Dutchess County Water and Wastewater Authority

Village of Tivoli Sewer System Upgrade Project

November 2026

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DUTCHESS COUNTY WATER AND WASTEWATER AUTHORITY

Presentation Overview

Dutchess County Water and Wastewater Authority (DCWWA)
Regulatory Compliance
Project Background
Collection System
Flow Rates
Sources of Inflow and Infiltration
Collection System Evaluation and Proposed Solutions
Collection System Right-of-Way Maintenance
Collection System Project Schedule
Treatment Plant & Pump Station Project Schedule
Treatment Plant & Pump Station Work Location
Treatment Plant & Pump Station Construction Team
Projected Capital Cost Estimate
Cost Savings Measures
Summary and Conclusions
Q&A

Dutchess County Water and Wastewater Authority (DCWWA)





DCWWA

- Public Benefit Corporation established at the request of Dutchess County
- Mission Statement
  - Protect and enhance the health, environmental sustainability and economic stability of Dutchess County and its residents through the provision of clean drinking water and proper treatment of wastewater, acting at all times with a commitment to accountability and transparency.
- Has operated the Tivoli WWTP since 2019 under an agreement for eventual ownership transfer to DCWWA.

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Regulatory Compliance





Project Need

- Systemic treatment module failures have contributed to recurring State Pollution Discharge Elimination System (SPDES) permit exceedances for this aging facility.
- New York State Department of Environmental Conservation (NYSDEC)
  - Order On Consent
  - By June 1, 2025 Engineering Plans, Specifications and Construction Schedule shall be submitted to the NYSDEC to bring the plant into compliance.
  - By June 1, 2025 an Inflow and Infiltration Report along with a schedule of implementation shall be submitted to the NYSDEC to reduce I&I and eliminate plant bypasses and overflows.
  - Potential Fines (failure to act)
    - The New York State Department of Environmental Conservation issued an Order On Consent that includes provisions for penalties of up to $37,500 per day for each violation.
  - Action Required

Project Background

(January 24, 2023 Sewer Project Forum)



Wastewater Treatment Plant

- Design Flows
  - Design flow (average day): 100,000 gallons per day
  - Design flow (peak hourly flow): 500,000 gallons per day
- Treatment Capability
  - Tertiary Treatment plant
- Reached its Useful Life
  - Safety Concerns
  - Regularly fails to meet existing State Pollution Discharge Elimination System Permit

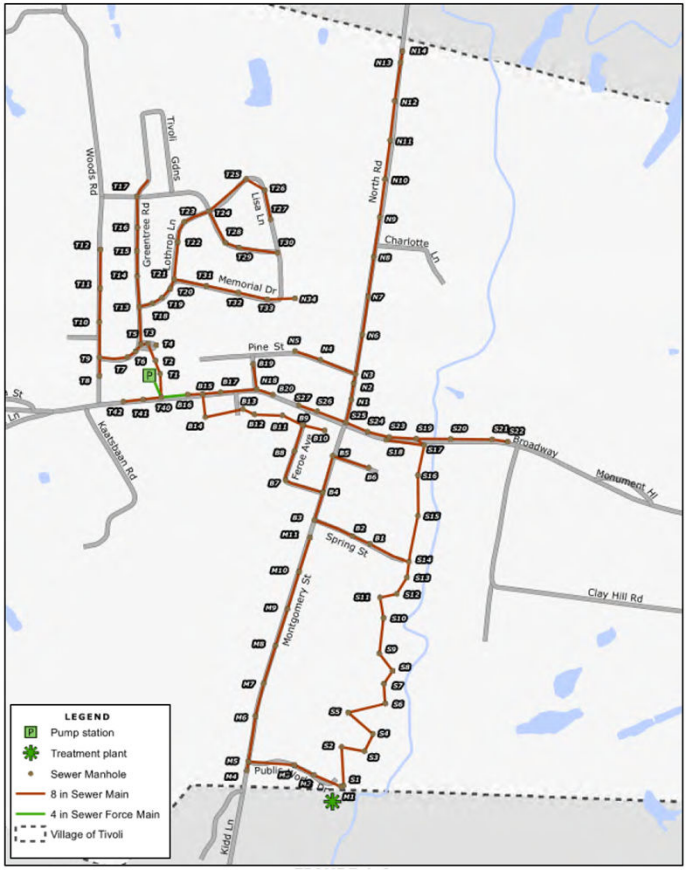
(March 1, 2023 Sewer Project Forum)



Collection System

- Approximately 4.75 miles of sewer piping
  - Most installed in the late 1930's and early 1940's
  - Maximum capacity: ~875,000 gallons per day
- 1 submersible pump station
  - Located on Broadway near St. Sylvia Church parking lot
- Inflow and Infiltration

Project Background



Collection System

- Comprised of primarily 8” and 10” clay, cement, and concrete piping.
- Surcharging, Root Intrusion, Inflow, and Infiltration
- Average Daily Flow: ~ 75,000 gallons per day
- Peak Instantaneous Flow: ~1,000,000 gallons per day
- Pump Station Capacity: ~500,000 gallons per day

