

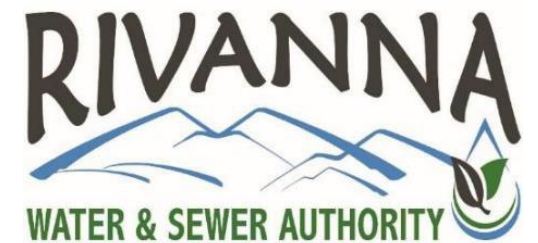
Community Water Supply



Presented to Rivanna River Basin Commission

By: Bethany Houchens- Water Resources Coordinator

September 24, 2025



Rumors Pour When Rain Doesn't

By Eric M. Weiss
September 25, 2002

With Charlottesville reservoirs threatening to dry up in just 88 days, some students at the University of Virginia have entertained thoughts of Christmas break starting around Thanksgiving.

Rumors of an early university shutdown were so pervasive in the past week that college officials Monday sent an e-mail to every student denying plans to send all 18,000 of them home early to conserve water. University officials said fall classes and exams will end on schedule -- 82 days from today.

"Closing early is not something that the university itself has talked about," said Louise Dudley, a U-Va. spokeswoman. "It's a leap from understanding how dire the situation is to the saying that the university will close."

Few doubt the seriousness of the water situation. The university is supplied by the municipal system, whose reservoirs are at 54.1 percent of capacity. City officials said that with no rain and unyielding consumption, they would run out of water in three months.

2002 drought in the Southeast — states from Virginia to Georgia had their driest August-July on record this year.

Aug 2001-Jul 2002 Statewide Ranks
National Climatic Data Center/NESDIS/NOAA



2002 Drought

Drought Emergency Declared in Virginia

L.A. TIMES ARCHIVES
AUG. 31, 2002 12 AM PT

FROM TIMES WIRE SERVICES

RICHMOND, Va. — Virginia Gov. Mark Warner on Friday declared a state of emergency because of the ongoing drought and banned lawn watering and car washing in most parts of the state.



The Rapidan River went dry in 2002, down to to 1 cubic foot per second (cfs). That forced the water system in the Town of Orange into emergency status..



Origin of the CWSP



A historic drought in Central Virginia in 2002 sparked a decade-long planning process to increase the community's Urban water supply.



The community evaluated many alternatives, including taking water from the James River, but decided to “drink local” and stay within our Rivanna River watershed.



A community water supply plan was supported by the Board of Supervisors and approved by City Council and the ACSA in 2012.



Tagged Mountain Reservoir Dam

Joint Permit Support

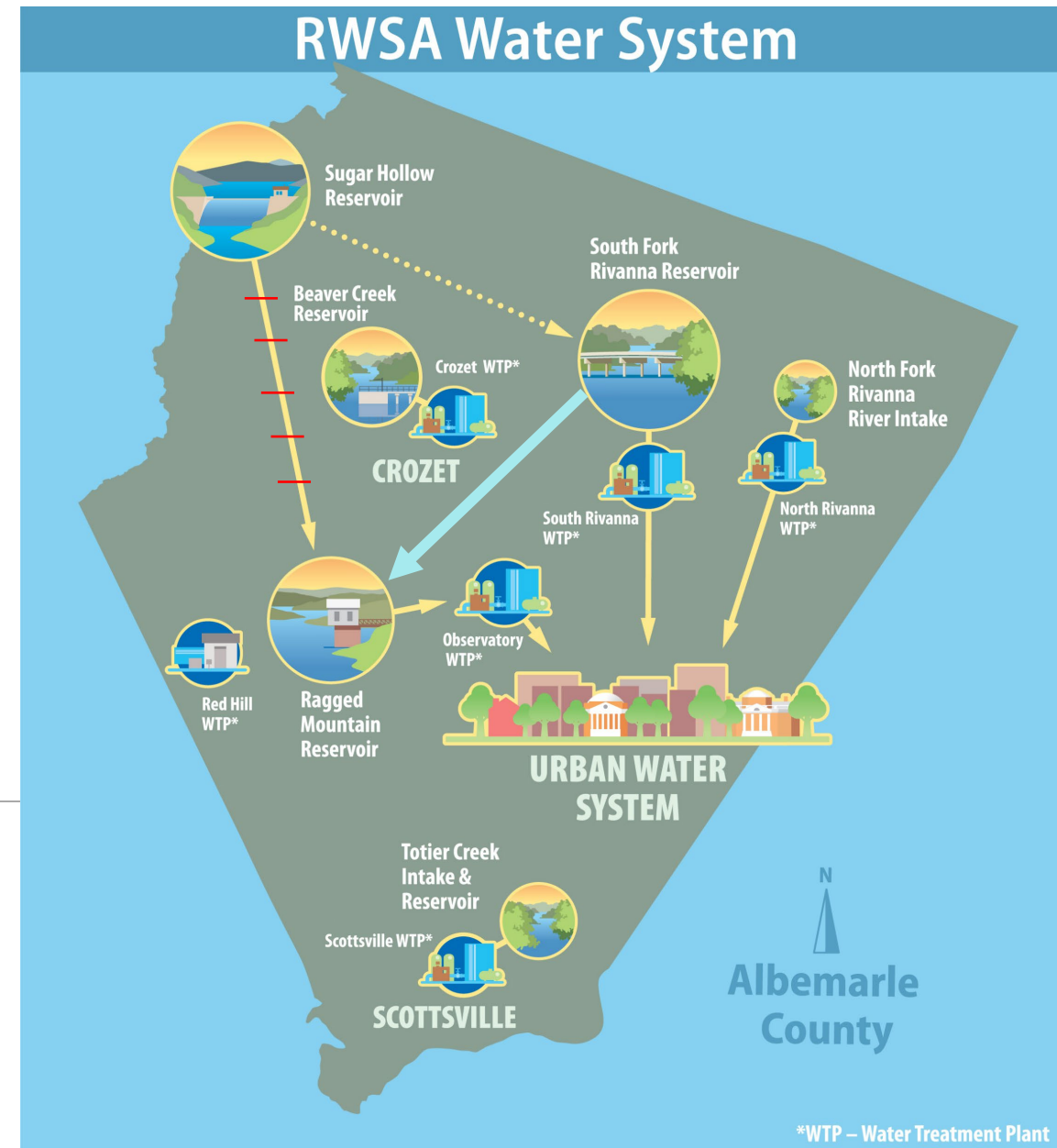
Water Supply Planning for 50 Year Period

- **significant technical evaluation, regulatory coordination and community input**
 - Safe Yield Study
 - Water Supply Alternatives Evaluation
 - Demand Analysis for the Urban Area
 - Coordination with community partners

Ragged Mountain Dam Project Agreement

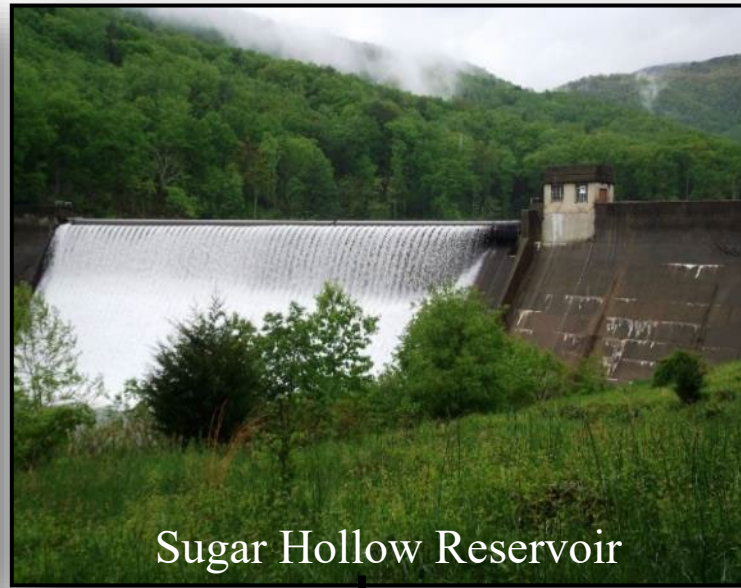
- Approved in 2012 by the City, ACSA, and RWSA. Established payment terms and directed RWSA to construct and operate:
 1. A new earthen dam for the RMR:
 - *Construction of the new dam was completed in 2014 and the reservoir was filled in 2015*
 2. The SRR – RMR Pipeline and Pumping Project:
 - *Scheduled for completion in 2026 – 2030*
 3. Intake tower modifications and perimeter grading to raise the RMR water level an additional 12 feet = 700 MG of additional storage capacity
- Required RWSA to complete a bathymetric survey of the Urban reservoirs, and an Urban Water Safe Yield and Demand Study, every 10 years beginning in 2020.

