

Sanitary Sewer Collection System Plan Update

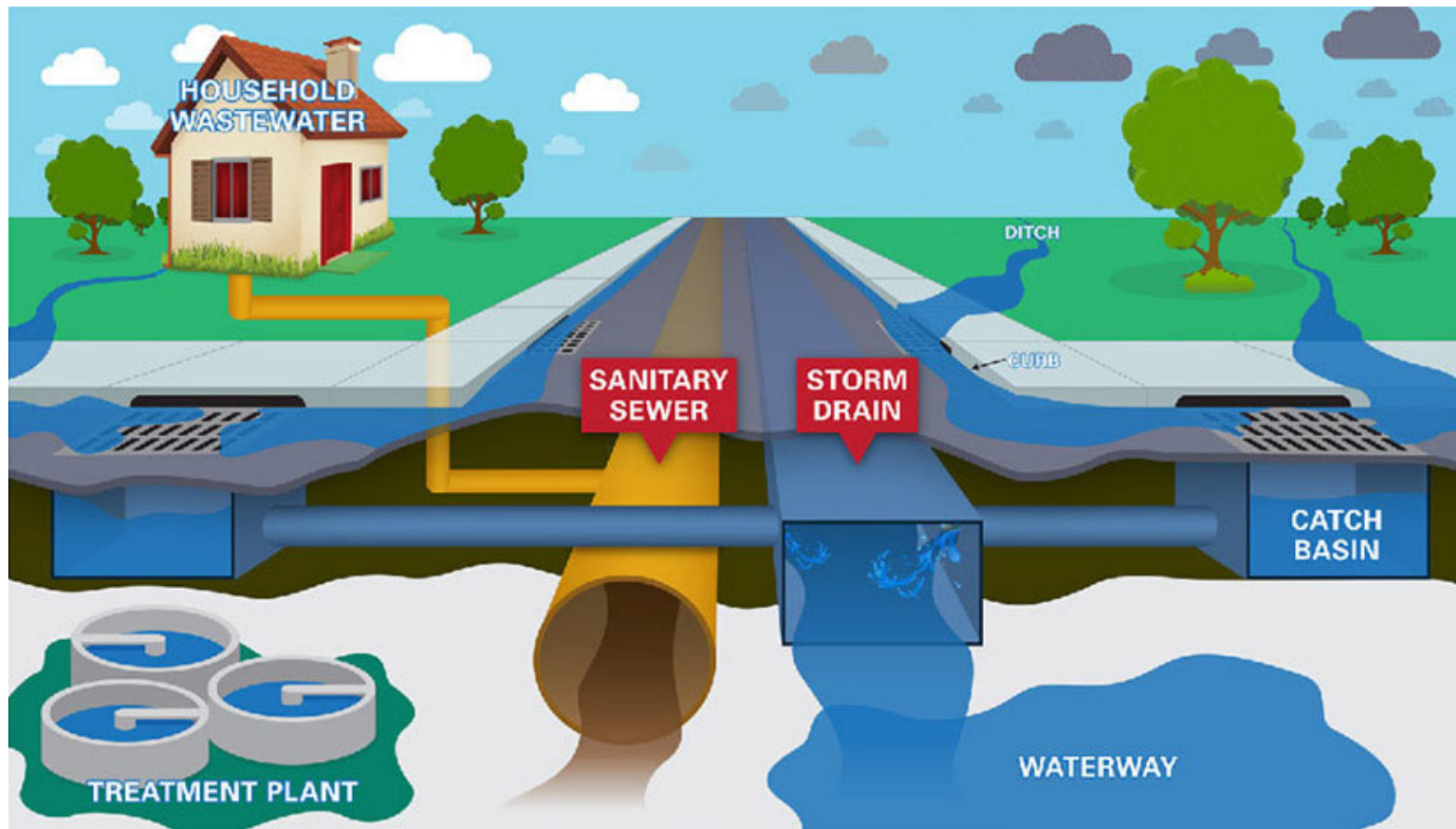
An element of Arlington County's Comprehensive Plan

Jon Lawler, P.E.
Water Sewer Streets

11/15/2023

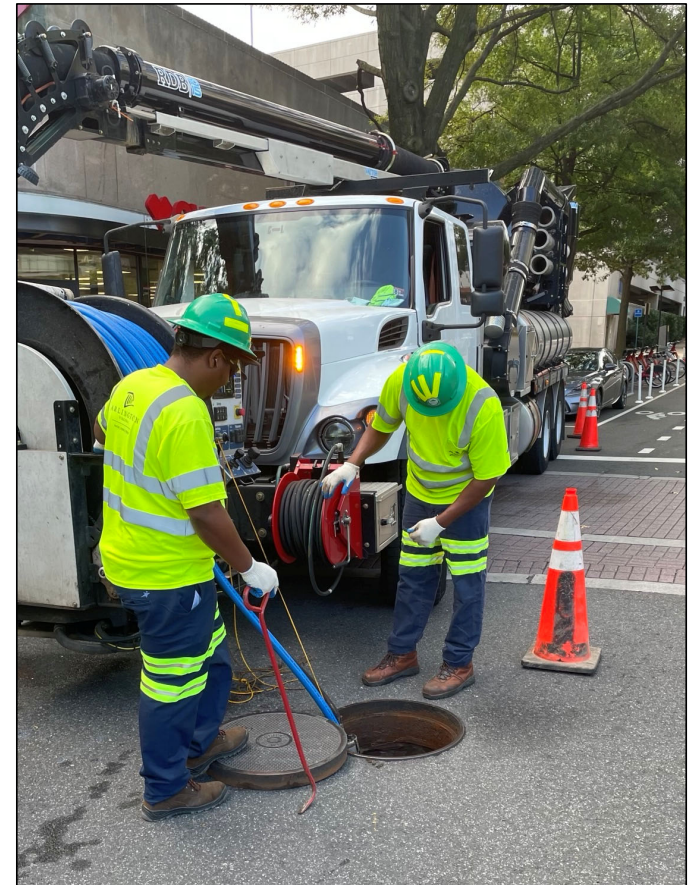


What is a Sanitary Sewer?



Sanitary Sewer System Plan Update Overview

- Background
- Overview of wastewater sewer system and current programs
- Highlights of the 2023 Plan Update
- Action Plan Recommendations



