

# South Rivanna Reservoir to Ragged Mountain Reservoir Water Line Project

## **Key Points:**

1. The purpose of this water line project is to ensure the urban water system has an adequate supply of drinking water for the next 50 years, including during extreme drought conditions like those endured in 2001-2002. This water line is an essential component of the Community Water Supply Plan (CWSP), which was widely discussed and crafted by many organizations in the community over a ten-year period from 2002 – 2012. In addition to water supply, the CWSP also considers other community values including maximizing the use of current infrastructure, replacement of aging infrastructure, and balancing the needs of the community with the needs of our rivers and reservoirs.
2. The Rivanna Board Water & Sewer Authority (RWSA) of Directors and staff are currently discussing this major water line project far in advance of the actual construction so that strategic financial planning can be implemented to maintain consistent drinking water costs for the community in the future.
3. The RWSA Board of Directors and staff have provided accurate information about the goals, budget and schedule for this project to the Charlottesville City Council, Albemarle Board of Supervisors, Albemarle County Service Authority (ACSA), the media, and many community groups including the League of Women Voters and the Sierra Club, as well as on our web page, over the past seven months. We held an informational meeting for residents near the proposed path of the water line in the Georgetown Road area on June 19, 2018 at Albemarle High School. Questions from all of these meetings have been openly and fully addressed.
4. In addition to increasing the raw water supply, the water line will provide greater dependability and flexibility for our drinking water system by connecting our two largest water supply reservoirs and two largest water treatment plants. This water line connection will make it possible to supply raw water from either reservoir to both of our two largest drinking water treatment plants, South Rivanna and Observatory. Major construction projects to increase the treatment capacity of the Observatory water treatment plant and renovate the South Rivanna water treatment plant will be completed over the next five years to further support water system dependability and flexibility.
5. This project will provide significant enhancements to the natural conditions in the Moormans River and the South Rivanna River basin by eliminating the withdrawal of four million gallons per day from the Sugar Hollow Reservoir. This goal was stated in the Joint Permit Application submitted by the RWSA to the Virginia Department of Environmental Quality (VDEQ) and the Army Corps of Engineers on June 30, 2006, as well as in City Council's Resolution Approving a Local Water Supply Plan dated June 2, 2008.
6. The preliminary schedule for completing final design and construction of the water line and associated facilities is over an eight-year period between 2027 and 2040. RWSA staff is updating urban area raw water supply and demand studies, which will be completed in the fall of 2019. Based on the results from these studies, the RWSA Board of Directors may defer or accelerate the project schedule as part of the annual review of the Capital Improvement Program.
7. RWSA has a contractual obligation with the City and the ACSA to raise the water level 12 feet in the RMR only when urban area demand reaches 85% of the water supply. The City and the ACSA would have to authorize any change to this requirement. RWSA also has a contractual obligation to assess water demand and supply every 10 years, with the first report required by 2020.
8. Water restrictions were implemented in October 2017 as the result of rapid decline in the SRR water level from September 17 – October 3, 2017. To capture forecasted rain and increase the water level in the reservoir in October, RWSA requested a permit modification to reduce the release of water into the river below the dam, as required by our permit. The VDEQ required the community to implement mandatory water conservation measures as a condition for approval of the permit modification.

RWSA staff have provided detailed information and responses to all questions about the causes of the decline in the reservoir including responses to an extensive list of questions Board members heard from the community. Information about the causes of the decline in the SRR, and operational changes subsequently implemented, was presented to the RWSA Board of Directors in a public meeting on October 27, 2017, which included:

- a. Drought conditions in central Virginia, including Albemarle County and the City of Charlottesville, as a Drought Advisory Watch was declared by the VDEQ's Virginia Drought Monitoring Task Force (VDMTF) on October 11, 2017. The VDMTF stated that the primary factors contributing to the declaration included:
  - Precipitation totals less than 75 % of normal over the 90 days and less than 25 % of normal over the last 30 days
  - Stream flows lower than 75 – 95 % of recorded flows, indicating moderate to severe hydrologic drought with a period of below-average water content in streams, aquifers, lakes and soils
  - Groundwater levels lower than 75- 95% of previously recorded September and October levels

In addition, precipitation in the Charlottesville /Albemarle area in 2017 totaled 36.62 inches, 11 inches below normal annual precipitation of 47.68 inches (data from Jerry Stenger, Director of AASC Designated State Office of Climatology).