Water Treatment Facilities Overview





South Fork Rivanna Reservoir



Sugar Hollow Reservoir



Ragged Mountain Reservoir



Beaver Creek Reservoir - Crozet



Totier Creek Reservoir - Scottsville

Urban
Area

3.3 Billion Gallons

5 Water Supply Reservoirs

Reservoir Statistics

Reservoir	Volume* (MG)	Surface Area (Acres)	Watershed (Sq Miles)	Watershed land use
South Fork Rivanna	885	366	259	Rural, Farmland, Forest
Ragged Mountain	1,438 (2.1)#	170	2	Primarily Forested
Sugar Hollow	339	47	18	Forested
Beaver Creek	500	104	10	Rural, Farmland, Forest
Totier Creek	155	66	29	Rural, Farmland, Forest

* Data Sources

- South Rivanna 2018 bathymetry Next survey in 2028
- Ragged Mountain 2018 bathymetry Next survey in 2028
- Sugar Hollow 2015 bathymetry Next survey in 2028
- Beaver Creek 2016 bathymetry Next survey in 2028

#- Current project to add 700 MG to RMR

Reservoir Monitoring Program

- Goal to collect data to better understand the biological and chemical processes in our reservoirs to enhance water treatment decisions
 - Established baseline data in 2014
 - Annual review of program data by consultant
 - South Rivanna, Ragged Mountain, Beaver Creek Reservoirs are sampled twice a month (April-Nov)
 - Totier Creek Reservoir is sampled monthly (June-Aug)



Water Quality Specialist using water quality Sonde



Secchi Disk

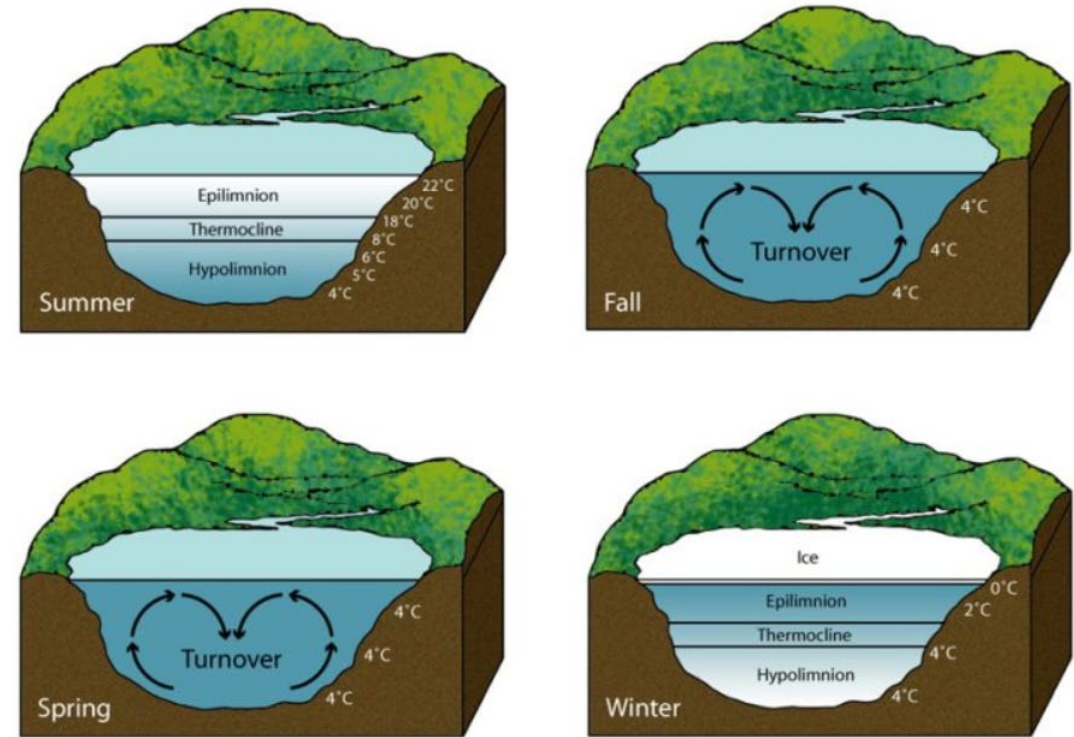


South Fork Rivanna Reservoir

WE PRODUCE DRINKING WATER EVERY DAY!

Reservoir Characteristics

- Stratification - The separation of water in a reservoir into stable layers of differing densities and temperatures. Most prominent in summer months.
- Turnover – Seasonal mixing of a reservoir that occurs when the outside temperatures cool.



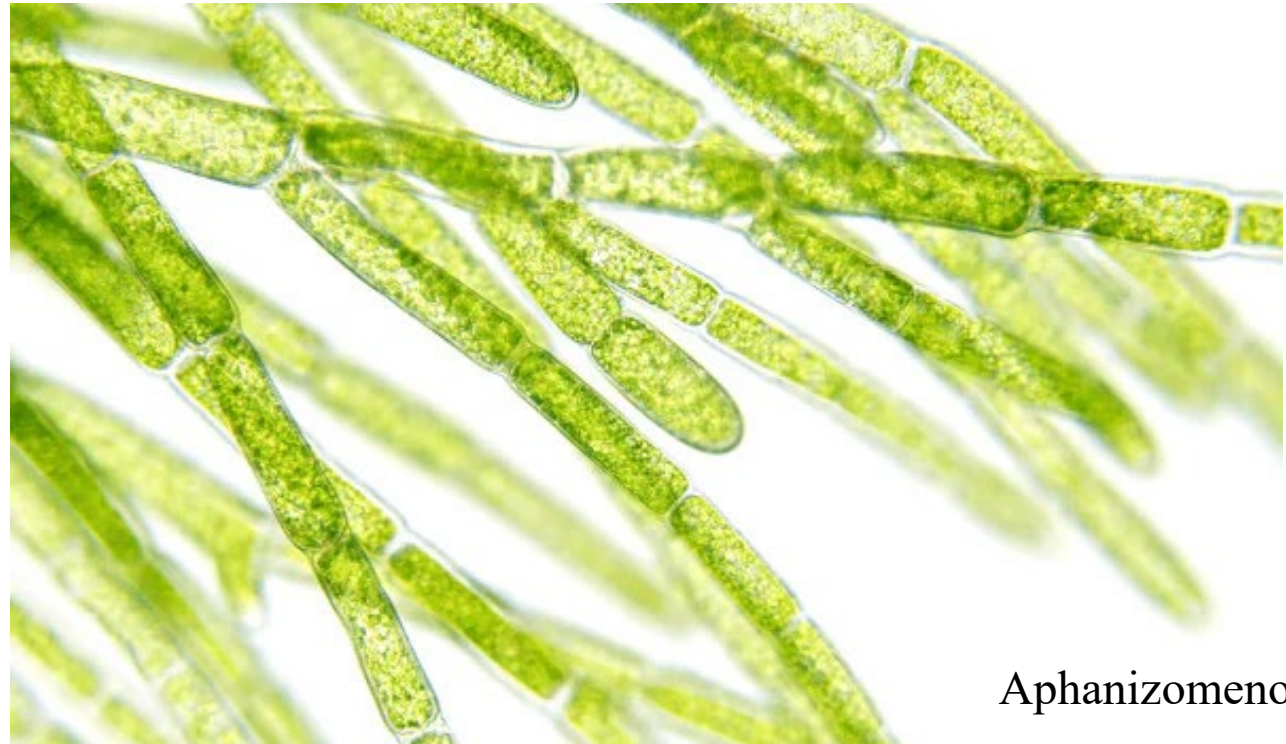
Source National Geographic Society

<https://education.nationalgeographic.org/resource/lake/>

Algae: Why does RWSA treat their reservoirs?