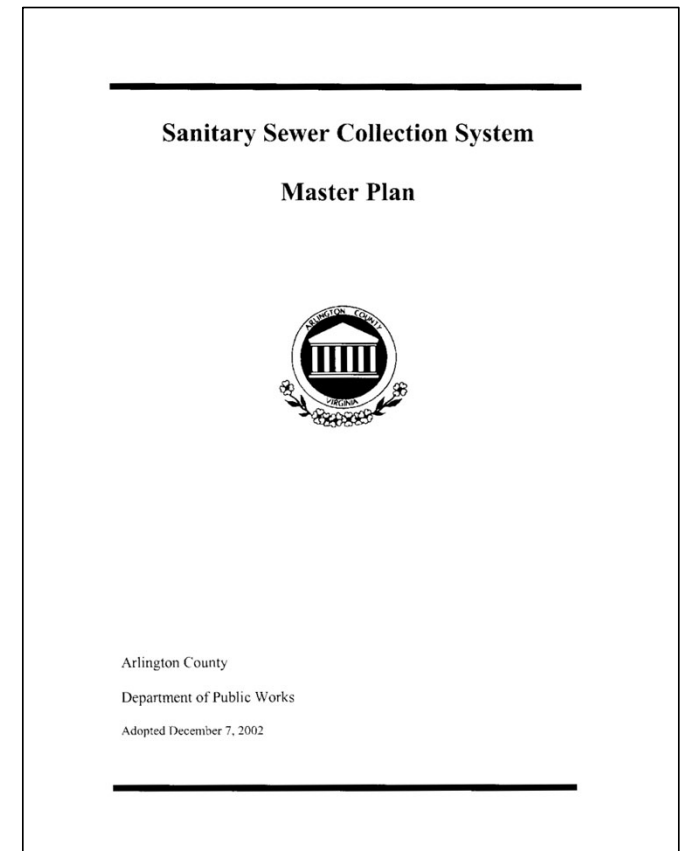
Comprehensive Plan

- One of 11 elements in Comprehensive Plan
- Established by County Board in 1960
- First Sanitary Sewer guiding Plan was adopted in 1961
- Sanitary Sewer Collection System Plan evaluates the system facilities, practices, programs, policies and improvements needed to provide and maintain adequate service into the future.



Background

- Most recent update was adopted in December 2002
- Planning level document
- Plan updated to account for:
 - Updated growth & development forecasts
 - Updated capacity assessment of sanitary sewer system flow demands
 - Identify system improvements
 - Evaluate ongoing rehabilitation, operations and maintenance efforts of the system



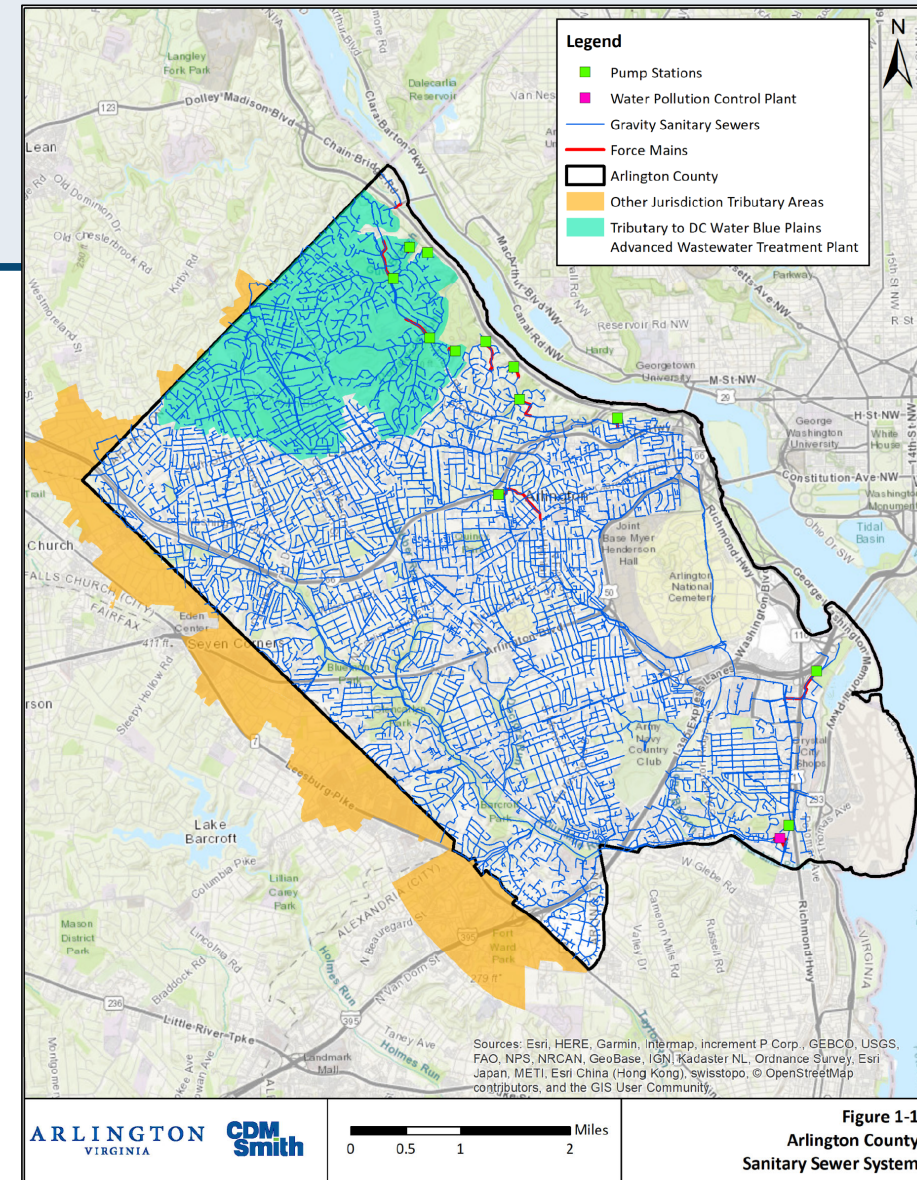
Goals & Objectives

- **Overall Goal:** to guide future programs to maintain the gravity sewer system such that it continues to operate reliably and remains a valuable resource to the County residents.
- **Objectives:**
 - Describes the County's sanitary sewer collection system.
 - Documents ongoing programs and improvements undertaken by the County to maintain and upgrade the gravity sewer system to serve the needs of the residents and ensure continuous service.
 - Identifies and addresses any portions of the gravity sanitary sewer system that do not have sufficient capacity for existing and projected future peak wastewater flow demands.
 - Recommends potential programs to address current or future capacity issues, reduce backups and emergencies, optimize operation efficiency and improve service reliability.
 - Recommends potential programs to maintain or reduce the rates of groundwater infiltration and stormwater inflow entering the public and private sewers to reduce treatment and pumping costs, conserve capacity, and improve overall system performance.
 - Recommends an Action Plan to improve the condition of the system and ensure that it operates effectively, safely and efficiently.