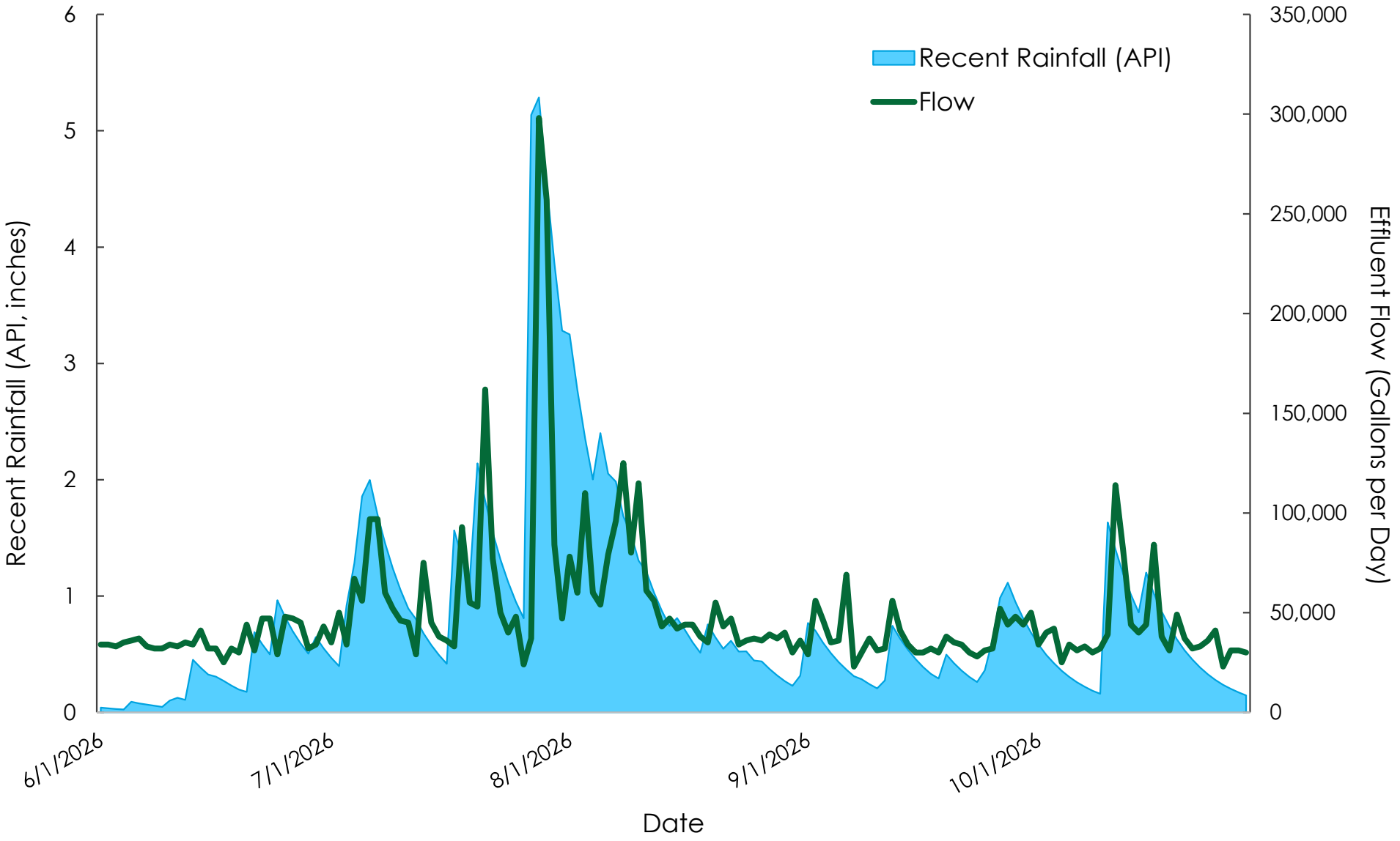
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Collection System – Significant Flows



- **Impacts**
  - **Manhole Overflows & Spills**
  - **Wastewater Treatment Plant Impacted by Significant Flows**
  - **Damaging Equipment**
  - **Human and Environmental Impacts**

Relationship Between Rainfall and Sewer Flow



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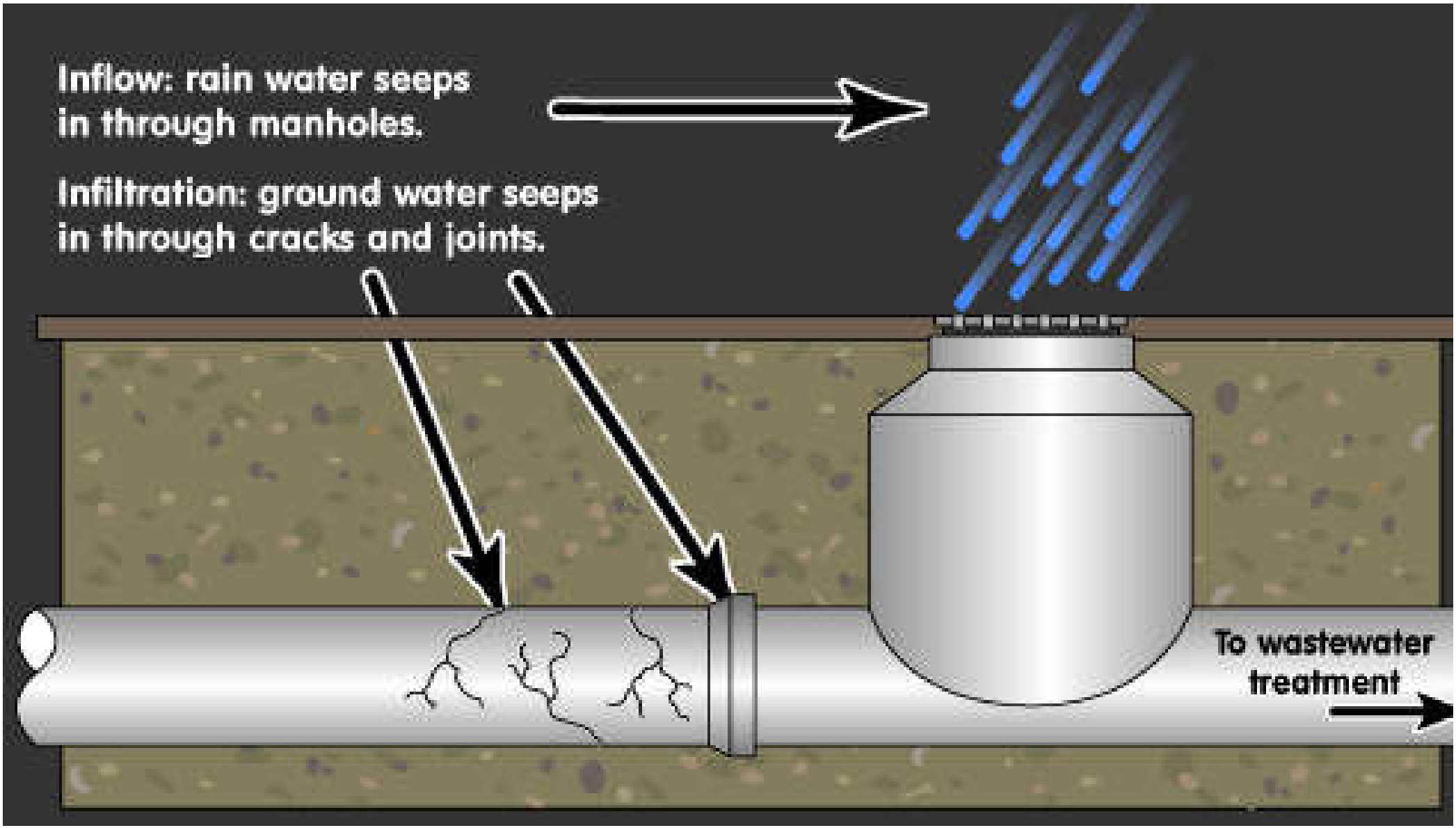
Stormwater



What is Stormwater?