- b. RWSA gates through the dam which were leaking approximately 3 million gallons per day for two months (180 million gallons total), representing 36% of the total decline from the reservoir of approximately 490 million gallons.
- c. An over-release from the reservoir resulting from the use of USGS / VDEQ stream gage provisional inflow data, which was later determined by VDEQ to be over recording the amount of water flowing into the reservoir. RWSA released more water into the river below the dam than would have been required to meet permit requirements (70% of inflow) based on the original provisional data. This is the normal procedure followed by VDEQ and RWSA to complete releases from the reservoir to the Rivanna River. VDEQ routinely verifies inflow gage data by taking actual flow measurements in the river.

In November, staff talked with the Daily Progress about how leaking gates and releases thru the meter in the dam contributed to the decline of the reservoir water level. Staff also discussed how adjustments to the gates would be monitored more frequently in the future. (Daily Progress article on November 11, 2017 by Allison Wrabel).

9. The RWSA Board of Directors and staff are committed to providing adequate, dependable, safe and cost-effective drinking water and wastewater services for the long-term future of the Charlottesville / Albemarle community. Our plans for this water line project reflect this commitment.

## **Historical Context:**

In 2001-2002, a harsh and lengthy drought gripped the Charlottesville / Albemarle area. Our primary water source, the Rivanna River, dropped to levels never seen before. The 18-month event provided clear evidence that the public water supply system serving the urban area did not have an adequate supply of drinking water. Severe water restrictions were mandated for residents and businesses, outdoor landscape irrigation was forbidden, commercial car washes were closed, and other businesses were required to reduce their water usage by 25%. When the drought was over, the community demanded that actions must be taken to reduce the risk of severe restrictions in the future.

Following 10 years of extensive public discussion involving many organizations in the community, elected and appointed officials ultimately agreed on a Community Water Supply Plan (CWSP) in 2012. The CWSP included a strategy for constructing and utilizing the infrastructure necessary to increase the supply of public drinking water to meet the water requirements of the Charlottesville/Albemarle urban area for 50 years.

The CWSP reflects the level of risk the community is willing to take with our supply of drinking water. It also considers other community values including maximizing use of current infrastructure, replacement of aging infrastructure, and balancing the needs of the community with our rivers and reservoirs. The CWSP includes a strategy to increase the urban area water supply, and includes not just the storage of raw water, but also the ability to get that raw water to our treatment plants for processing into drinking water. The basin components of the CWSP includes:

- Constructing a larger dam for the Ragged Mountain Reservoir (RMR). The larger dam and expanded reservoir would increase raw water storage from 0.5 to 1.5 billion gallons, and have the capacity to store a total of 2.1 billion gallons when needed in the future.
- Constructing a water line from the South Rivanna Reservoir (SRR) to the RMR to be used as the sole means to fill the expanded RMR. The RMR is the only raw water supply for the Observatory water treatment plant. Upon completion of the new raw water line from SRR, the existing 90+ year old water line from the Sugar Hollow Reservoir (SHR) to the RMR, currently used to fill the RMR, would no longer be used. Initial planning anticipated construction of the water line by 2021.
- Increasing the amount of water stored in the RMR from 1.5 to 2.1 billion gallons by raising the water level an additional 12 feet (600 million gallons) when needed in the future.

To implement the CWSP, the City, the ACSA, and the RWSA entered into agreements providing for RWSA to construct the additional infrastructure to implement the CWSP and how the costs for that infrastructure would be allocated between the City and the ACSA, all as described in the Ragged Mountain Dam Project Agreement and the Water Cost Allocation Agreement, signed in 2012.