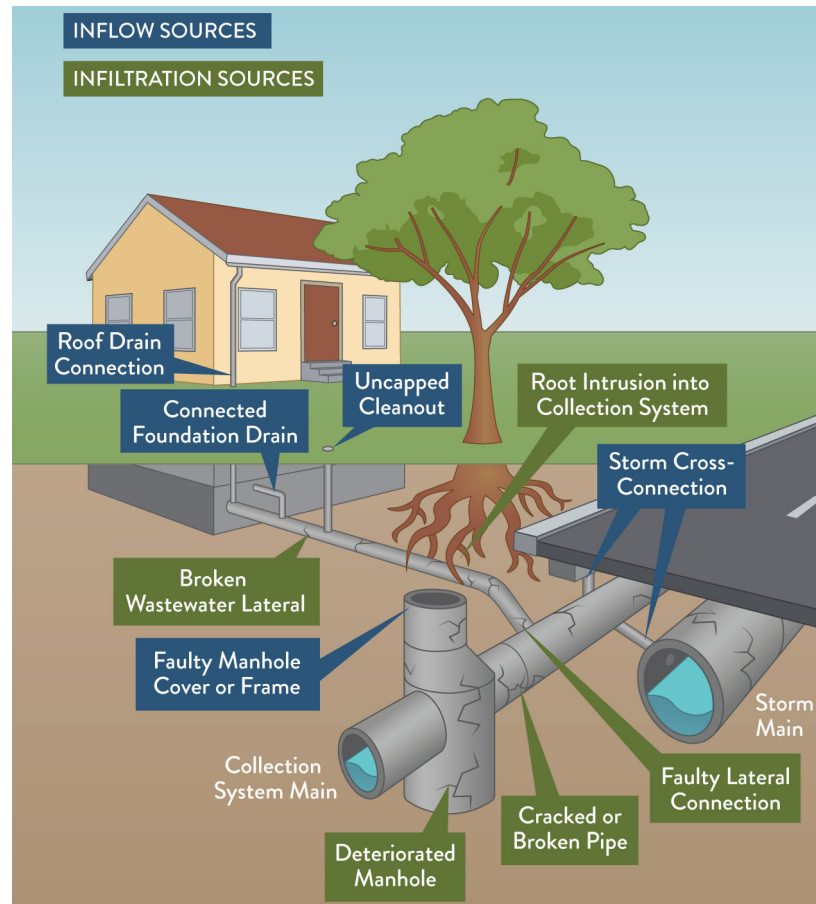


Sanitary Sewer System Overview

- 459 miles of gravity sewers
- Approximately 15,000 manholes
- 13 sewer lift stations
- IJ Partners
 - Fairfax County
 - Falls Church
 - Alexandria

