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BOARD OF DIRECTORS

Regular Meeting of the Board of Directors of Rivanna Water & Sewer Authority

DATE: **October 24, 2017**

LOCATION: **Conference Room, Administration Building**
695 Moores Creek Lane, Charlottesville, VA

TIME: **2:15 p.m.**

AGENDA

1. ***CALL TO ORDER***

2. ***MINUTES OF PREVIOUS BOARD MEETINGS***
   a) *Minutes of Regular Board Meeting on September 26, 2017*
   b) *Minutes of Special Emergency Board Meeting on October 5, 2017*

3. ***RECOGNITION***

4. ***EXECUTIVE DIRECTOR'S REPORT***

5. ***ITEMS FROM THE PUBLIC***

6. ***RESPONSES TO PUBLIC COMMENTS***

7. ***CONSENT AGENDA***
   a) *Staff Report on Finance*
   b) *Disposition of FY17 Rate Center Results*
   c) *Staff Report on Operations*
   d) *Staff Report on Ongoing Projects*
   e) *Recommendation to Award Engineering Services Agreement for Geotechnical and Materials Testing - Schnabel Engineering, LLC*

f) *Request to Execute Work Authorization for Preliminary Engineering Report – Observatory WTP and South Rivanna WTP - Short, Elliot and Hendrickson Engineers*

g) *Recommendation to Award Construction Contract – 2017 Sanitary Sewer Rehabilitation and Repair - IPR Northeast, LLC*

8. OTHER BUSINESS

a) *Drought Status Update – Executive Director, Bill Mawyer*

b) *Financial Review – Director of Finance/Administration, Lonnie Wood*

c) *Financial Review and Capital Funding Analysis, Davenport & Co.*

9. OTHER ITEMS FROM BOARD/STAFF NOT ON AGENDA

10. CLOSED MEETING

11. ADJOURNMENT

GUIDELINES FOR PUBLIC COMMENT AT RIVANNA BOARD OF DIRECTORS MEETINGS

If you wish to address the Rivanna Board of Directors during the time allocated for public comment, please raise your hand or stand when the Chairman asks for public comments.

Members of the public requesting to speak will be recognized during the specific time designated on the meeting agenda for "Items From The Public." Each person will be allowed to speak for up to three minutes. When two or more individuals are present from the same group, it is recommended that the group designate a spokesperson to present its comments to the Board and the designated speaker can ask other members of the group to be recognized by raising their hand or standing. Each spokesperson for a group will be allowed to speak for up to five minutes.

During public hearings, the Board will attempt to hear all members of the public who wish to speak on a subject, but it must be recognized that on rare occasion presentations may have to be limited because of time constraints. If a previous speaker has articulated your position, it is recommended that you not fully repeat the comments and instead advise the Board of your agreement. The time allocated for speakers at public hearings are the same as for regular Board meetings, although the Board can allow exceptions at its discretion.

Speakers should keep in mind that Board of Directors meetings are formal proceedings and all comments are recorded on tape. For that reason, speakers are requested to speak from the podium and wait to be recognized by the Chairman. In order to give all speakers proper respect and courtesy, the Board requests that speakers follow the following guidelines:

- Wait at your seat until recognized by the Chairman.
- Come forward and state your full name and address and your organizational affiliation if speaking for a group;
- Address your comments to the Board as a whole;
- State your position clearly and succinctly and give facts and data to support your position;
- Summarize your key points and provide the Board with a written statement, or supporting rationale, when possible;
- If you represent a group, you may ask others at the meeting to be recognized by raising their hand or standing;
- Be respectful and civil in all interactions at Board meetings;
- The Board may ask speakers questions or seek clarification, but recognize that Board meetings are not a forum for public debate; Board Members will not recognize comments made from the audience and ask that members of the audience not interrupt the comments of speakers and remain silent while others are speaking so that other members in the audience can hear the speaker;
- The Board will have the opportunity to address public comments after the public comment session has been closed;
- At the request of the Chairman, the Executive Director may address public comments after the session has been closed as well; and
- As appropriate, staff will research questions by the public and respond through a report back to the Board at the next regular meeting of the full Board. It is suggested that citizens who have questions for the Board or staff submit those questions in advance of the meeting to permit the opportunity for some research before the meeting.

The agendas of Board meetings, and supporting materials, are available from the RWSA Administration Office upon request or can be viewed on the Rivanna website(s)

Rev. September 22, 2009

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RWSA BOARD OF DIRECTORS
Minutes of Regular Meeting
September 26, 2017

A regular meeting of the Rivanna Water & Sewer Authority (RWSA) Board of Directors was held on Tuesday, September 26, 2017 at 2:15 p.m. in the 2nd floor conference room, Administration Building, 695 Moores Creek Lane, Charlottesville, Virginia.

Board Members Present: Mr. Mike Gaffney – Chair, presiding; Ms. Kathy Galvin (arrived at 2:17 p.m.); Ms. Lauren Hildebrand; Mr. Maurice Jones; Mr. Gary O'Connell; Dr. Liz Palmer; and Mr. Doug Walker.

Board Members Absent: None.

Staff Present: Ms. Miranda Baird, Mr. Tim Castillo, Ms. Victoria Fort, Dr. Richard Gullick, Mr. Doug March, Mr. Bill Mawyer, Ms. Betsy Nemeth, Ms. Michelle Simpson, Ms. Andrea Terry, Ms. Kathy Ware, and Ms. Jennifer Whitaker.

Also Present: Mr. Kurt Krueger, RWSA counsel, media representatives and members of the public.

1.0 Call to Order

The regular meeting of the RWSA Board of Directors was called to order by Mr. Gaffney on Tuesday, September 26, 2017 at 2:15 p.m.

2.0 Minutes of Previous Board Meetings

a.) Minutes of Regular Board Meeting on August 22, 2017

b.) Minutes of Special Joint Meeting on August 31, 2017

Dr. Palmer moved to approve the RWSA Board meeting minutes of August 22, 2017 and August 31, 2017. Mr. Jones seconded the motion, which passed by a vote of 6-0. Ms. Galvin had not yet arrived and was absent from the meeting and the vote.

3.0 Recognition

There were no recognitions.

4.0 Executive Director's Report

Mr. Mawyer reported that there would be a ribbon-cutting ceremony event, held rain or shine, for the new Rivanna Pump Station on October 5, 2017, from 10:30 to 11:30 a.m., to include Board members and anyone from the community who would like to attend. He stated that Rivanna would have some comments and then there would be a tour of the facility. Mr. Mawyer noted that there are 100 steps to the bottom, which would be the long tour and there would also be a shorter tour of 25-50 stairs. He mentioned that there is no elevator.

Mr. Mawyer reported that the RWSA has been busy with community outreach, and Wastewater Manager Tim Castillo had done a presentation two weeks earlier for the Virginia Joint Annual Meeting of the Virginia American Waterworks Association and the Virginia Water Environment Association. He stated that Ms. Andrea Terry would do a presentation on September 28 regarding the Moorman's River watershed for the Thomas Jefferson Chapter of Trout Unlimited. Mr. Mawyer noted that he had given a presentation the previous evening to the Pantops Community Advisory Committee on odor reduction from the wastewater treatment facility. He reported that he would be doing a presentation on Friday on water supply and reservoir management, as part of the Rivanna River Renaissance Conference held at the County Office Building on September 29.