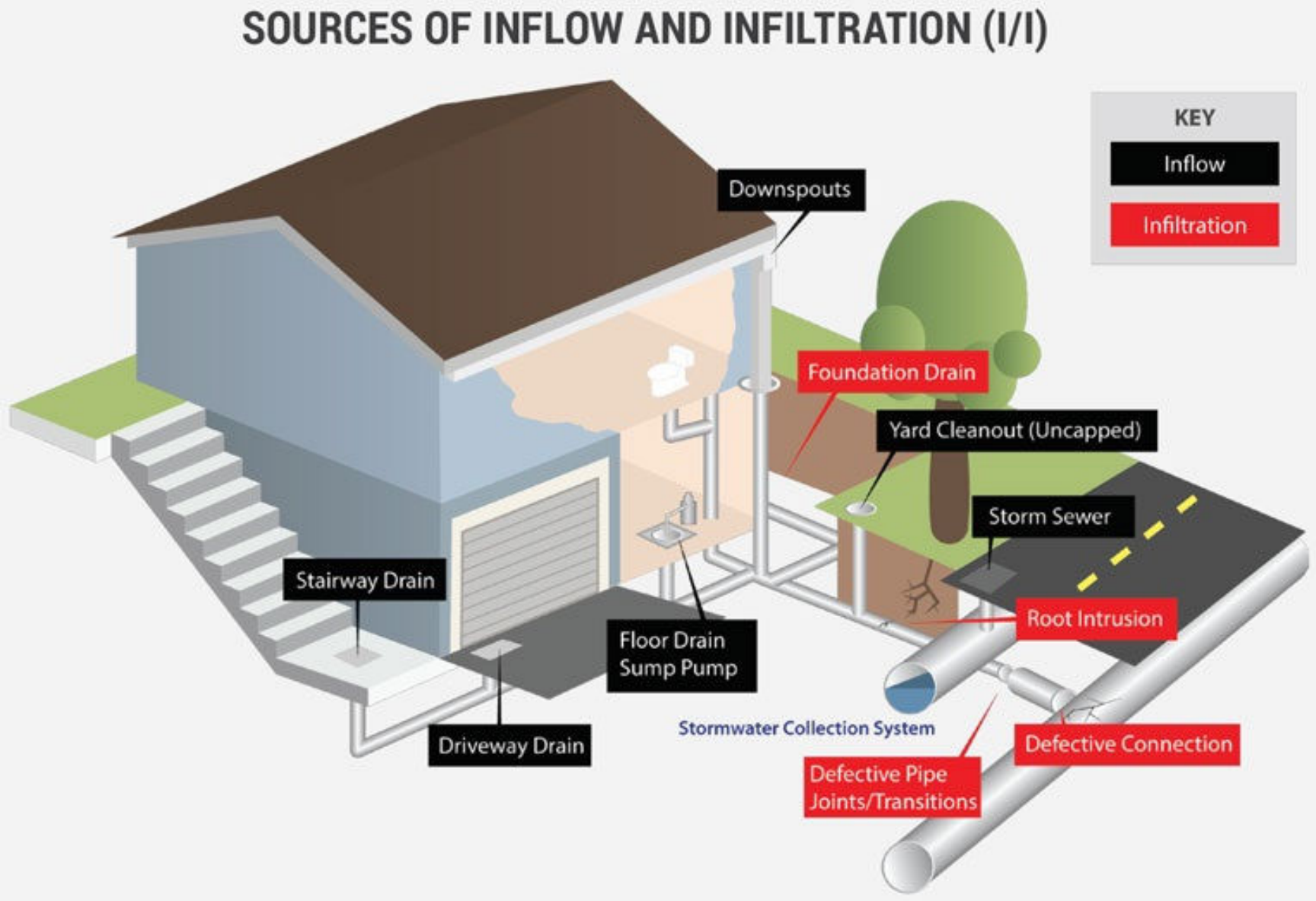
- Water from rain or melting snow that doesn't soak into the ground but runs off into waterways
- It flows from rooftops, over paved areas and bare soil, and through sloped lawns
- Picks up a variety of materials on its way
- Runoff quality depends on the season, local meteorology, geography, and land use

Inflow and Infiltration



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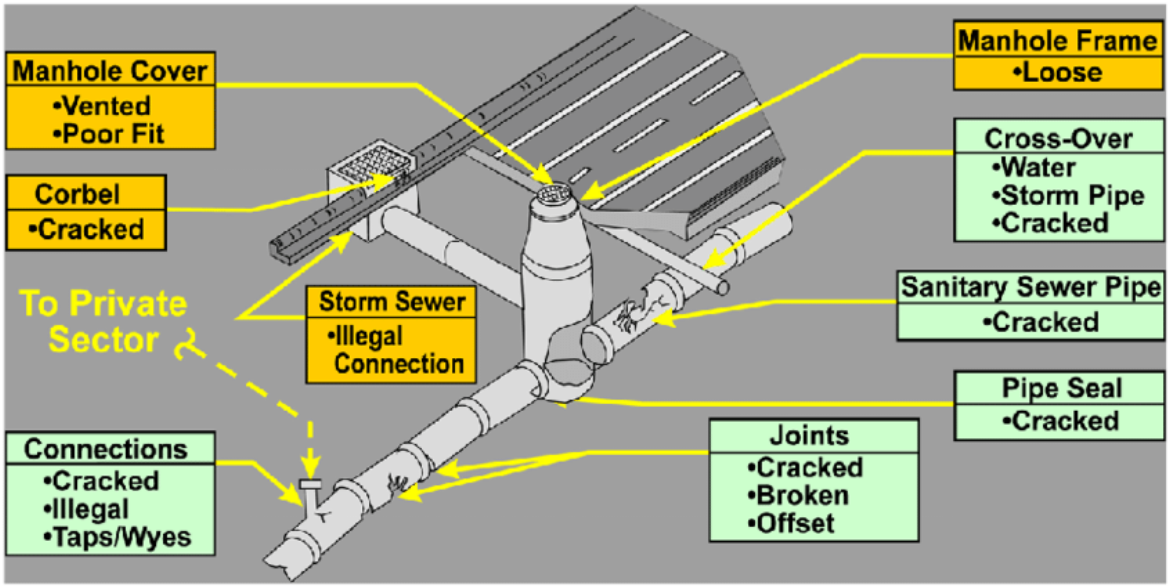
Inflow and Infiltration