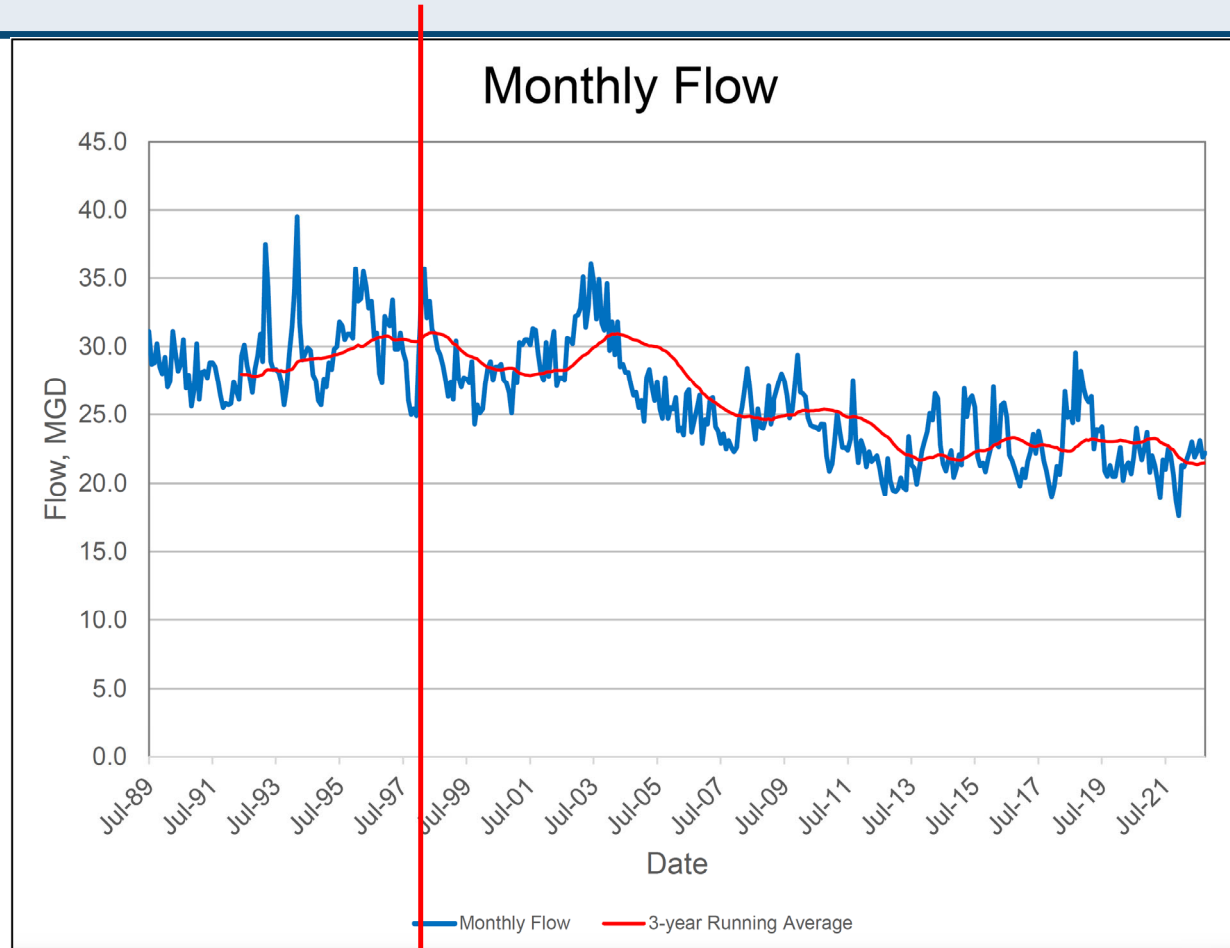


Common Sources of Sanitary Sewer Inflow & Infiltration

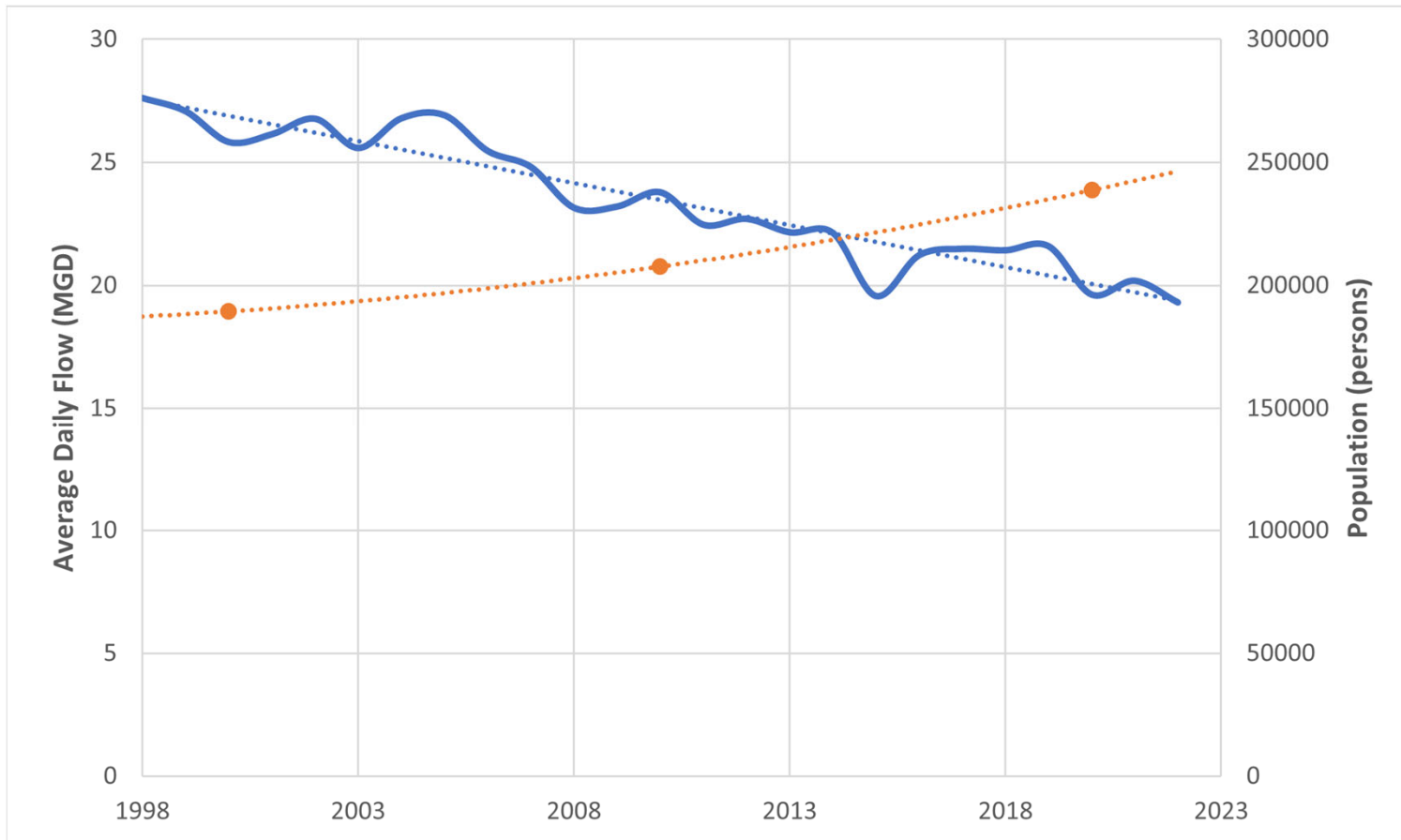


Historic Flows at WPCP (40 MGD Capacity)

Sewer Relining Program Began in 1998

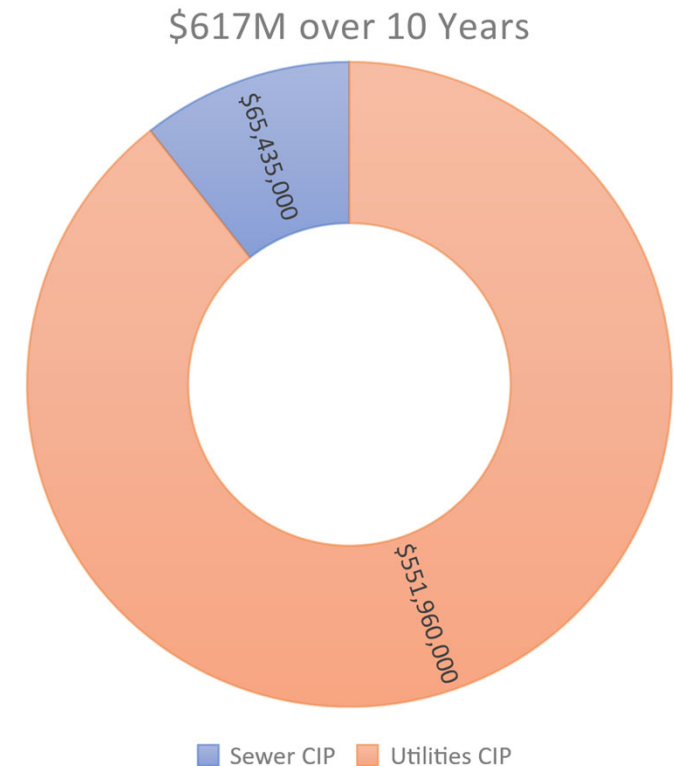


Water Demand vs Population Growth

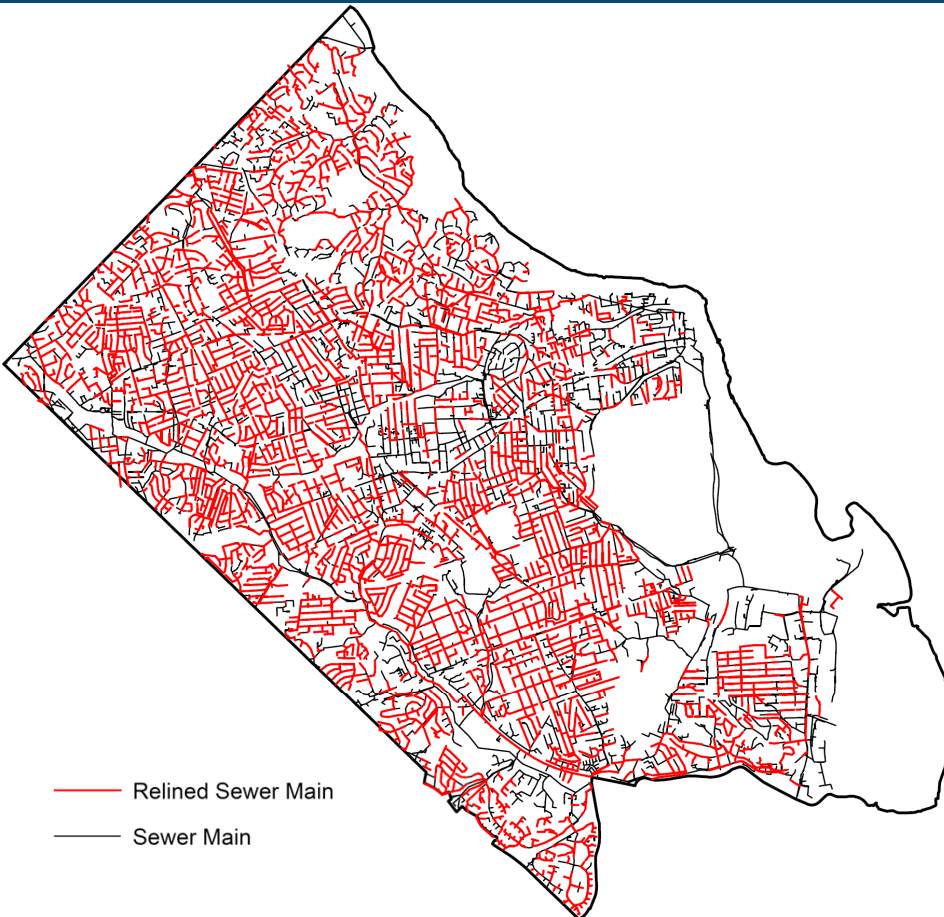


Sanitary Sewer Capital Improvement Planning (CIP) Programs (10-year FY23-32 CIP Budget)