Mr. Mawyer stated that Rivanna's strategic plan was moving forward, with vision, mission, and value statements drafted through the project steering committee. He noted there were currently six goal teams working on six draft goals, to flesh out those goals and what the implementation steps would be – with those goals brought back to the project steering committee on October 12 for a full-day workshop. Mr. Mawyer stated that if all proceeded as planned, they would have a draft strategic plan which would be brought back to both Rivanna boards for consideration at their regular meetings on November 14, with completion slated for their December 19 meetings.

Mr. Mawyer reported that Rivanna has been monitoring the reservoirs, and over the last 10 days the reservoir levels have dropped about 7%, with the urban reservoirs now at 77% full – holding about 2.1 billion gallons of stored water total, or 200 days of storage. He stated that the drought management plan addresses levels of 75% as a trigger for a drought watch, but that number is based on the hydrological model the consultants run. Mr. Mawyer noted that the consultants ran the model the previous week to evaluate if there was a 20% probability of being less than 75% full over the next 12 weeks, using data for the past 100 years and forward projections for the next three months. He noted that this uses the likelihood for rain, existing conditions, and reservoir levels, and the model predicted there is a 3% chance for the combined reservoir levels to be less than 75% after the next 12 weeks. Mr. Mawyer commented that they are in relatively good shape but would continue to monitor it.

Mr. Walker asked if Rivanna would wait for 12 weeks to determine where things stood, or continue to monitor it.

Mr. Mawyer responded that they would run the model weekly and get a new prediction through the model with each run to see what the probability is that they would be less than 75% after 12 weeks. He stated that they would monitor reservoir levels, which would likely

continue to decline unless there was some rain, and then monitor the model to establish the probability.

Mr. Walker asked if the 75% level automatically triggered the drought watch by policy, or if it just generated a conversation about it.

Mr. Mawyer responded that the drought management plan stipulates that when they run the model and the model says there is a greater than 20% chance of levels at less than 75%, after the next 12 weeks, drought management procedures would be implemented.

Mr. Walker commented that it was the threshold, timeframe, and probability.

Mr. Mawyer confirmed this.

Mr. Gaffney stated that if it was July 1st and they were at 77%, then looking out 12 weeks would probably trigger a drought watch, but here there is rain in the fall and sometimes a hurricane.

Mr. Mawyer emphasized that it is somewhat of a multi-component evaluation, and it took a while to read and re-read it to make sure they understood the model.

Mr. O'Connell commented that the City and County drought management plans were based upon Rivanna's determination.

Mr. Mawyer confirmed that if they did determine that a drought watch was necessary, Rivanna would ask its board to give the chairman authority to send a declaration to the Service Authority, the City, and the County to implement drought watch requirements. He mentioned that the Service Authority has a set of all-voluntary drought watch requirements, but the City did not until the second phase of drought warning. Mr. Mawyer noted that the City did conservation all the time, so the voluntary conservation measures were already in place. He stated that at the drought watch stage, there were all voluntary measures requested of the community.

Mr. O'Connell commented that they were typically outdoor measures.

Mr. Mawyer agreed, stating that this included watering lawns at night rather than during the day and similar measures.

Mr. Mawyer stated that another data point was that prior to RWSA deciding to build the new Ragged Mountain Dam, there was 1.1 billion gallons of water available, and the 30 feet of water added with the new dam added 1 billion gallons to storage providing a 200-day supply instead of a 100-day supply, which would have put the reservoir at 65% capacity rather than the current 77%.

Mr. Gaffney commented that this would have put them in drought warning rather than just a watch.

Dr. Palmer stated that this also took into consideration that they can only use the Ragged Mountain water at the smaller water treatment plant.

Ms. Whitaker confirmed that they could only use water from the Ragged Mountain Reservoir at the Observatory Water Treatment Plant.

Dr. Palmer noted that this was the second smallest water treatment plant, as she had ignored the North Fork.

Mr. Mawyer emphasized that the 77% capacity mentioned was the collective volume of Sugar Hollow, Rivanna, and Ragged Mountain – the three urban reservoirs – not just Ragged Mountain, although it did add 1 billion gallons to that total sum.

Mr. Gaffney pointed out that it had been six weeks since Wintergreen had water restrictions on all uses.

Mr. Mawyer stated that 10 days ago, Rivanna levels were at 84% capacity and now they were at 77%. He noted that they also monitor the state drought information online, and the drought management plan had a regional drought response committee that could be called together to talk about a plan should it become an issue.

Mr. Mawyer stated that Rivanna was also moving forward with a number of capital projects, design and construction, and staff had been doing a good job on that.

Dr. Palmer stated that she would like to have more information from Andrea Terry on her talk to Trout Unlimited.

Ms. Terry responded that the RWSA has had a good relationship with Trout Unlimited for a long time and they have asked her to attend their meetings in the past to talk about concerns and agreements that were in place with respect to a lease. She stated that they would discuss a little bit of everything.

Dr. Palmer asked if they had concerns about the water levels.

Ms. Terry replied that they had not mentioned it, but she was prepared to talk about it.

5.0 Items from the Public

There were no items from the public presented.

6.0 Responses to Public Comments – No Responses This Month

There were no responses to public comments this month.

7.0 Consent Agenda

a.) Staff Report on Finance

b.) Staff Report on Operations

c.) Staff Report on Ongoing Projects

d.) Recommendation to Award Construction Contract – MCAWRRF Digester #1 Coating

e.) Recommendation to Award Construction Contract – MCAWRRF Roof Replacements

f.) Request for Additional Construction Change Order Authorization – MCAWRRF Odor Control Phase 2

g.) Recommendation to Award Engineering Services – Crozet WTP Expansion

Dr. Palmer moved to approve the Consent Agenda as presented. Ms. Galvin seconded the motion, which passed by a vote of 7-0.

8.0 Other Business

a.) Presentation and Recommendation to Award Engineering Services Contract - South Fork Rivanna Reservoir to Ragged Mountain Reservoir Water Line Right-of-Way

Ms. Whitaker presented on the status of the South Fork to Ragged Mountain waterline right-of-way project, noting that there was a report in the board packet that addressed the current work trying to be accomplished, with the right-of-way design and acquisition process ready to get underway.

Ms. Whitaker stated that the project purpose emerged from the community water supply plan. It was a 50-year plan adopted in 2012 with implementation intended to be in phases over time and each phase coming into effect as needed. She said the idea was that the plan would increase the safe yield of the urban reservoir system from 12.8 to 18.7 million gallons per day. Ms. Whitaker stated that phase one of the plan was building the Ragged Mountain Dam, which was completed in 2014.

Ms. Whitaker explained that the community water supply plan did not define which came first in terms of the next two phases, but the intent is that at a future point in order to meet the ultimate designed safe yield, Rivanna needed to raise the water level at Ragged Mountain. She noted that project was simply a clearing at the rim of the reservoir, unbolting a gate and bolting it at an alternate location, and allowing the water to rise.

