



# Fairfax County Wastewater Management Water Reuse

Presenters: Ellie Coddling & Katie Sager

Department of Public Works and Environmental Services  
*Working for You!*



A Fairfax County, VA, publication  
October 19<sup>th</sup>, 2023

# Agenda

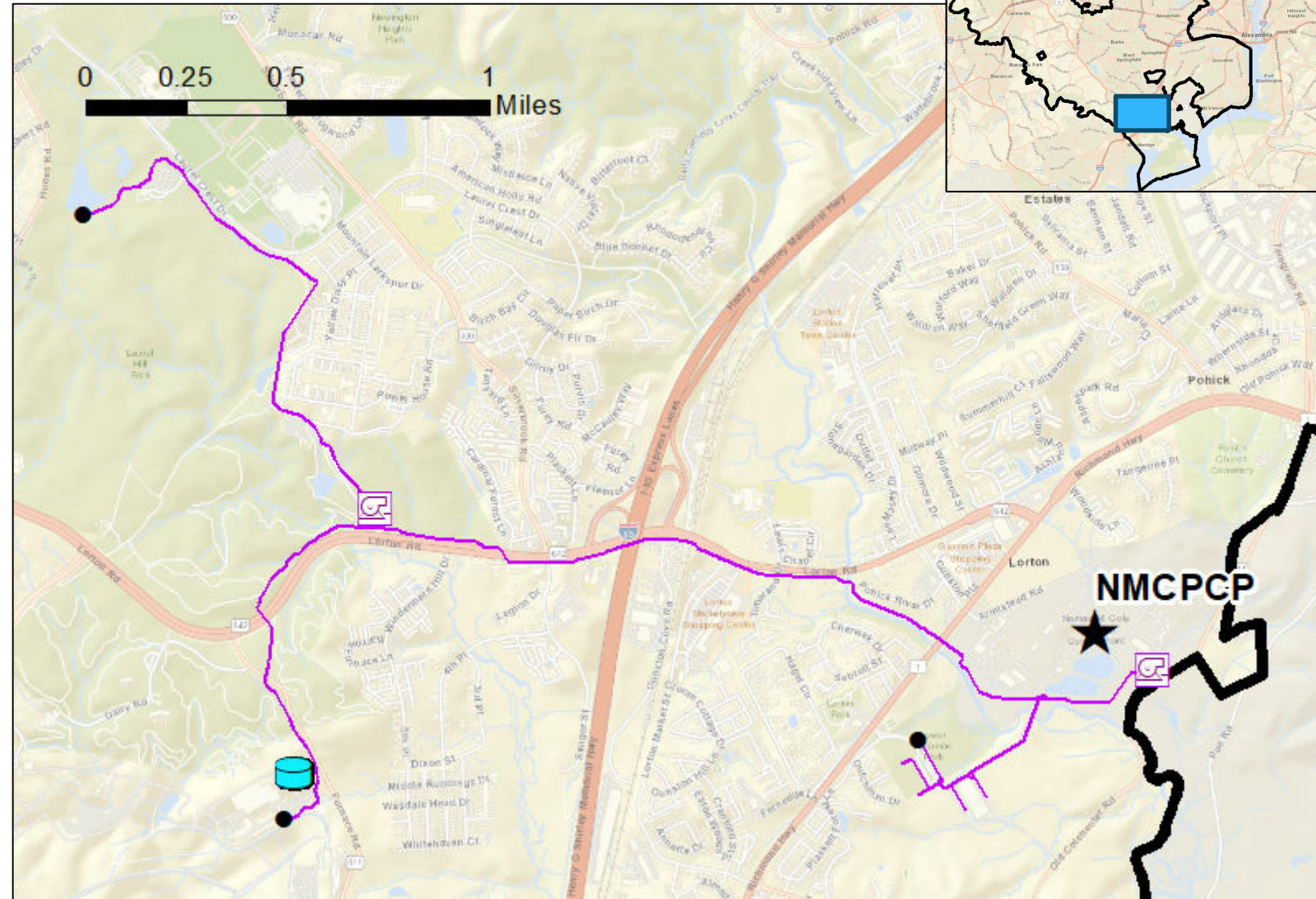
- Wastewater Reuse - Existing System
- Wastewater Reuse - Future Potential Expansion
- Stormwater Reuse





# Wastewater Reuse System

- Constructed in 2011
- Level 1 Reuse System
- Key infrastructure:
  - Approximately 6 miles of pipe
  - 6.6 mgd PS at NMCPCP
  - 2.2 mgd booster PS
  - 0.5 MG Elevated tank
  - 3 reuse customers