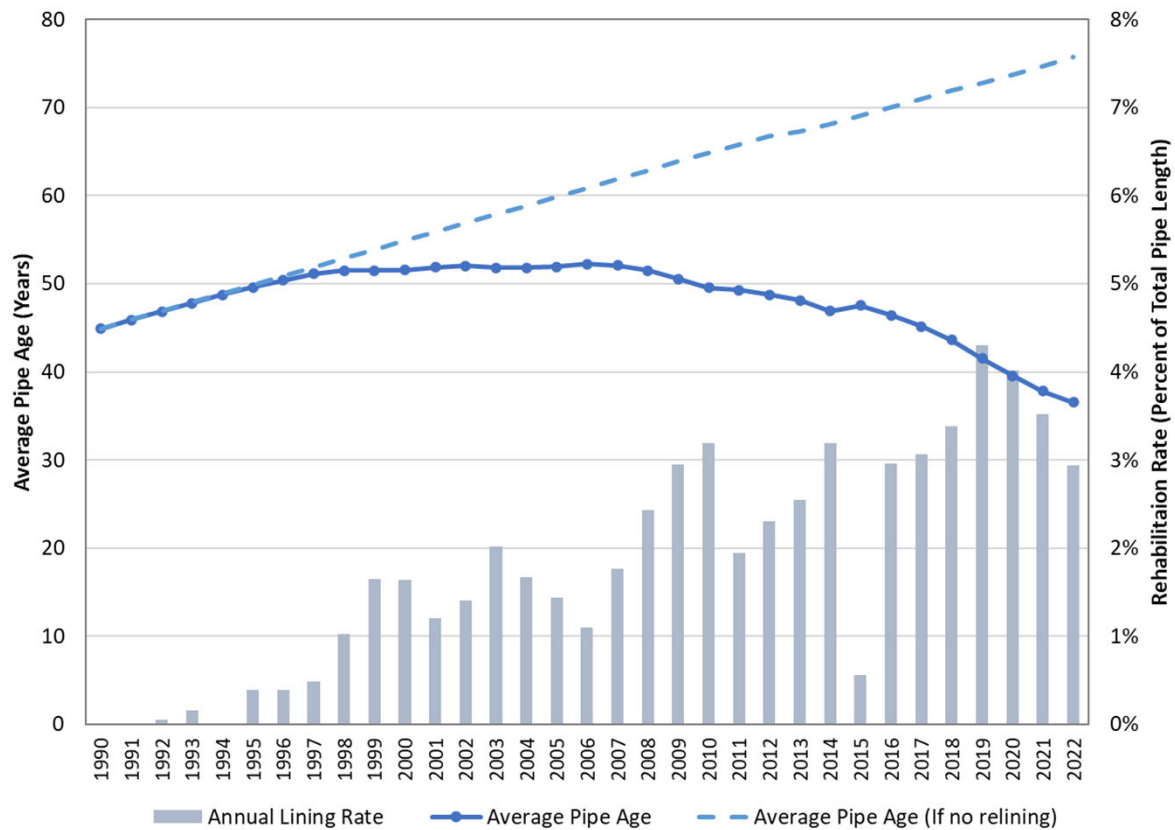
- Infiltration and Inflow (I&I) (\$31,800k)
- Large Diameter Sewer Rehabilitation (\$16,545k)
- Sewer Main Replacement Program (\$8,330k)
- Manhole Rehabilitation (\$5,300k)
- Improvements for Development (\$2,660k)
- Sewer Force Mains Replacement Program (\$800k)



Infiltration and Inflow (I&I) Program (\$31,800k)



I&I Program – Reducing Pipe Age



Large Diameter Rehab (\$16,545k)



Sewer Main Replacement Program (\$8,330k)



Manhole Rehab (\$5,300k)



10/05/18 02:27 PM

Preventative Maintenance (PM) Program

Table 2-9 PM Program by Type

PM Program	Number of Sewer Segments	Sewer Segments (Miles)
Grease	554	15.4
Trouble	253	7.8
Tree Root	236	7.4
Total	1043	30.6

Table 2-10 PM Program Flushing Frequencies

Flushing Frequency (Days)	Number of Sewer Segments	Sewer Segments (Miles)
30	161	3.9
90	438	12.7
180	208	6.6
Total	807	23.2

Preventative Maintenance

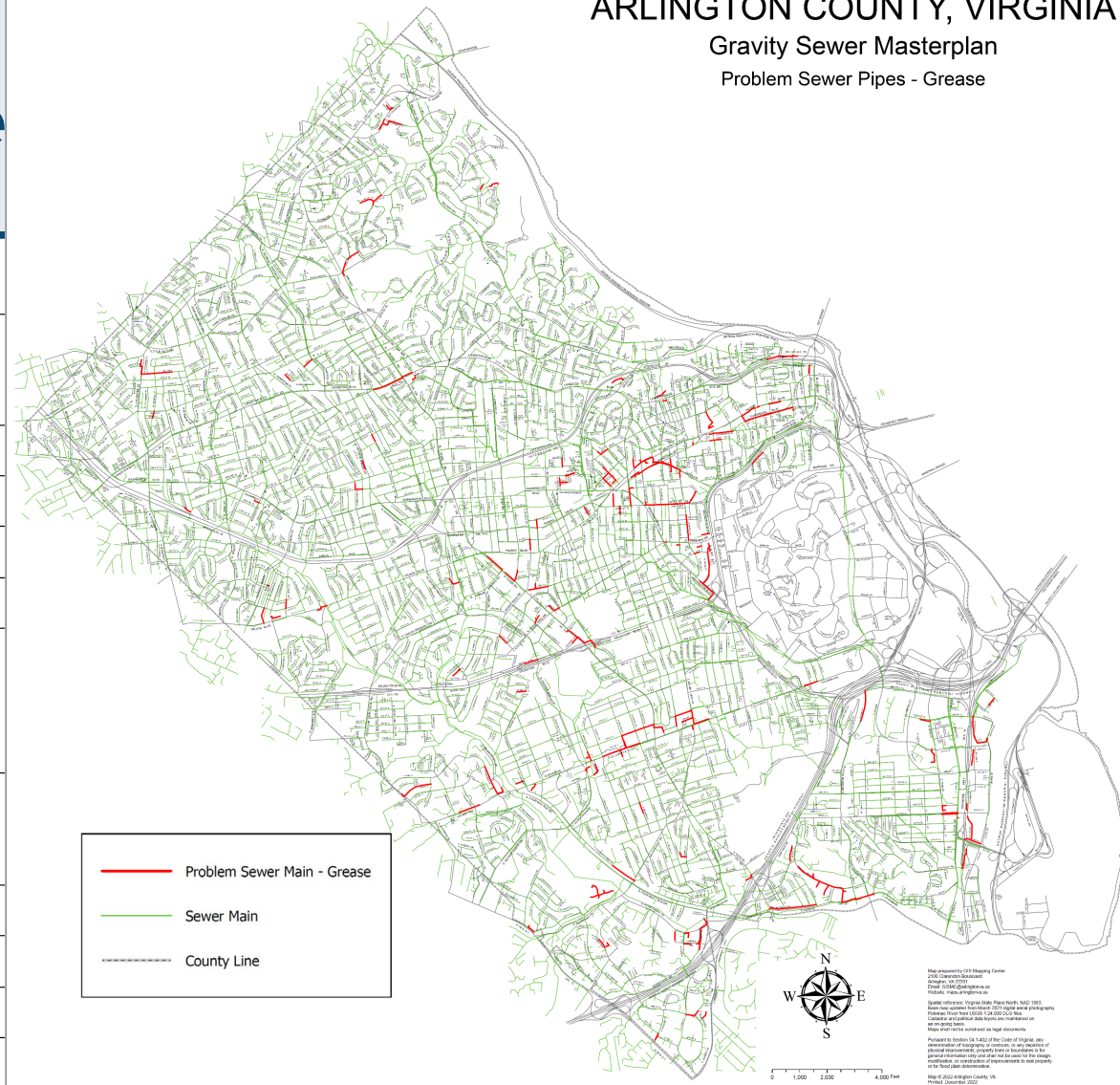
ARLINGTON COUNTY, VIRGINIA Gravity Sewer Masterplan Problem Sewer Pipes - Grease