Ms. Whitaker stated that the second project was to connect the South Fork Rivanna Reservoir to the Ragged Mountain Reservoir, and there were several things that drove the increase in safe yield and it was not simply that there is a pipeline. Ms. Whitaker said that the pipeline allowed the reservoir at Ragged Mountain to be filled five times faster than it currently did, which was part of the safe yield increase, as it allowed them to quickly draw and refill. She noted that the other benefit of the pipeline project was that it connected all the urban water sources to all the urban water treatment plants – which allowed RWSA to utilize multiple plants, allowed for redundancy and resiliency, and tied those facilities together. She noted that this meant they didn't have to build as large a plant at each facility as if it were treating 100% capacity, as RWSA would be able to split the load and get the raw water to where the

finished water needs to be. Ms. Whitaker stated that if Rivanna is able to connect facilities, it increases the safe yield.

Mr. O'Connell recalled that there was a specific formula in the agreement related to the 12-foot rise in the Ragged Mountain Dam pool level.

Ms. Whitaker responded that the agreement says the water level will be increased when demand reaches 85% of safe yield, and confirmed that it was a mathematical calculation.

Dr. Palmer noted that it didn't necessarily have to be what was done first if they decided the other pipeline benefits were worthwhile.

Ms. Whitaker stated that the agreement could be interpreted in two different ways, and the 85% trigger was there – but the question was whether the pipeline was in place before or after that, which was still a lingering question in her view.

Mr. O'Connell pointed out that the agreement didn't provide a formula for the pipeline as to when it would occur.

Ms. Whitaker confirmed this.

Mr. Mawyer clarified that it says the pipeline is part of the project, along with building the dam and all the associated work. He stated that in terms of raising the water level 12 feet, the agreement says they need to reach 85% of the safe yield. Mr. Mawyer stated that they are doing bathymetric studies to evaluate how much water is in the Rivanna Reservoir, and then checking the demand, so when they reach 85% that's when the agreement says either the City or Service Authority could ask Rivanna to move forward with raising the water level 12 feet, without needing the concurrence of the other public body.

Mr. O'Connell asked if the bathymetric work was done annually.

Mr. Mawyer responded that it was every 10 years.

Mr. O'Connell noted that 2020 would be the next hard look in terms of safe yield.

Ms. Whitaker explained that there are five reservoirs and they are budgeting the bathymetrics for every other year, so they are getting current data with the idea that by 2020 they would have the demand projection, all the new bathymetry, and be able to run the safe yield model to determine where they are on the spectrum that was envisioned.

Dr. Palmer stated that in the meantime, they were depending upon a 100-year-old pipeline to fill Ragged Mountain.

Ms. Whitaker responded that the upper Sugar Hollow pipeline was the transmission between the two reservoirs, and it was built in 1920.

Mr. Gaffney stated that if it's 85% to raise it 12 feet, the assumption the board made was that the pipe would be in place before that.

Mr. O'Connell stated that the Service Authority board's assumption was that the 12 feet would occur first.

Dr. Palmer commented that she was on the ACSA Board at that time.

Ms. Galvin commented that it was a logistical problem then, because the new pipeline would be needed to raise the 12 feet.

Ms. Whitaker explained that part of their analysis has been to really lay out what the demand vs. safe yield curve is, and they have run the safe yield model under 10 different scenarios – with the idea being to plot the new demand number and all safe yield scenarios out and show the sequences that indicate when pieces needed to be built. She stated that at that point, they can bring all the information out and make a more informed decision as to how and when the dollars come into play, and what it means for the water treatment plants. Ms. Whitaker noted that part of the scope of this work and the upcoming work on the bathymetry is to better define that exact question and establish when those projects need to get built.

Mr. O'Connell commented that they were also looking at the Observatory and South Fork Rivanna water treatment plants in terms of expansion needed.

Ms. Whitaker confirmed this.

Mr. Mawyer stated that this was a very big puzzle and they were looking at all of the pieces collectively. He noted that 600 million gallons is the 12 feet, and with the Sugar Hollow pipe they can get 4 million gallons per day – so that would take 150 days if they were only using that pipeline. He explained that they took about 5 months, from January to May, to fill what was used from Ragged Mountain last year over the winter. Mr. Mawyer stated that they would never want to bring Sugar Hollow way down as it was in the past, so he did not think they could use it for hundreds of days to fill Ragged. He noted that they could also fill that extra 12 feet over several years, if they so choose.

Dr. Palmer noted that it wasn't just the Sugar Hollow Reservoir they were concerned about, because they were also concerned downstream about water going in there. She recognized that there were instream flow requirements, but she thought of those as the minimum requirements for the health of the river.

Ms. Whitaker clarified that if the reservoir was not spilling, that's what was going into the river – so if it was 1 foot down or 15, what went into the river above the dam was what went into the stream release. She emphasized that it was a question of whether they were spilling or not spilling that drove the stream number.

Mr. O'Connell asked if this was also the case for the Rivanna River in terms of instream flow, as he had received concerns from people trying to reach the river, and asked if there was a requirement for a certain release once the level was down.

Ms. Whitaker confirmed this, stating that the number was based off of the Mechums River gauge and a scaling factor, and in looking back over the last few weeks and months, they were releasing the cap – which was 20 million gallons per day downstream – and as the influent streams and Mechums gauge have gone down, Rivanna has been tapering its release to match the decrease seen on the raw water influent side.

Ms. Whitaker reported that the waterline project was more than just a waterline and was composed of five separate pieces of the project: an intake at the South Fork Rivanna Reservoir that can pull in as much as 41 million gallons per day; a pretreatment facility at South Fork; a booster pump station that can transmit 25 MGD from South Fork to Ragged Mountain; the pipe itself at approximately 9 miles in length; and a return pump station on the Ragged Mountain side that can return up to 16 MGD back to the South Fork plant or the South Fork reservoir.

Dr. Palmer noted that there had been some discussion about moving the intake, which could affect the pretreatment.

Ms. Whitaker confirmed that there had been some discussions about that. She explained that the South Fork Reservoir has a big "U" shape, and the last leg of the reservoir itself was probably about 10% of the length of the project. She stated that one idea that had emerged was moving the intake from the dam and water treatment plant up the reservoir into an alternate location, and whether they could shorten the pipe by about 10%. Ms. Whitaker stated that there were several issues related to that, including the fact there was permitting in place to be in the reservoir at the dam and water treatment plant site, so that intake structure was a significant piece of this permit.

Mr. O'Connell asked if that was the deepest part of the South Fork reservoir.

Ms. Whitaker confirmed that it was, stating that this was where the highest velocities typically occurred. She noted that as you head up the reservoir, you get into some of the tributary streams such as Ivy Creek and a few other areas. Ms. Whitaker pointed out that staff have concerns about water quality, potential sediment, etc. – so for the moment the plan is to bring the facilities all the way to the water treatment plant. She noted that the other factor is that they need to be able to get the water from Ragged Mountain to the South Fork plant, so they could put it back in the reservoir and allow it to go downstream or bring it into the pretreatment facility. Ms. Whitaker stated that the current thinking is to bring it to its original location at the South Rivanna treatment plant, and then evaluate whether alternatives are needed as a cost-saving measure.

Dr. Palmer pointed out that there is a significant cliff and big elevation for a large portion of that.

Ms. Whitaker responded that there were elevation changes and permitting changes also, and putting an intake structure in a run-of-the-river reservoir was no small undertaking – so having to move the permit location could present some challenges.

Mr. Gaffney asked for clarification that there would just be one point going both directions.