# Wastewater Reuse System - Funding

- Project cost: ~\$17.7M
- Multiple grants made this project possible:
  - American Recovery and Reinvestment Act (ARRA) - \$6.5M
  - Water Quality Improvement Fund ([WQIF](#)) - \$1.8M
  - State and Tribal Assistance Grant (STAG) - \$289K
- Without these grants, utility could not have pursued project





# Wastewater Reuse System – Existing Customers



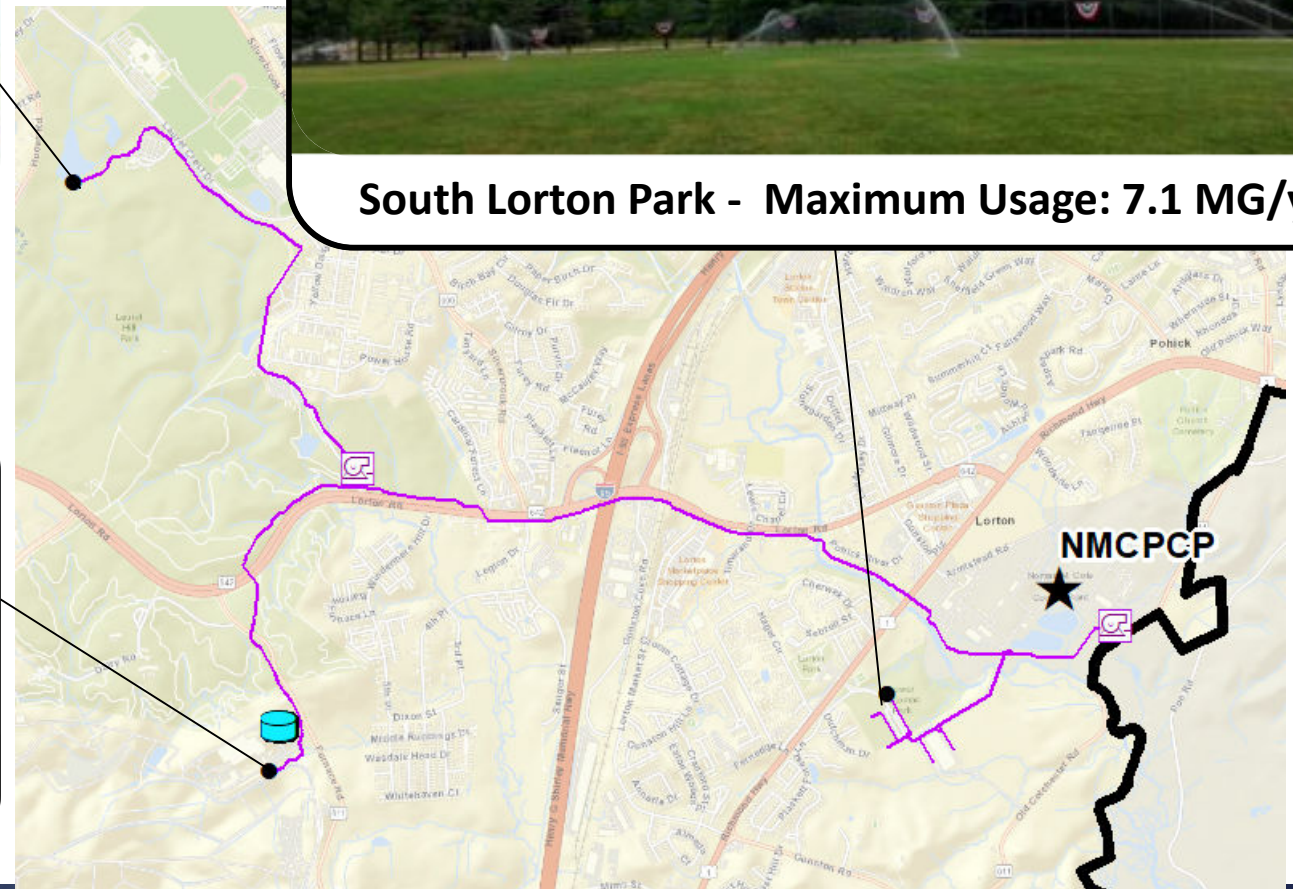
**Laurel Hill Golf Course: Maximum Usage: 24 MG/yr**