**Under the Ragged Mountain Dam Project Agreement, the City and ACSA directed RWSA to:**

- Construct, fill and operate the larger dam for the RMR to hold 1.5 billion gallons including an extra 12 feet for a future increase in the water level (see 4<sup>th</sup> bullet point below).
- Evaluate the storage capacity of the urban water system (SRR, RMR and the SHR), as well as the current and future water demand of the urban area. These evaluations were required to be completed by the year 2020 and every 10 years thereafter.
- Construct, own and operate the water line from the SRR to the RMR.
- Raise the RMR water level 12 feet (600 million gallons) if the urban area water demand reached 85% of the urban area water supply. Either the City or ACSA acting alone may direct RWSA to fill RMR with the additional 12 feet of water when the demand reached 85% of supply.

**The Water Cost Allocation Agreement generally required:**

- The City to pay 15% and the ACSA to pay 85% of the cost of the larger RMR dam.
- The City to pay 20% and the ACSA to pay 80% of the cost of the SRR to RMR water line.
- The City to be allocated 20% of the additional water (1.98 million gallons per day).
- The ACSA to be allocated 80% of the additional water (7.92 million gallons per day).
- A “True-Up” of costs if the City or ACSA exceeded its water allocation.

**The current status of the Community Water Supply Plan is:**

- RWSA completed construction of the larger dam for the RMR in 2014. One billion gallons of water was added to the larger reservoir in 2014 – 2015.
- RWSA is updating the estimated storage capacity of the urban water system, as well as the current and future water demand of the urban area. These studies will be completed by the fall of 2019. Currently, water supply for the urban area is estimated to be 16.4 million gallons per day, and water demand is about 9.1 million gallons per day. The most recent water demand study completed in 2011 indicated the urban area will require additional water storage capacity by 2040.
- RWSA is evaluating locations for installation of the nine-mile-long water line from the SRR to the RMR, and will acquire permanent easements in 2019 – 2021 to prevent conflicts with facilities property owners may want to construct in the future. RWSA originally explored water line locations near Georgetown Road. Those locations were determined to be difficult due to conflicts with traffic and existing underground utilities within a limited street width. Currently under consideration is a route along Lambs Road and behind the Albemarle/Jouett/Greer schools complex. The currently proposed route can be viewed on our web page <http://www.rivanna.org/srr-to-rmr-water-line-project/>. Discussions with the Albemarle County School Board will be held to consider the proposed route.

## **Benefits of the water line are:**

- Dependability of our urban water system:
  - By connecting the SRR and RMR with this water line, as well as the South Rivanna and Observatory Water Treatment Plants, our water storage and water treatment facilities will be better prepared to maintain drinking water service to the urban area, especially during periods of drought or disasters. Two examples demonstrating the importance of redundancy and reliability to the public drinking water system include:
    - A recent exercise sponsored by the regional Emergency Operations Center included a scenario in which a plane crashed into the SRR, spilling fuel into the water, raising concern about structural damage to the dam, and making the water in the SRR unusable until the cleanup was completed. While we are hopeful this would never occur, this is a realistic scenario given the close proximity of the airport to the SRR. Under these conditions, the proposed water line could be used to transfer water from the RMR to the South Rivanna Water Treatment Plant, and in combination with the Observatory Water Treatment Plant, maintain water service to urban water customers in the City, County and UVA.
    - During the significant rain storm on May 30, 2018, there was seven feet of water powering over the SRR dam. Under normal weather conditions, there is typically several inches of water flowing over the dam. Fortunately, there was no damage to the dam due to the storm, but the event showed the formidable natural forces which could impact our drinking water infrastructure. The proposed water line would increase our ability to maintain water service in the urban area during natural and manmade disasters.
- Increased water supply:
  - By completing the water line and adding 600 million gallons to the RMR and the urban water system, an additional supply of water will be available to maintain water services over the duration of any future drought.
- Better for the environment:
  - The proposed water line and associated facilities will balance the needs of the community with the needs of our rivers and reservoirs. The water line will withdraw up to 25 million gallons of raw water per day from the SRR when the reservoir is overflowing and pump the raw water to the RMR or to the Observatory Water Treatment Plant. The existing water line, currently used to transfer four million gallons of water per day from SHR to fill RMR, will be taken out of service. Because of this change, an additional four million gallons per day will remain in the SHR and will be available for release into the river. While the new regulatory permit we will receive after the water line is completed will reduce the release required from SHR from 100% of inflow to 90% of inflow, the transfer of four million gallons per day from SHR to RMR will no longer be required to fill RMR. Consequently, water levels in the SHR will be greater than or equal to current water levels. By withdrawing and transferring water thru the proposed water line from SRR to fill RMR, more water will be available in the SHR, the Moorman's River and the South Rivanna River basin.
  - This project was always intended to provide significant enhancements to the natural conditions in the Moorman's River and the South Rivanna River basin. This goal was specifically stated in the Joint Permit Application submitted to the Virginia Department of Environmental Quality and the Army Corps of Engineers on June 30, 2006, as well as in the City Council's Resolution Approving a Local Water Supply Plan dated June 2, 2008.