Ms. Whitaker confirmed this, adding that there would be a pump station at both ends that allow water to be moved from one direction or another.

Dr. Palmer stated that one direction was predominately downhill, with some gravity feed from Ragged Mountain to South Fork.

Ms. Whitaker stated that at the lower portion of the alignment, there was a series of hills or small mountains, so in either direction the water must be pumped. She stated that the other benefit to be discussed was that the pump station at the southern end near Ragged Mountain also had the potential to replace the Royal and Stadium Road Pump Stations currently used. She noted that Royal Pump Station was built with the 1920s pipeline, so it had some age and capacity issues, and that would allow them to bring more water from Ragged Mountain to the Observatory Treatment Plant as well as bringing it to the South Fork plant.

Mr. O'Connell asked about the options for pretreatment, as there was some question about the original assumption that there would have to be pretreatment – and he asked whether this would be studied.

Ms. Whitaker responded that it would be studied, stating that staff looked at it in some length with this scope of work, and stated that with this project they are simply trying to secure right-of-way. She noted that the pretreating question was a follow-up question that was specific to water quality and treatment specialties, which were typically addressed by different contractors than those who do pipeline assignments and design. She added that at some point they would have water quality specialists come in and really examine what needed to be done to secure the water quality going forward, including any pretreatment needs. Ms. Whitaker pointed out that this was built into the budget and the project but was not built into the piece of the project before them.

Mr. O'Connell asked if the pretreatment facility would follow from the intake and if it would just be set in there once the intake was decided, which would also decide their alignment.

Ms. Whitaker confirmed this, noting that sizing it and developing it and making sure it fit within the processes of the rest of the treatment facility.

Ms. Whitaker stated that the project before the board today was to secure the location of the waterline itself and a location for the raw water return pump station on the Ragged Mountain end of the project. She noted that the reason they were interested in trying to secure that location was that it drives the southern terminus of the cross-country alignment, and setting that location would alter where they were going to and from. Ms. Whitaker stated that the facility was fairly important on their ability to use that facility in the future, to ensure they

have access to it from east/west as well as north/south, and that would drive pipeline alignment.

Mr. Mawyer asked for confirmation that the first three components would be on property RWSA already owns.

Ms. Whitaker responded that this would be the case, if they go at South Fork.

Ms. Whitaker explained that the scope of the current project was to do several things, including looking at a waterline routing study, and she referenced a map created when they were working through the water supply plan. She stated that the original thought was that the water main would follow the proposed western bypass alignment, but the bypass ceased as a project. Ms. Whitaker stated that they looked at the two ends and logical corridor for the water main, and she pointed out the likely routing for the pipeline with some specific properties they would like to go across. She stated that they would be doing a routing study and an alternatives analysis on some of the routes, as well as site selection, which included costs to provide power and other services to this location at the Ragged Mountain end of the project. Ms. Whitaker noted that they would also be looking at a preliminary engineering report and working with the health department on getting it approved, and then taking the project through about a 30% design and cost estimate. She stated that this would give them a more refined idea of true costs, and from there would do easement plat preparation, with an estimate of about 70 parcels for easements. Ms. Whitaker noted that they would need to coordinate with government and commercial owners as well as individuals.

Ms. Whitaker stated that Rivanna was proposing to use the Michael Baker Engineering firm for the project, with a fee of approximately $528,000, with a total project budget of about $2.295 million. She noted that the project would require a fair amount of design work and coordination work, and then work with the easement acquisition process.

Mr. O'Connell asked if the estimate included funding for easements.

Ms. Whitaker responded that the original total project budget estimate did include that, and they have done escalation factors based on current assessment rates – knowing that it was subject to change.

Mr. Walker asked if they had evaluated the total budget estimate based on the fee proposal from Baker on this part of the work, and whether staff still felt good about that number.

Ms. Whitaker responded that they had, and stated that staff estimates the project itself at about $63 million – so $528,000 was about 2.5% of the pipeline cost. She said that while this seems like a large percent of the project budgeted at the moment, but looking at 30% design of the total project budget it was actually fairly reasonable.

Dr. Palmer recalled that Rivanna had done a lot of public outreach and preliminary design on the route, with community meetings and a facilitator, and she asked if any of that information was still valuable or if it was completely dated.

Ms. Whitaker responded that to some degree it was dated because different parcels had been developed and there were different priorities in the community as well as a different generation of property owners. But there were a lot of detailed notes because staff spent a lot of time out in the field walking the area. She stated that there were four or five key properties along the route that would drive the rest of the alignment, and once they started talking to those property owners and confirming that the line would cross specific parcels, it would help drive some of the other questions. Ms. Whitaker presented a project schedule, stating that they were kicking off the work now and would anticipate discussing property acquisition in 2019 and 2020 with the idea of having it secured by 2021. She acknowledged that there was significant work to be done as well as significant property owner discussion to take place.

Ms. Galvin moved to award the engineering services contract for the South Fork Rivanna Reservoir to the Sugar Hollow Reservoir as presented. Mr. Walker seconded the motion, which passed by a vote of 7-0.

b) Presentation "Wastewater 101"

Dr. Gullick stated that there were four wastewater plants or water resource recovery facilities, with Moores Creek processing about 10 MGD, Glenmore processing about 100K gallons per day, Scottsville processing about 50K gallons per day, and Stone Robinson Elementary School processing about 3K gallons per day when it was open. He referenced an aerial view of the Moores Creek facility, stating that all of the wastewater from the Charlottesville, Albemarle and Crozet metro areas coming in through the intakes and going through the equalization basins that also help settle off grit. He noted that they were building grit removal facilities at the headworks as part of the odor control project, and from there the particles settle out and go through the biological process that's the heart of the treatment plant. Dr. Gullick stated that the effluent would then cross the campus up to the sand filters, go through ultraviolet disinfection, and then be discharged to the river. He noted the rest of the facilities included digesters and centrifuges for solids handling.

Mr. Gaffney asked if the photo was up to date.

Dr. Gullick responded that it was not, and explained that there were new covers now on the Moores Creek site, and there was also one empty tank that was having a pipeline being built in it.

Mr. Gaffney asked if Dr. Gullick could show the before and after when they finished the odor control project.

Dr. Gullick stated that he could. He explained that in terms of a process schematic, the wastewater came in and he pointed out the liquid train, which took out some of the suspended solids and took some of the organic matter – biochemical oxygen demand, which took oxygen out of the river when bacteria degraded it, and that needed to be removed for fish. He stated that it then went through a biological treatment that addressed the oxygen demand and also took care of the phosphorous and nitrogen, which are nutrients of concern to the Chesapeake

Bay specifically. Dr. Gullick explained that they then settle out the bacteria used and return it, with cleaner water going through sand filters and disinfection with ultraviolet light. He noted that they didn't use chlorine at Moores Creek, Glenmore, or Scottsville, so there was no chemical usage and no need to dechlorinate. Dr. Gullick stated that Rivanna's permits are based on that treated water, although there are some requirements for composting, but the digesting requirements from the state DEQ come for the treated water.