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Inflow and Infiltration

Inflow and Infiltration

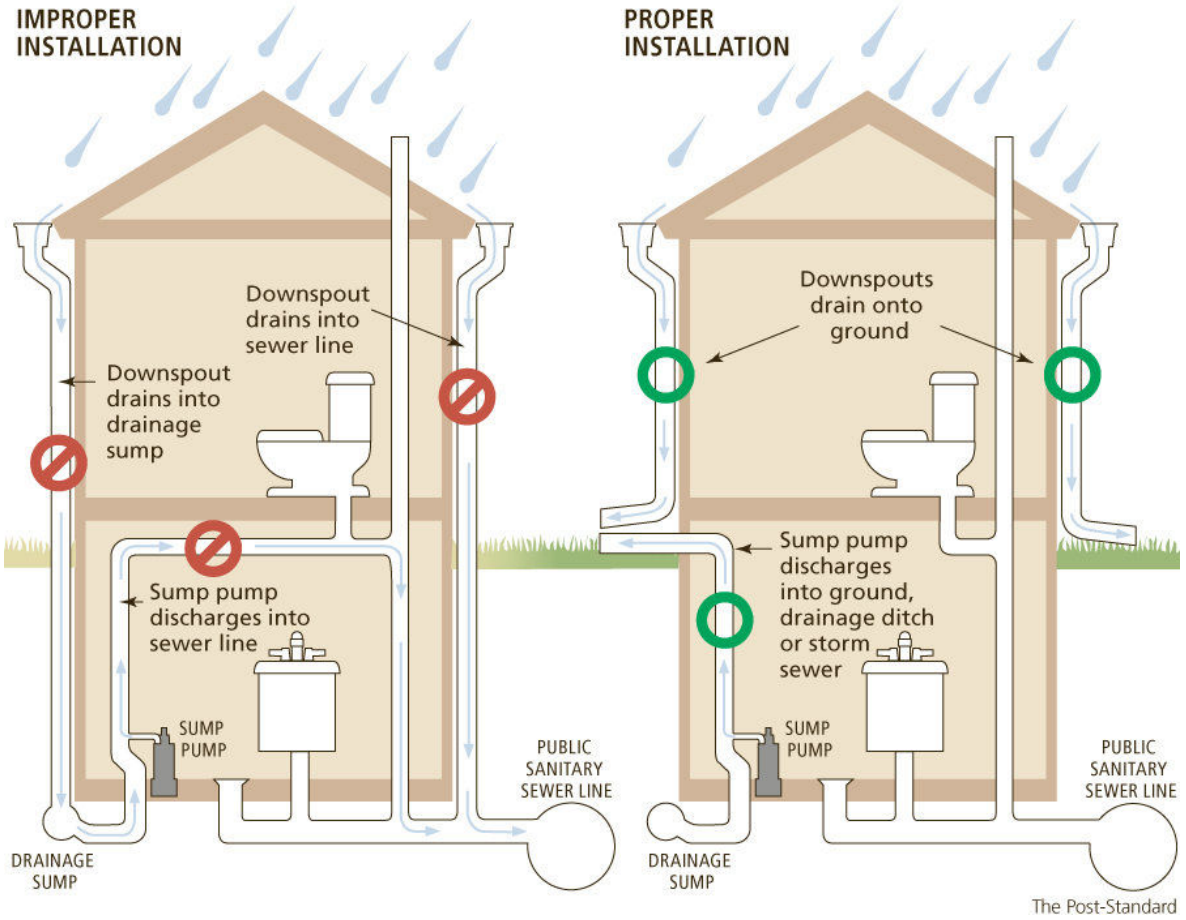


Rain and High Groundwater Affects Wastewater Collection System

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Sump Pumps and Downspouts

Sump Pumps and Downspouts



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The impact of wet weather flows on aging infrastructure

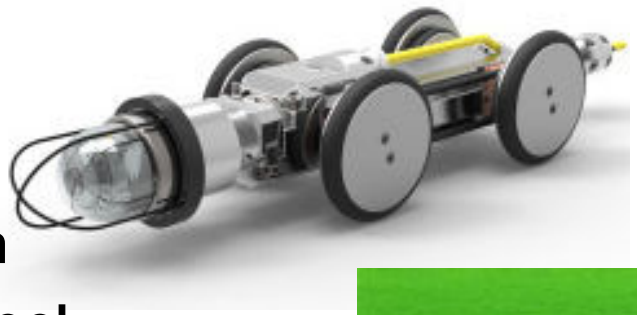






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Evaluation



Inspection Technology

- Digital Camera Inspection
  - Highly Effective Design Tool
- Smoke Testing
  - Fast
  - Economical
  - Safe
  - Protects People and Property