Algae can cause operational issues at water treatment plants

- Filter Clogging
- Taste and Odor
- Algal Toxins
- Increased chemical use



Aphanizomenon

2024-2025 Algae Applications *

Year	South Rivanna	Beaver Creek	Ragged Mountain	Sugar Hollow	Totier Creek
2024	1	5	0	0	0
2025	0	6	2	0	0

* January 1, 2024 – September 12, 2025



Algae Treatment Equipment

SeClear



- RWSA uses an engineered copper sulphate product made by **SePRO** called SeClear
- Product will bind with excess Phosphorus and algae and will make them unavailable
- NSF/ANSI-60* Certified

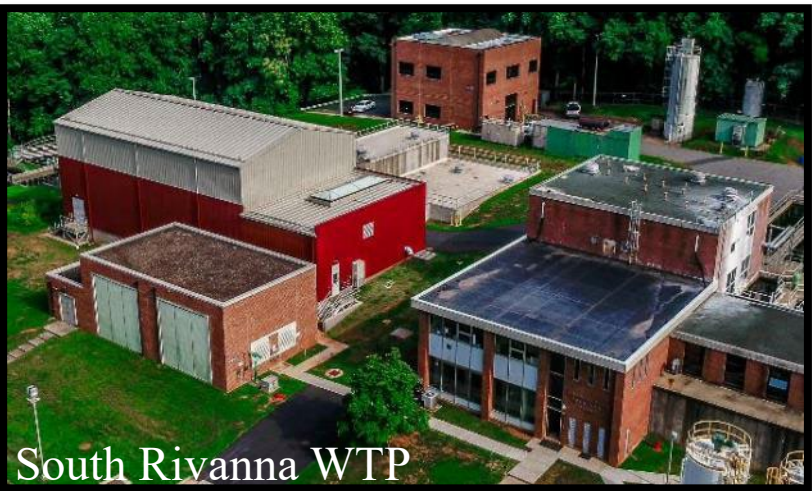
*National Sanitation Foundation establishes requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals



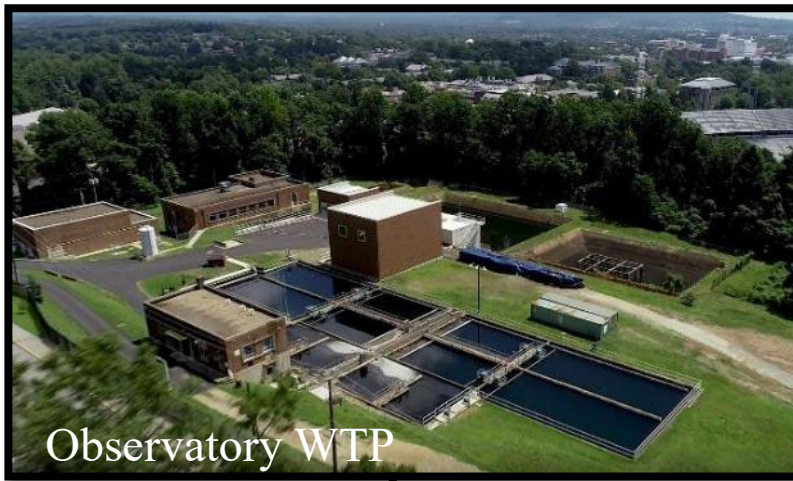
Source Water Protection Initiatives

- Source Water Protection plans for Beaver Creek, Totier Creek, and North Rivanna watersheds
- Source Water Protection Plan for South Rivanna Watershed 2025-2026
- Participate in Rivanna Riverfest with partner organizations
- Participate in Rivanna River Forest Health and Resilience Partnership
- Participate on Rivanna Conservation Alliance Science Advisory Committee