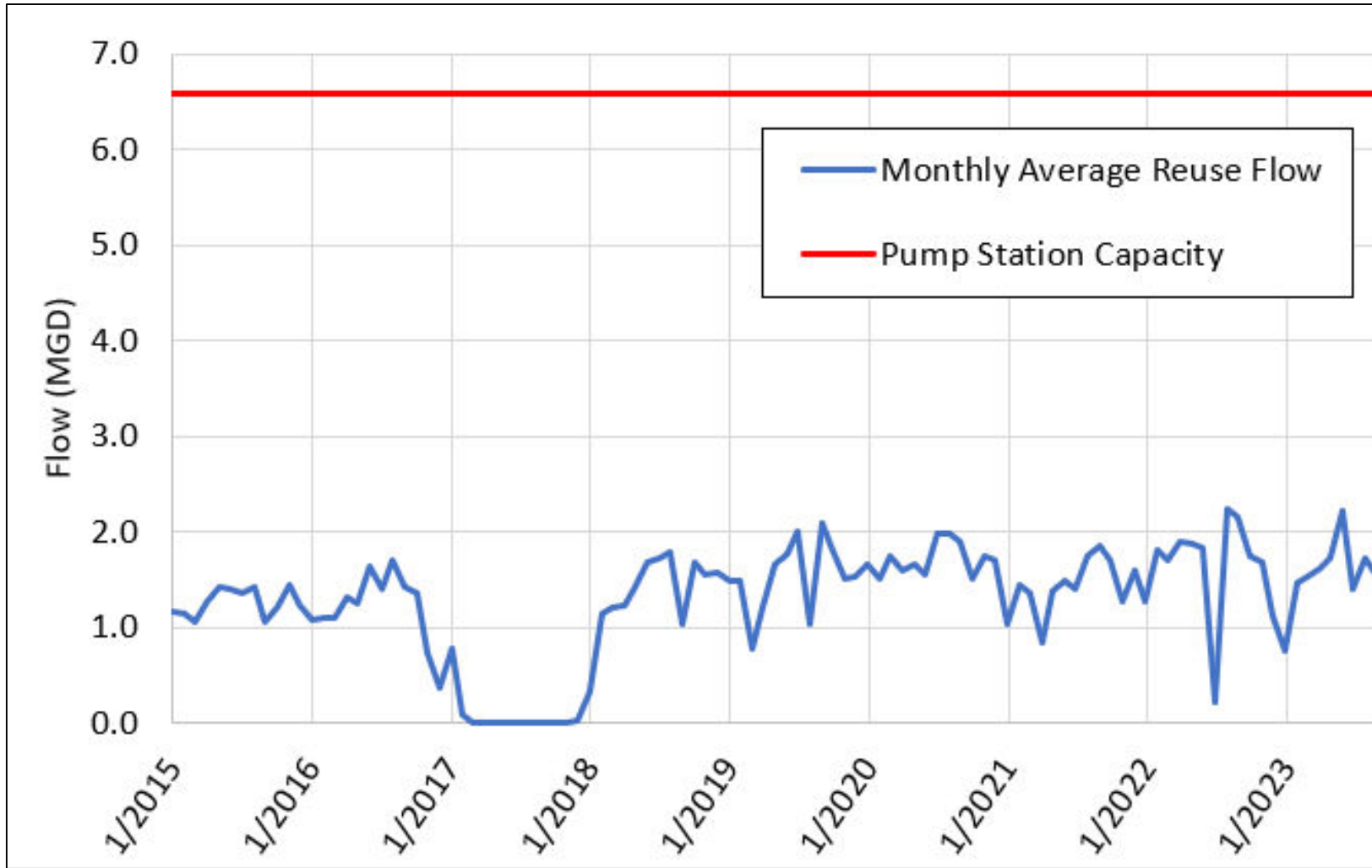
**South Lorton Park - Maximum Usage: 7.1 MG/yr**



**Covanta: Minimum Usage: 274 MG/yr (0.75 MGD)**



# Wastewater Reuse System – Existing Customers





# Wastewater Reuse System

- Key drivers:
  - Grant funding
  - Large industrial user
- Project Implementation:
  - County's first design-build project
  - Providing reuse to park authority assisted in easements
  - Providing reuse to public baseball fields assisted in public support
  - OCA ruling that the sewer easements could include reuse water



# Existing System Successes

- County obtained grant funding to initiate construction of reuse system
- The Noman M. Cole Jr. Pollution Control Plant (NMCCPP) has been able to successfully produce Level I reclaimed water as required by state regulations for reuse
- Additional water savings have been achieved through the use of the Advanced Plant Water to meet non-potable water needs within the NMCCPP.
- The use of reclaimed water both on and off site reduce the nutrients discharged to the Chesapeake Bay basin.