Dr. Gullick stated that staff reports to the board some of this information but not all, noting that they report on flow, biochemical oxygen demand, suspended solids, ammonia, and phosphorous and nitrogen levels. He stated that they did not have plots for pH levels or bacteria counts after disinfection, or dissolved oxygen. He noted that they have a variety of requirements whether it's a weekly or monthly average, minimums and maximums, and the monitoring requirements change from whether it's a grab sampling or a single or composite sampling over a day, and at what intervals it needed to be done over days, weeks, or months. Dr. Gullick stated that the removal efficiencies have been excellent, and Moores Creek was getting 99% removal rates because of the improvements previously done to the plant for enhanced nutrient removal. He noted that they would normally remove 2/3 of suspended solids and 1/3 of the biochemical oxygen demand just in the primary settlers alone, so they would be removing 90%+ in a normal process, and noted that he could show the Board what was removed at the other plants that don't have the biological process. He noted that the parts per million permit limits for biochemical oxygen demand were around 10-22, and Rivanna was down around 1 as an average for the year of 2016. Dr. Gullick stated that they were getting out ammonia to a level of about 0.26 ppm, and the requirement was 2, and they were also well below the nutrient limits.

Mr. Gaffney asked if he could find out what "best in class" measures were.

Dr. Gullick responded that it would be mid to upper-90s for the suspended solids and the biochemical oxygen demand and ammonia at a lot of plants, but where Moores Creek stood out was with the nitrogen and phosphorous nutrient removal.

Mr. Gaffney asked if he could get figures from other plants in Virginia or the U.S.

Dr. Gullick responded that he could get some numbers.

Ms. Galvin commented that this was a small community that had invested a lot in water quality, and she would like to see how they compared to larger, more sophisticated systems.

Mr. Mawyer stated that many systems have a 5 ppm nitrogen, 0.5 phosphorous total, and the state's Water Quality Improvement Fund helps Rivanna and other entities around the state lower nutrient outputs to those levels. He noted that 3 for nitrogen and 0.1 for phosphorus was touted as the limit of technology, and the concern is that as regulatory requirements become more stringent, they will require more plants to reduce nitrogen from 5 to 3 ppm and phosphorous from 0.5 to 0.1.

Dr. Gullick stated that both the state and federal government realize that this would make little or no impact to the Bay, because of nonpoint sources, but they were simply squeezing as much out of water authorities as possible – and he has asked this question of EPA officials.

Dr. Palmer noted that this had been a complaint for years.

Dr. Gullick referenced a table in their report, stating that the first column showed the flows with 10 MGD from Moores Creek, Glenmore at 94K, Scottsville at 42K, and Stone Robinson barely registering at 1K because it wasn't yet open. He stated that the biochemical oxygen demand was about 2, with a limit of 11, and the limits were higher at Glenmore and Scottsville because the plants weren't as advanced and were smaller facilities. Dr. Gullick stated that they were not required to monitor for ammonia at Glenmore or Scottsville, but did because it was important to remove. He noted that Moores Creek's ammonia level had changed with the new permit. Dr. Gullick stated that in addition to the mass per volume concentrations, the state required the concentration to be taken and multiplied by the permitted capacity of the plants to establish a mass per time or mass per day loading in kilograms per day. He referenced the permit requirement for suspended solids and for the biochemical oxygen demand – the latter of which had become stricter under the new permit in July 2016 when it was renewed. Dr. Gullick pointed out Rivanna's performance in comparison to regulatory standards going back to early 2016. He noted that the ammonia limits change seasonally, as the chemical is more toxic in warmer water and thus had a lower limit. Dr. Gullick noted that the limit changed in July 2016 with the new permit, and that standard had actually relaxed – so the summer limit was at 2 and the winter limit was 7, with Rivanna's levels being consistently low for ammonia removal regardless of season.

Dr. Gullick referenced a table showing the level of nutrient removal, stating that it was not a toxicity issue with streams but was more of a chronic issue as nutrients were discharged into the James River down into the Chesapeake Bay and built up over time. He stated that the state was concerned with nutrient loads on an annual basis, but for tracking purposes they took the limit of 283,000 pounds and divided it by 12 to provide a monthly approximation. Dr. Gullick stated that they have just under 24,000 pounds per month allowed, with about 3,700 pounds discharged – so they were at about 16% of what the allocation is and even lower on phosphorous. He noted that the monthly allocation was not a permit requirement, as you could be well above it in a given month without exceeding the annual limit.

Dr. Gullick referenced the legal requirement under Rivanna's permit, with up to 282,994 pounds per year, and pointed out the allowable amount via the enhanced nutrient removal funding which necessitated a stricter limit. He explained that instead of 6 mg per liter nitrogen, it would be 5 mg per liter, and 0.3 instead of a 0.5 for phosphorous. He stated that they don't get a permit violation if they exceed those limits, but would have to pay some money back because they used those funds. He referenced Rivanna's total cumulative nitrogen pounds over the course of the year, stating that they should end up at a good level if they continue with their performance and thus would end up with some credits. Dr. Gullick explained that there as a nutrient trading group within the state whereby entities can trade or sell credits, so Rivanna could take the difference and sell their credits into a pool for other industries and wastewater plants to buy. He noted that the prices were set in advance by the

nutrient credit organization and then allocated out of the money spent to buy them, and he stated that they might end up selling zero credits if there aren't enough buyers, but in the three years he has been with Rivanna the average has been about $100,000 per year. He noted that there were not nearly as many nitrogen credits on the market, so they do well with those versus phosphorous and about 90% of the income from the differential comes from nitrogen. Dr. Gullick added that they do not show dissolved oxygen, pH, or e-coli.

Dr. Palmer stated that there had been a lot of talk about planning for hundred-year floods and 50-year floods, and asked what they were designed for in terms of handling large quantities.

Mr. Castillo responded that they were designed to hold 21 million gallons in all storage basins, with a total plant peak flow rate of 85 MGD – with as much going through the plant as possible and anticipation that the storm would recede and allow for pump back out of storage.

Dr. Gullick stated that they can treat 45 MGD, and the rest needed to go to the holding ponds, which were much bigger than the equalization basins shown. He noted that with a very big flood, that would fill up very quickly, but they did not see those high rates very often.

Dr. Palmer asked if they had ever had one since this was put in.

Mr. Castillo responded that there was a very high level one of the first weeks the new Rivanna Pump Station was put in, with about 53 million gallons put through.

Dr. Gullick mentioned that when you get that big of a flood, the rainwater ends up more dilute and they will bypass the ammonium and use the nutrient removal process in an effort to save the bacteria that will remove the ammonia and biochemical oxygen demand. He noted that this is known as a "step feed," and it was not possible to store all the water from very high rain levels – although large metropolitan areas have constructed facilities to try to contain it. Dr. Gullick stated that there have been no overflows into streams that he was aware of in the three years since he had been here.

Ms. Whitaker stated that since they upgraded the wet weather capacity of the plant, the Rivanna Pump Station upgrade has eliminated the last issues in that regard.

Dr. Gullick stated that standard operating procedure with certain rain conditions means they check the first manholes going up from there, and if there is a problem they go to the next set that are sensitive.

Mr. Gaffney asked if there could be an update on the I&I [inflow and infiltration] – where they were at the worst point and what it currently is.

Dr. Palmer stated that when she first took the tour of the new wastewater plant, she recalled an employee saying they were planning for a three-year rain event.

Dr. Gullick and Ms. Whitaker confirmed that they plan for a two-year statistical recurrence,

and Dr. Gullick stated that this was an overall long-term statistic, not an actual annual realization.