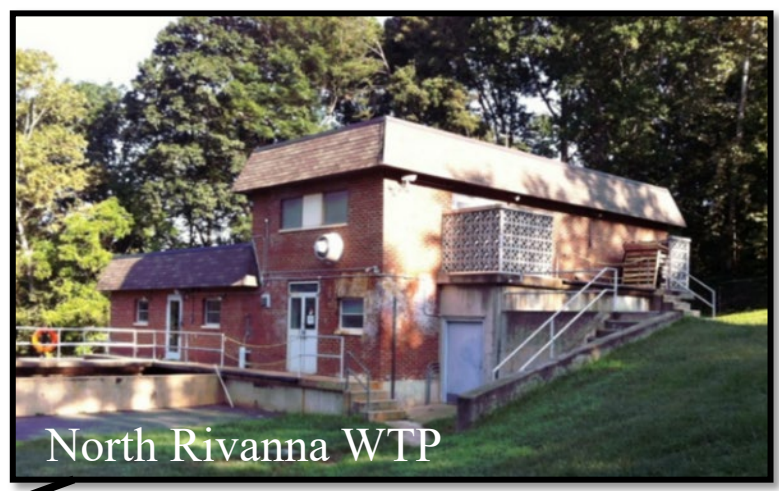




South Rivanna WTP

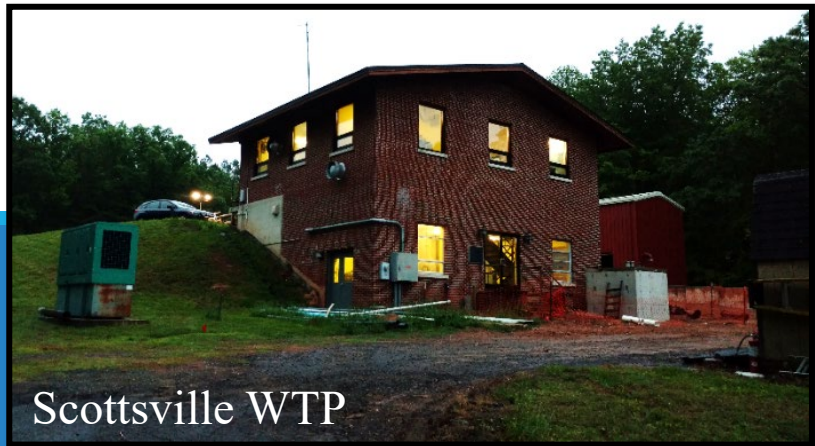


Observatory WTP

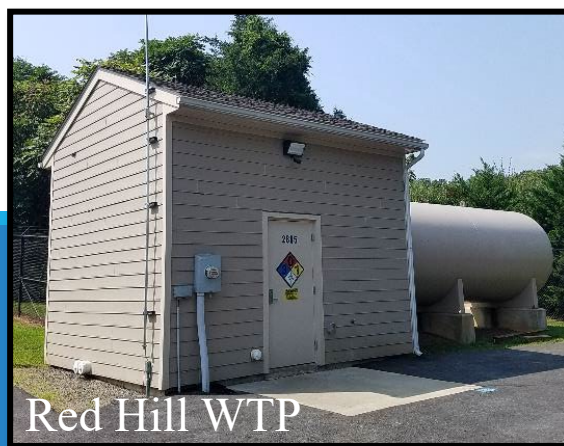


North Rivanna WTP

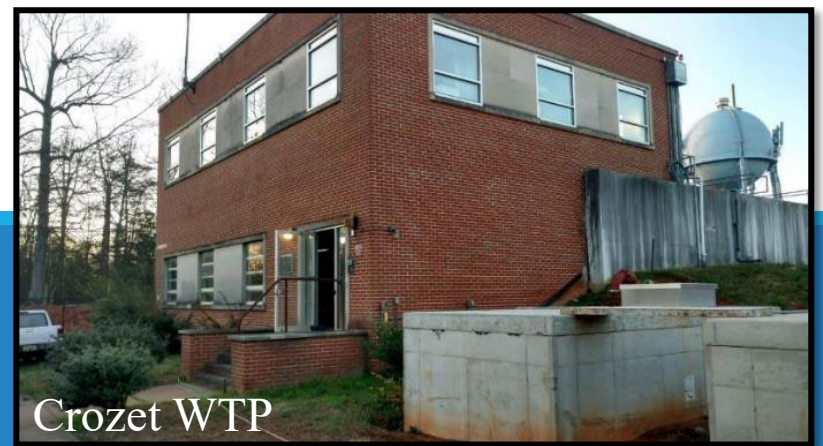
Urban
Area



Scottsville WTP



Red Hill WTP



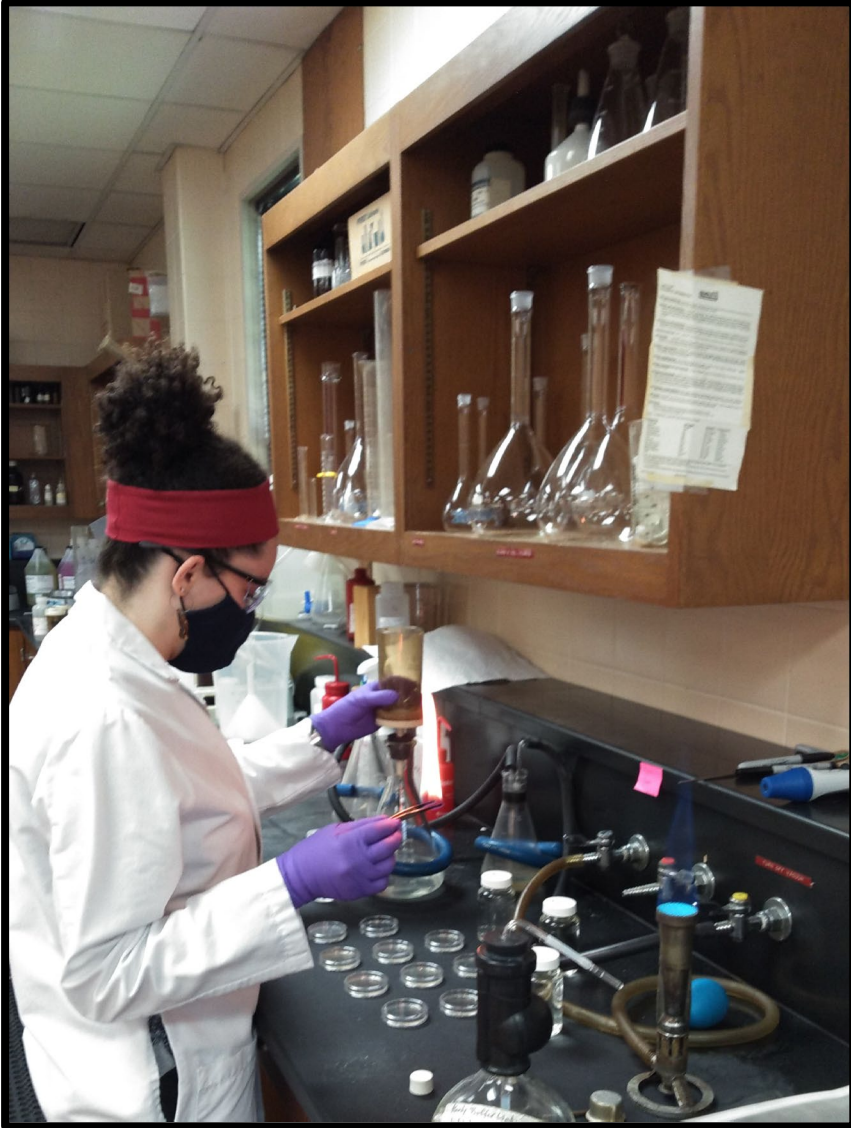
Crozet WTP

6 Water Treatment Plants

Drinking Water Testing Requirements

Monthly reports submitted to Virginia Department of Health include the following:

- Daily volume of water pumped in and out of each water plant
- Daily chemical dosage at each water plant (coagulant, lime, powder activated carbon, polymer, corrosion inhibitor, chlorine, and fluoride)
- Filter turbidity, water temperatures (raw and finished), and pH reports
- Finished water chlorine residuals and disinfection calculations
- Total Coliform sample results for all 4 water systems
- Safe Drinking Water Act results are posted to EPA central data exchange website

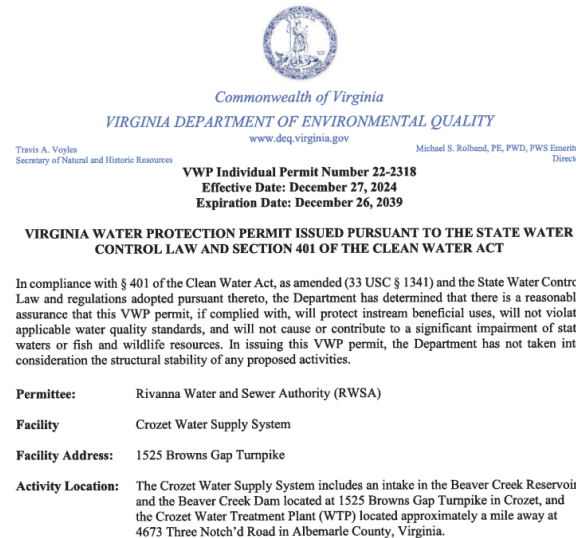


Virginia Water Protection (VWP) Permits

Regulate activities that impact surface waters, including wetlands and streams, ensuring compliance with state and federal water quality standards

Crozet VWP

- Issued on December 27, 2024
- Authorizes surface water withdrawals from Beaver Creek Reservoir and established a Minimum Instream Flow for Beaver Creek (when upgrades to raw water withdraw infrastructure is complete)
- Permits the construction of a surface water intake and associated infrastructure



Urban VWP

- Operating on an extension since 2023 – waiting on updated draft permit following public comments to VaDEQ
- Authorizes surface water withdrawals from Sugar Hollow, South Rivanna, and Ragged Mountain Reservoirs
- Permits construction projects in the urban watershed including raising the Ragged Mountain pool and the South Rivanna to Ragged Mountain Reservoir raw water pipeline

Drought Response and Contingency Plan

- Supports the Rivanna Regional Drought Response Committee: RWSA, ACSA, City, County representatives
- Updated by RWSA in 2025
- Provides guidance on the 3 drought stages: Watch, Warning, and Emergency
- Separate indicators to monitor the Crozet and Urban Water Supply Systems in the OASIS water model:
 - The Crozet System relies on usable Beaver Creek Reservoir storage
 - Urban Water System uses South Rivanna Reservoir level and/or probability forecasts for systemwide storage (SRR, RMR, SHR)
 - OASIS model will simulate current system operations over the historic hydrologic record (1926 through 2024)

