



# **Metropolitan Water Reclamation District of Greater Chicago**

**Welcome to the July Edition  
of the 2022  
M&R Seminar Series**

# NOTES FOR SEMINAR ATTENDEES

- All attendees' audio lines have been muted to minimize background noise.
- A question and answer session will follow the presentation.
- Please use the "Chat" feature to ask a question via text to "All Panelists."
- The presentation slides will be posted on the MWRD website after the seminar.
- This seminar is pending approval by the ISPE for one PDH and is pending approval by the IEPA for one TCH. Certificates will only be issued to participants who attend the entire presentation.

## **TONY CONN SR. WATER DISTRIBUTION AND COLLECTION MANAGER CITY OF NAPERVILLE**



Tony Conn, Sr. has been with the City of Naperville for 30 years, serving as Water Distribution and Collection Manager since 2017. Leading a team of 47 employees, he manages the water distribution, water supply, wastewater collection & pumping, and storm water pumping sections. His educational background includes Industrial Maintenance and Electrical Automated Systems. He holds various certifications including IEPA Wastewater Collection Systems operator, IEPA Cross-Connection Control Device Inspector, IEPA Class “C” Water Operator, as well as several NASSCO certifications. He is a member of WEF, IWEA, CSWEA, NFPA, AWWA/ISAWWA, NASSCO and NASTT. He is also a member of the IWEA Golden Manhole Society and serves as an IWEA Collection System Committee Member.

Tony is an avid cyclist, including road, mountain, cyclocross and endurance. He is looking forward to soon meeting his eighth grandchild.

"Infiltration and Inflow  
Control at the City of  
Naperville"



Tony Conn Sr. Water Distribution and Collection  
Manager



# Overview of the Naperville Collection System

<u>WASTEWATER:</u>	
Treatment Facility	Springbrook Water Reclamation Center
Capacity - Dry Weather Design (MGD)	26.25 million gallons/day
Capacity - Wet Weather Design (MGD)	55.13 million gallons/day
Average Daily Wastewater Flow (Calendar 2022)	17.278 million gallons/day
Average 3 Low-Flow Months (Calendar 2022)	13.929 million gallons/day
Wastewater Pump Stations (2022)	23
Back Flow Prevention Stations (2022)	7
Sanitary Sewers (2022)	566 miles
Manholes (2022)	14,020
Customers - Total (2022)	43,781
Customers - Residential (2022)	40,449
Wastewater Utility Population Served:	
Naperville	150,126
Warrenville	<u>13,158</u>
Total	163,284

<u>WASTEWATER:</u>	
Flow Monitors	46 Open Channel 13 Closed Pipe (Lift Station)
SSO Alarms	18
Ground Water Monitoring Wells	14
Rain Gauges	13
Sanitary Main Rehabilitation (CIPP)	637,000
Sanitary Lateral Rehabilitation (CIPP)	4,636
Sanitary Laterals Grouted	507
Sanitary Manhole Rehabilitation (Entire)	1,020
Sanitary Manhole Rehabilitation (Upper Only)	1,500 (CIPP Chimney Liners)
Manholes Replacement	75
Customer Calls: City responsibility 2021-2022	0
Customer Calls: City responsibility 2021-2022	0
Inverted Siphon Rehabilitation	5 of 8 Siphons

# What is Naperville doing to combat I&I?

Since the 1990's, Naperville has committed significant resources (more than \$4-5 million annually) towards the goal of reducing I&I using the techniques mentioned above. City staff take a holistic approach when planning and completing rehab projects, taking care to match the proper technique with the existing field conditions and desired outcome. Planning for rehabilitation begins with flow monitoring from I&I studies. These studies help form a general 10-year guide for rehabilitation.

Generally mainline pipes are the first to be rehabilitated, followed by manholes, and finally individual service lines. The number of assets scheduled to be rehabbed per year are prioritized and can vary based on a number of factors including asset condition and budget. Assets in the same geographic area are all rehabbed before moving on to other areas. All assets in a geographic area can be completed in as little as two years or up to several years-time. Assets that are candidates for grouting typically receive grout prior to any lining in the area.



# Inflow and Infiltration Investigation Tools

- **Flow Monitoring:**
  - Permanent
  - Temporary
  - Micro Basin
  - RDII Studies
- **SCADA Data**
- **MSI Inspections**
- **Smoke Testing**
- **Dye Flooding**
- **Manhole Inspections**
- **Manhole Scanning**
- **Building Inspections**
- **GIS**
- **Saturated Ground Inspections:**
  - Mainline CCTV
  - Manhole Inspections
  - Lateral CCTV



# City Of Naperville Ten-Year I&I Reduction Plan

Revised 12/30/21 TC

Additional Flow Monitors	Years	Number of Meters	Status	Completion Date	Manholes
NWPS and North PS Flow Area	2020	4	Complete	April, 2020	T04-009, T03-029, T03-028, N16-091
Coach Dr South Flow Basin	2021	3	Complete	April, 2021	S03-001, S09-002, S09-001
Sheri and Sunderland Flow Basins	2022	3			S17- 007, T02-035A, S29-047
Sheri and Sunderland Flow Basins	2023	2			S29-102, C51-110
Springbrook Interceptor	2024	2			T01-010, S24-092
Springbrook Interceptor	2025	2			C45-025B, T01-041
Hobson, Hobson Mill Flow Basins	2026	2			C21-001, C30-003B
Hobson, Hobson Mill Flow Basins	2027	1			C33-001
TBD	2028	0			
TBD	2029	0			
Micro-Flow Basin Studies	Years	Number of Meters			Subdivisions
None	2020	0			None
None	2021	0			None
South Pump Station Phase 1	2022	7			University Heights, Misc.
South Pump Station Phase 2	2023	7			Farmington, Misc.
Downtown Area Re- Monitoring	2024	10			Downtown, College Area.
South Interceptor Phase 1	2025	7			Old Farm, Misc.
South Interceptor Phase 2	2026	7			Knoch Knolls, Misc.
NWPS Area Re-Monitoring	2027	10			NWPS Tributary.
Springbrook Interceptor Phase 1	2028	7			Buttonwood, Misc.
Springbrook Interceptor Phase 2	2029	7			Springbrook Crossing, Misc.
Dye Water Flooding	Years	Footage			Subdivisions
Basin N25	2020	10,330	Started	All work moved to 2022	Old Naperville
Basin N26	2021	9,228	In Planning	All work moved to 2022	Old Naperville
Basin Co5	2022	26,492			Downtown, College Area.
Basin Co6	2023	28,456			Downtown, College Area.
Basin N24	2024	11,888			Old Naperville
TBD	2025	TBD			TBD
TBD	2026	TBD			TBD
TBD	2027	TBD			TBD
TBD	2028	TBD			TBD
TBD	2029	TBD			TBD
Smoke Testing	Years	Footage			Subdivisions
None	2020	None			None
Basins N19, N10, N11, N12	2021	147,000	Complete	August,2021	SayBrook, Naperville Heights
Basins C28, C35 ,C37, C40, C29, c43, c30	2022	75,252			West Highlands
Basins So8, So9, S15, S16	2023	89,637			Naper Carriage Hill, Hunters Woods
None	2024	None			None
None	2025	None			None
None	2026	None			None
Basins So4, So5, So6, S27	2027	50,252			Signal Point, Misc.
Basins S12, S13, S14, S17, S18, S23	2028	102,406			Old Farm
SOC area	2029	100,000			SOC area
Manhole Inspections	Years	Number of Manholes			Area
Basins C28, C43, C35	2020	138	152	November, 2020	West Highlands
Basins C37, C38, C29, C30	2021	100	N/A	Moved to 2022	West Highlands
Basins, No1, Wo2 Wo3, Wo4, Wo5	2022	265			McDowell Tributary
Basins, Wo6, Wo7, Wo8, N28	2023	388			McDowell Tributary
Basins N15, N16	2024	376			Brookdale
Basins Co1, Co4	2025	217			Brush Hill, Will-O-Way
Basins Co8, c09, C54	2026	170			Brush Hill, Will-O-Way
Basin So4, So5, So6, S27	2027	293			Coach Drive Flow Basins
Basins S15, S16, S37	2028	328			Coach Drive Flow Basins
S14, S18, S23, S31	2029	290			Old Farm
CCTV Saturated Grounds	Years	Footage			
Basins C28, C43, C35	2020	33,612	15,000	December, 2020	West Highlands
Basins C37, C38, C29, C30	2021	22,672	N/A	Moved to 2022	West Highlands
Basins, No1, Wo2 Wo3, Wo4, Wo5	2022	59,021			McDowell Tributary
Basins, Wo6, Wo7, Wo8, N28	2023	40,000*			McDowell Tributary