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Evaluation

Smoke Testing

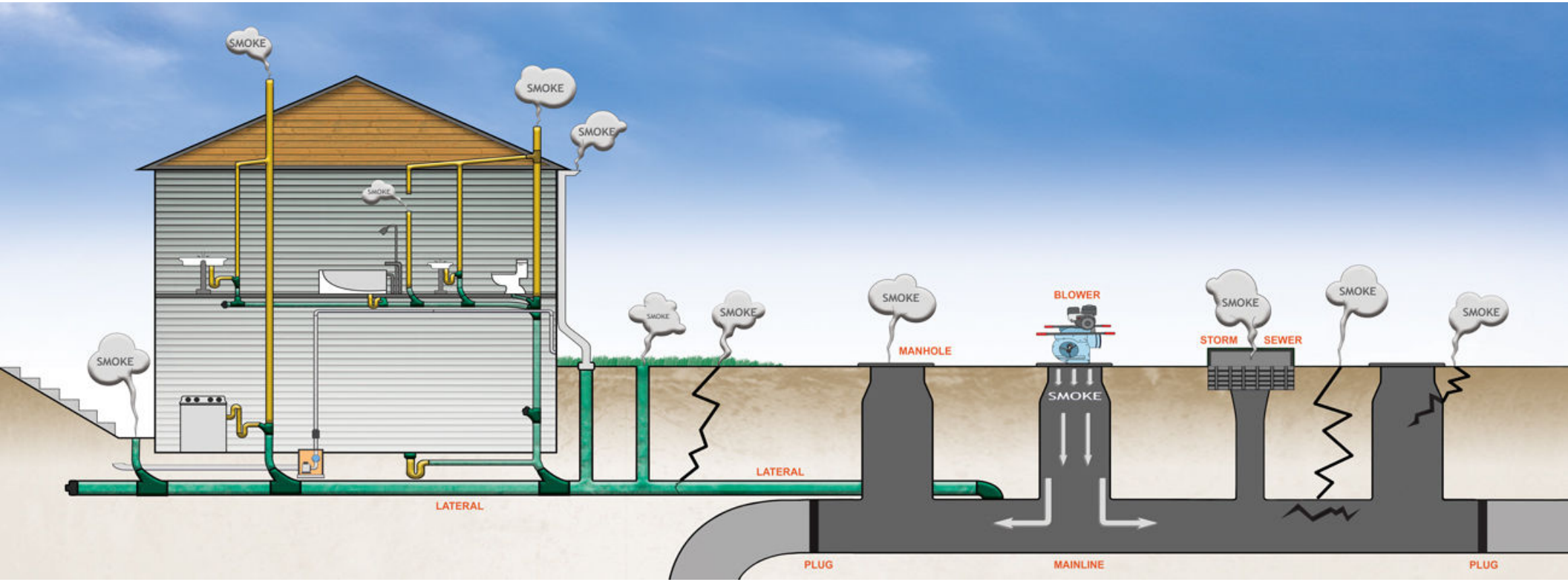
September 17-18, 2024



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Evaluation

Smoke Testing



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Evaluation

Smoke Testing









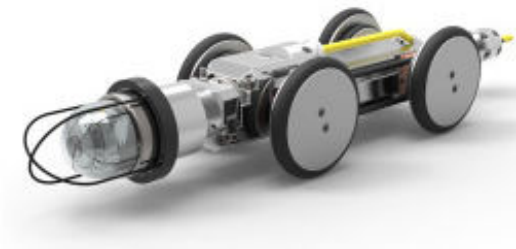
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Evaluation

Inspection Technology

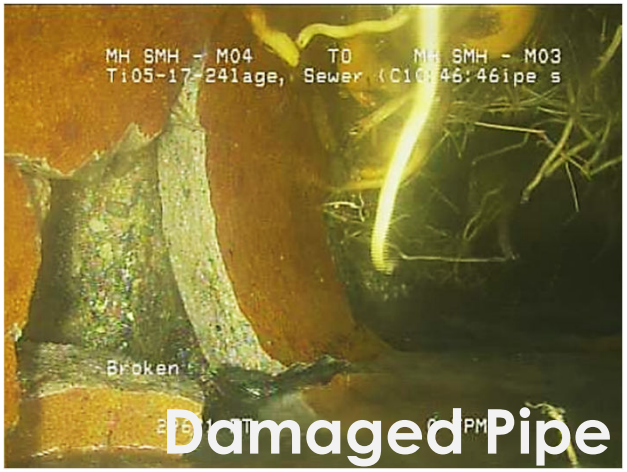
- Smoke Testing
  - Smoke testing is the fastest and most economical method for identifying breaks within sewer lines
  - During a test, residents may see smoke coming from vent stacks on buildings or from holes in the ground, which is part of the testing process. Public Outreach and Education are important.
  - The smoke has no odor, is non-toxic, is non-staining, does not create a fire hazard and clears within a few minutes.
  - While the smoke is not harmful, residents with concerns about small animals or individuals with respiratory problems may wish to open doors and windows on the day of the test or leave the building for the day.
  - The smoke should not enter your home unless you have defective plumping or dried up drain traps.
  - If smoke does enter your home, you could have a defect in your system which may be allowing dangerous sewer gases to enter.

Evaluation



Digital TV Inspection

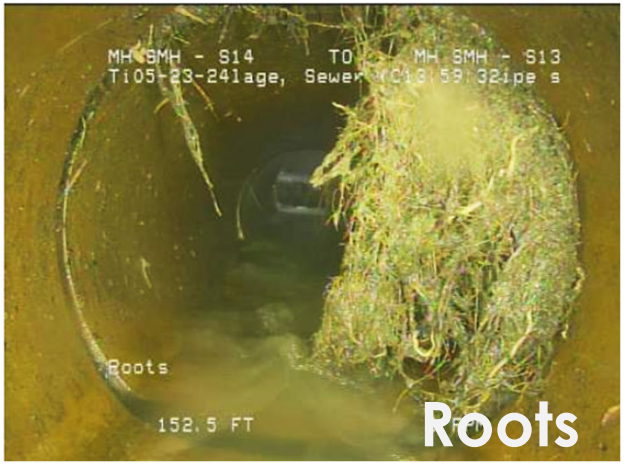
May 9 – 13, 2024











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Design Solutions

Develop Constructable Solutions

- **Traditional Pipe Replacement**
  - Long Time Frames
  - Expensive
  - Effective
- **Cured-in-Place-Pipe Lining**
  - Practical
  - Fast
  - Economical
  - Effective





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Solutions

Cured-in-Place-Pipe Lining



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Collection System Right-of-Way Maintenance



- Easement line carries flow from 90% of customers
- Terrain creates access problems
  - Foot access
  - UTV access
  - Truck access
- Tree and brush removal
- Completed January 2025

