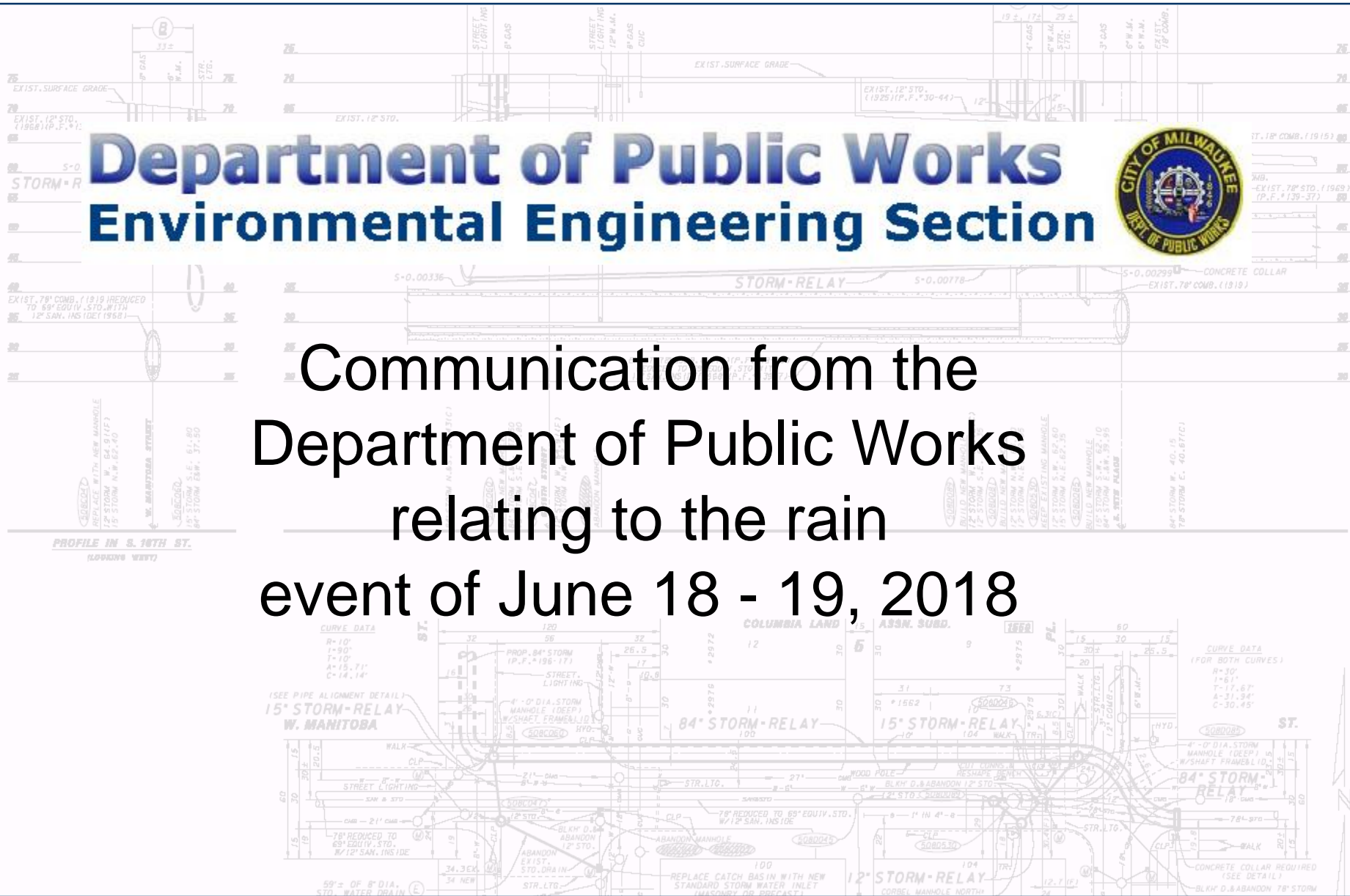


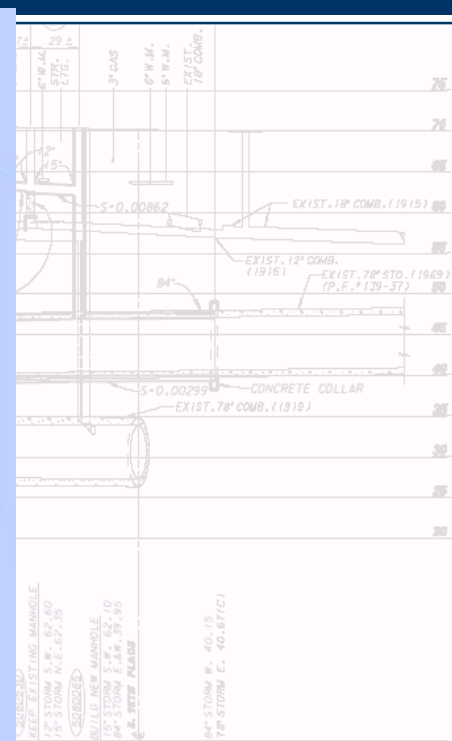