Added to

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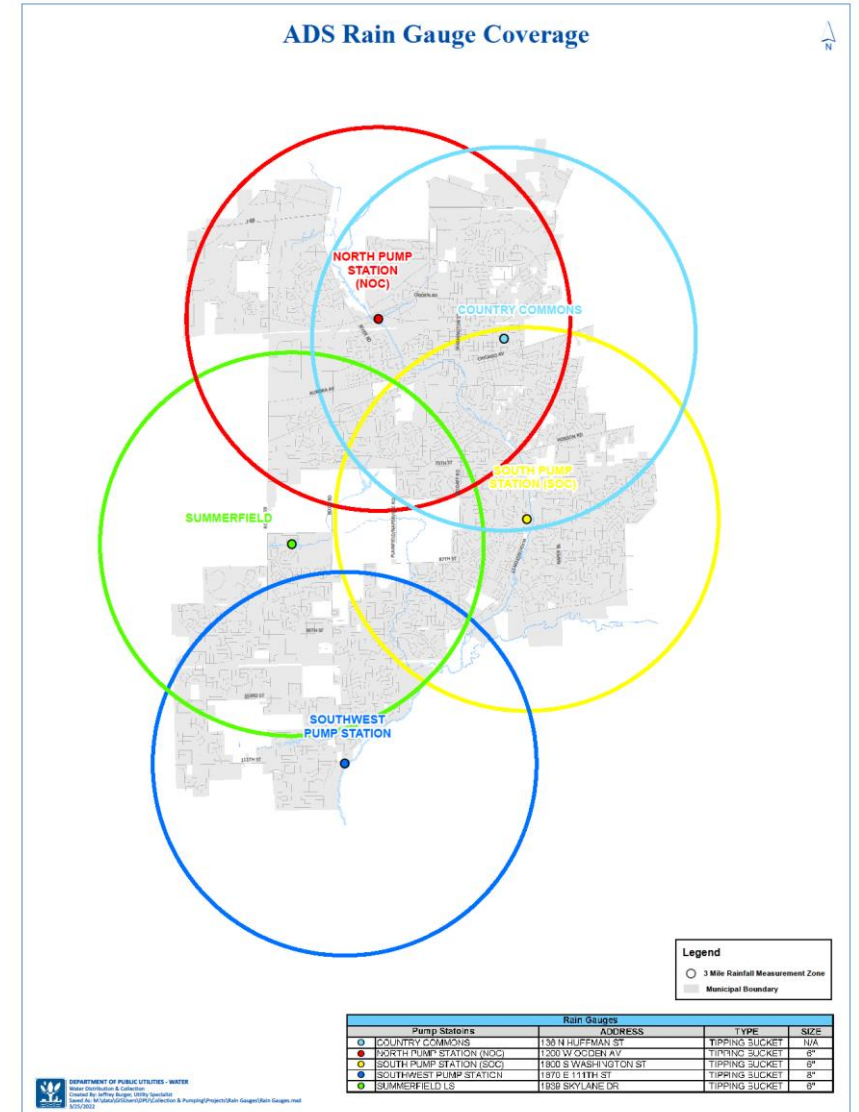
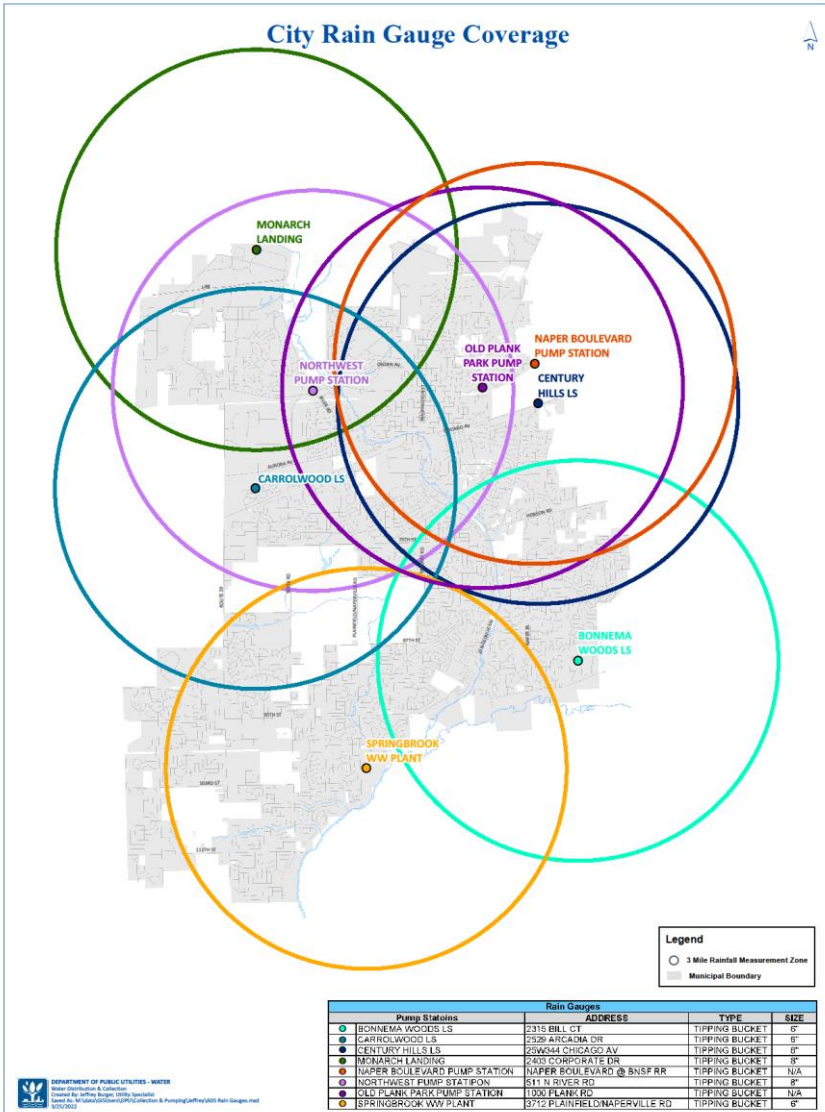


# SSO ALARMING

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# RAIN GAUGES



# Rain Data from SCADA

Rain Data is Collected in:

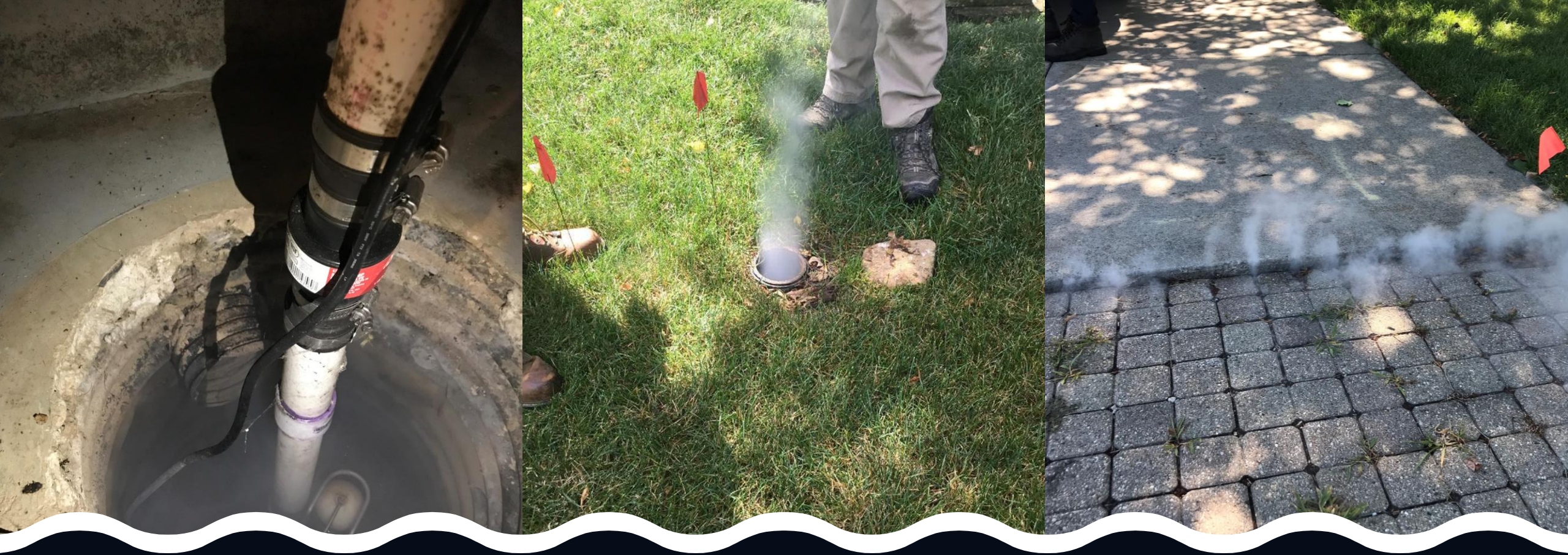
- 5-Minute
- Hourly
- Daily

Naperville Pump Stations Daily Rain											
Region:											
Territory: Naperville											
Serial #:	Springbrook Rain (In.)	SW Pump Rain (In.)	NW Pump Rain (In.)	Monarch Landing Rain (In.)	Century Hills Rain (In.)	Carrolwood Rain (In.)	Bonnema Woods Rain (In.)	Old Plank Road Rain (In.)	Naper Boulevard Rain (In.)		
1	0.035	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.000		
2	0.004	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
4	0.799	4.610	0.370	0.240	0.230	0.530	0.400	0.140	0.170		
5	0.063	0.170	0.080	0.110	0.070	0.020	0.210	0.060	0.200		
6	0.469	0.070	0.390	0.360	0.330	0.390	0.510	0.160	0.350		
7	0.000	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000		
8	0.189	0.000	0.050	0.040	0.010	0.060	0.310	0.020	0.020		
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
11	0.004	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000		
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
15	1.185	0.480	0.870	0.920	1.030	0.940	0.970	0.340	0.680		
16	0.047	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.050		
17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020		
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030		
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020		
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
23	2.512	0.280	1.230	1.270	1.010	1.660	1.700	0.140	0.550		
24	0.673	0.190	0.820	0.980	0.910	0.670	0.760	0.020	0.070		
25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030		
26											
27											
28											
29											
30											
31											
Minimum	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Average	0.239	0.236	0.152	0.158	0.144	0.171	0.195	0.035	0.088		
Maximum	2.512	4.610	1.230	1.270	1.030	1.660	1.700	0.340	0.680		
Total	5.980	5.900	3.810	3.950	3.590	4.280	4.880	0.880	2.190		

# SCADA DATA

Lift Station Amperage Report											
July 2022											
Territory: Naperville											
Huffman Lift Station											
DateTime	Pump 1 T1 Avg.	Pump 1 T1 Max.	Pump 1 Runtime	Pump 1 Starts	Pump 2 T1 Avg.	Pump 2 T1 Max.	Pump 2 Runtime	Pump 2 Starts	Wetwell Level Min.	Wetwell Level Avg.	Wetwell Level Max.
1	3.703	7.400	0.7	46	7.435	7.500	0.5	45	1.990	2.692	3.500
2	3.725	7.400	0.6	46	7.440	7.500	0.5	46	2.030	2.730	3.470
3	3.734	7.600	0.6	46	7.424	7.800	0.5	47	1.940	2.738	3.520
4	3.726	7.300	0.6	49	7.428	7.600	0.5	48	1.990	2.750	3.500
5	3.749	7.500	0.7	48	7.403	7.500	0.5	48	2.050	2.761	3.470
6	3.659	7.300	0.6	49	7.410	7.600	0.6	50	1.950	2.757	3.520
7	3.707	7.300	0.6	45	7.396	7.500	0.5	44	1.930	2.739	3.500
8	3.702	7.400	0.6	44	7.415	7.700	0.4	44	1.970	2.685	3.490
9	3.685	7.300	0.6	42	7.401	7.500	0.5	43	1.980	2.673	3.430
10	3.691	7.300	0.5	43	7.427	7.700	0.5	42	1.950	2.706	3.470
11	3.691	7.300	0.6	41	7.407	7.600	0.4	42	1.990	2.742	3.530
12	3.715	7.300	0.5	39	7.438	8.100	0.4	36	2.020	2.747	3.500
13	3.618	7.300	0.4	32	7.620	7.900	0.3	30	2.040	2.824	3.500
14	3.697	7.200	0.1	33	7.894	8.600	0.0	32	2.000	2.684	3.470
15	3.712	7.300	0.5	36	7.788	8.200	0.4	37	2.040	2.755	3.520
16	3.688	7.300	0.5	37	7.398	7.500	0.4	37	1.950	2.726	3.460
17	3.665	7.300	0.5	34	7.401	7.600	0.4	34	2.000	2.660	3.400
18	3.719	7.300	0.5	44	7.427	7.900	0.4	43	2.010	2.680	3.380
19	3.693	7.200	0.5	31	7.408	7.600	0.4	32	1.930	2.741	3.510
20	3.477	7.200	0.3	31	7.415	7.800	0.2	24	2.090	2.830	3.500
21	3.670	7.200	0.4	26	7.402	7.900	0.3	27	2.120	2.785	3.480
22	3.676	7.100	0.3	26	7.428	7.800	0.3	25	1.940	2.704	3.490
23	3.767	7.300	1.1	75	7.392	7.700	0.9	75	1.960	2.737	3.470
24	3.953	7.300	2.4	151	7.394	7.500	2.2	151	2.030	2.862	3.670
25	3.834	7.300	1.3	96	7.382	7.500	1.2	96	2.110	2.758	3.500
26											
27											
28											
29											
30											
31											
32											

Pump Station Flow, Ground Water & Rain											
Site: Huffman Pump Station											
970 F.M. Version 1.19											
Region:											
Territory: Naperville											
Serial #:	Site ID:										
Date	Discharge Flow (MG)	Rainfall (In.)	Wetwell Level Min.	Wetwell Level Avg.	Wetwell Level Max.						
1	0.219	0.000	2.0	2.7	3.5						
2	0.219	0.000	2.0	2.7	3.5						
3	0.224	0.000	1.9	2.7	3.5						
4	0.235	0.530	2.0	2.7	3.5						
5	0.232	0.020	2.0	2.8	3.5						
6	0.234	0.390	2.0	2.8	3.5						
7	0.212	0.000	1.9	2.7	3.5						
8	0.211	0.060	2.0	2.7	3.5						
9	0.207	0.000	2.0	2.7	3.4						
10	0.206	0.000	2.0	2.7	3.5						
11	0.201	0.000	2.0	2.7	3.5						
12	0.179	0.000	2.0	2.7	3.5						
13	0.141	0.000	2.0	2.8	3.5						
14	0.169	0.000	2.0	2.7	3.5						
15	0.179	0.940	2.0	2.8	3.5						
16	0.178	0.010	2.0	2.7	3.5						
17	0.162	0.000	2.0	2.7	3.4						
18	0.212	0.000	2.0	2.7	3.4						
19	0.149	0.000	1.9	2.7	3.5						
20	0.121	0.000	2.1	2.8	3.5						
21	0.123	0.000	2.1	2.8	3.5						
22	0.119	0.000	1.9	2.7	3.5						
23	0.387	1.660	2.0	2.7	3.5						
24	0.962	0.670	2.0	2.9	3.7						
25	0.508	0.000	2.1	2.8	3.5						
26											
27											
28											
29											
30											
31											
Minimum	0.119	0.000	1.9								
Average	0.240	0.171	2.7								
Maximum	0.962	1.660	3.7								
Total	5.989	4.280									



# Smoke Testing

- Smoke testing in three-year intervals
- Defects repaired over three-years
- 2021 Smoke Testing Project: 146,657 LF with 586 defects.
- 2022 Smoke Testing Project: 85,000 LF of 153,821 LF scheduled.