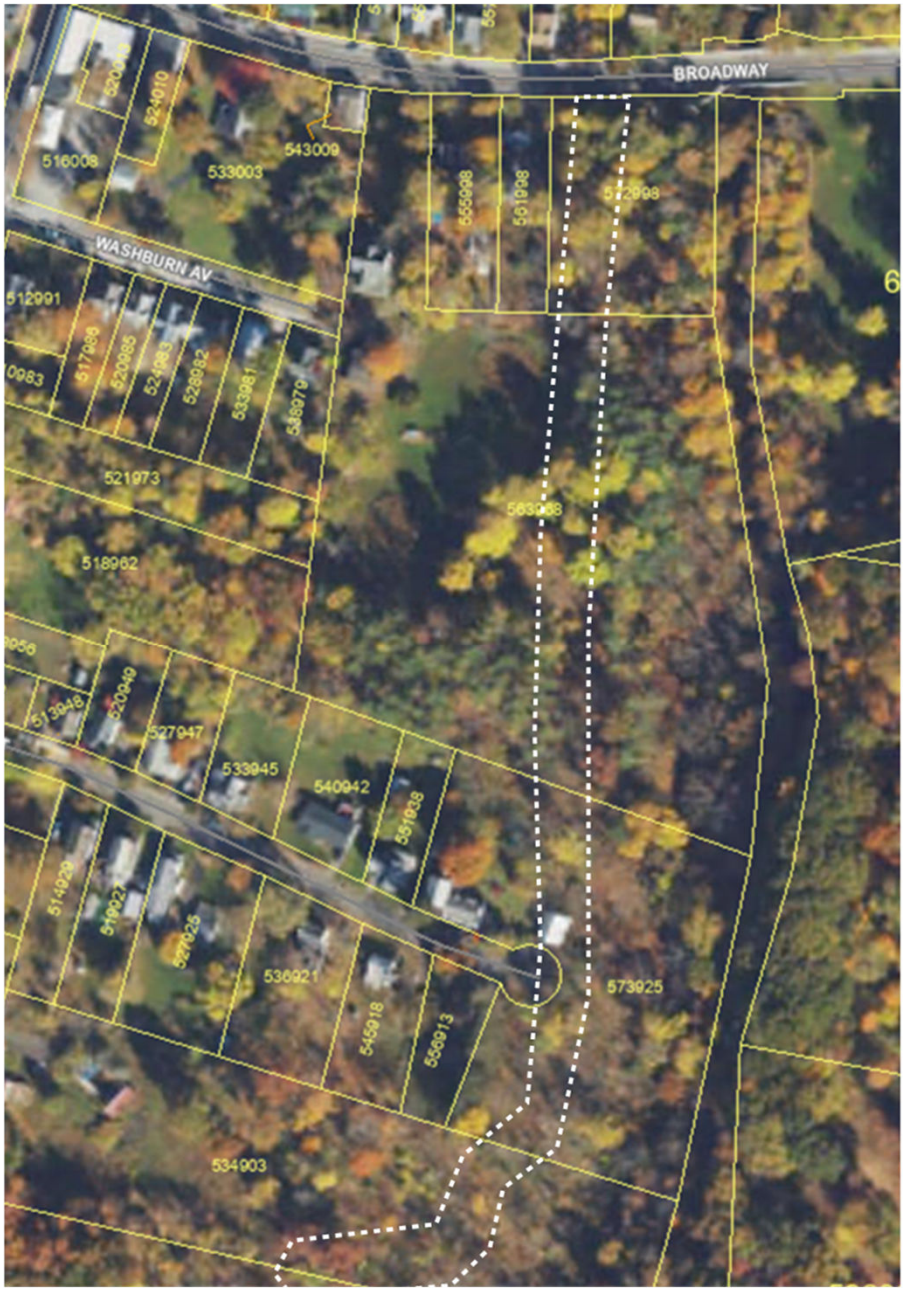
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Collection System Right-of-Way Maintenance



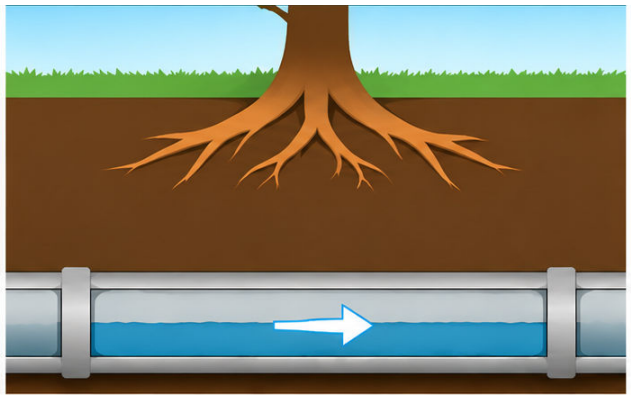
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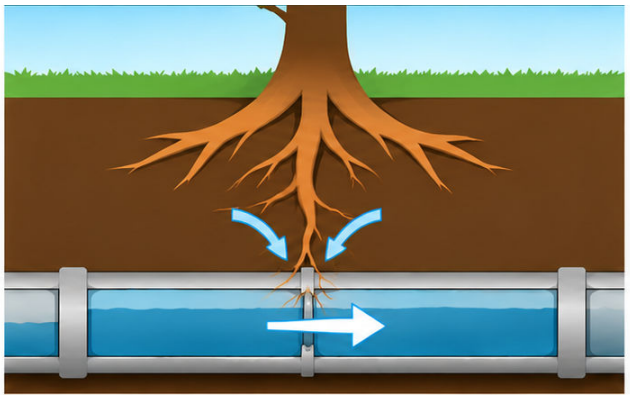
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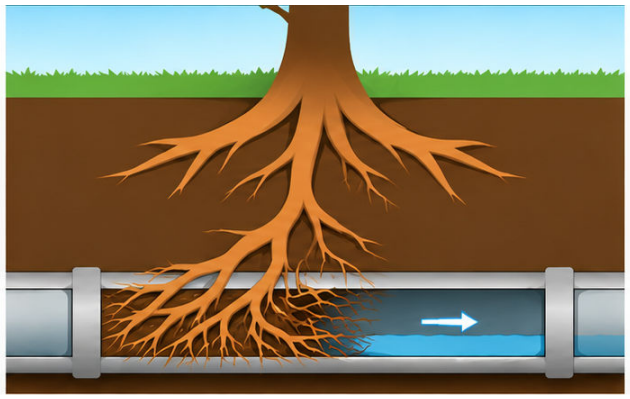