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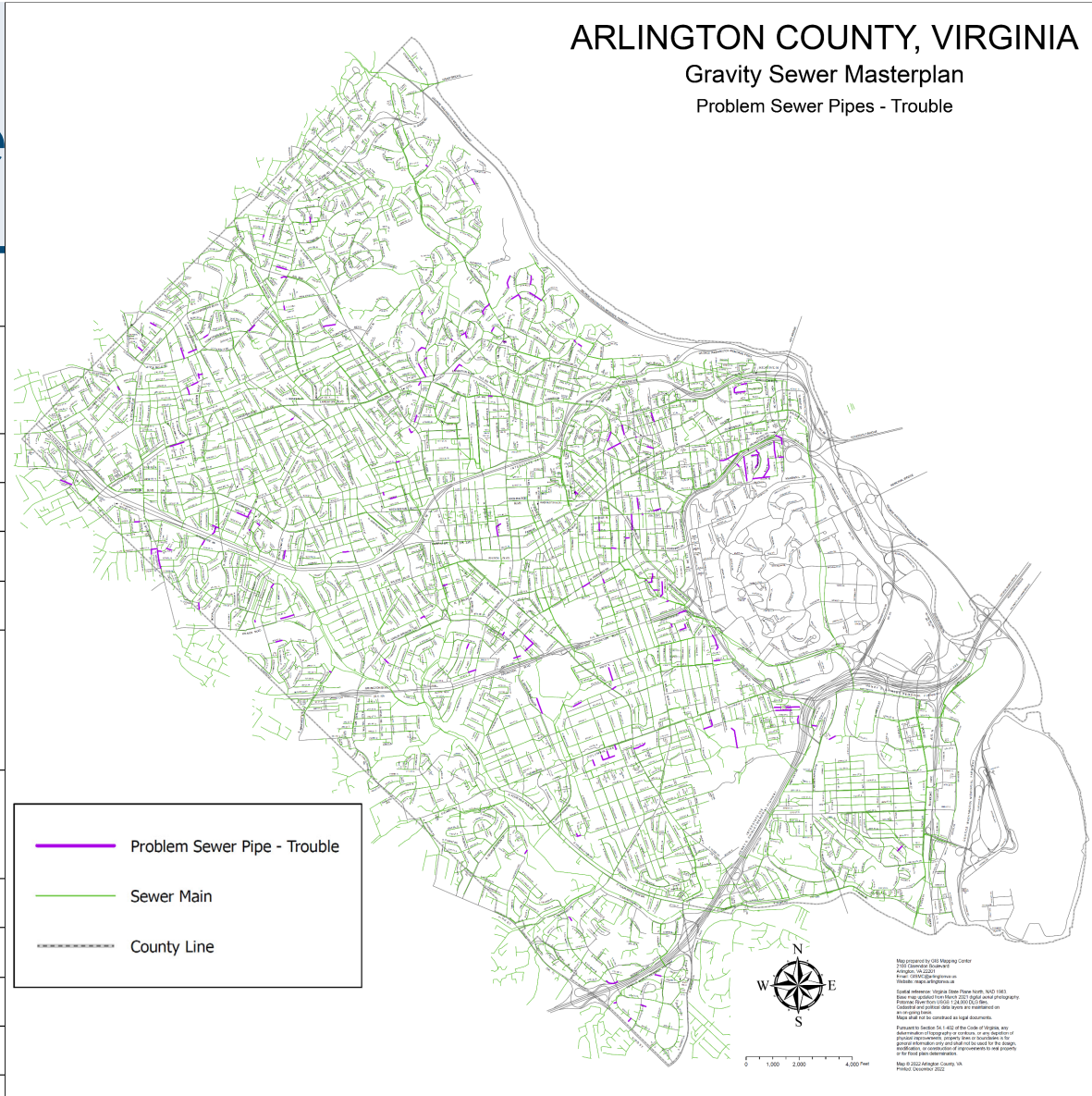
ARLINGTON COUNTY, VIRGINIA Gravity Sewer Masterplan Problem Sewer Pipes - Trouble

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GRID Program

- Flush every 12" diameter and smaller segment once every 5 years
 - **Coming up short (only flushed 34% of non-PM segments)**
- Need \$330k/year to achieve 100%
- SL-RAT



Sewer Backups

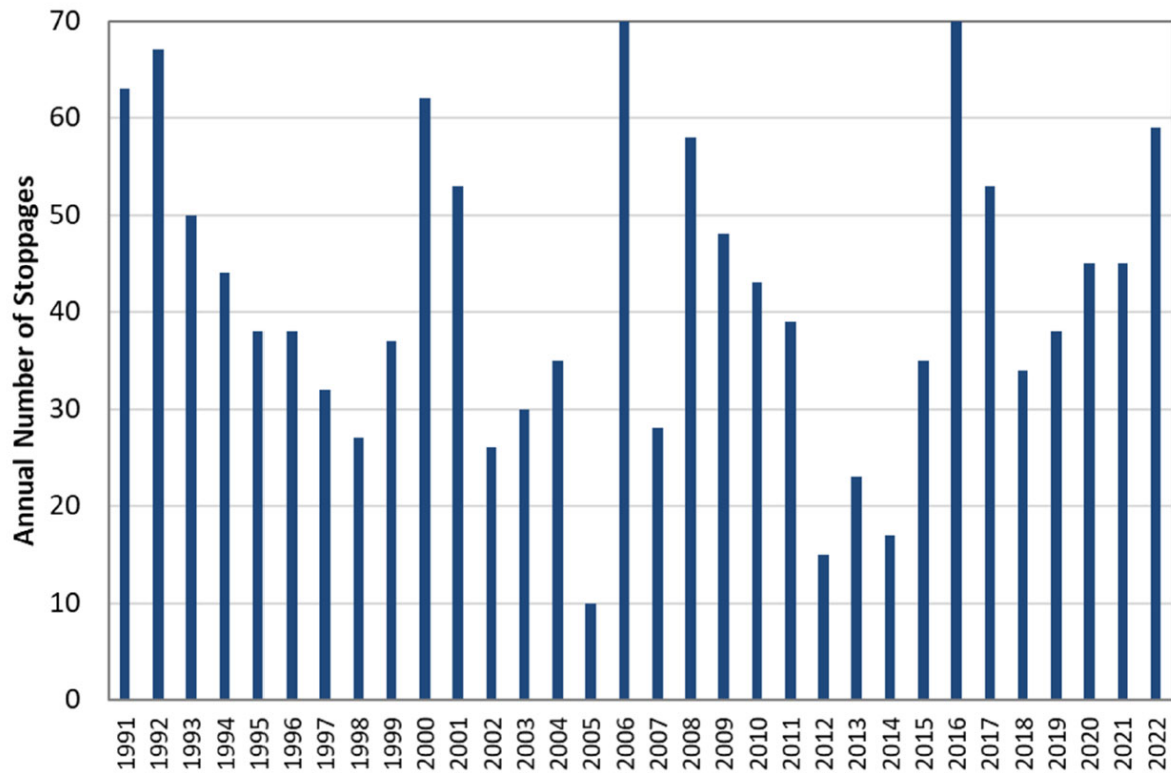


Figure 2-8 Reported Sanitary Sewer Discharges from Public Sewers (1991–2022)

