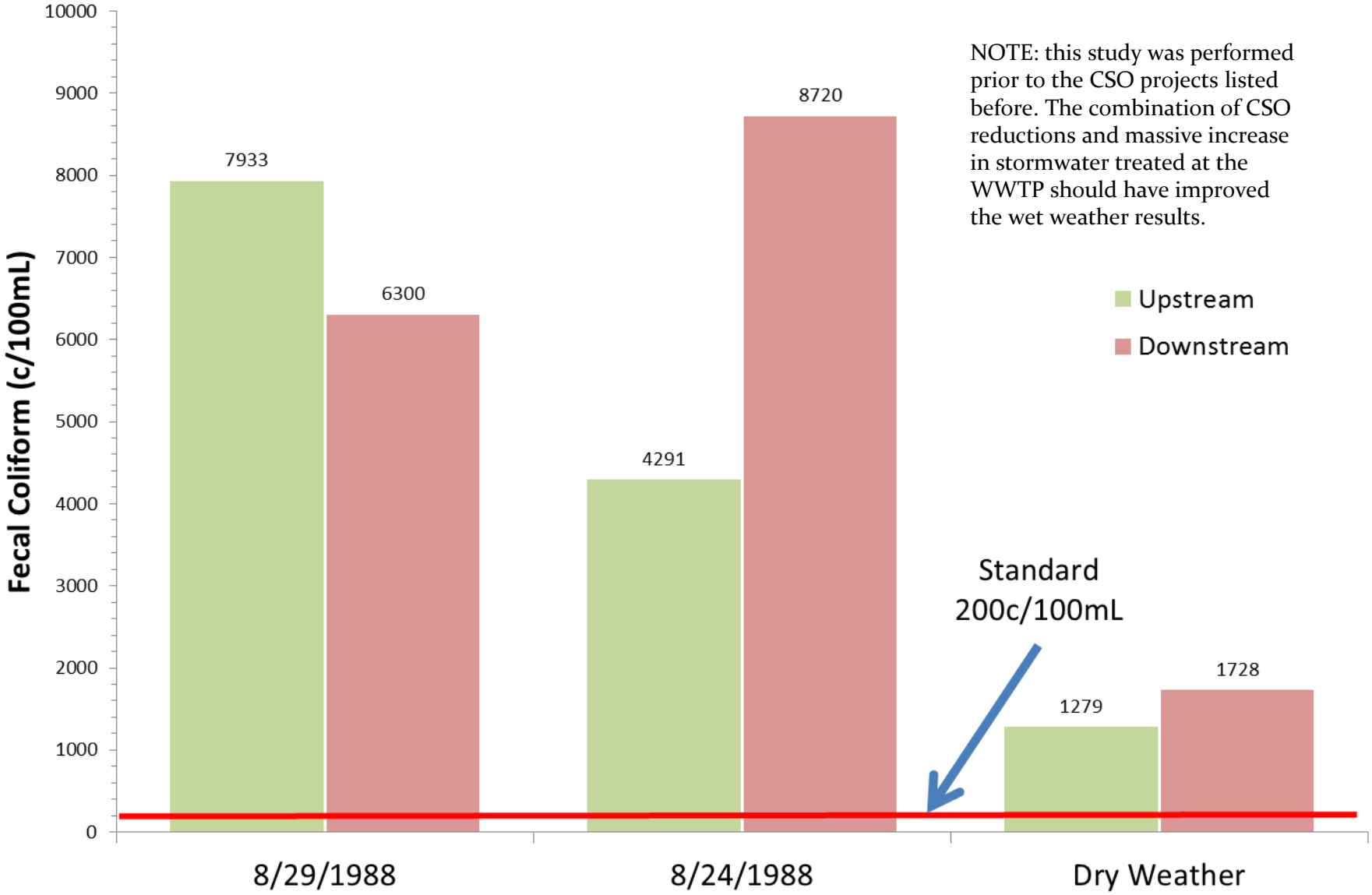

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1989 Dusfrene-Henry Report

"Concerning bacterial contamination, we can state with assurance that irrespective of CSO abatement strategies, the fecal coliform limit of 200 c/100mL will continue to be grossly exceeded as a result of bacterial contamination from other sources besides CSOs for significant rainfall events"

Where do the pathogens come from?