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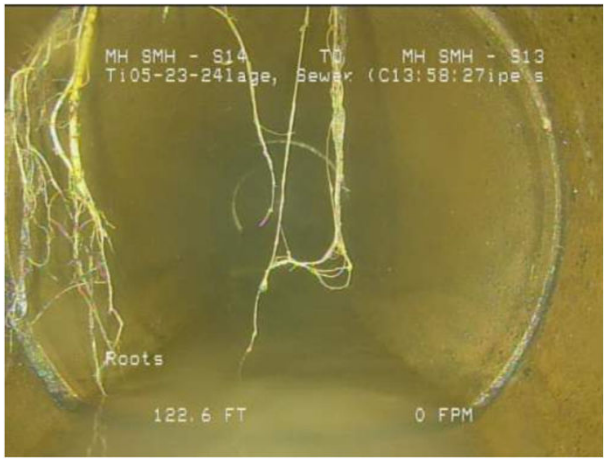
Collection System Right-of-Way Maintenance













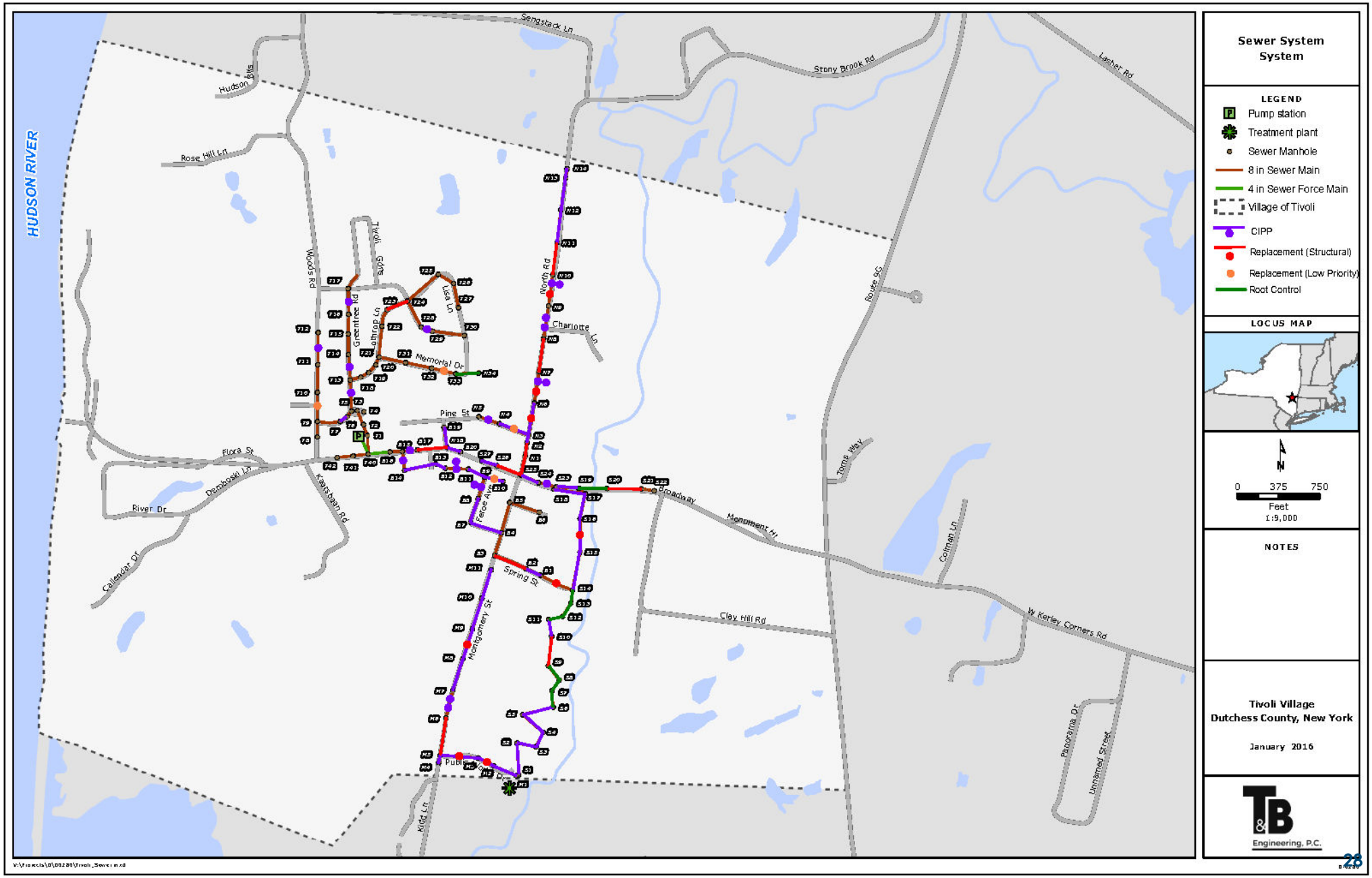
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Collection System Right-of-Way Maintenance



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Collection System Rehabilitation Plan



Engineer-Recommended Collection System Improvements

Item	Quanitity	Unit	Unit Cost	Total Cost
Pipe Replacement (Structural; in roadway)	2,585	LF	$ 350.00	$ 904,750.00
Pipe Replacement (Structural; in easement)	283	LF	$ 300.00	$ 84,900.00
CIPP Lining	8,125	LF	$ 50.00	$ 406,250.00
Liner Point Repairs	20	EA	$ 2,400.00	$ 48,000.00
Root Control Treatment	1,313	LF	$ 6.00	$ 7,878.00
Heavy Cleaning	431	LF	$ 6.00	$ 2,586.00
Remove Protruding Taps	28	EA	$ 500.00	$ 14,000.00
Lateral T-Liners	5	EA	$ 7,500.00	$ 37,500.00
Pipe Replacement (Low Priority)	40	LF	$ 350.00	$ 14,000.00
CCTV	1,588	LF	$ 2.00	$ 3,176.00
			Total	$ 1,523,040.00
			+ 15% General Conditions	$ 1,751,496.00
			+ 40% Engineering & Contingency	$ 2,453,000.00

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Anticipated Project Schedule

Schedule – Collection System

• Sewer Cleaning / Digital TV Inspection	Spring 2024
• Smoke Testing	Summer 2024
• Evaluation Report Complete	Spring 2025
• Evaluation Report Approved	Spring 2026
• Design Contract Awarded	November 18, 2026
• 100% Design	Spring 2027
• Regulatory Approval	Summer 2027
• Bidding / Notice to Proceed	Fall 2027
• Construction	Through Summer 2028