# Existing System Successes

- The reuse system has reduced demand on the potable water system by over 1 mgd.
- Reuse treatment less energy intensive compared to potable treatment
- Reuse water provided to two irrigation customers who have no potable water backup
- Fairfax County customers receive reuse water at an affordable rate (75% of potable water)
- Fairfax County receives \$300,000 per year for reuse water fees



# Existing System Challenges



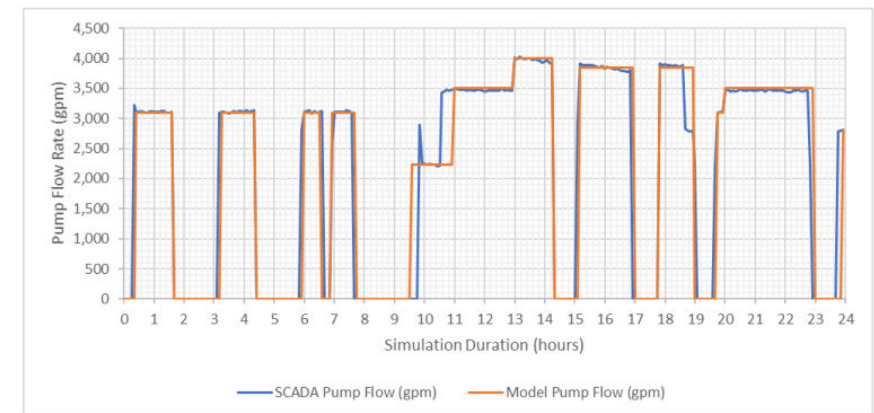
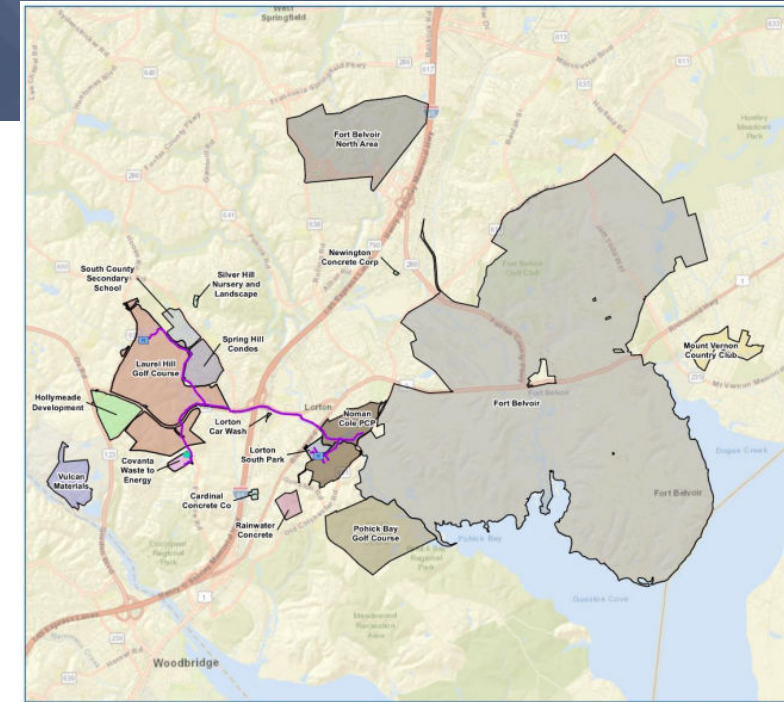
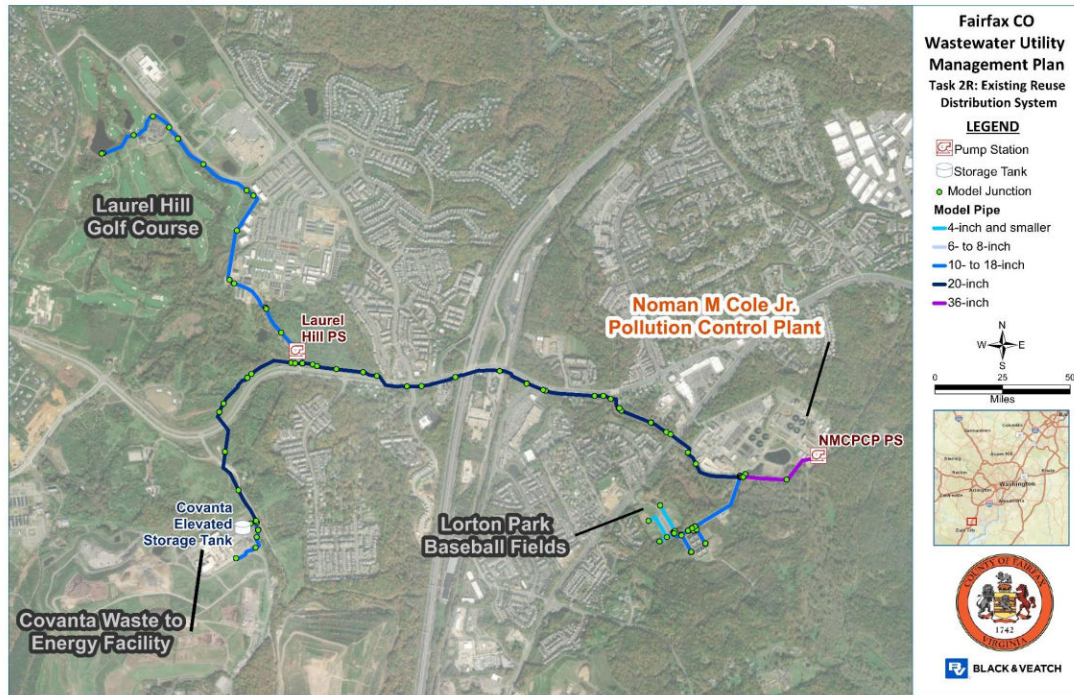
- Additional energy requirements to treat and pump reclaimed water does not help plant reduce greenhouse gases or to achieve net zero.
- Nutrient trading through reuse is not significant enough yet compared to credits received for enhanced nutrient removal.
- Surge problems in the reclaimed water distribution system during startup: resolution with new reclaimed water pumps.
- DEQ considers a reuse water break to be a reportable spill.
- The reuse filling station was located inside the plant, making use by the public difficult. It requires entry into the secure facility.
- County staff had to learn to operate a water distribution system.