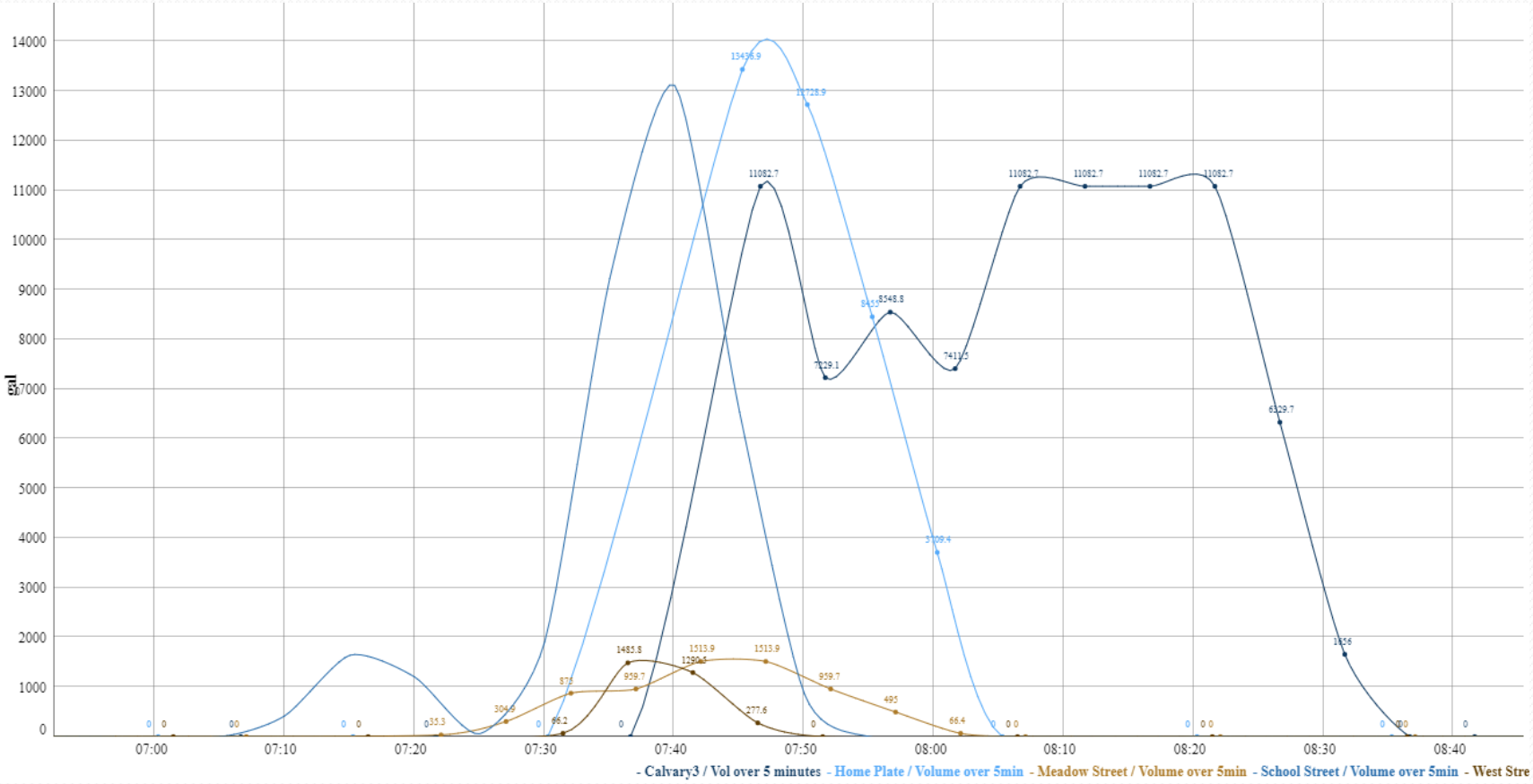
"Under dry weather, FIB [Fecal Indicator Bacteria]can be associated with flows to storm sewer systems that originate from groundwater, irrigation runoff from lawns, vehicle washwater, power-washing flows, leaking sanitary sewer lines, improper sanitary sewer line connections, and other sources. FIB and pathogens may be associated with the original water source itself or flows may transport previously deposited fecal material from urban wildlife (e.g., birds, squirrels, foxes) living in the urban area and in storm sewers (e.g., rats, raccoons). ***Under wet weather conditions, urban runoff mobilizes FIB and pathogens deposited on landscaped and impervious surfaces, collected in catchbasin sediment, or present in biofilms within the storm sewer system***."