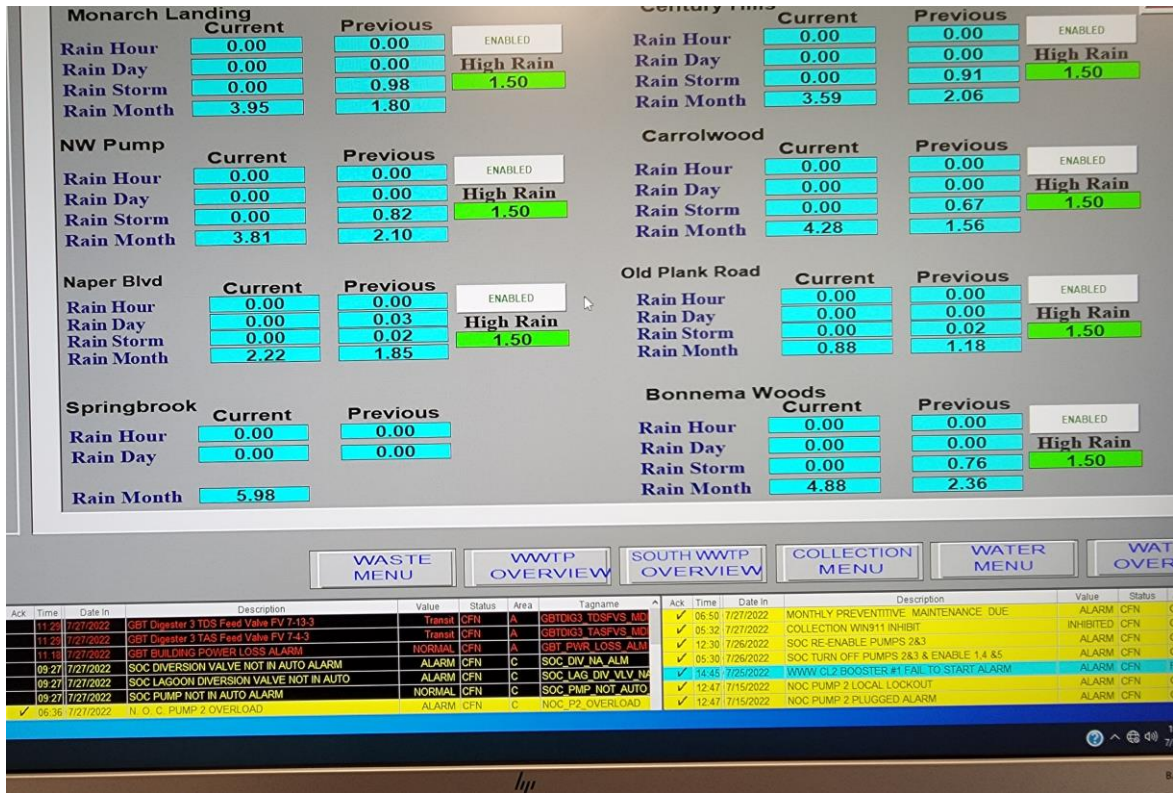
# Storm Water Dye Flooding



# Manhole Inspections

- Visual Inspection During Sewer Cleaning
  - 3D Manhole Scanning
  - Basin Manhole Inspections
  - Saturated Ground Inspection
- 
- Total of 1854 Manhole inspected in 2021





# Saturated Ground Inspections:

- Rain Gauge Data
- Mainline CCTV Inspections
- Manhole Inspections

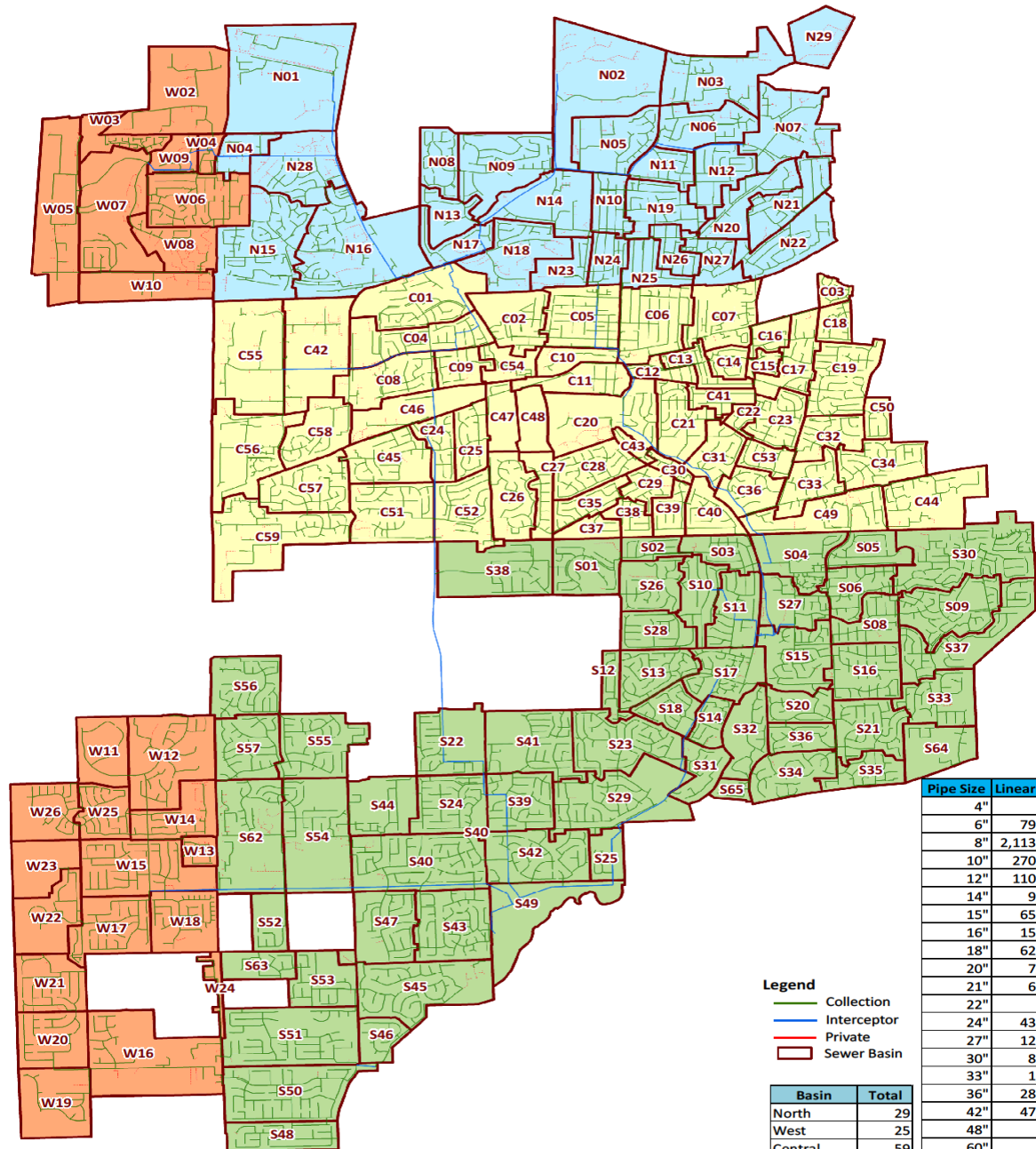
# What's Working in Naperville and Why it Continues

## Entire Flow Basin

- Mainline Lining
- Lateral Lining
- Manhole Rehabilitation
- Mainline Grouting
- Lateral Grouting



## Sanitary Sewer Basins



# Water Migration

Using just one method of Sanitary Sewer Rehabilitation doesn't eliminate Infiltration and Inflow.

**Water moves to the next defective area.**



# Manhole Rehabilitation

Before



After



## What's Working?

- Any new manhole rehabilitation product must go through two freeze/thaw cycles with no defects to be considered for a Naperville “Manhole Rehabilitation Project”.
- Currently only three products are approved for the “Manhole Rehabilitation Program”.
- 3-Year Warranty for all rehabbed manholes.

Raven 405  
250 Mils

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SpectraShield

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# Manhole Rehabilitation

**Existing Brick Manhole**



**Cementitious Products  
( $\frac{3}{4}$ "-1" Thick)**



**Wastewater Epoxies  
(250 Mil)**



# Main Line Lining

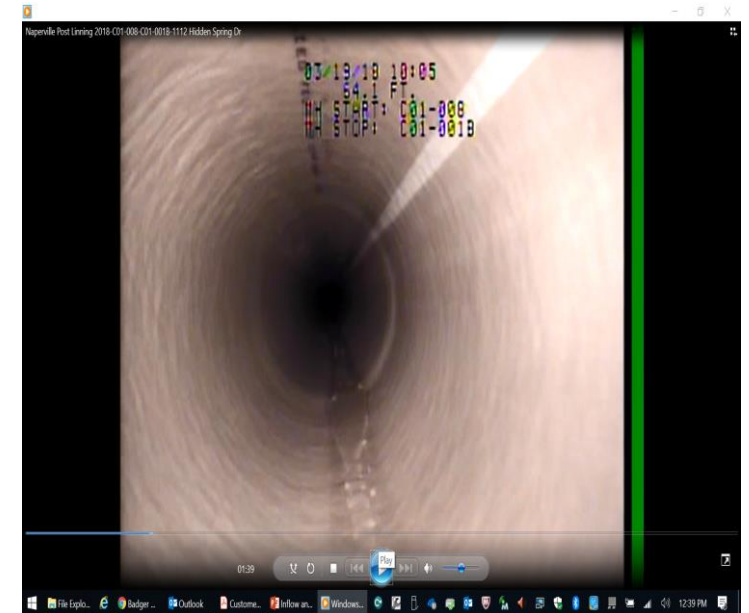
Before CIPP Lining



CIPP Lining



After CIPP Lining

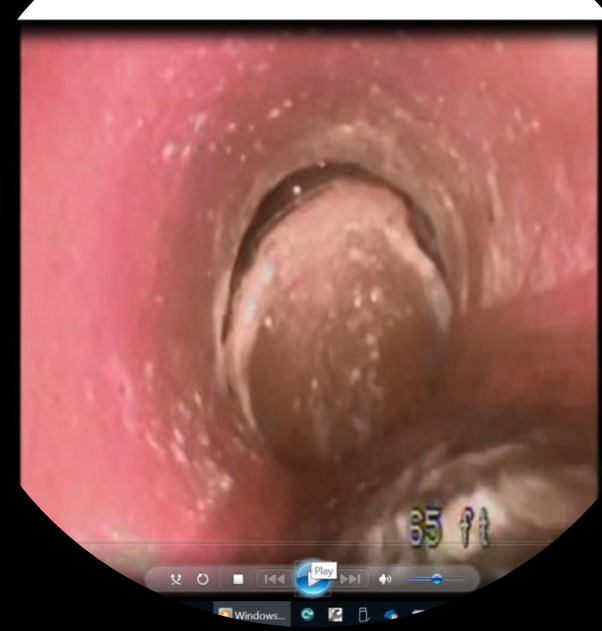


- *Cured-In-Place-Pipe* (CIPP) lining is primarily performed on sanitary sewer pipe constructed of Clay, ACP or Truss.
- The minimum allowable thickness for the finished product shall be 6 mm (Small diameter CIPP 6”-23”).