Mr. Gaffney commented that a two-year rain does not cause flooding.

Dr. Palmer acknowledged this, but noted they have greater than two-year rain events all the time.

Ms. Hildebrand pointed out that a two-year rain event was about four inches over 24 hours.

Dr. Palmer stated that it seemed like they have them every year.

Ms. Galvin stated that they were nowhere near 4 inches in 24 hours.

Dr. Gullick stated that was a pretty heavy requirement in terms of this system.

Ms. Whitaker commented that with this system specifically, it was highly dependent on antecedent moisture condition so they can take a 7 to 10-inch rain without any problems, but also have a 4-inch rain create big problems. She noted that it depended on how saturated the soils are, and the Rivanna system seemed to be much more sensitive than others, due to the topography and soil composition.

Mr. O'Connell asked what would trigger any additional projects once the current ones were completed, and asked what the next level of capital improvements would be pending particularly at Moores Creek.

Dr. Gullick responded that they might want to change how the thickeners operate, but other than that were working on the digesters for some leakage, but until flows increased the plant was in fairly good shape. He stated that the focus had been on wastewater, so now the focus was on the water plants needing rehabilitation.

Ms. Whitaker added that there was some work needed on the Crozet pump stations in terms of facility maintenance, but not from a capacity standpoint.

9.0 Other Items from Board/Staff not on Agenda

There were no additional items presented

10.0 Closed Meeting

There was no closed meeting held.

11.0 Adjournment

There was no closed meeting held.

12.0 Adjournment

At 3:16 p.m., Mr. O'Connell moved to adjourn the RWSA Board meeting. Mr. Jones seconded the motion, which was approved by a vote of 7-0.

There being no further business, the meeting adjourned at 3:16 p.m.

Respectfully submitted,

_____

Mr. Maurice Jones
RWSA Secretary-Treasurer

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RWSA BOARD OF DIRECTORS
Minutes of Special Emergency Meeting
October 5, 2017

A special emergency meeting of the Rivanna Water & Sewer Authority (RWSA) Board of Directors was called by the Chair and held on Thursday, October 5, 2017 at 12:00 p.m. in the 2nd floor conference room, Administration Building, 695 Moores Creek Lane, Charlottesville, Virginia.

Board Members Present: Mr. Mike Gaffney – Chair, presiding; Ms. Kathy Galvin; Ms. Lauren Hildebrand; Mr. Maurice Jones; Mr. Gary O'Connell; Dr. Liz Palmer; and Mr. Doug Walker.

Board Members Absent: None

Staff Present: Mr. Bill Mawyer, Mr. Doug March, Ms. Miranda Baird, Ms. Jennifer Whitaker, Ms. Betsy Nemeth, Ms. Andrea Terry, Dr. Richard Gullick, Ms. Cindy Polaro, and Mr. Jay Young.

Also Present: Mr. Kurt Krueger, RWSA counsel, media representatives and members of the public.

1.0 Call to Order

The special emergency meeting of the RWSA Board of Directors was called to order by Mr. Gaffney on Thursday, October 5, 2017 at 12:00 p.m.

Mr. Mawyer reported that he had asked the Board to attend this emergency special meeting, which is allowed in the RWSA bylaws and requires a three-hour advanced notice for the public. He stated that the reason staff felt this could not wait until the regular Board meeting on October 24th was because there is a significant issue related to water level decline at the Rivanna Reservoir. Mr. Mawyer noted that Rivanna can potentially stop the release of 6-8 million gallons of water per day, with mandatory restrictions being declared, and this stems from a discussion with the Department of Environmental Quality (DEQ). He noted that one tool that can be used to mitigate and hold onto water storage is for Rivanna to ask DEQ to allow a decrease in minimum instream flow releases – which had been 9 million gallons a day. An additional 5 to 6 million gallons per day was being removed from the reservoir for treatment in the South Rivanna plant. Mr. Mawyer stated that Rivanna has asked DEQ to allow the release to be minimized to between 1.3 and 3 million gallons, depending on how

tightly the valve in the reservoir dam can be sealed. He noted that one of DEQ's conditions is for Rivanna to declare mandatory water restrictions for DEQ to consider the request.

Mr. Krueger mentioned that the RWSA bylaws allow the Board to declare an emergency meeting on three hours' notice, but also require that the declaration for the meeting be approved by a vote of the Board. He noted that Mr. Mawyer's abbreviated background information was to allow them to feel comfortable making that declaration.

Mr. Walker stated that this requested Board vote was just for the approval of the declaration of the emergency meeting, and there would be a separate action to authorize the chair to act with respect to the emergency water restrictions.

Mr. Walker moved to approve the declaration of a special emergency meeting of the RWSA Board. Mr. Jones seconded the motion, which passed unanimously (7-0).

2.0 Items From the Public

There were no items from the public presented.

3.0 Response to Public Comments

There was no response to public comments.

4.0 Request for Authorization to Declare a Drought Warning or Drought Emergency

Mr. Mawyer reported that the Rivanna Reservoir was 100% full on August 3, and within 60 days it has declined to 42% of capacity – and staff believes that over the last few weeks, it is declining at an even faster rate. He stated that the average decline was 8.5 MGD as a net deficit of what came in to the reservoir versus what was taken out and what was released to the stream, with evaporation also a factor, but since the September Board meeting and October 2, the reservoir decreased at an average of 15.5 MGD. Mr. Mawyer noted that this rate had doubled, so the decline in water level was actually accelerating, which is typical of drought conditions as the drier it gets, the faster the ground pulls in surface water. He stated that a drought watch was declared the previous Tuesday, which is the first step in the drought management program and asks for voluntary measures to be taken. He stated that Rivanna issued press releases and sent a letter to Council and the Board of Supervisors, as well as the ASCA.

Mr. Mawyer stated that RWSA staff has been talking with DEQ about minimizing the instream release and sent them a letter earlier in the day asking for a variance to the permit, to lower the release. He noted that one of DEQ's conditions is for the community to be in mandatory water restrictions, so the next step would be to declare a drought warning, which has mandatory restrictions for both ACSA and City customers in terms of lawn-watering and other activities. Mr. Mawyer stated that this would put the community in mandatory requirements and would meet DEQ requirements, which would save about 6-8 MGD and significantly extend the storage of the reservoir.

Mr. Mawyer noted that they could hope that upcoming storms will bring precipitation – but there were several storms predicted for September that never arrived, and they also may not bring enough rain. He stated that at 42% of capacity, they would need about 600 MG to fill Rivanna Reservoir. Mr. Mawyer stated that it was suggested that the Board consider the motion, then he would go through some photos depicting conditions. He noted that the Town of Orange had declared mandatory water restrictions on October 4, and DEQ showed emergency stream flow conditions on its website for the "Middle James Area," which includes the Rivanna service area. Mr. Mawyer stated that DEQ also changed the groundwater flow from "normal" to "watch," and reservoir levels were also changed to "watch".

Mr. Mawyer stated that they believed it would be prudent to save every gallon possible in the reservoir, noting that the South Rivanna Treatment Plant and Observatory Treatment Plant jointly serve the urban system – and the urban system cannot be fully served with only the Observatory Treatment Plant in operation through the Ragged Mountain Reservoir. He noted that most of the water for the system is currently in Ragged Mountain, with the Rivanna Reservoir being significantly low.