Pathogens in Urban Stormwater Systems – 2014 - Urban Water Resources Research Council Pathogens in Wet Weather Flows Technical Committee Environmental and Water Resources Institute, American Society of Civil Engineers http://www.asce-pgh.org/Resources/EWRI/Pathogens%20Paper%20August%202014.pdf

CSO Monitoring

Storm Event of 09-11-18

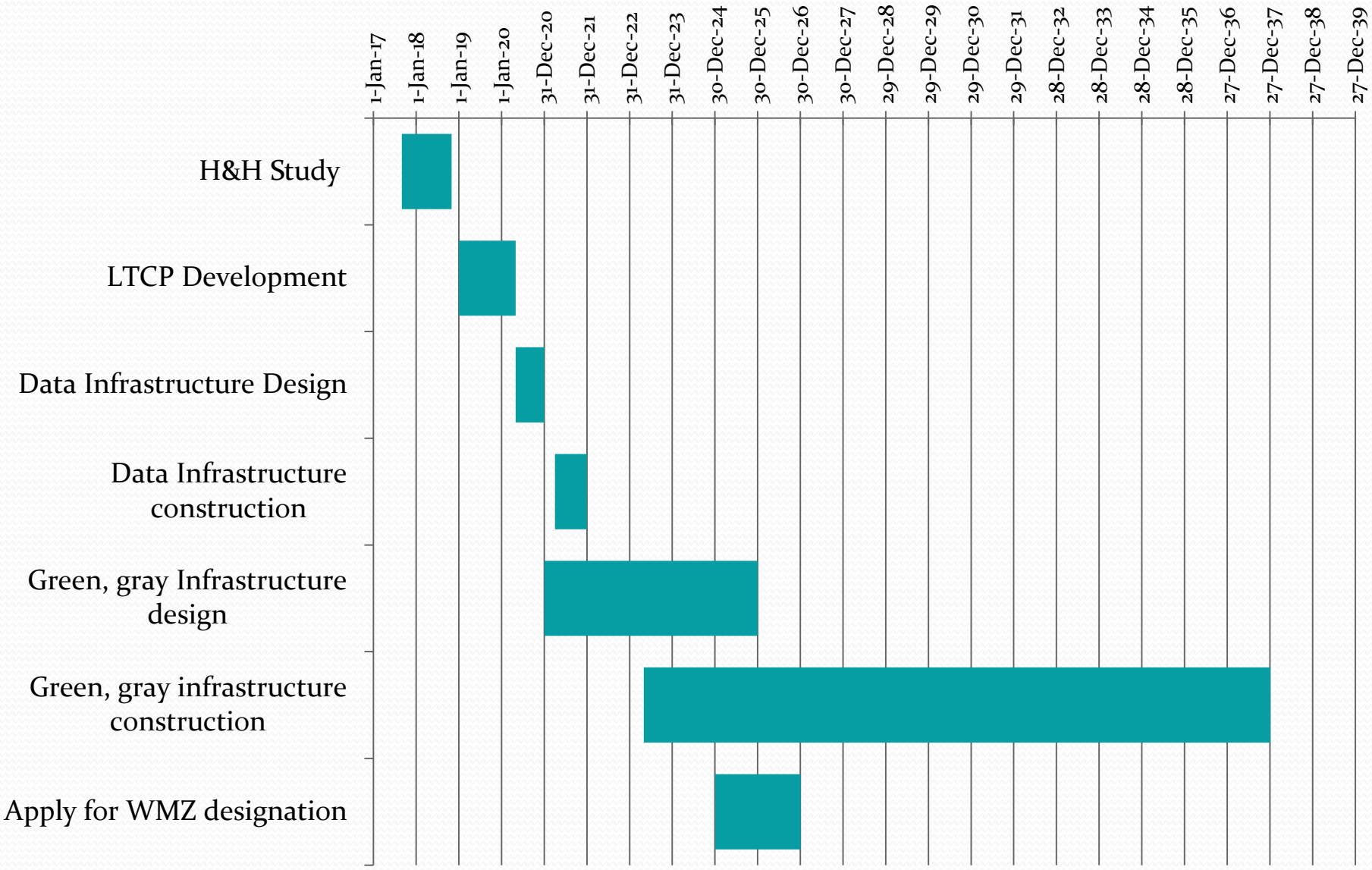
Total Overflow 169,723 gallons
Total Rainfall 0.53 inches
Maximum Rainfall Rate 0.47 Inches per hour