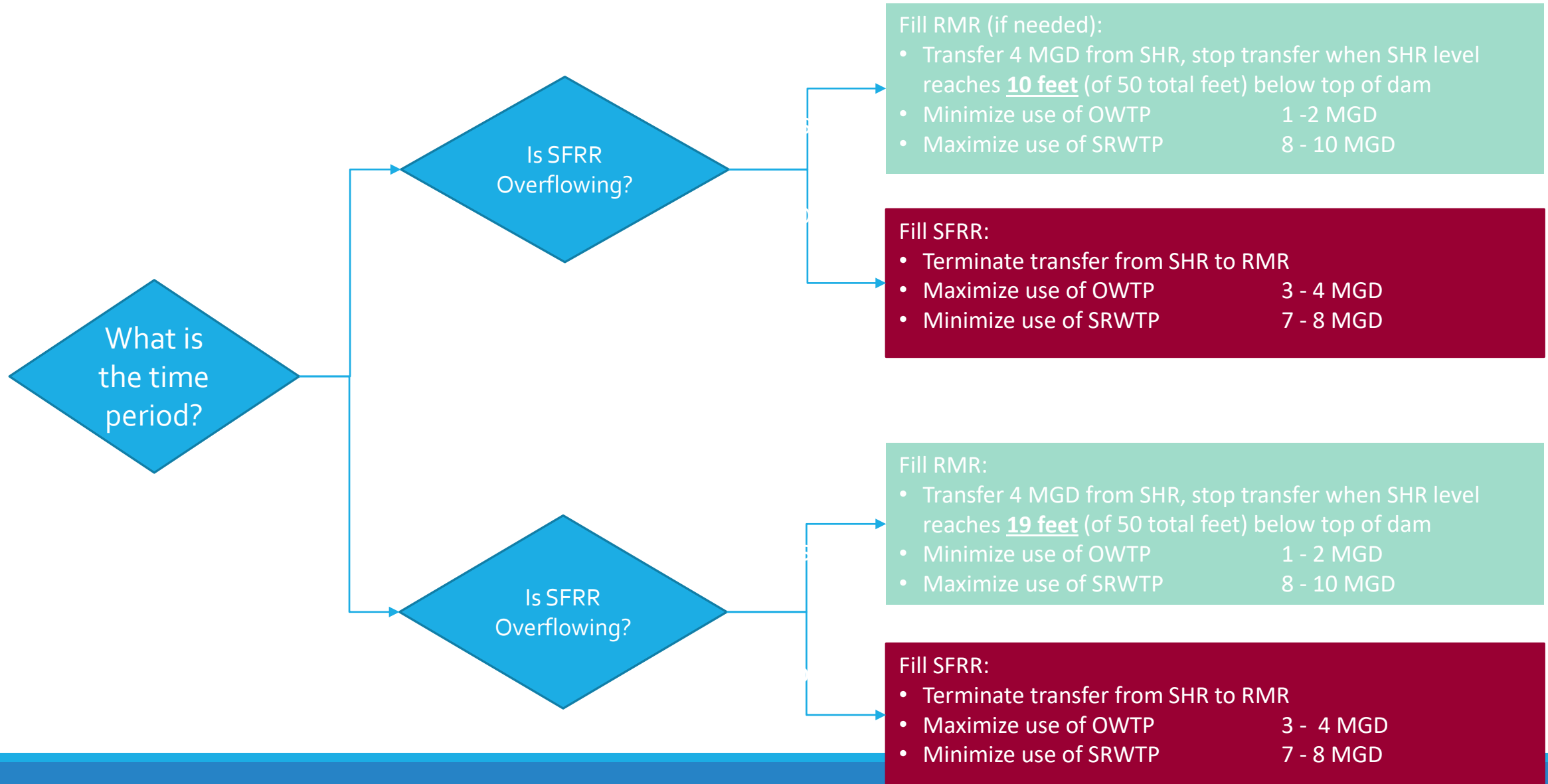
Crozet:

Trigger Stage	Beaver Creek Reservoir Usable Storage (%)
Drought Watch	60
Drought Warning	50
Drought Emergency	40

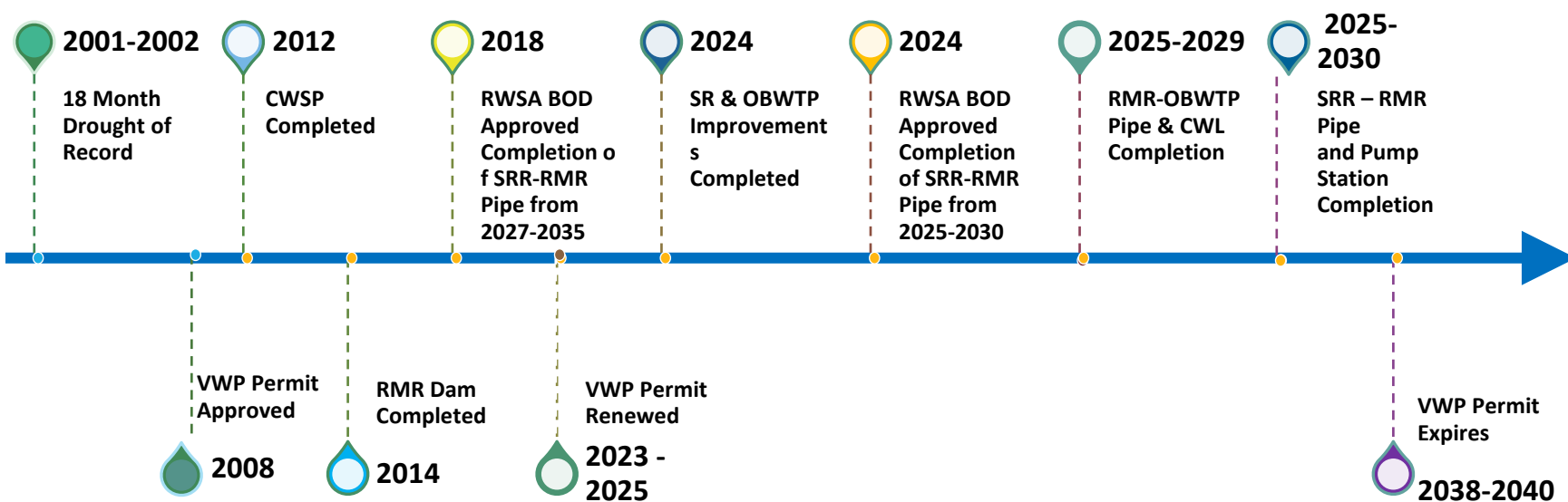
Urban:

Trigger Stage	SFRR Elevation Below Normal Pool (ft)	Usable Storage (%)
Drought Watch	1.0	90.2
Drought Warning	2.0	80.8
Drought Emergency	4.0	63.3

Water Supply Operational and Transfer Strategy



Timeline for Completion of Water Supply Projects for our Community



FY 26 – 30

Capital Improvement Program

76 Projects, \$561 M

68 Construction, 4 Studies, 4 I.T. / Asset Management / Radio

Urban Water	Urban Wastewater	Non-Urban Projects & Shared	Total
\$322 M	\$130 M	\$109 M	\$561 M

Funding

Already Paid For	Ex. Debt Proceeds	Cash Reserves	Grants	New Debt	Total
\$21 M	\$93 M	\$13 M	\$41 M	\$393 M	\$561 M

Water Supply Studies

RWSA Safe Yield Study Gannett Fleming– January 2004

RWSA Safe Yield Study Supplement No. 1– July 2004

RWSA Demand Analysis for the Urban Service Area– May 2004

RWSA Water Supply Alternatives Supplemental Evaluation– July 2004

RWSA Conceptual Stream & Wetland Mitigation Plan – November 2006

RWSA Review of Proposed Pipeline from South Fork Rivanna Reservoir to Ragged Mountain Reservoir – February 2010