## Lateral Lining

Locate Service Lateral  
Install Cleanout/Vac-A-Tee  
Clean Service Lateral  
Install LMK Tee Liner  
Shorty  
Stubby  
Full length liner

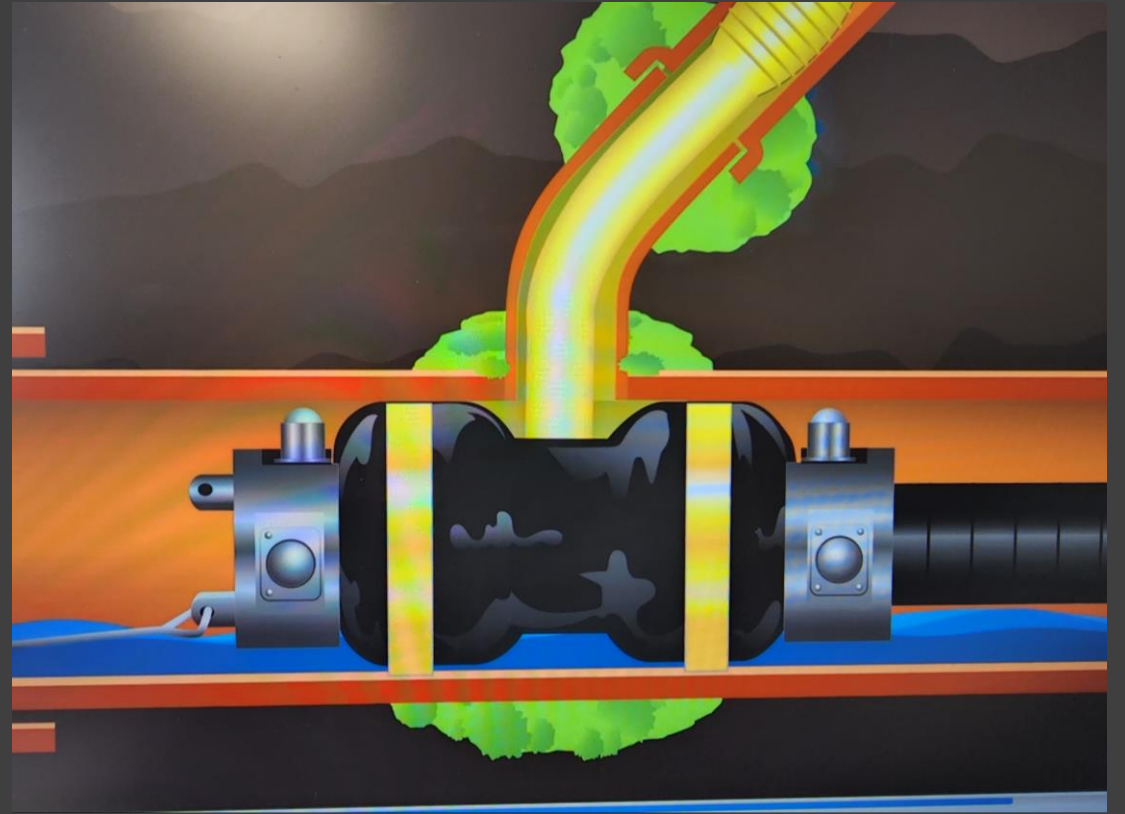
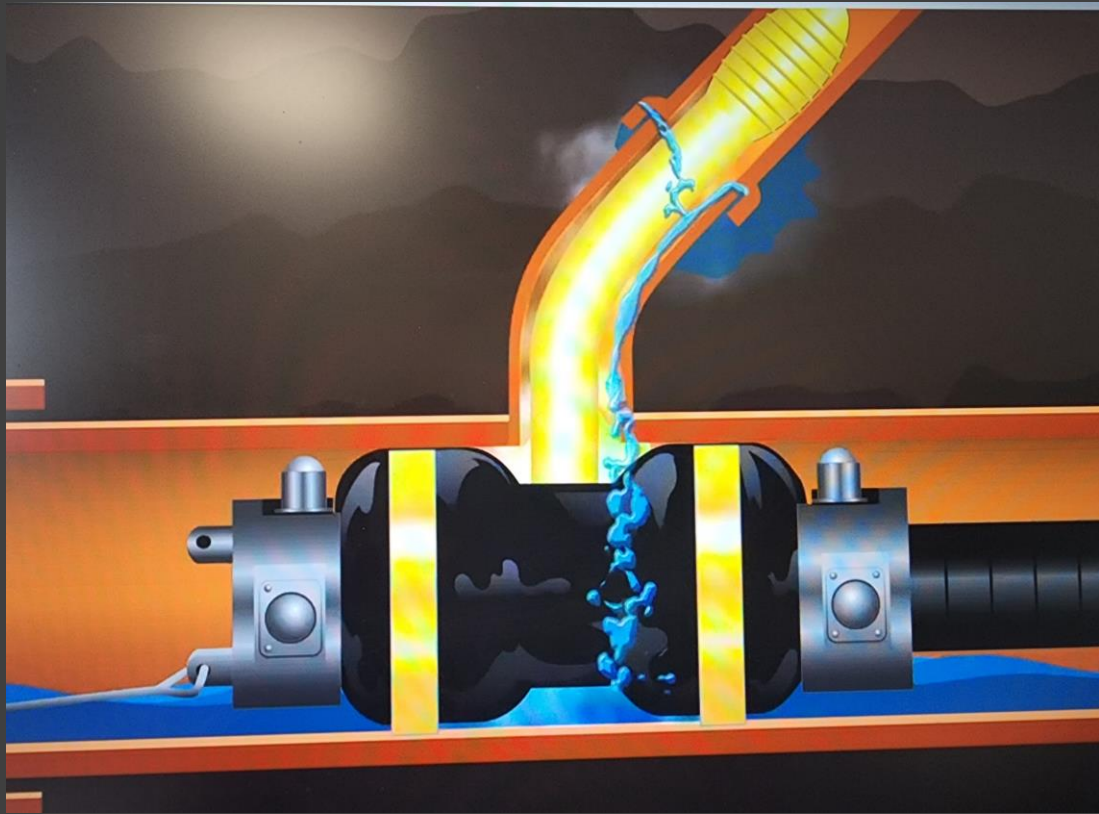




# Lateral Lining CIPP



# Lateral Lining CIPP



# Mainline Lateral Grouting

# Lateral Grouting

## Lateral Grouting Process

- Locate Service Lateral
- Install Outside Cleanout
- Clean Lateral
- Grout Mainline Connection with Mainline Lateral Packer
- Grout Lateral from Cleanout to *Foundation* with a Push Packer
- Grout Lateral from Cleanout to *Main* with a Push Packer
- Warranty Testing



# Manhole Rehabilitation Inspections

- Manhole Cleaning and Preparation Inspection
- Equipment Inspection
- Grouting
- Wet Film Thickness Inspections
- Visual Inspection
- Spark Testing
- Adhesion Testing

NAPERVILLE – DPU-WATER



Date:  
WO #

### Manhole Rehabilitation Inspection Form

Bid # 22-010      Contract # 2180      Location \_\_\_\_\_  
 Address \_\_\_\_\_      Contractor SpectraTech      Applicator \_\_\_\_\_  
 Weather \_\_\_\_\_      Temp \_\_\_\_\_  
 Manhole # \_\_\_\_\_      Manhole Diameter \_\_\_\_\_      Manhole Depth \_\_\_\_\_

Substrate Block, Brick, Concrete, Renew	Preparations		Flow Control		Thickness Measurement		Visual		Adhesions		Spark	
	Pass	Fail	YES	NO	250 MILS	500MILS	Pass	Fail	Pass	Fail	Pass	Fail

Adhesion tester manufacture \_\_\_\_\_

Adhesion tester Recommended PSI \_\_\_\_\_

Adhesion test Date of Correction \_\_\_\_\_

Spark test manufacture ABQ Industrial

Spark test recommended voltage 9 – 10 vK

Number of spark test defects \_\_\_\_\_

Spark test defects date of correction \_\_\_\_\_

Reviewed Performance work statement (PWS)    YES    NO

IF NO WHY? \_\_\_\_\_

COMMENTS: \_\_\_\_\_

# Manhole Rehabilitation Inspections.

## Wet File Thickness Test



- a. The minimum installed thickness of manhole coatings shall be:
  - i. 250 mils (1/4") for Raven 405
  - ii. 250 mils (1/4") for Spraywall

- a. For Raven and Spraywall, City of Naperville staff shall test coating thickness during the "wet" phase of installation to verify compliance with minimum thickness requirements. The Contractor shall schedule all work so as to enable timely testing by City staff.