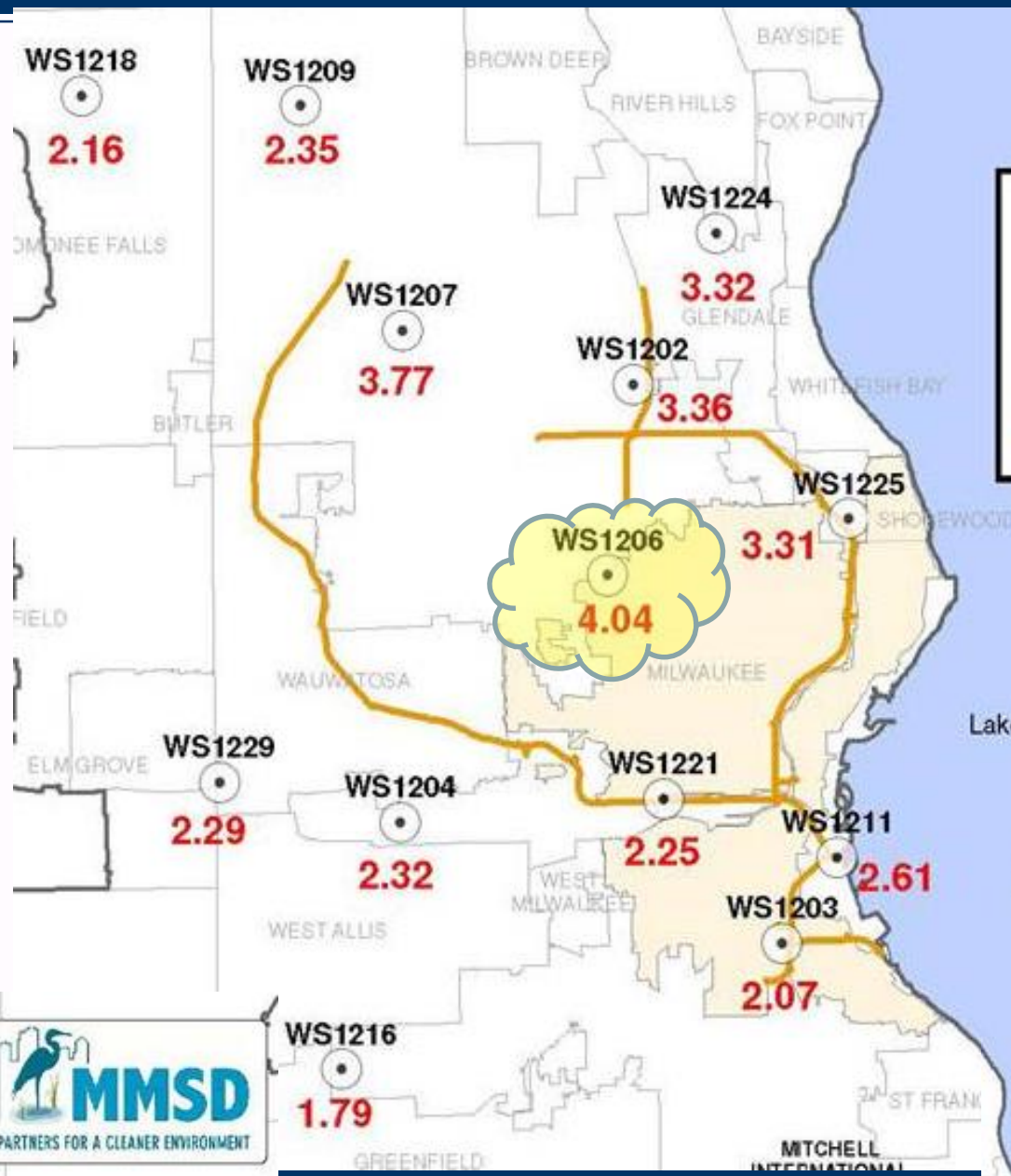
Department of Public Works Environmental Engineering Section