# Recent Water Reuse Studies

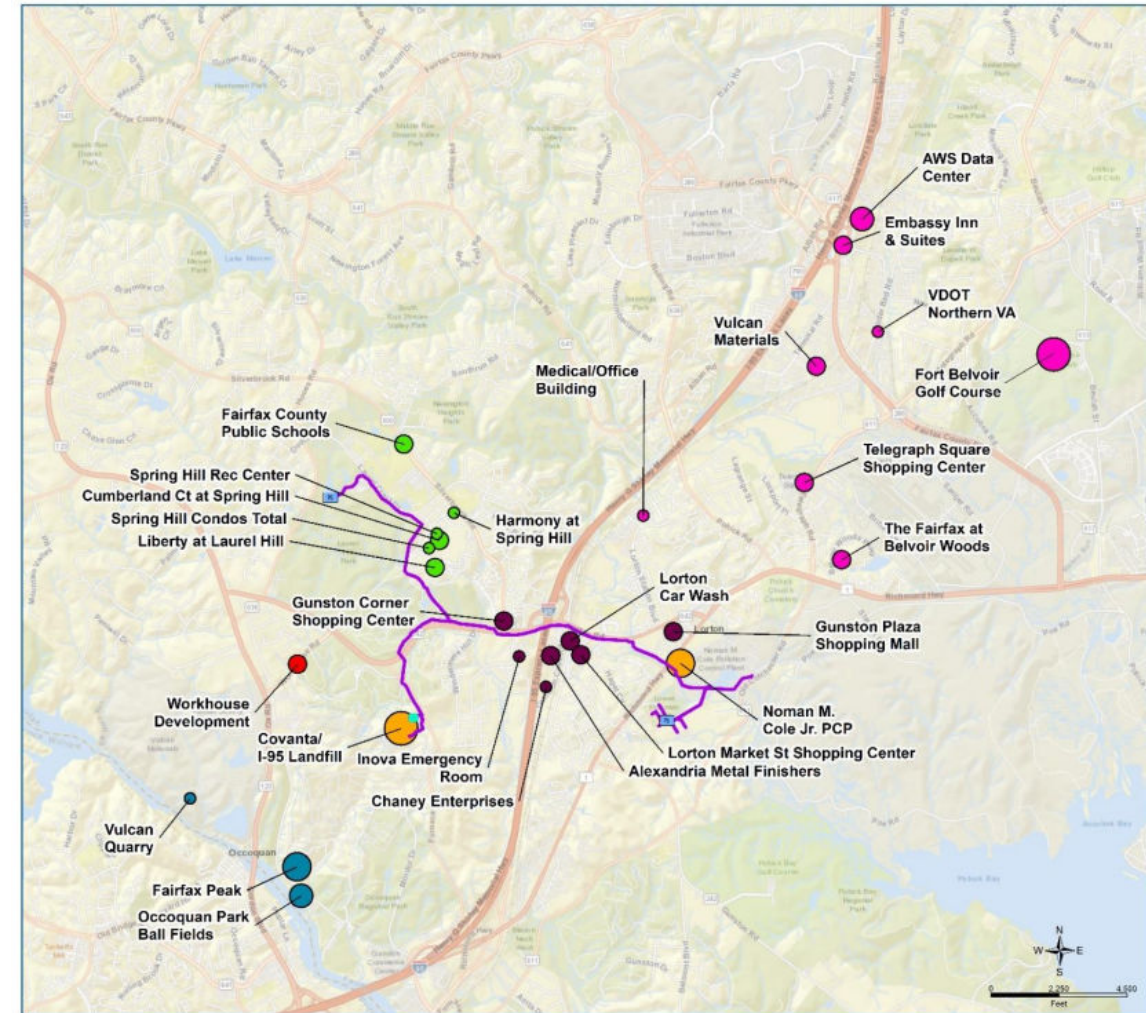
- 2010 – Reclaimed Water Management Plan
- 2012 – Reuse Water Program Financial Evaluation
- 2022 – Updated Wastewater Utility Management Plan