## **Schedule for final design and construction of the water line is:**

- The RWSA Board of Directors reviews the Authority's Capital Improvement Program (CIP) each year to assess the purpose, priority, cost and schedule of all proposed water and wastewater projects. To assist RWSA staff with financial planning for the FY 2019 – 2023 CIP, the Board recently established a schedule of 2027 – 2040 as the likely period for completion of this project, expected to take eight years for final design and construction.

- RWSA staff will provide updated information about the estimated storage capacity of the SRR and the urban water system, as well as the current and future water demand of the urban area, when ongoing studies are completed by the fall of 2019. Based on the results from these studies, the RWSA Board of Directors may defer or accelerate the project schedule during the annual CIP planning and approval process.
- The Charlottesville City Council also endorsed the 2027 – 2040 schedule.
- The ACSA Board of Directors approved a similar schedule of 2027 – 2035.

### **Will the water line prevent water restrictions like those required in October 2017?**

- The water line would provide additional flexibility by connecting two of our reservoirs and two of our water treatment plants, which would reduce the risk of water restrictions during drought conditions as well as natural and manmade disasters. By increasing the amount of raw water we can store in the RMR and the urban water system, we can withstand abnormal conditions for longer periods.
- Water restrictions required in October 2017 were the result of rapid decline in the SRR water level from September 17 – October 3, 2017. In an effort to capture forecasted rain and increase the water level in the reservoir in October, RWSA requested a permit modification to reduce the release of water into the river below the dam. The VDEQ required the community to implement mandatory water conservation measures as a condition for approval of the permit modification. The decline in the SRR water level was the result of:
  - Drought conditions in central Virginia, as declared by VDEQ’s Virginia Drought Monitoring Task Force on October 11, 2017.
  - RWSA gates through the dam which were leaking approximately three million gallons per day for two months (180 million gallons), representing 36% of the total decline from the reservoir of approximately 490 million gallons.
  - Over-release from the reservoir resulting from provisional stream inflow gauge data which was over recording the amount of water flowing into the reservoir and causing RWSA to release more water than would have been required to meet RWSA’s permit requirements.
- The summer of 2017 was the first period of drought conditions after completion of the larger dam and filling of the larger RMR reservoir in 2015. RWSA staff gained valuable experience in the coordinated storage of water in the SHR, SRR and RMR, as well as the coordinated use of our South Rivanna and Observatory Water Treatment Plants during periods of lower than normal rainfall and drought. We have captured those lessons, updated our operational procedures, and will use them to support the urban water system here forward.

The Rivanna Water and Sewer Authority Board of Directors and staff are committed to providing adequate, dependable, safe and cost-effective drinking water and wastewater services for the long-term future of the Charlottesville / Albemarle community. Our plans for this water line project reflect this commitment.