Communication from the
Department of Public Works
relating to the rain
event of June 18 - 19, 2018



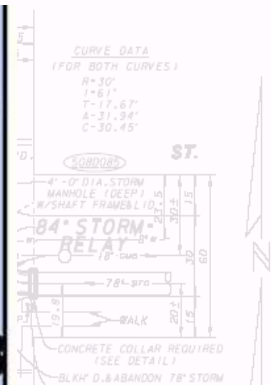
Monday and Tuesday 6/18 & 6/19 MMSD Rainfall Gauges



MMSD WEATHER STATIONS

Total Precipitation
(Inches)

June 18-19, 2018



Monday June 18th Storm Intensities

- **Rainfall intensity:** is a measure of the amount of rain that falls over time. The intensity of rain is measured in the height of the water layer (inches) covering the ground in a period of time (hour)
- A storm that has a 50% chance of happening in a given year is called a 2-year storm event
- A storm that has a 1% chance of happening in a given year is called a 100-year storm event

Gage location	3626 W Fond du Lac
Total Rain for 6/18/18 (over ~12 hours)	3.09 inches (5-10 yr event)
30-min maximum rainfall total 3:15-3:45 pm	2.13 inches (50-100 yr event)
1-hr maximum	2.38 inches (25-50 yr event)
2-hr maximum	2.82 inches (10-25 yr event)
3-hr maximum	2.85 inches (10-25 yr event)



Precipitation Estimates for Sewer Design

- Combined sewers designed for a 10-year 24-hour storm event
- Storm sewers up to 2016 were designed for the 5-year 24-hour storm event; changed to the 10-year design storm in 2016

Point precipitation frequency estimates										
NOAA Atlas 14	Volume 8	Version 2								
Milwaukee County										
PRECIPITATION FREQUENCY ESTIMATES										
Duration	1	2	5	10	25	50	100	200	500	1000 years
5-min:	0.33	0.39	0.49	0.58	0.69	0.78	0.87	0.95	1.06	1.15
10-min:	0.48	0.57	0.72	0.85	1.02	1.14	1.27	1.39	1.56	1.68
15-min:	0.58	0.7	0.88	1.03	1.24	1.39	1.55	1.7	1.9	2.05
30-min:	0.82	0.98	1.24	1.46	1.75	1.97	2.18	2.4	2.67	2.87
60-min:	1.05	1.26	1.61	1.91	2.32	2.64	2.96	3.3	3.75	4.09
2-hr:	1.29	1.55	1.98	2.35	2.88	3.31	3.75	4.2	4.83	5.31
3-hr:	1.45	1.72	2.2	2.62	3.23	3.74	4.27	4.84	5.63	6.26
6-hr:	1.73	2.02	2.53	3	3.73	4.34	5.01	5.73	6.77	7.61
12-hr:	2.05	2.32	2.83	3.32	4.08	4.75	5.48	6.29	7.46	8.43
24-hr:	2.34	2.64	3.2	3.73	4.56	5.28	6.06	6.92	8.17	9.19
2-day:	2.62	3.01	3.71	4.34	5.3	6.1	6.96	7.88	9.2	10.26
3-day:	2.87	3.28	4	4.66	5.65	6.48	7.36	8.32	9.67	10.76
4-day:	3.09	3.51	4.25	4.92	5.93	6.78	7.67	8.64	10.02	11.12
7-day:	3.63	4.11	4.95	5.68	6.77	7.66	8.6	9.59	10.99	12.1
10-day:	4.11	4.65	5.56	6.35	7.49	8.41	9.37	10.38	11.77	12.87
20-day:	5.6	6.24	7.28	8.17	9.41	10.38	11.36	12.38	13.74	14.79
30-day:	6.89	7.64	8.85	9.84	11.19	12.21	13.22	14.23	15.54	16.52
45-day:	8.56	9.52	11.01	12.2	13.73	14.85	15.9	16.91	18.15	19.01
60-day:	10	11.18	12.99	14.38	16.13	17.35	18.46	19.47	20.62	21.36