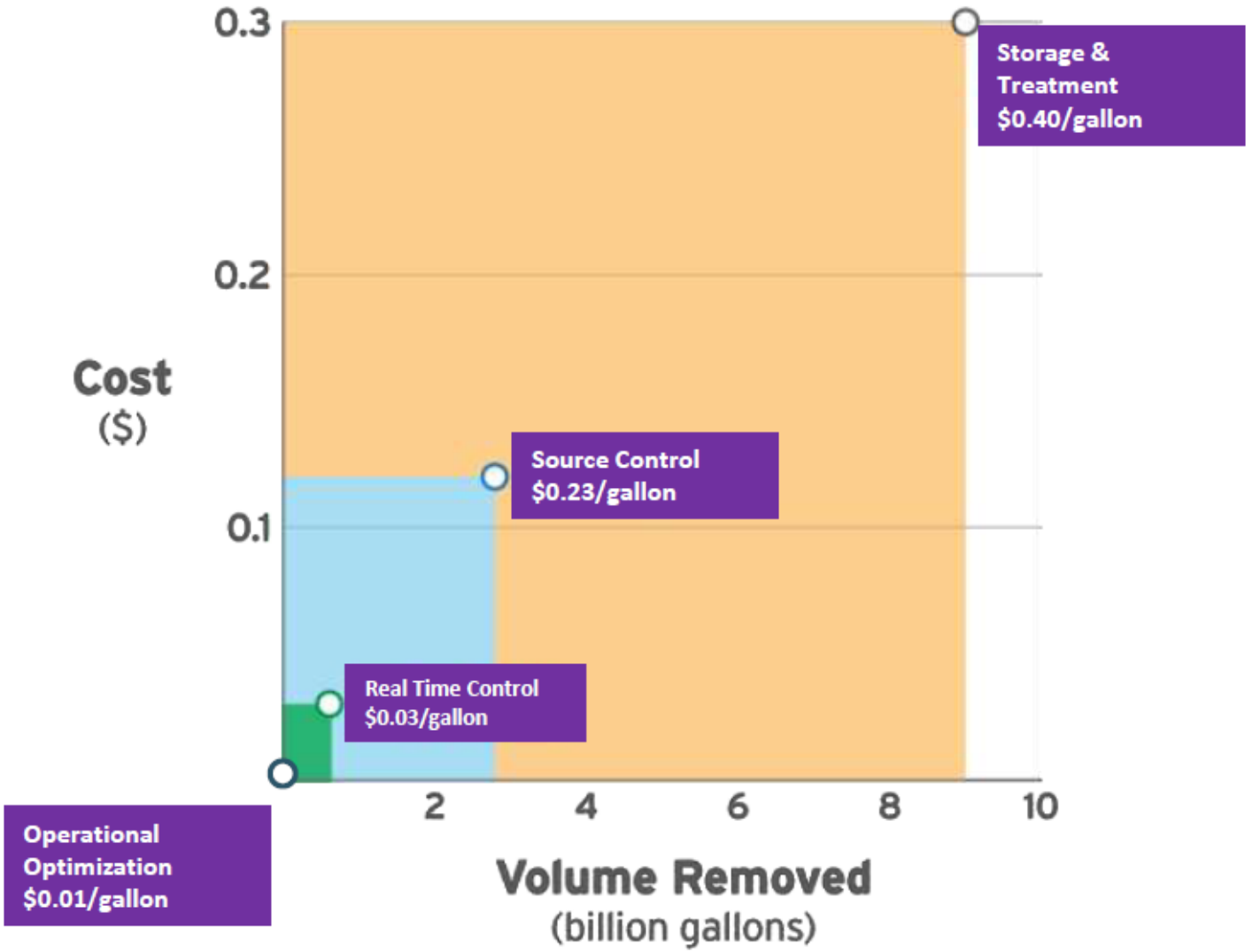
Next Steps

- Complete a model of the WW collection system.
- Prepare a Long Term Control Plan schedule of projects to meet VWQS. Measures likely to be included are:
  - Additional separation projects (3 under design now);
  - Potential increase in WWTP capacity to 29mgd;
  - "Data infrastructure" installed on collection system to maximize in-pipe and on-the-ground storage;
  - "Green infrastructure" projects to capture stormwater before entering the combined system;
  - Storage and disinfection facilities in the collection system and other "gray infrastructure" projects.