Mr. Mawyer emphasized that they want to do everything possible on the demand side, through the actions of the Board to implement mandatory restrictions and try to reduce the use. He stated that they have switched operations and have minimized water production at the South Rivanna Treatment Plant while maximizing production at the Observatory plant, using Ragged Mountain to minimize what was being taken out of the Rivanna Reservoir. Mr. Mawyer reiterated that the third tool to try to retain capacity in the South Fork Rivanna Reservoir was the request of DEQ to reduce minimal instream flow.

Mr. Walker asked him to discuss the process by which the warning would be implemented, given that City Council, the Board of Supervisors, and the ACSA would need to be involved.

Mr. Mawyer explained that Rivanna would issue a drought warning declaration letter under Mr. Gaffney's signature to the City, County, and the ACSA – whose boards would need to approve the action.

Mr. O'Connell clarified that the ACSA would have to make a request to the Board of Supervisors to act, which would likely be the following Wednesday evening, and the ACSA Board would probably meet that Monday or Tuesday.

Mr. Mawyer noted that the Council and Board of Supervisors have the legislative authority to enact the water restriction ordinances, and it was likely that DEQ would authorize a reduction in the required release to the river based on the actions taken now, as Rivanna would like to close the gate on the pipe that releases to the stream as soon as possible.

Mr. Walker stated that this would likely affect the timing of the restrictions' effect.

Mr. Mawyer explained that Rivanna would issue a press release indicating RWSA has declared a drought warning and explaining what it means in terms of localities enacting ordinances, etc., which would soon enact the warning stage. He reviewed some of the specific

provisions in the ordinances – such as limiting lawn watering to manual watering only and the prohibition of washing vehicles and sidewalks, as well as refilling ornamental fountains and swimming pools.

Mr. Jones asked when the Chair would declare a drought warning.

Mr. Mawyer responded that it would either be now or the following day, as the letter is ready for him to sign. He stated that there are 9 MGD going out on minimum instream flow, and reducing that to 2-3 MGD would save a full day's supply.

Mr. Gaffney asked for clarification as to DEQ allowing the instream flow change, and the timing with the City and County approvals.

Mr. Mawyer responded that the DEQ may not allow the change without the approvals first, but Rivanna is emphasizing the practicality that the Board and Council would agree to take this action – so that DEQ would possibly allow the flow to be stopped immediately following the RWSA Board's action.

Mr. O'Connell stated that this would lead to communications with the public as to what the warning stage is, which is basically restricting every outdoor use and having restaurants only offer water to customers at their request. He stated that there are some important restrictions that would impact residents, and they need to get the word out.

Dr. Palmer mentioned that she had been on WINA earlier that morning and had talked about drought watch measures being all voluntary – so this was moving very quickly and it was important to make the distinction for the public.

Mr. O'Connell also pointed out that people didn't know the difference other than they were moving to mandatory restrictions that would be enforced.

Ms. Galvin stated that this would also help the public understand that there were drought restrictions even though the new Ragged Mountain Dam had been built, given the controversy surrounding that project, and asked that a very clear statement regarding the reason for restrictions should be made.

Mr. Mawyer agreed.

Dr. Palmer commented that it should include the release and also a statement regarding the fact that the water supply plan has not yet been completed.

Ms. Galvin agreed and emphasized that they can't treat the water they could tap into from the Ragged Mountain Dam at the capacity they need, but this seemed to be getting lost on members of the public – with questions as to why the community went through all of that yet still had a drought. She reiterated that the plan was not completely implemented yet.

Mr. Mawyer responded that the drought's impact on the Rivanna Reservoir has moved very quickly – with the model saying just a week earlier that capacity was at 70% and everything was okay, and now a drought warning. He stated that the best they could explain it was the loss of 13-15% of reservoir capacity from one week to the next.

Dr. Palmer stated that if there was any problem with the DEQ not allowing Rivanna to lower the release from South Fork without the rest of the boards, Rivanna staff would contact the Board and Council so they could take action and hold a special meeting, if necessary.

Mr. Mawyer mentioned that DEQ was working very cooperatively with Rivanna and was looking to balance the public need with the environmental need, and that's why the minimum instream flow requirement was there in the first place. He emphasized that when there was a challenge to the supply, the DEQ wanted both sides to share in the challenge.

Mr. Walker commented that everyone has been experiencing the dryness over the last several weeks, so there was an intuitive understanding of the dilemma and maybe even of the urgency. He noted that if the area gets rain over the next few days, the intuitiveness might change – but the facts and perceptions of conditions won't.

Mr. Mawyer stated that hopefully they would get the rain and afterwards could work with Mr. O'Connell and Ms. Hildebrand to look at reservoir levels. He noted that it would not be expected to go into a warning and then right back out of it, unless they were very lucky. Mr. Mawyer stated that usually during drought conditions – even when bodies of water fill up quickly from a storm, they start receding quickly also.

Ms. Galvin asked how many inches of rain would be needed to fill it up, because it was unlikely they would get more than an inch or two.

Mr. O'Connell noted that he had seen a report showing them as being about 7 inches less than the average summer, down from 13 to 6. He stated that he did not know how many inches of rain it would take to get back to that point, but it was a lot of rain.

Mr. Walker commented that it also mattered when the rain came.

Dr. Palmer stated that they did not know the extent of the hydrologic drought.

Mr. Mawyer pointed out that the other four reservoirs are at 80% or more of capacity, so the focus was just on the South Rivanna.

Ms. Galvin stated that she has heard that it takes one foot of snow to equal one inch of rain.

Mr. Gaffney responded that hopefully they would not have to wait for snow.

Mr. O'Connell stated that when they've been at this stage before, it didn't end until January or February, so they may be in for months of drought.

Mr. Gaffney commented that in 2002, it took 30 days to fill the reservoir.

Mr. O'Connell asked if Rivanna planned to put together a press release and information packet that would address these questions and could be shared with the public.

Mr. Mawyer responded that the press release was a minimum and would be done later that afternoon, as they want to give DEQ a copy of it.

Mr. O'Connell stated that the questions he has received from constituents relate to how quickly things have changed, and this information would help people understand why – particularly the decline of the South Fork levels.

Mr. Mawyer noted that on August 3rd, the reservoir was full, so the water storage had declined very quickly.

Ms. Galvin stated that the questions she has received pertain to why they are in this situation since they built the dam.

Mr. Mawyer replied that the reason why is because they cannot serve the full area with the Observatory Treatment Plant only.

Ms. Galvin stated that it was a technical point but an important one to address.

Mr. Gaffney added that it shows the importance of the [South Fork Rivanna Reservoir - Ragged Mountain Reservoir] pipeline.

Mr. O'Connell stated that it also shows the need to enlarge the Observatory Treatment Plant.

Ms. Galvin agreed.

Mr. Gaffney asked if capacity would be added to Observatory when it was rebuilt.

Mr. Mawyer responded that they would need to go from 5.4 to 10 million, and if they had that capacity now, Rivanna and Observatory would be almost equal and could each independently serve the urban area as well as collectively.

Dr. Palmer asked about the pressure issues.

Ms. Whitaker responded that the Southern Loop Avon to Pantops pipeline project was also part of that solution, and that it addresses the ability to transfer water on the distribution side so it addresses the pressure issues as well.