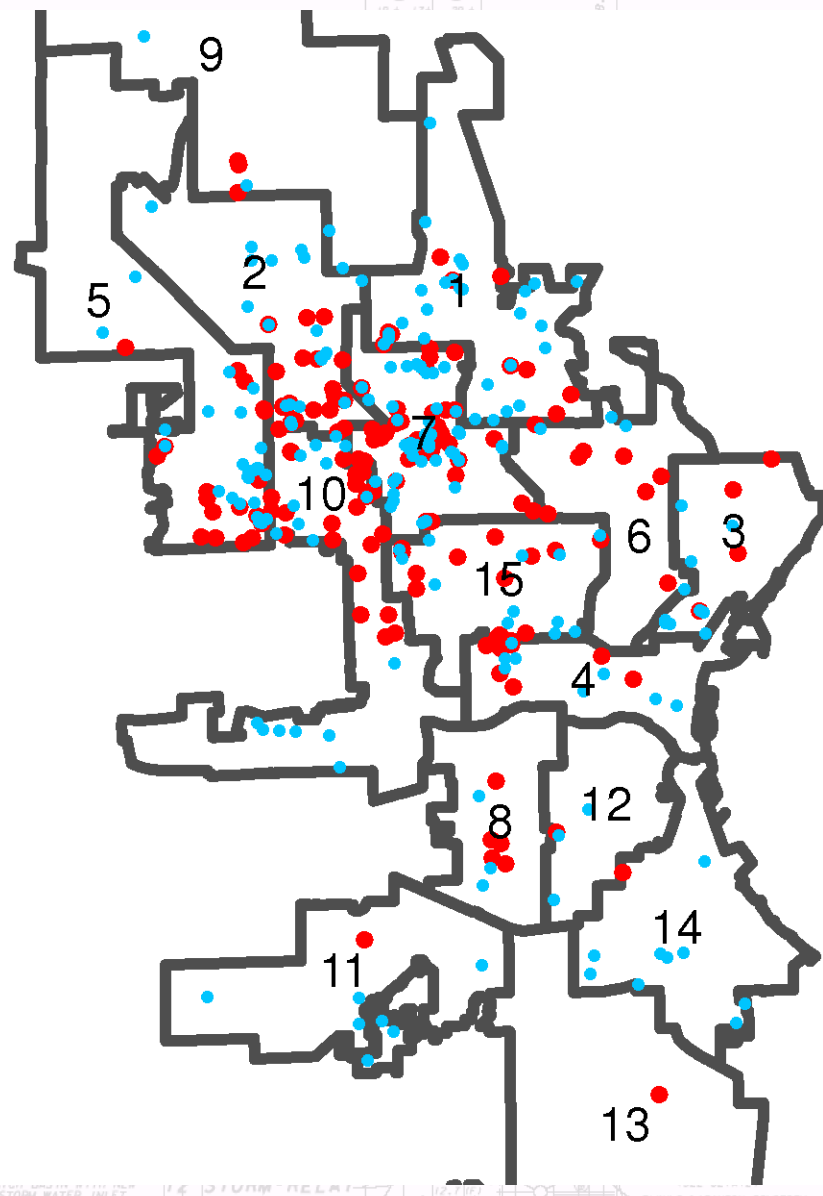


Storm Impacts

**City of Milwaukee, June 18th,
2018 Backwaters & Surface Flooding**

- Backwater
- Clogged Catch Basin / Surf. Flooding

Alderman District	Backwater Complaints	Surface Flooding
1	12	33
2	22	26
3	5	9
4	8	10
5	20	36
6	8	5
7	38	52
8	5	4
9	3	4
10	27	25
11	1	12
12	1	3
13	1	1
14	1	12
15	18	16



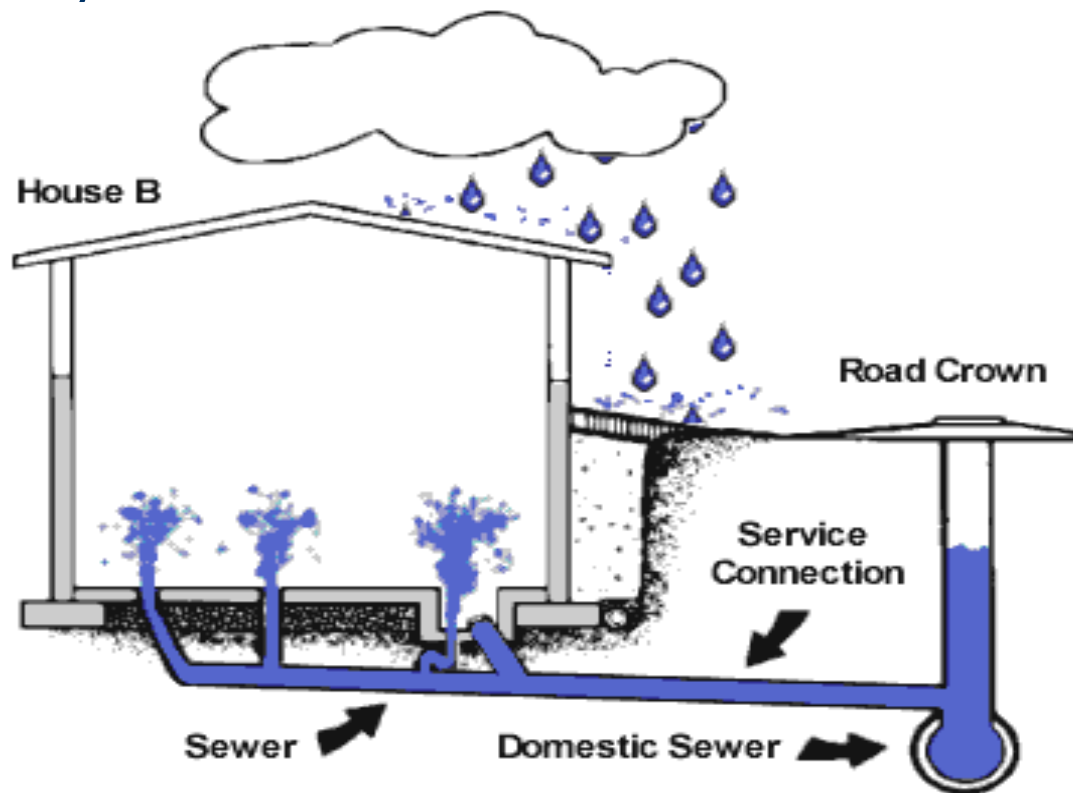
Sources of Excess Water in the Sanitary Sewer System: Infiltration/Inflow (I/I)

- Infiltration is clear rain water entering a sanitary sewer system through defective pipes, pipe joints, lateral connections to sewer mains and manhole walls.
- Inflow is clear water entering the sanitary sewer system through connections such as foundation drains, downspout connections, and catch basin connections.