RWSA AECOM Regional Water Demand Forecasts– September 2011

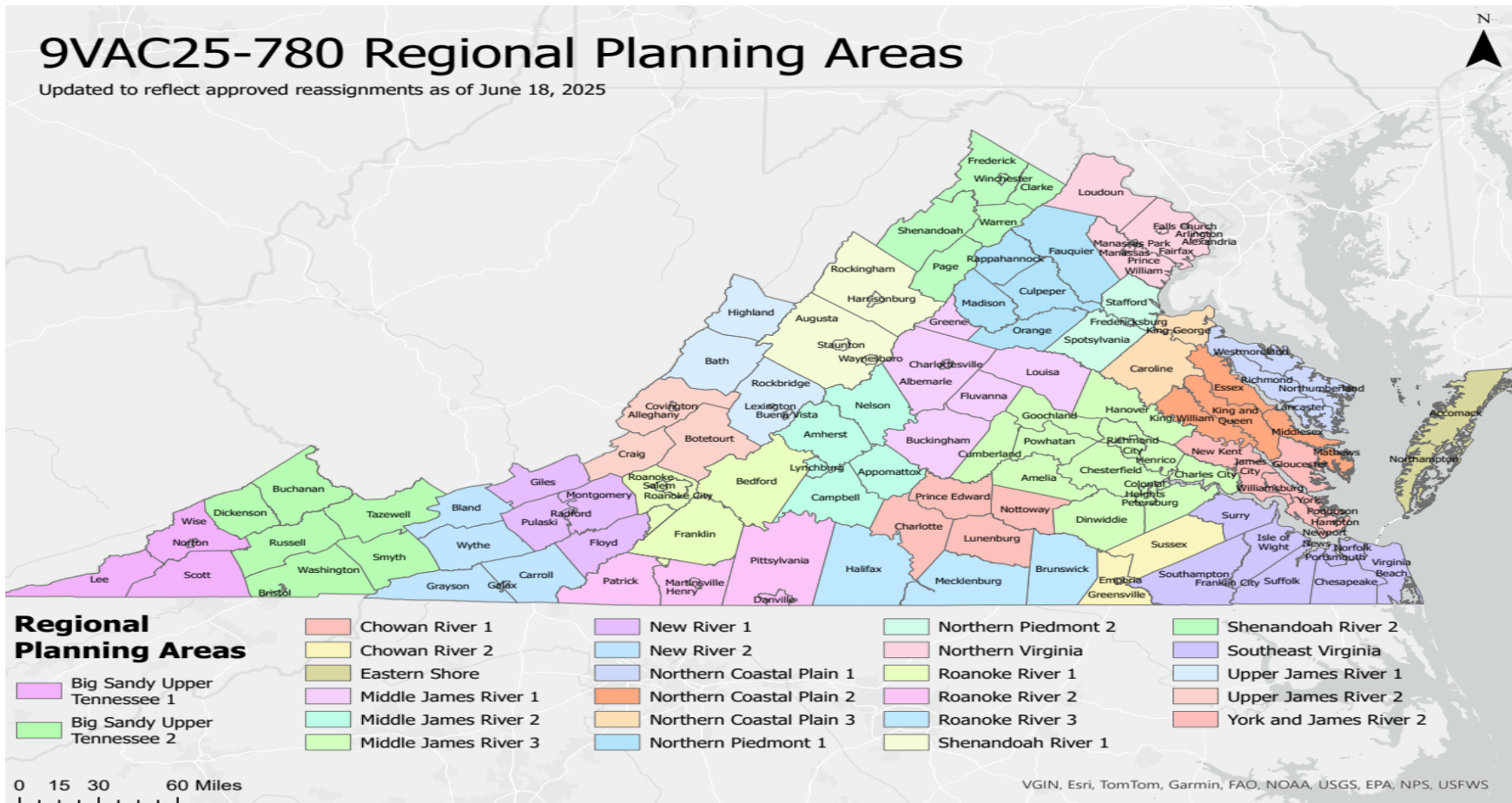
RWSA Urban System Water Demand Forecast Report– July 2020

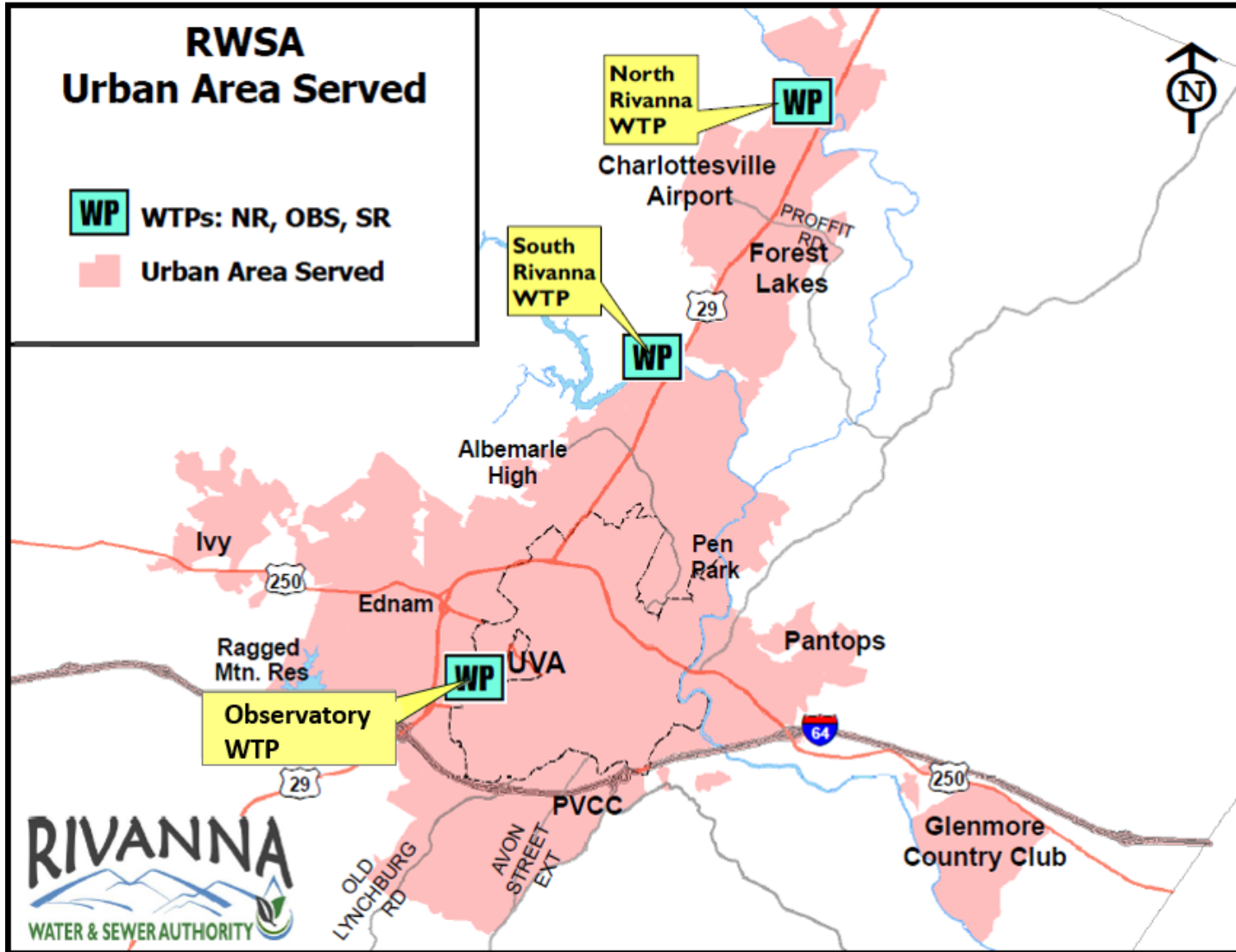
RWSA Safe Yield and Reliability Analysis Update Report– July 2020

Water Supply Planning & The State Water Resources Plan

- ❖ Water Supply Planning Program in response to the 2001-2002 drought.
- ❖ Section 62.1-44.38:1 in Code of Virginia requires a comprehensive statewide process to:
 - ❖ Ensure adequate and safe drinking water is available to all citizens,
 - ❖ Encourage, promote, and protect all other beneficial uses,
 - ❖ Encourage, promote, and develop incentives for alternative sources.
- ❖ Regulation requires localities to develop water supply plans – DEQ evaluates impacts.
- ❖ Water Supply Plans on a 5 year cycle: 2013, amended in 2018, and due again in 2023.
- ❖ The State Water Resources Plan:
 - ❖ Compiles information submitted via Water Supply Plans (existing and projected demands, sources, etc).
 - ❖ Cumulative Impact Analysis Modeling by river basin to evaluate future sustainability of water supply and protection of other beneficial uses. Groundwater modeling evaluates sustainability of groundwater resources.
 - ❖ First published in 2015. Second one slated for late 2020 (in development).