# SPARK TEST (HOLIDAY DETECTION)

- Every manhole in this bid specifications is to be Spark tested.
- Every Spark Test is to be witnessed by a City Representative.
- Spark testing refer to ATSM D-4787 and NACE SP0188-2006
- Testing Procedures and Voltage Requirements shall be done as per Manufacturer recommendations.
- All defects are to be clearly marked and the count of defects per manhole shall be given to the City Representative.
- All defects are to be repaired per Manufacturer recommendations.
- 10% of repaired manholes are to be Re-Spark tested at no additional charge to the City of Naperville.
- City Representative will select the 10% of the manholes to be retested.





# ADHESION (PULL-OFF) TEST

- An Adhesion test shall be done to 10% of the manholes in this bid specification.
- City Representative will select the 10% of the manholes to be retested.
- Three Adhesion Tests will be done on each manhole. Bench, Cone, Barrel sections or areas selected by the City Representative.
- Testing Procedures shall be done as per Manufacturer recommendations.
- All areas tested are to be repaired per Manufacturer recommendations. This cost shall be considered incidental and not charged to the City of Naperville.
- If 50% of the 10% tested fail, an additional 20% of the manholes in this bid specification shall be tested. This cost shall be considered incidental and not charged to the City of Naperville.



# Main Line CIPP Inspections

- Wet-Out Facility Visit
- Traffic Control
- Site Inspection
- By-Pass Pumping
- Visual Liner Inspection
- Curing Reports
- Curing Temperatures
- Samples
- Video Inspections of Cured Liner Before Service Reinstatement
- Service Lateral Reinstatement



# Main Line CIPP Inspections

Main Line  
Lateral

## City of Naperville Water Utilities CIPP Inspection Form

Type of CIPP Installation    Water Cure CIPP     Stream Cure CIPP     UV GR CIPP

Date	Main Line Set	Contractor	Work Order #
1. Site condition ( Before work)		Pass <input type="checkbox"/>	Fail <input type="checkbox"/>
2. Traffic Control		Pass <input type="checkbox"/>	Fail <input type="checkbox"/> N/A <input type="checkbox"/>
3. By-Pass Pumping		Pass <input type="checkbox"/>	Fail <input type="checkbox"/> N/A <input type="checkbox"/>
4. Property Owner Notification		Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input type="checkbox"/>

CIPP Inspection	Address
1. Preinstallation Inspection	Pass <input type="checkbox"/> Fail <input type="checkbox"/>
2. Visual Liner Inspection (before Install)	Pass <input type="checkbox"/> Fail <input type="checkbox"/>
3. Received a copy of Wet-Out Report	Yes <input type="checkbox"/> No <input type="checkbox"/>
4. Reviewed Wet-Out Report	Pass <input type="checkbox"/> Fail <input type="checkbox"/>
5. Witness End Seal Installation	Yes <input type="checkbox"/> No <input type="checkbox"/>
6. Termination Points Sealed	Yes <input type="checkbox"/> No <input type="checkbox"/>
7. Leaking Between Host Pipe and Liner	Yes <input type="checkbox"/> No <input type="checkbox"/>

CIPP Installation Inspection		Foreman		Operator			
MH to MH #	Pipe Size (in)	Pipe Length (ft)	Weather	Temp	Curing Log	# of SC	Sample Taken
Water Heater/Stream Pressure (psi)	Tube Pressure (psi)	Tube Temp (F)	Thermo #1 Temp (F)	Thermo #2 Temp (F)			

**Sample**

1. Sample Taken by Contractor	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2. Sample Witnessed and Approved	Yes <input type="checkbox"/>	No <input type="checkbox"/>

UV GR CIPP Inspection		Foreman		Operator			
MH to MH #	Pipe Size (in)	Pipe Length (ft)	Weather	Temp	Curing Log	# of SC	Sample Taken
Curing speed	Light source working & wattage	Inner air pressure	Curing temperatures				

Chemical Grouting		Main		Host Pipe/Liner	
Manhole #	Grout Type	Manufacturer	# of tubes	Sealed	

Main Line  
Lateral

## City of Naperville Water Utilities CIPP Inspection Form

MH to MH #	Grout Type	Manufacturer	# Joints failed	# of Gallons Pumped	Sealed

**Comments:-**

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# Grouting Inspections

- Equipment Inspection
- Cup Test
- Barrell Test
- Air Testing
- Grouting Process
- Finished Product
- 11-Month Warranty test



# Grouting Inspections

- Pre-Cleaning
- Set-Up
- Service Lateral Connection
- Cleanout to Main
- Cleanout to Foundation

City of Naperville Department of Public Utilities - Water




Grouting of Sanitary Sewer Service Connections and Service Laterals  
Cress Creek Phase 8  
22-017

**Cleanout to Foundation Test & Seal Report**

Service Lateral Address:	
Pipe Diameter:	
Distance from cleanout to building foundation:	
Distance between pipe joints:	
Numer of joints tested:	
Test pressure :	
Duration of test:	
Number of joints passing:	
Number of joints failing:	
Number of joints grouted:	
Gallons of grout used after initial test:	
Numer of joints re-tested after grouting:	
Number of joints failing re-test:	
Number of joints grouted after re-test:	
Operator Name:	
Date:	
Time started:	
Time ended:	
Operator Comments:	

City of Naperville Department of Public Utilities - Water



Grouting of Sanitary Sewer Service Connections and Service Laterals  
Cress Creek Phase 8  
22-017

**Cleanout to Main Test & Seal Report**

Service Lateral Address:	
Pipe Diameter:	
Distance from cleanout to main:	
Distance between pipe joints:	
Numer of joints tested:	
Test pressure :	
Duration of test:	
Number of joints passing:	
Number of joints failing:	
Number of joints grouted:	
Gallons of grout used after initial test:	
Numer of joints re-tested after grouting:	
Number of joints failing re-test:	
Number of joints grouted after re-test:	
Operator Name:	
Date:	
Time started:	
Time ended:	
Operator Comments:	

# Lateral Lining Inspections

## City of Naperville Water Utilities Lateral CIPP Inspection Form

Type of CIPP Installation    Water Cure CIPP     Stream Cure CIPP     UV GR CIPP

Date *5/4/2022*    Inspector *Emily E.*    Contractor *PPI*    Work Order # *232312*

- |                                 |  |                               |   |
|---------------------------------|--|-------------------------------|---|
| 1. Site condition (Before work) | Pass <input checked="" type="checkbox"/> | Fail <input type="checkbox"/> |   |
| 2. Traffic Control              | Pass <input checked="" type="checkbox"/> | Fail <input type="checkbox"/> | N/A <input type="checkbox"/>            |
| 3. By-Pass Pumping              | Pass <input type="checkbox"/>            | Fail <input type="checkbox"/> | N/A <input checked="" type="checkbox"/> |
| 4. Property Owner Notification  | Yes <input checked="" type="checkbox"/>  | No <input type="checkbox"/>   | N/A <input type="checkbox"/>            |

CIPP Inspection    Address *209 N Julian*

- |   |  |  |
|---|--|--|
| 1. Preinstallation Inspection               | Pass <input checked="" type="checkbox"/> | Fail <input type="checkbox"/>          |
| 2. Visual Liner Inspection (Before Install) | Pass <input checked="" type="checkbox"/> | Fail <input type="checkbox"/>          |
| 3. Witness End Seal Installation            | Yes <input checked="" type="checkbox"/>  | No <input type="checkbox"/>            |
| 4. Termination Points Sealed                | Yes <input checked="" type="checkbox"/>  | No <input type="checkbox"/>            |
| 5. Leaking Between Host Pipe and Liner      | Yes <input type="checkbox"/>             | No <input checked="" type="checkbox"/> |

CIPP Installation Inspection    Foreman *Jeremy O.*    Operator *Dylan*

Upstrm MH	Dwnstrm MH	Main Size	Liner Dimensions	Weather	Temp (F)	Curing Log (y/n)
<i>C07-020</i>	<i>C07-019</i>	<i>8"</i>	<i>8" x 6" x 30' T</i>	<i>Dry</i>	<i>45°</i>	<i>yes</i>
Resin Impregnate Time	Resin Temp (F)	Steam Temp. (F)	Water Heater/Stream Pressure (psi)	Cook Start	Cook Finish	Cool Down Complete
<i>9:07 am</i>	<i>30°</i>	<i>270°</i>	<i>6-7</i>	<i>10:00 am</i>	<i>10:30 am</i>	<i>10:52 am</i>

Comments:

# COMMUNICATIONS

## Public

- Letters sent to property owners in all affected areas
- Signs are posted in affected areas
- Projects are posted on City's Website
- HOAs are notified of work
- A City representative talks to each homeowner