How Do Basement Backups

- During heavy rain events, I/I, dramatically increase the amount of flow in the sanitary sewer system (5 to 6 times the sewer capacity).
- I/I can increase the risk for basement backups and may also cause sanitary sewer overflows.

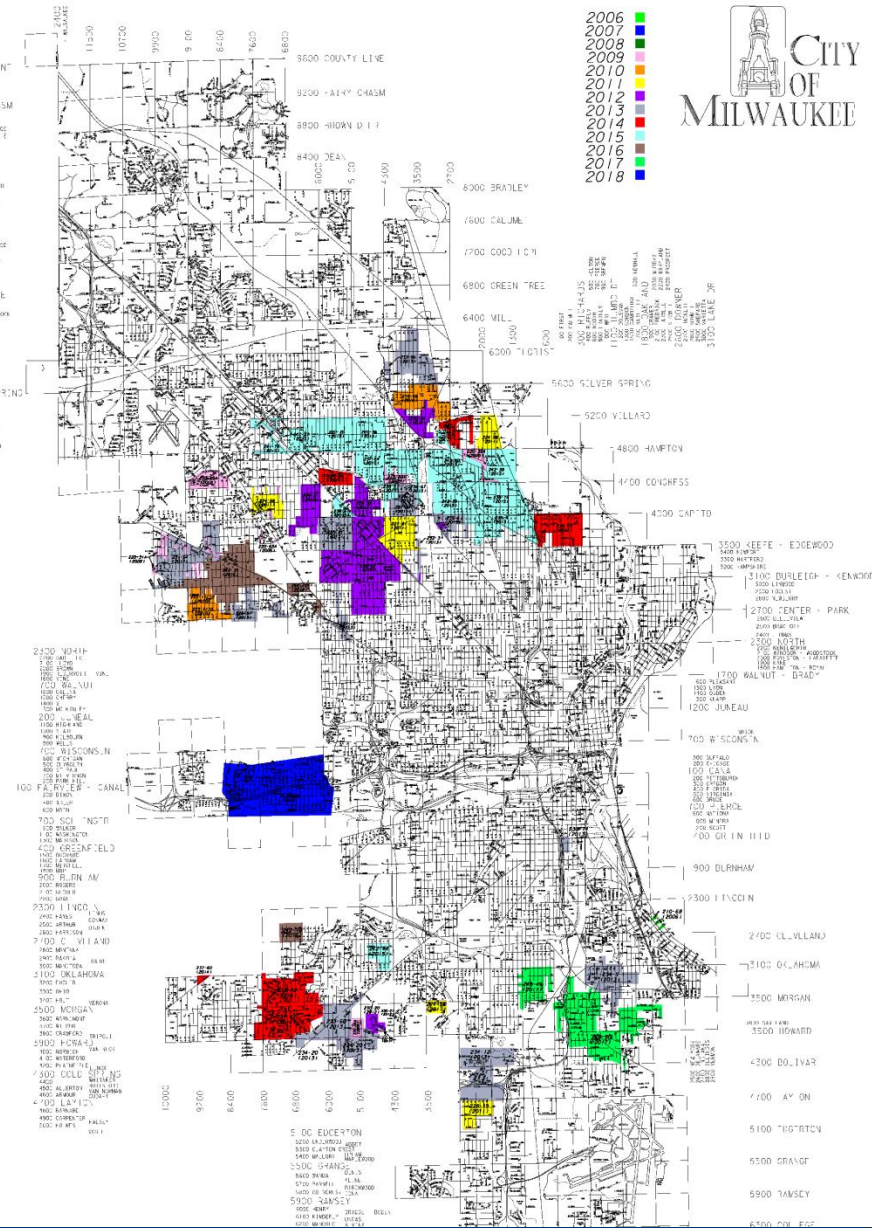


- June 18 SSO Event

-

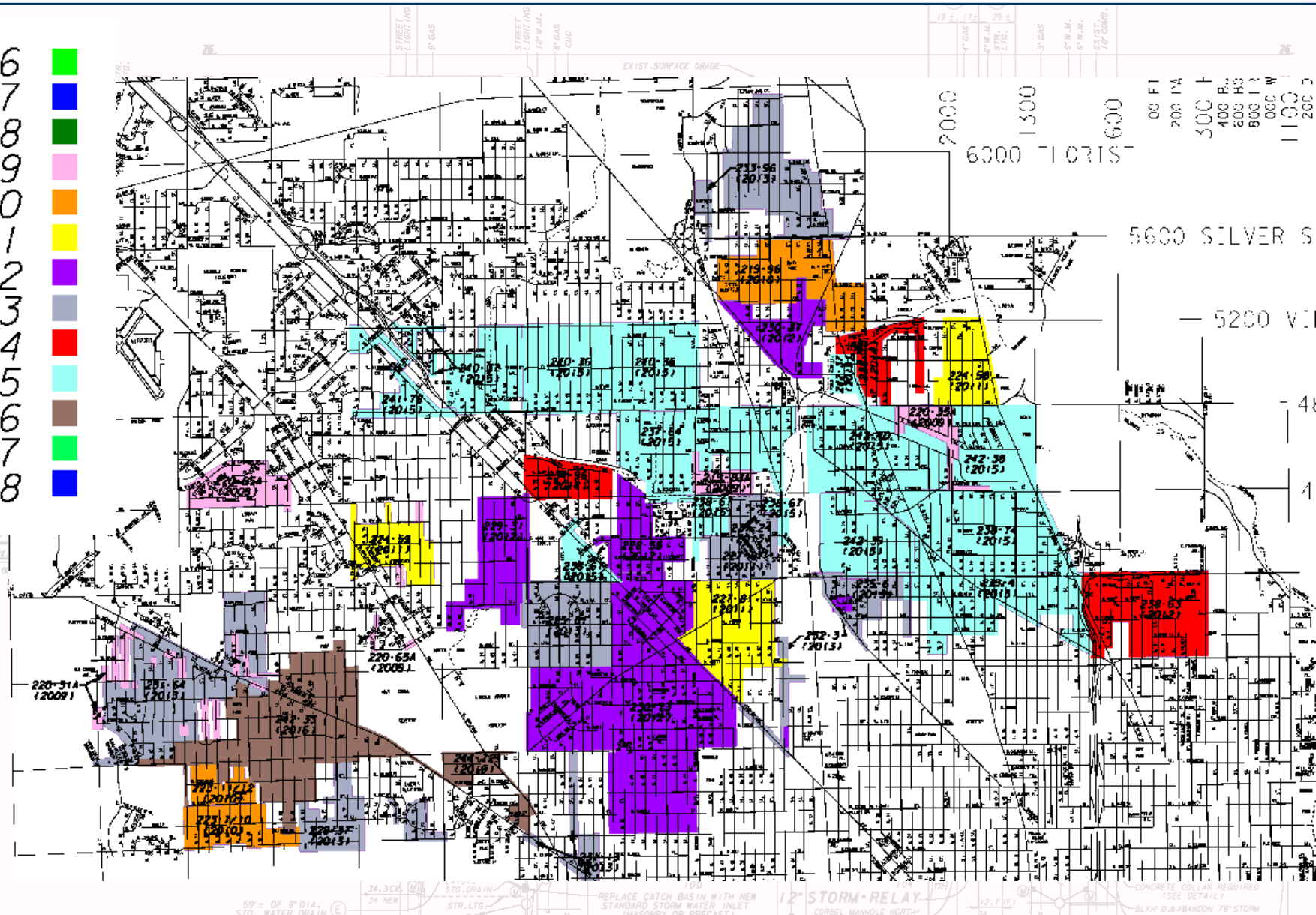
Sanitary Sewer Lining Projects

- Since 2006 over 45 Area sanitary sewer systems have been lined.