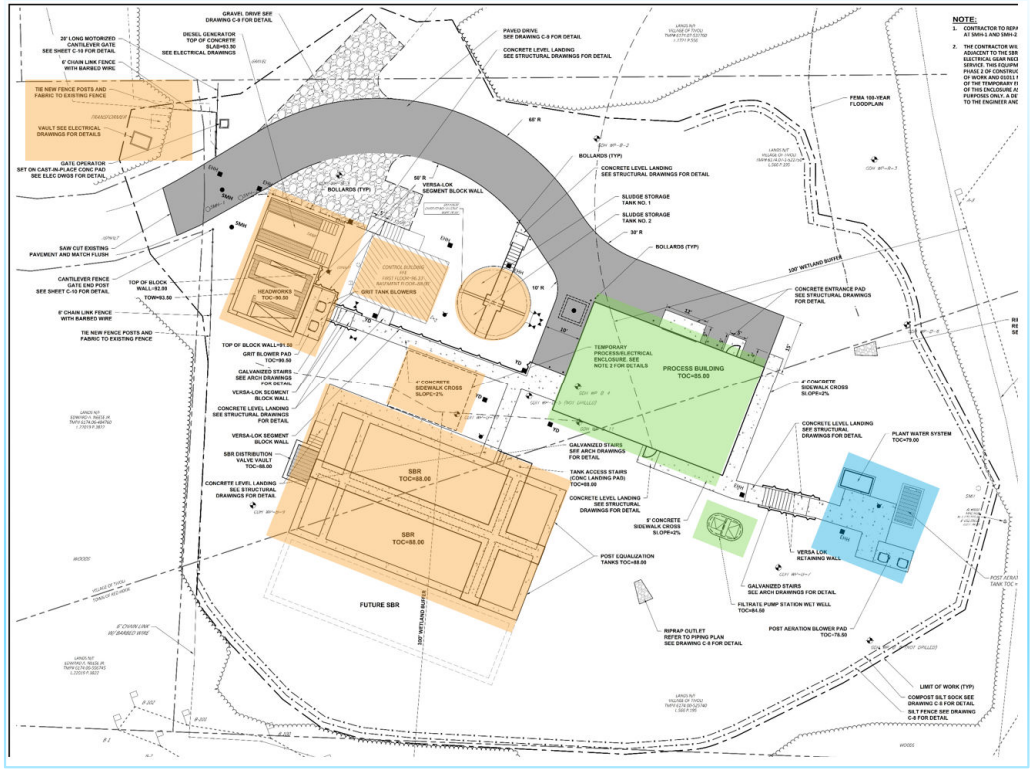
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Current Project Schedule

Schedule – Treatment Plant & Pump Station

• Notice to Proceed	September 2024
• Construction	Fall 2024 - Summer 2027
○ Pump Station online	June 2026
○ WWTP Phase 1 Start-Up	November 2026





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Work Location

- **26 Public Works Drive (Wastewater Treatment Plant)**
- **103 Montgomery Street (temporary fenced contractor area for trailers, parking, and storage of equipment and material); See MAP**







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WWTP & Pump Station Construction Team

Construction Contractors

- W.M. Schultz Construction (General Contractor)
- Foremost Electric (Electrical Contractor)
- S&O Construction (Plumbing Contractor)
- D.J. Heating & Air Conditioning (HVAC Contractor)

Construction Administrator

- Tighe & Bond (T&B Engineering and Landscape Architecture)

  (Procured via "Request for Qualifications" process as per financing requirements)

Design Consultant

- Wright-Pierce Engineering Consultants

Project Manager

- DCWWA

Owner

- Village of Tivoli

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Projected Total Capital & Operating Sewer/Water Expenses

Tentative Total Project Cost	Current (November 2026)
WWTP, Pump Station, Coll. Sys. Phase I	$20,469,469
Collection System Phase II (Construction)	$2,210,197
Total Project Cost	$22,679,666
WIIA+ Grant	-$919,150
Bipartisan Infrastructure Law Grant	-$6,696,575
Total Cost Financed	$15,063,941*
DC Grant	-$50,000
Net Cost Financed	$15,013,941
Borrowing Term	28 years **
Annual Debt Service	$536,212

Tentative Typical Single Family	*Sewer*	*Water*
Annual Capital Cost	$1,188	$243
Annual Operating Cost	$667	$543
Total Household Cost	$1,855	$786
Total Annual Water and Sewer Cost	$2,641	

** Project partners sought additional funding sources to offset the Total Estimated Capital Cost, and Bipartisan Infrastructure Law grant funding was awarded.*

*** EFC loans are generally 30 years, but on some projects, they have limited the term of the loan to 2 yrs. Short-term and 28 yrs. Long-term.*

**** Annual Debt Service is projected based on Interest-Free Hardship Financing approved by EFC to be applied to all amounts not offset by Grants.*

*****Water assessment long term financing is now in place, which funded water tower, pipe and supply improvements.*

******Operating Costs are based on a typical dwelling using approximately 111 gallons per day. Operating budgets are subject to annual changes due to mandatory expenses, including costs for chemicals, electricity, insurance, and labor.*

+ WIIA = Water Infrastructure Improvement Act.

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Cost Savings Measures

Innovative Cost Savings

- Reuse of existing structures at WWTP
  - Imhoff tank converted to Sludge Holding Tank
  - Post Aeration Tank
  - Control Building
- Relining of existing pipes & manholes
  - Reduced project timeline
  - Elimination of road/sidewalk restoration
  - Long product life 50+ years
  - Significant reduction in cost for CIPP vs. open-cut replacement
    - 57% for small diameter sewer pipes
    - 63% for medium diameter sewer pipes

Source: Kaushal & Najafi (2020) - Sanitary Sewer Construction Cost Comparison Between Trenchless CIPP Renewal and Open-Cut Replacement (Proceedings of International Structural Engineering and Construction)

Summary and Conclusions



- **Upgraded Collection System**
  - **Comply with NYSDEC Consent Order (and future regulations)**
  - **Long term reliability of sewer service to the Village**
- **Collection System Life Extended**
- **Pump Station Replacement**
- **Treatment Plant Replacement**

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THANK YOU

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