## Management/Council



**City of Naperville  
DPU-Water  
Cress Creek  
Service Line Grouting  
Bid #21-019 (Michels)**

**LEGEND**

**Grouting**

- Grout Entire (37)
- Mainline Grouted (20)
- Grouted Entire (21)
- Mainline Grout Only (7)

**Manhole**

- Collection
- Drop Manhole
- Lined Thru

**Gravity Main**

- Collection
- Lined Main
- Low Pressure Sets

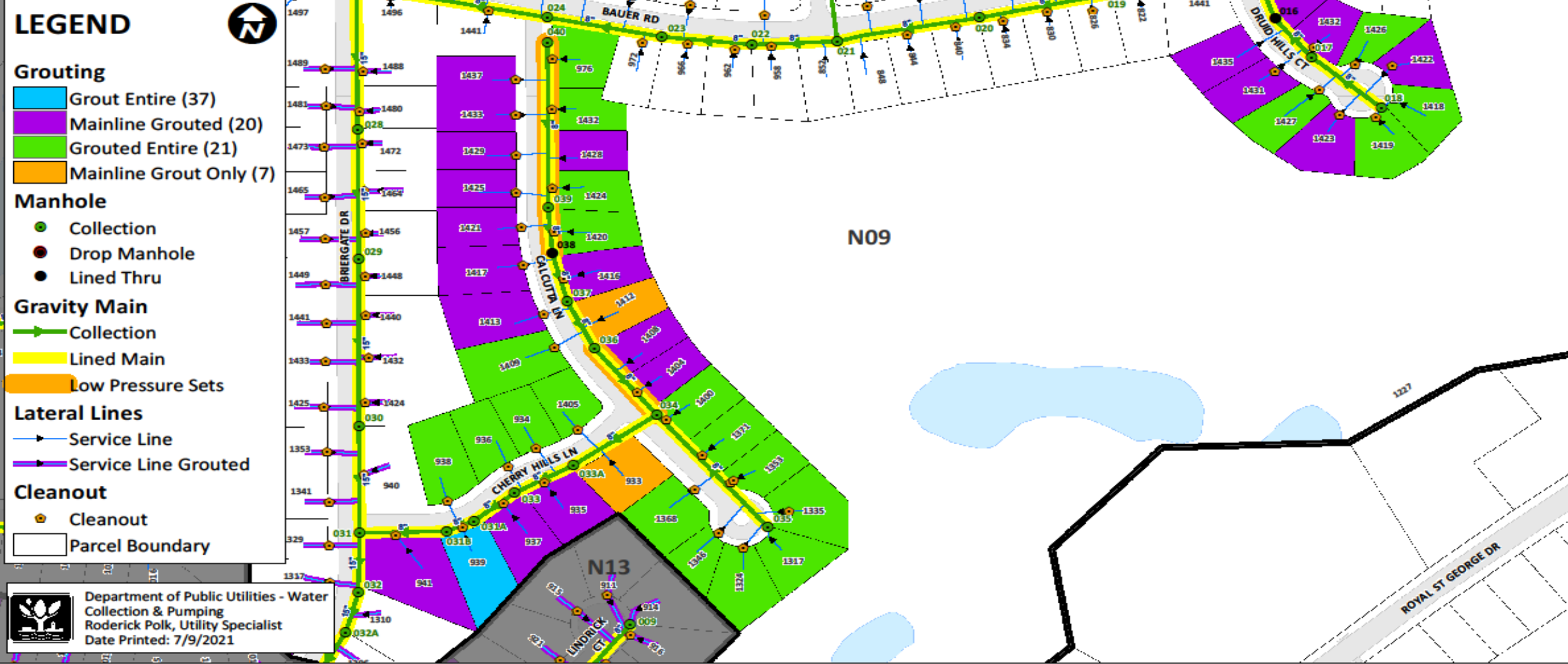
**Lateral Lines**

- Service Line
- Service Line Grouted

**Cleanout**

- Cleanout

Parcel Boundary



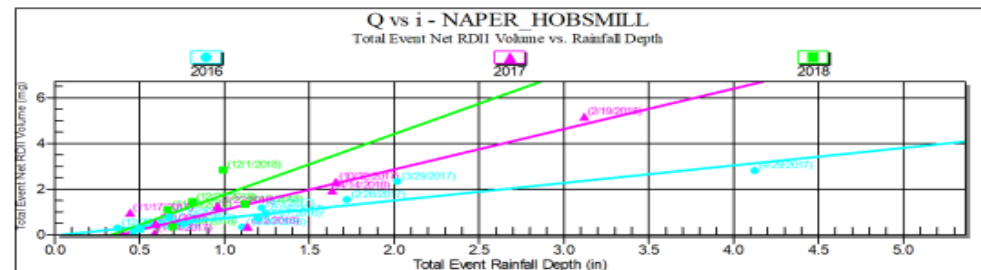
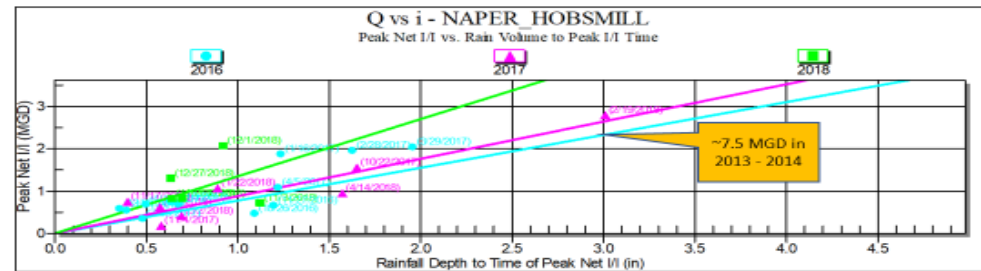