# Potential Future Expansion

- Fairfax County is always looking for opportunities to expand reuse network
- Challenges for expansion:
  - Regionally potable water is cheap with no supply issues
  - Limited opportunity for reuse customers along existing infrastructure
  - Significant capital cost to extend pipeline to future customers
  - Limited number of potential large water reuse customers to support expansion cost



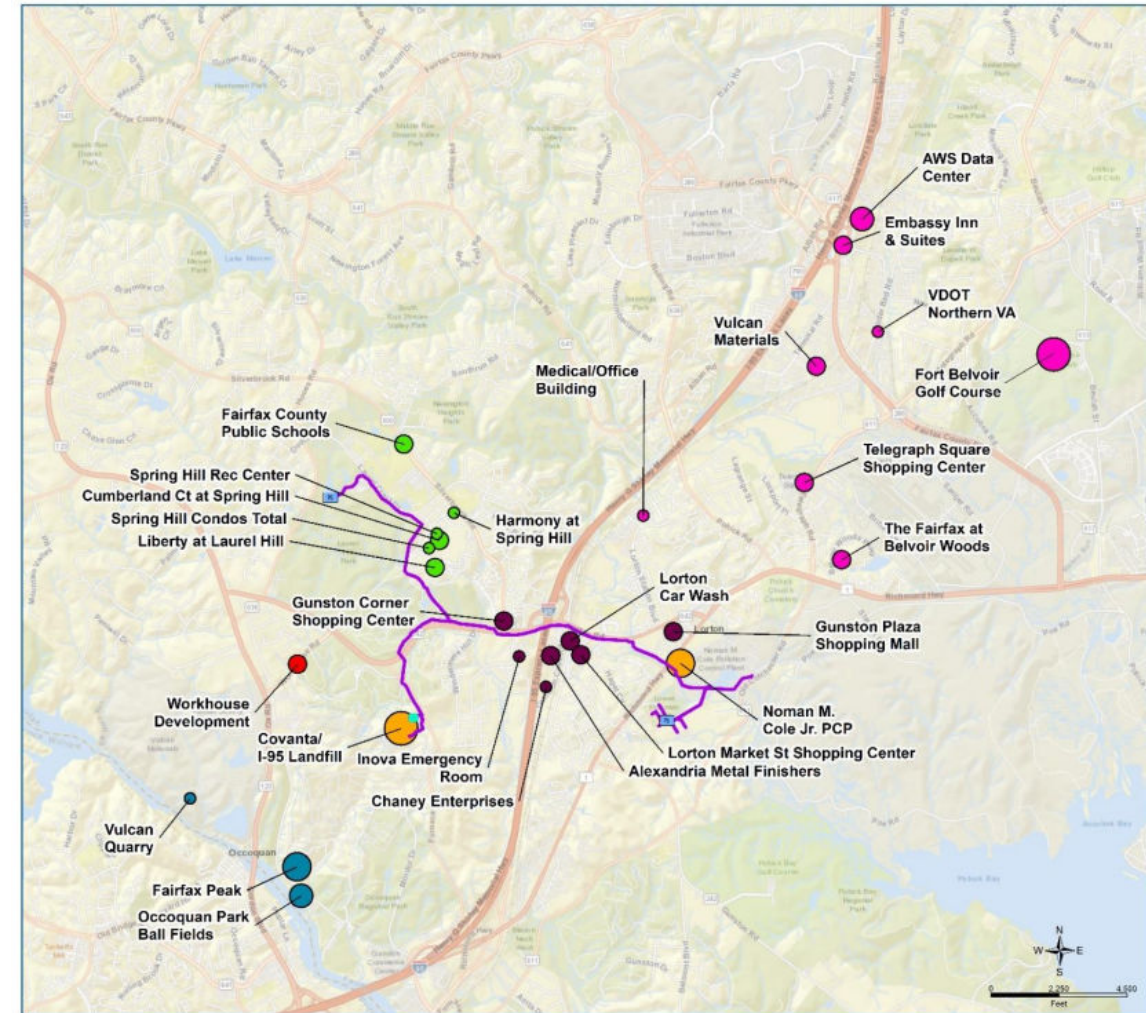
Updated Fairfax County WUMP Study (2022)