CSO LTCP Schedule



Cost



Early Benefits

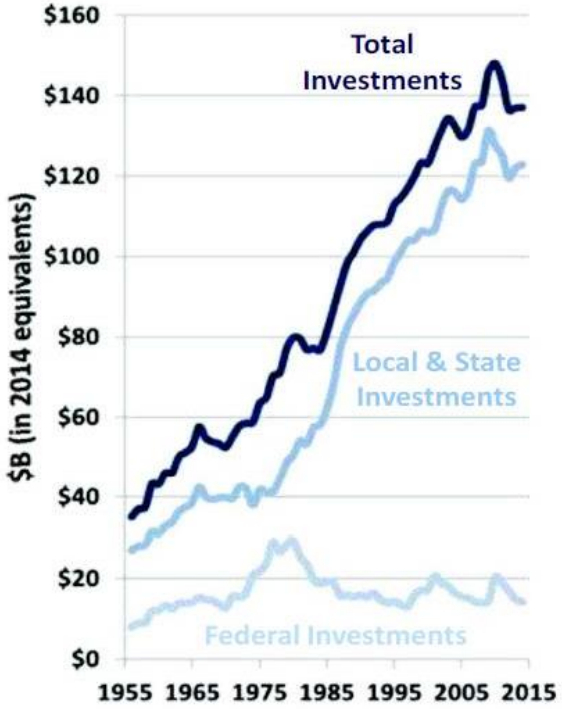
Source: Cincinnati MSD West Weather Optimization Program. 2017

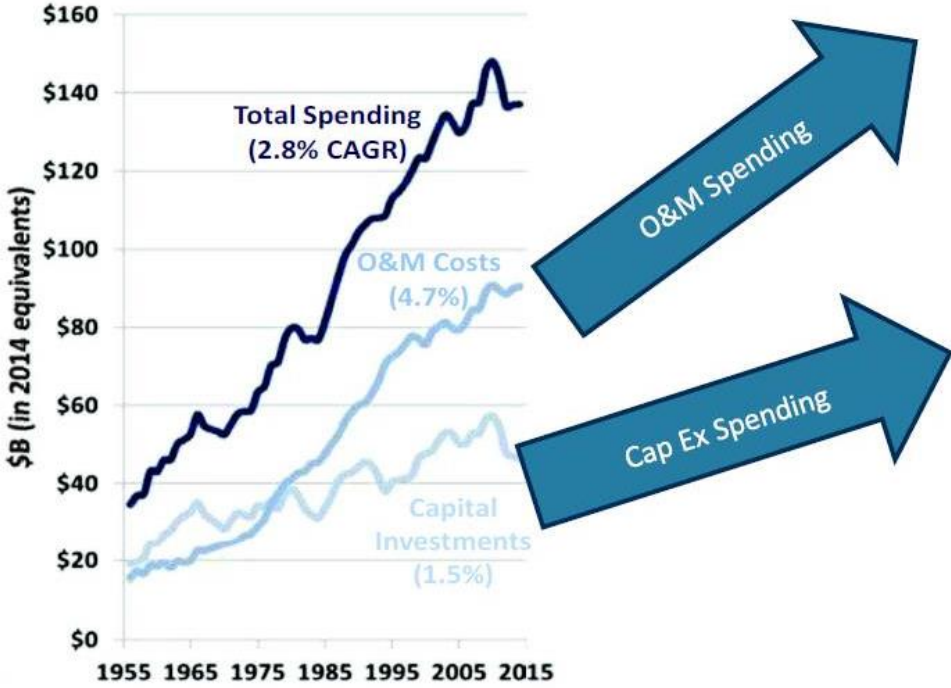
Cost

- 100% separation - $150m plus the cost of treating 600mg of stormwater ($100m?);
- Data infrastructure - $1.2m?
- Green infrastructure – unknown;
- Gray infrastructure – unknown, but 2 storage and disinfection plants studied in 1989 would cost $20m to $30m today (this would only be part of the required infrastructure).
- Operations and maintenance cost of new infrastructure - ?

Cost

- Federal and local funding supports
- O&M costs: a larger budget driver than Cap Ex





Cost – Other immediate water quality needs

- Replace force main - $1m;
- Repair WWTP digesters - $3m
- 3 separation projects - $3m;
- Lake Champlain TMDL - $20m?
- Moon Brook TMDL - $20m?
- MS4 requirements - $500,000 per year?

Questions?

Jeff Wennberg, Commissioner
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jeffw@rutlandcity.org