# What's Working in Naperville and Why

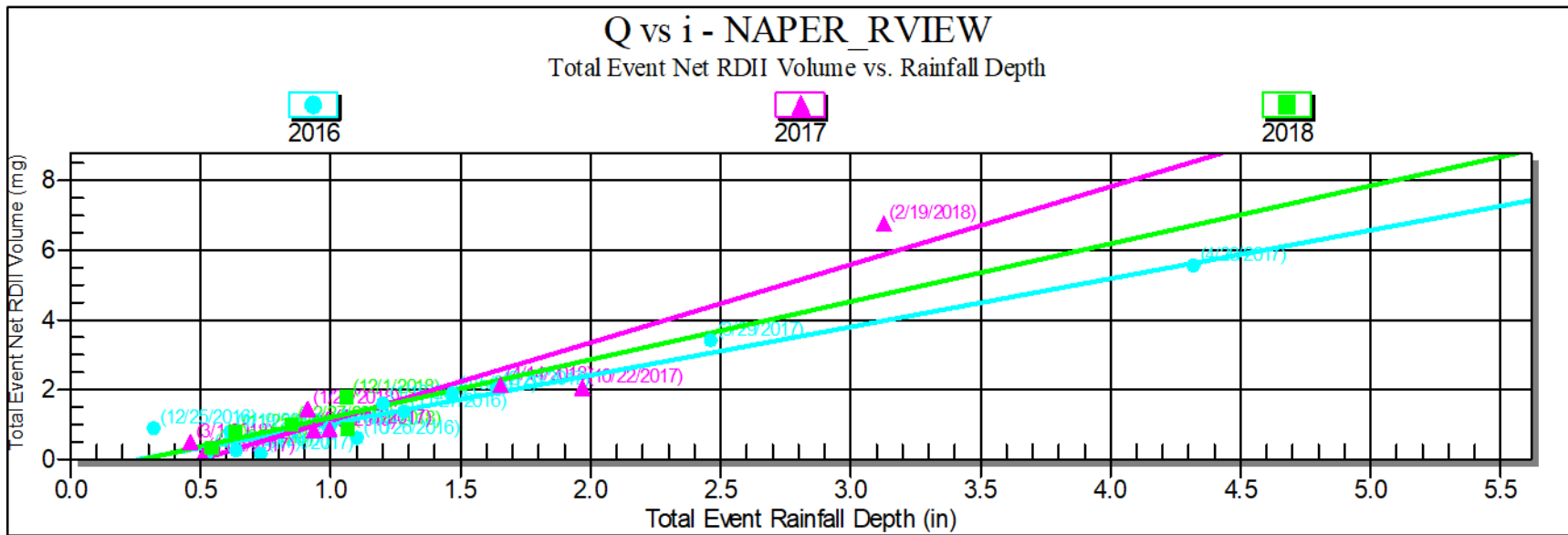
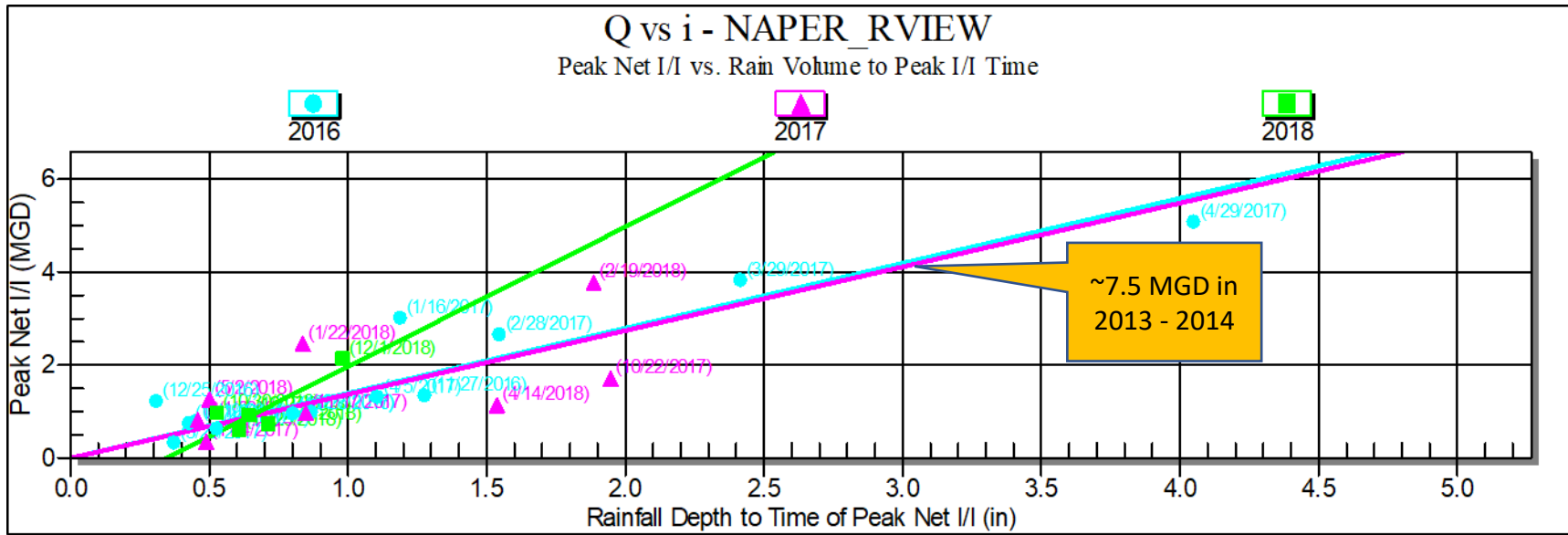
Area	Estimated I&I from Main Line	Estimated I&I from Lateral	Estimated I&I from Manhole	2013 Peak I&I	2017 Peak I&I	
Burning Tree	20%	70%	10%	1.3 MGD	.06 MGD	53.8% Reduction
Hobson Mill	25%	65%	10%	7 MGD	2.3 MGD	67.1% Reduction
Prescott	20%	70%	10%	2.75 MGD	2 MGD	27.3% Reduction
Riverview	30%	60%	10%	8 MGD	4 MGD	50% reduction
* Based on a 3" rain fall						

“The improvements may be the best I have seen for basins this size.”

City of Naperville Flow Meter Service Provider.



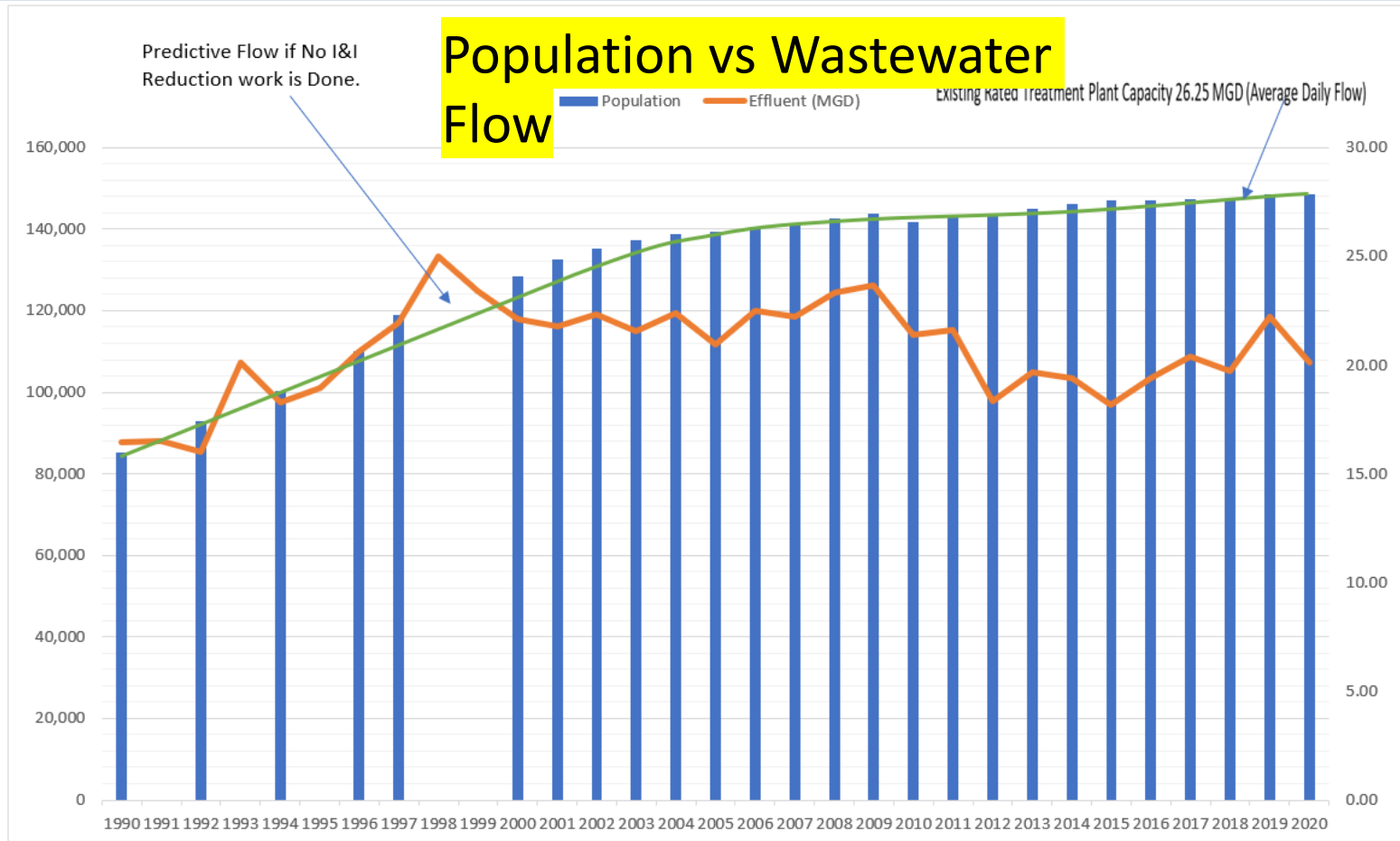
I assembled a quick comparison of wet weather performance of 4 of your sewer shed and the improvements have been impressive. The improvements may be the best I have seen for basins this size.











# Positive Impact

*Naperville's proactive approach to combating I&I has yielded positive results. Since 1998 the population of Naperville has increased by roughly 30,000 people or about 20%. Yet when looking at the average amount of water treated at the SWRC flows have decreased by roughly 30% over the same period.*





# RESULTS

- **Reduced Customer Service Calls** - 2007: Responded to 600 Calls. 2019: Responded to 295 Calls. **Yearly Saving Of \$61,000**
- Less Time on Customer Service means crews can spend more time on I/I work which reduces the chance of main line Back-ups.
- **Reduced Sewer Maintenance Cost** - Yearly Root Cutting is now Jet Flushing only every four years. **\$64,513 Yearly Savings**
- **Reduced Chance Of Injuries** - Priceless
- **Reduced Pumping Cost** - Reduces the cost of operating a wastewater pump station.
- Reduced Electric Cost
- Reduced Maintenance Required
- Reduced By-Pass Pumping needed due to high flows
- **Treatment Plant Flow** - Current flow is 19.75 MGD. Plant capacity is 26.75 MGD.
- Current I&I program contributed to delay in plant expansion
- Plant expansion cost in 1998 estimated at \$9 MILLION.



CITY OF NAPERVILLE WATER UTILITIES

CAPACITY, MANAGEMENT, OPERATIONS AND MAINTENANCE (CMOM) PROGRAM

Tony Conn Sr. | Water Distribution and Collection Manager  
Katy Librizzi | Collection and Pumping Supervisor  
Rev. 12/2019



Revised 12/30/21

City of Naperville Ten-Year I&I Reduction Plan and Status Report



Tony Conn-Water Distribution and Collection Manager  
CITY OF NAPERVILLE

# Questions?