# Potential Future Expansion

- Requirements for future expansion:
  - Major industrial users of reuse water with constant demand (“Anchor” users).
  - Absence of industry, toilet flushing (require dual plumbing)
  - Grants to help offset the significant capital costs
- Potential Future Anchors:
  - Data Centers (cooling water)
  - Fort Belvoir
  - Fairfax Water Vulcan Quarry

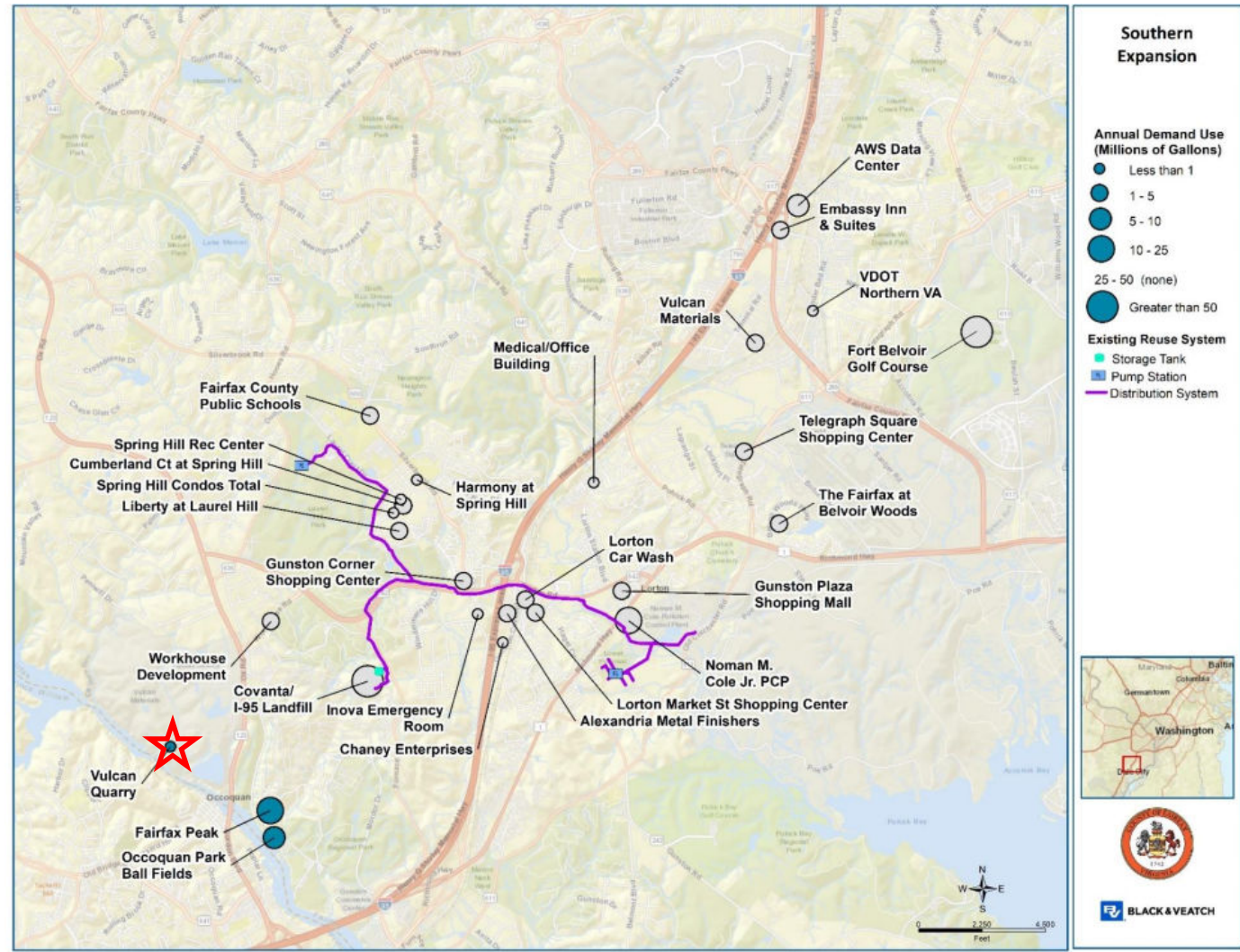


Updated Fairfax County WUMP Study (2022)