Asset Management

Cartegraph Requests Work **Assets** Resources Reports Jon Search

Back Home > Assets Create Reports

Assets Map Filter Search by address Measure Select

Add layer

- 2018-2022 CCTV
- 2022 CCTV
- 2021 CCTV
- 2020 CCTV
- 2018 CCTV
- 2019 CCTV
- All Guardrails
- All Water Hydrants
- All Sewer Laterals
- All Sewer Mains 14693**
- All Pavement (PCI worse than 25)
- All Water Mains
- All Storm Nodes
- All Meter Boxes
- All Water Valves

ID	Diameter	Material	Length	Street	Estimated	Criticality Fa...	PM Program	PM Sched...	Relined Date-	Pipe Mate
15336	8 in		157 ft	N RANDOLPH ST	100	1				
3612	8 in		81 ft	N TAZEWELL ST	100	1				
3921	8 in		239 ft	N RICHMOND ST	100	1				
15335	8 in		101 ft	N RANDOLPH ST	100	1				
3922	8 in		162 ft	N RICHMOND ST	100	1				

Selected 0 1 - 5 of 14693

Asset Management

Sewer Main 6997



Diameter: **8 in**
 Material:
 Length: **286 ft**
 Installed: **9/1/1940**
 Replaced:

Risk Score: **-/25**
 42 Years and 10 Months Left
 Estimated OCI: **97.19**
 Unknown Risk
 Excellent
 Total Cost To Date: **\$7,933**

- Map
- Location
- Details
- Risk
- Arlington Details
- Up /Down Stream Node ID's
- Inspections
- Tasks
- Linked Assets
- Attached Files

1 - 1 of 1

Tasks

0
 PROJECTED
 Tasks

0
 PLANNED
 Tasks

0
 IN PROGRESS
 Tasks

2
 COMPLETED
 Tasks

0
 CANCELED
 Tasks

Task ID	Activity	Status	Estimated Start ...	Actual Start D...	Actual Stop Da...	Priority	Total Cost
478167	Inspect	Completed	8/3/2021	8/6/2021 12:00:00...	8/6/2021 11:08:45...	None	\$92.54
428454	Line	Completed		2/24/2021 12:00:0...	2/24/2021 12:00:0...	None	\$7,840.25

Asset Management

Inspection Date: 9/12/2023 11:51:22 AM Panels: Asset Observation

USMH: 407
DSMH: 896

MGP
General Photo
50.2

01:41 / 10:18

USMH: 407
DSMH: 896

	Dis...	Code	Description	Grade	From	To	Val 1st	Val 2nd	Joint	Perc...	Cont.	Remarks
	3	AMH	Manhole				null	null				407
	3	MWL	Water Level				null	null		5		
	3	MGP	General Photo				null	null				
	4.3	TBA	Tap Break-in Active		9		4.0	null				
	50.2	MGP	General Photo				null	null				
	52.4	TR	Tap Rehabilitated		9		4.0	null				
	62	MGP	General Photo				null	null				
	64	TBA	Tap Break-in Active		9		4.0	null				ROOTBALL INSIDE OF LATERAL
	144.5	MGP	General Photo				null	null				
	146.8	TBA	Tap Break-in Active		9		4.0	null				
	210.8	MGP	General Photo				null	null				
	213.1	TBA	Tap Break-in Active		9		4.0	null				
	309.2	MGP	General Photo				null	null				
	311.6	TBA	Tap Break-in Active		9		4.0	null				
	337.7	AMH	Manhole				null	null				896 (DROP)