Sanitary Sewer Lining Projects

- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018



Private Property I/I Reduction Projects

• CITY-MMSD PARTNERSHIP TO IMPLEMENT I/I REDUCTION

- These projects consists of inspecting and rehabilitating the sanitary building sewers (laterals) homes
- This program is 100% voluntary and homeowners will not incur any costs
- The areas selected have reported numerous basement backups over the last few years
- Project will reduce risk of sanitary sewer overflows and basement backups, as well as reduce City and MMSD maintenance costs
- Three projects have been completed:
 - Clemens School Neighborhood, 260 homes, 7th Aldermanic District
 - Coopers Park Neighborhood, 280 homes, 5th Aldermanic District
 - S. 20th and W. Layton Neighborhood, 350 homes, 13th Aldermanic District

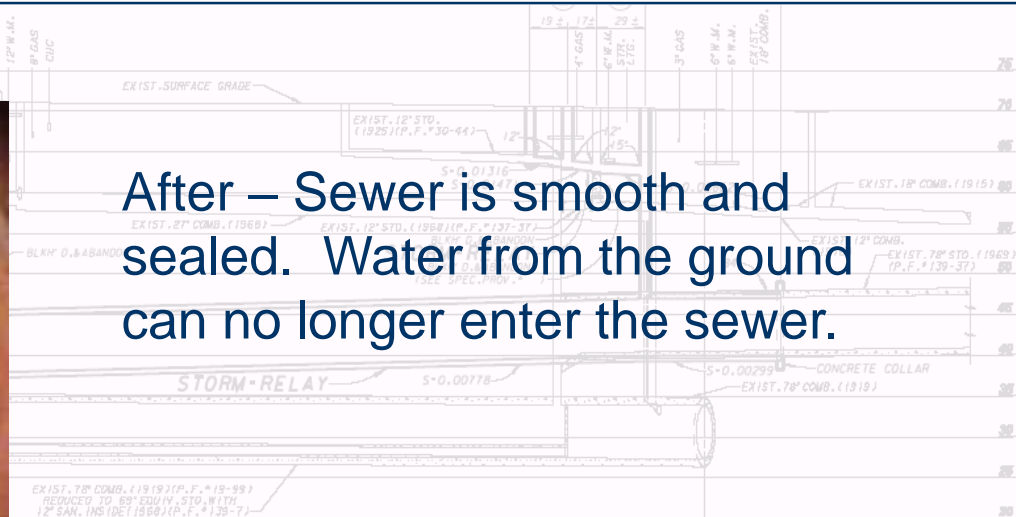


Sanitary Sewer Lining Projects



Before – Sewer is cracked and deteriorated. Water from the ground can enter the sewer freely.

After – Sewer is smooth and sealed. Water from the ground can no longer enter the sewer.



Options to Residents to protect their homes from flooding

- **Backwater Valve:** Prevents backflow from the sewer outside to the basement. Estimated Cost ≈ \$300 plus installation

Backflow Prevention Valves from Backflows.com

Page 1 of 1

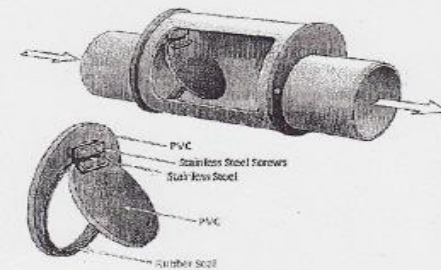
BACKWATER CHECK VALVES 6" TO 18" PIPE SIZE

Larger Check Valves: 6" to 18"

- Unique in-ground, in-line backwater protection for tile drainage systems and a variety of commercial applications.
- Full flow for drainage
- Constructed of rugged PVC
- SDR35 PVC stubs
- Very low cost
- Stainless Steel Hinge & Screws
- Rubber Seal for Tight Seating
- Made In USA
- Adaptable to other pipes with flexible couplers
- [Click Here](#)

Size	PVC, CMP, Etc.
6 inch	
8 inch	
10 inch	
12 inch	
15 inch	
18 inch	

Return to [waterworks-supply.com](http://www.waterworks-supply.com)



<http://www.backflowvalve.net/>

7/8/2000