Regional Water Supply Planning



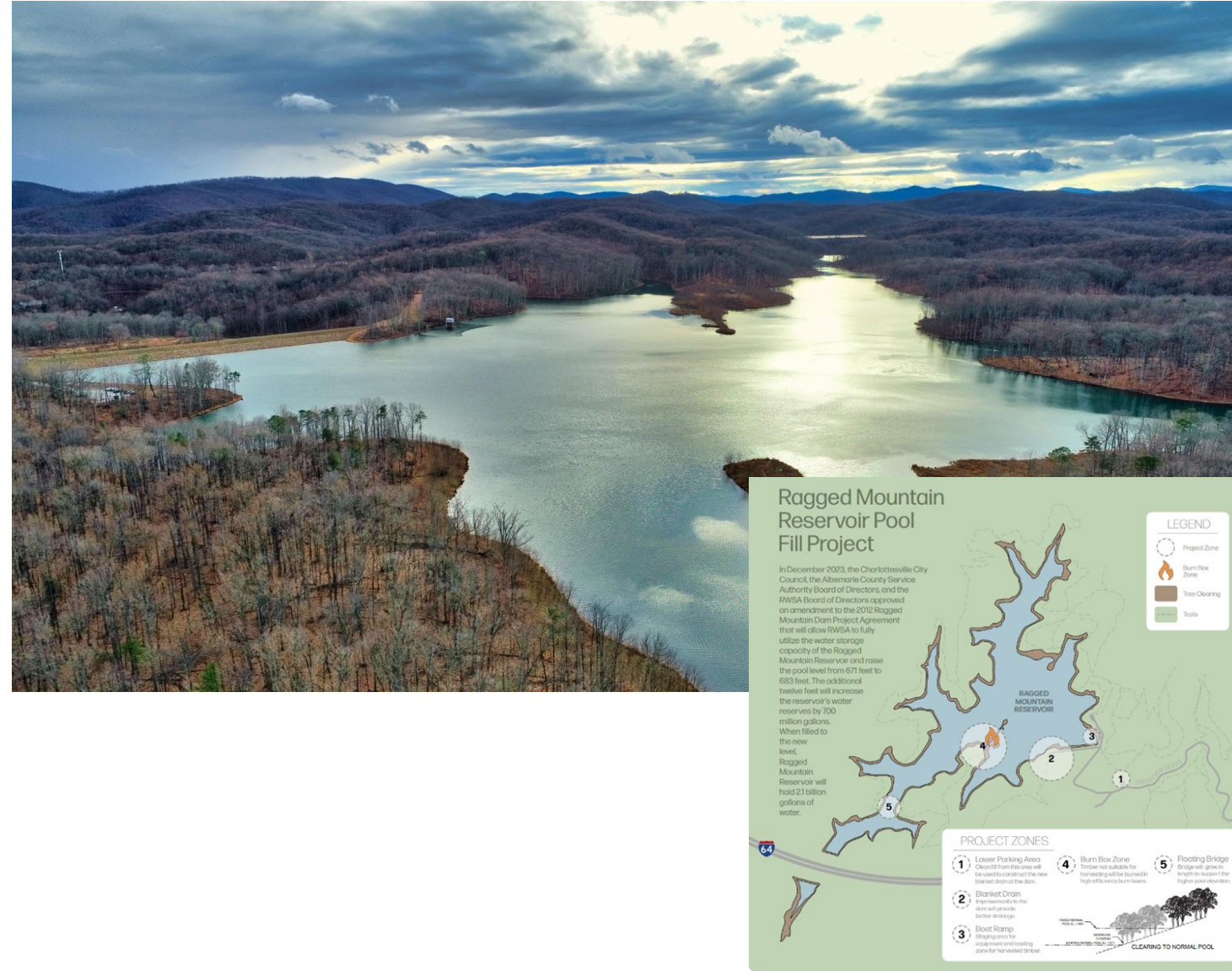


Urban Service Area

- RWSA provides wholesale water and sewer service to 125,000 people
- Served by 3 Water Treatment Plants and 1 Wastewater Plant
- Slightly different service area for water v. sewer

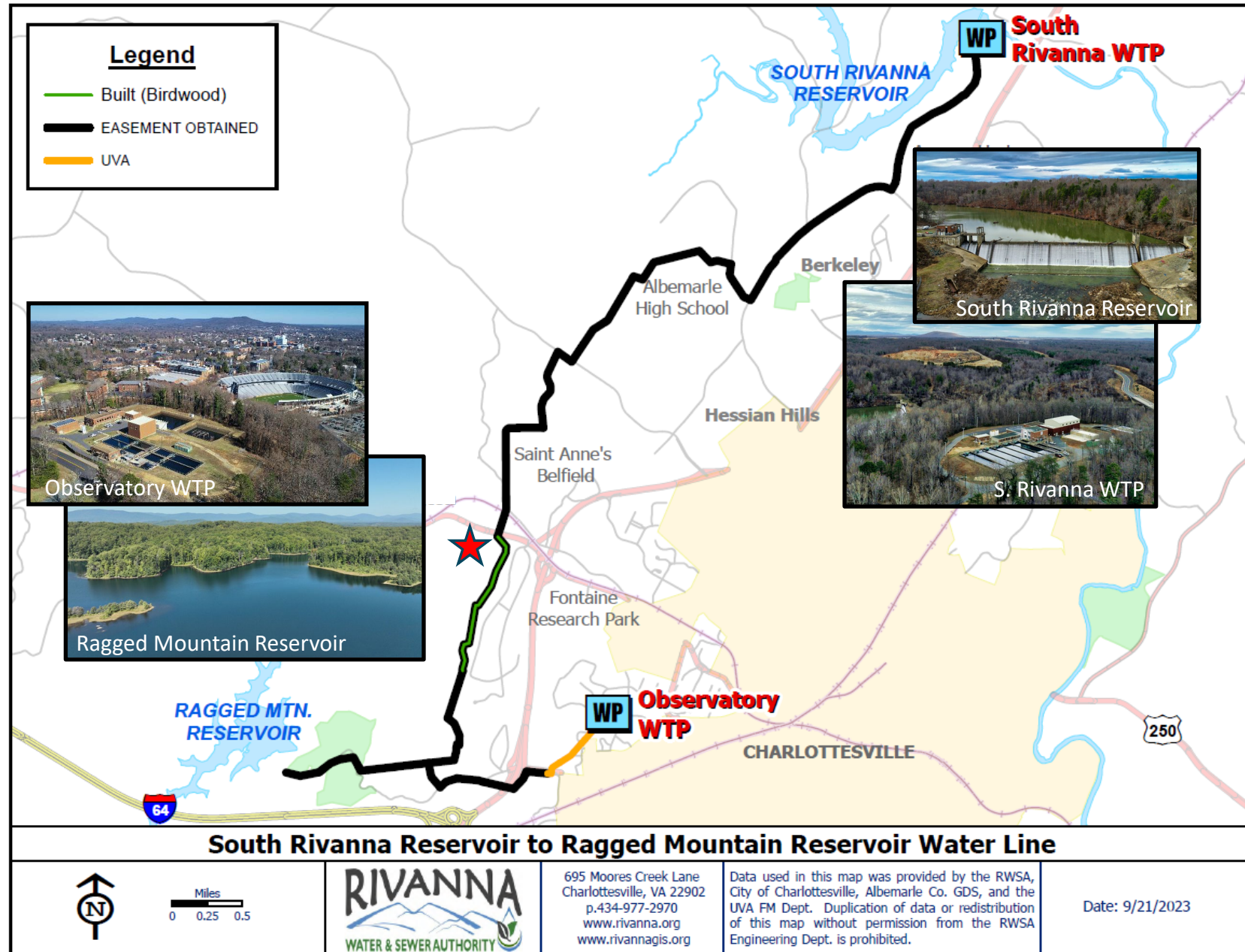
Ragged Mtn Reservoir, Raise Normal Pool Level Project