Search

Reports Actions

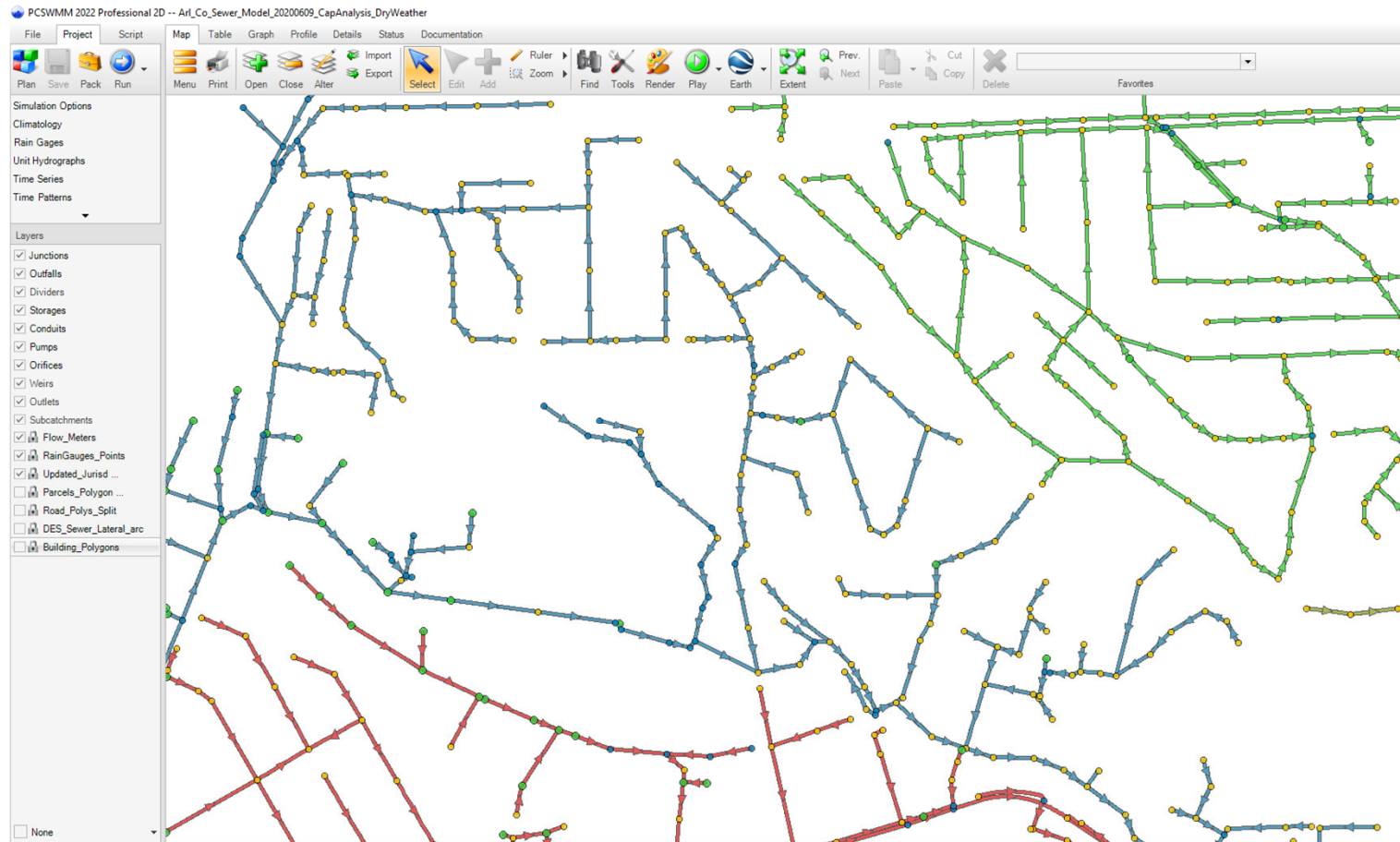
Estimated OCI
97.19

Total Cost To Date
\$7,933

Hydraulic Model Development

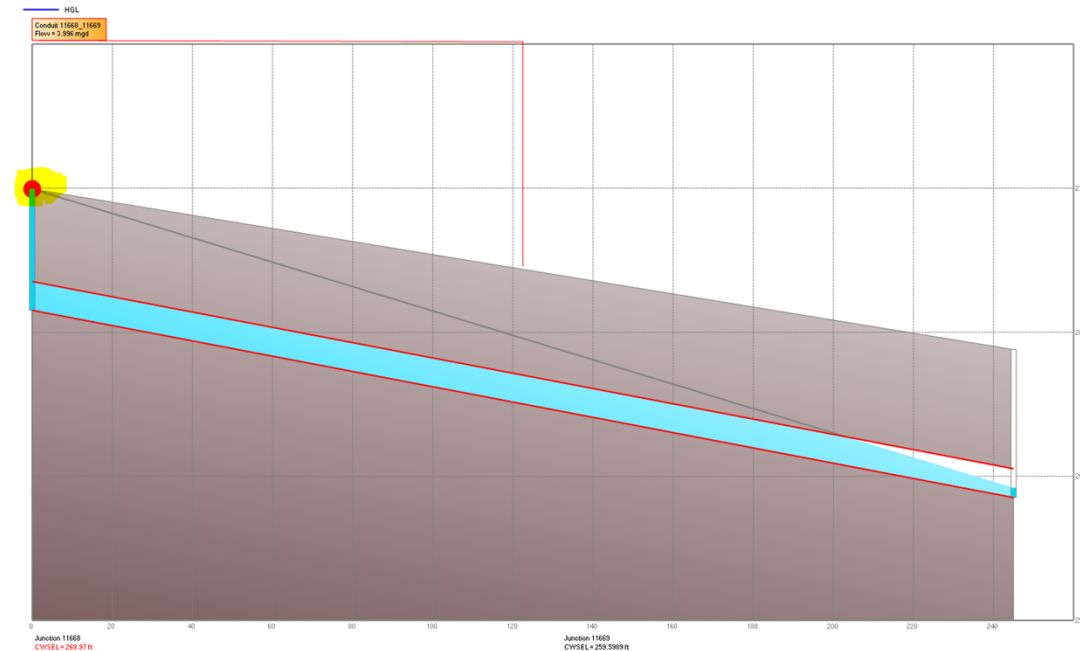
- New dynamic sanitary sewer system model developed in 2020
 - Includes **all** County sanitary sewers
 - Recent wastewater flows based on 2019 flow monitoring and water billing information (June – November 2019)
 - Calibrated to observed dry and wet weather flows from 42 temporary flow meters
 - **2045 future condition** model based on growth projections (as of 2020) in Round 9.1 Population & Land Use Model
 - Capacity assessment models (current and future) using **10-year design storm** for capacity planning and to evaluate future capacity needs

PCSWMM Modeling Software

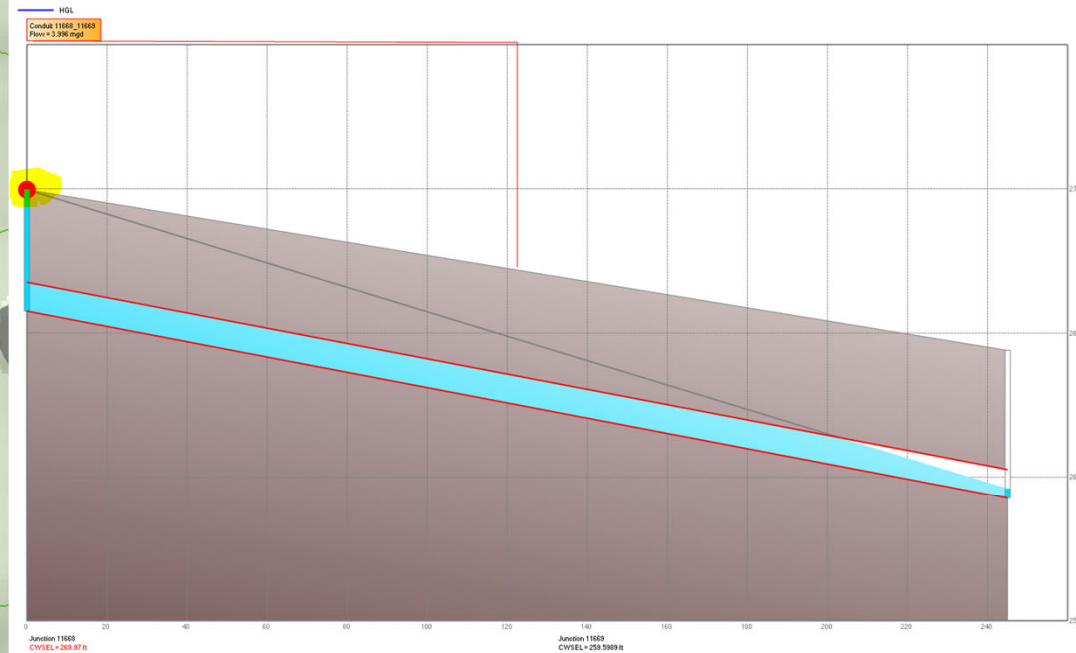


Hydraulic Capacity Model Findings

- Sufficient capacity in both the existing or future dry weather condition
- One (1) simulated overflow in the 2045 wet weather conditions model
- Three (3) surcharging sewer segments in the 2045 wet weather conditions
 - Still have more than 1 foot freeboard



Hydraulic Capacity Model Findings



Sanitary Sewer Action Plan Recommendations

- Achieve GRID Program via increasing operating funding (\$330k/year)
- Flush all 15" and 18" diameter sewers once every 5 years (\$33k/year)
- Accelerate large diameter inspection from 2.1 miles/year to 4.4 miles/year
- Implement a more robust manhole rehab program
- Continue stream crossing inspection program
- More consistent overflow reporting
- Periodically update design standards
- Continued enforcement of the Fats, Oils, and Grease (FOG) Program
- Update Plan in 2033 (10 years)

Next Steps

- Request to Advertise (**RTA**) Public Hearings: December 2023 County Board and Planning Commission Meetings
- Public Hearings at the January 8, 2024 Planning Commission and January 20, 2024 County Board meetings to consider plan for **Adoption**

How to Provide Comments

- Draft on County website at link below:
<https://www.arlingtonva.us/Government/Projects/Plans-Studies/Water-Utilities/Sanitary-Sewer-System-Master-Plan>
- Or, Google: *Arlington county sanitary sewer plan*
- Email comments to jlawler@arlingtonva.us
- For additional questions, call Jon Lawler at 703-228-7612