# Reuse System Expansion Challenges - Example

- Augment Fairfax Water's proposed Vulcan Quarry water storage project with reclaimed water (indirect potable reuse)
  - Driver:
    - Long-term resiliency
  - Challenges:
    - No need for additional water supply currently
    - Significant capital cost
    - Additional treatment
      - Long lead time for implementation
      - Require side stream treatment
      - Higher level treatment (PFAS) concerns



Updated Fairfax County WUMP Study (2022)





# Competing Interest? Stormwater Reuse

- Tysons Corner is a rapidly developing area
- Stormwater requirements: 1" water retention
- As of 2023:
  - 40+ active rezonings approved
  - 1 building with stormwater reuse projects under review
  - 6 buildings with stormwater reuse projects completed

Completed Project Name	Site Area (Acres)	Area to RWH (Acres)
Mitre 4	2.9	1.0
Capital One Block B	9.4	2.2
Capital One Block C	7.6	2.2
Capital One Block A	4.1	0.8
Ascent (Spring Hill Station F1)	3.5	0.6
Boro Blocks A&B	9.8	2.5
<b>Area Totals:</b>	<b>37.4</b>	<b>9.3</b>



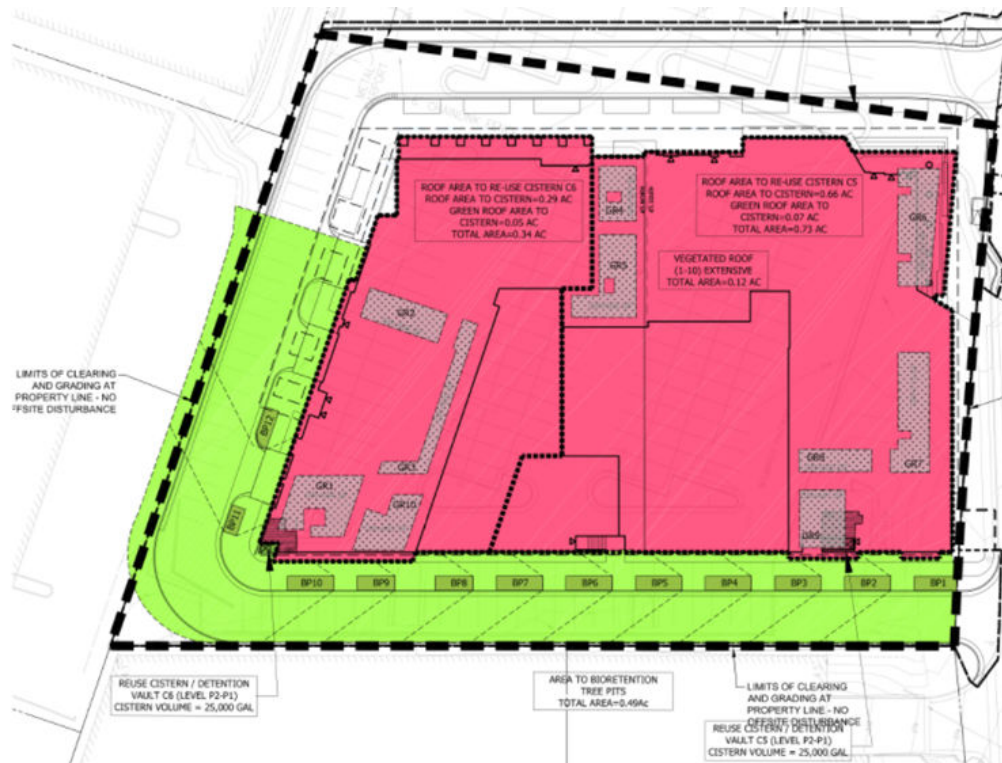
# Stormwater Reuse – Tysons Examples

## Arlington Partnership for Affordable Housing (APAH):

- *Under design*
- Inflow from roof
- Outflow to supplement water source heat pump make up supply

## Boro:

- *Constructed*
- Inflow from 2.49 acres, rainwater only
- Outflow to cooling make-up water only





# Questions