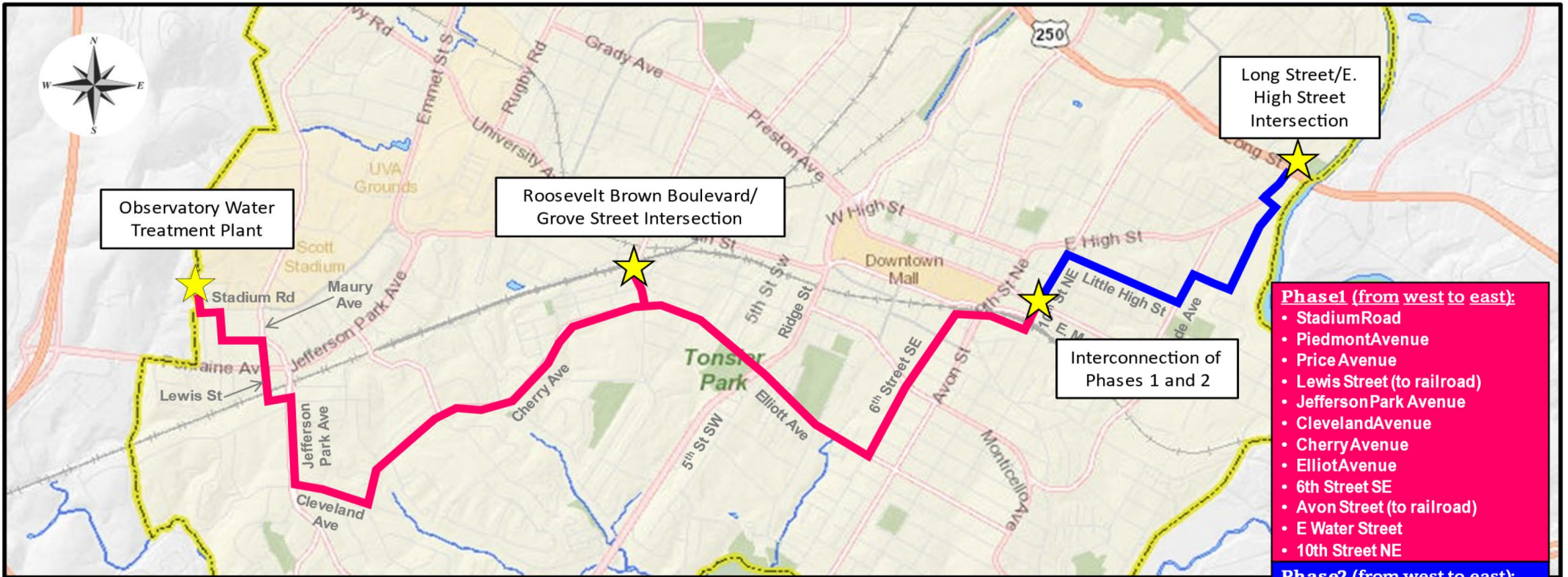
- 12 vertical feet of clearing around the reservoir to add 700 MG → 2.1 BG in total capacity
- Right abutment blanket drain
- 2 concrete boat ramps
- Modifications to riser structure, floating trail bridge, and spill containment boom
- Construction Award recommended to Faulconer Construction
- Contract Amt: \$11,018,050



Rivanna Reservoir to Ragged Mtn Reservoir Intake, Pumping and Pipeline

- 7 miles of 36-in raw water piping from SRR to Birdwood
- 25 mgd transfer capacity
- Raw water pump station and intake on SRR
- Completion: 2026 – 2030
- Budget \$84 M
ACSA 80%
City 20%





CENTRAL WATER LINE PROJECT PHASING MAP

Overall project map

- PHASE 1 – Hereford Drive to E. Market Street
- PHASE 2 – E. Market Street to E. High Street

North Fork Rivanna Dam Decommissioning

Dam removal will be able to proceed once the NRWTP plant has been taken offline (planned 2026)

The USFWS Partners for Fish and Wildlife Program (PFW) has agreed to work with RWSA and other partners to remove the dam

A NFPP (National Fish Passage Program) grant was recently awarded for removing the dam

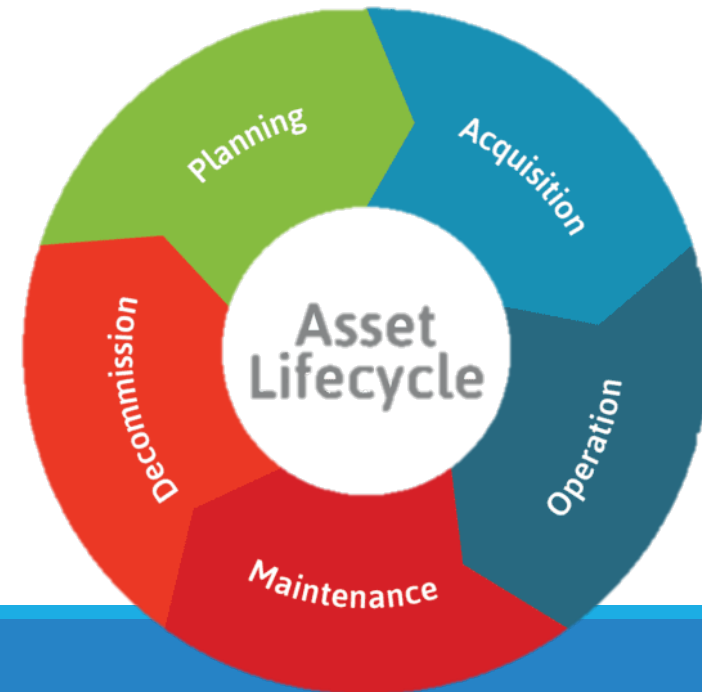
NFPP is coordinated through the USFWS Fish and Wildlife Conservation Office

Potential for coordinating with community organizations for survey assistance/ site monitoring/ stream restoration



What is asset management?

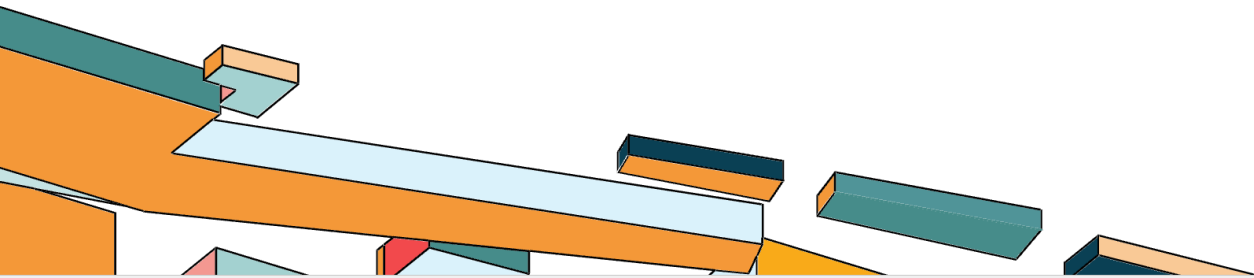
- A **long-term** program to attain and sustain the chosen level of service for the life of the asset in the most **cost-effective** manner.
- Rivanna's Asset Management Program consists of:
 - Computerized Maintenance Management Software (CMMS)
 - Asset Register/GIS
 - Decision Support Software (DSS)





2024 by the Numbers

Total Completed Work Orders:	4,075
Preventative Maintenance:	3,700
Corrective Maintenance:	375



Questions?

Ragged Mountain Reservoir