Mr. O'Connell asked if there could be some pressure losses to customers in the system along the way, if there is a decline.

Mr. Mawyer stated that they shouldn't see any in the near future.

Dr. Gullick explained that if they can stop the required releases and minimize that, they should be able to hold the [South Fork] reservoir steady and not have a problem with pressure.

Mr. Gaffney asked if North Fork was still operating and how much they were producing.

Mr. Mawyer responded that it was operating, and it produced 400,000 gallons per day. He pointed out that they ramped up operations at Observatory from a half-day to full-day operation and from 2 MGD to 5 MGD – and they backed off at the Rivanna plant from 9 MGD to 6 MGD. Mr. Mawyer noted that the other tools available were water conservation, minimum instream release, and nature.

Dr. Palmer asked if there were instream flow requirements below the dam at the North Fork plant.

Dr. Gullick responded that there were not.

Dr. Palmer asked about the North Fork water levels.

Dr. Gullick stated that it was still overflowing as he last heard, but there will come a point if it stayed dry that it would no longer overflow – and in the past, they have actually had to shut the treatment plant down to allow the water to collect to have enough to pump it up to the plant and turn it on and off.

Mr. Mawyer noted that they could not serve the area served by the North Fork plant from the Rivanna plant.

Mr. Walker stated they needed a motion to authorize the Chair to declare a drought warning or a drought emergency, should drought conditions continue in the Charlottesville/Albemarle area.

Dr. Palmer stated that they could just say drought warning.

Mr. Walker noted that the recommendation was to authorize either.

Mr. Mawyer stated they didn't expect to go to an emergency, but the authorization would ensure that they could take that next step if they didn't get agreement from DEQ.

Dr. Palmer moved to authorize the Chair to declare a drought warning or a drought emergency, should drought conditions continue in the Charlottesville/Albemarle area. Ms. Galvin seconded the motion, which passed unanimously (7-0).

Mr. O'Connell asked if the press release going out later that afternoon would declare the mandatory restrictions and the drought warning.

Mr. Mawyer replied that Rivanna would like to do that.

Mr. Walker thanked partners in the media for helping to get the word out.

5.0 Adjournment

Mr. Jones moved to adjourn the RWSA Board meeting. Mr. O'Connell seconded the motion, which passed unanimously (7-0).

There being no further business, the meeting adjourned at 12:23 p.m.

Respectfully submitted,

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Mr. Maurice Jones
RWSA Secretary-Treasurer

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **BILL MAWYER, EXECUTIVE DIRECTOR**

SUBJECT: **EXECUTIVE DIRECTOR'S REPORT**

DATE: **OCTOBER 24, 2017**

Reservoir Update

Water conservation measures declared by the Board, along with operational changes to minimize use of the South Rivanna Water Treatment Plant and reduction of instream release requirements, are successfully restoring the water level in the South Fork Rivanna Reservoir. Water storage increased by 110 million gallons, from 42% to 54% of reservoir capacity, from October 5 – 18. The water level in the reservoir increased by 1.7 feet over the same period. We plan to continue these measures until the reservoir is full.

Community Outreach

Staff participated in an "Imagine a Day Without Water" program held on the downtown mall on October 11, 2017. Along with the ACSA and the City Public Utilities Department, the three utilities had information tables and discussed water supply, drought, and various topics with the media and passersby.

Wastewater Manager, Tim Castillo, led the students of Sutherland Middle School's STEM team (Science, Technology, Engineering and Math) on a tour of the Moores Creek Advanced Water Resource Recovery Facility on October, 11, 2017.

One of our Senior Civil Engineers, Victoria Fort, met with first year engineering students from UVA as part of the Civil and Environmental Engineering (CEE) "Major's Night" to talk about what it means to become a civil engineer, and what systems we manage at RWSA/RSWA.

Strategic Plan for the Authorities

Our Strategic Planning project continues to move forward. Our consultant, Raftelis, and the Project Steering Committee assimilated all of the information gathered from the community, stakeholders, Board members and staff into Values, Vision and Mission statements. The Project Steering Committee and Goal Teams completed a draft Strategic Plan during a Strategy Workshop on October 12. The next Work Session with both Rivanna Boards will be held on November 14 to review the draft Strategic Plan. We are on schedule to approve the Strategic Plan during the Board meeting on December 19.

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **LONNIE WOOD, DIRECTOR OF FINANCE AND ADMINISTRATION**

SUBJECT: **DISPOSITION OF FY 2017 RATE CENTER RESULTS**

DATE: **OCTOBER 24, 2017**

The Authority ended the previous fiscal year with a cumulative net loss/deficit of roughly $546,000. The Urban Wastewater rate center was the most significant contributor to the deficit this year due to unbudgeted expenses for the clarifier repairs and chemicals for temporary odor control at the Moores Creek Plant. The amount of the deficit for Urban Wastewater was $673,900. Urban Water ended the year with a surplus of $113,700 mainly because revenues did a little better than anticipated. Of the other rate centers, Crozet Water and Glenmore Wastewater had deficits and the two Scottsville Rate Centers had surpluses.

After the completion of the audit, staff performs an analysis of the year ending financial results and the effect on the operating cash liquidity position. This is also done to ensure that rate center results are kept separate from each other. In some years similar to FY 2017, one rate center may have a deficit and others may have a surplus. Therefore, we do not want one rate center's surplus funding another rate center's deficit.

There is only one operating cash account where all transactions originate during the year for all capital and operating activities including inflow from revenues, bond proceeds and outflow for expenses and debt payments. Capital transactions are reconciled and separated at the end of each month, (i.e., no capital funds are in the operations account at the end of each month or at year end). However, all of the rate centers' operating results are comingled until this process of determining the results for the year and making transfers (to or from) the respective rate center reserves to ensure proper segregation.

The operations account has a target working cash balance of 60 days of cash & cash equivalents on hand to meet daily and monthly cash flow needs, which currently is $5,097,000 (based on the FY 2018 budget). This is an increase of $473,000 from the prior year, because the FY 2018 budget was increased significantly from the FY 2017 budget. At year end, this target is compared to actual cash basis results for the fiscal year, and the variance, if any, is brought before the Board for action, which is consistent with the Authority's financial policies.

At year end, operating cash and cash equivalents were as follows:

Cash on hand	$2,903,000
Cash equivalents	$1,648,000
Total	$4,551,000
60 Day Cash Target	$5,097,000
Deficit Operational Cash	($ 546,000)

Cash equivalents are the invoiced amounts mostly due from the City and ACSA net of our current accounts payable due at year end, which is a very conservative measure of working cash. *(Many entities only use actual cash on hand to measure their requirement of working cash.)*

The target amount is underfunded by $546,000 which agrees very closely to the cash basis result on the monthly vs. actual reports to the Board for June. Therefore, the following transfers to the discretionary reserves are recommended for FY 2017 to bring the operations account back to the target balance and properly keep the 6 rate center reserves separated. FY 2016 to FY 2013 transfers are included for comparison:

Transfers to (from) reserves based on ending results for each rate center:

	FY2017	FY2016	FY 2015	FY2014	FY2013
Urban Water	**$ 113,700**	$ 55,983	$ 279,390	$ 298,310	$ 225,400
Urban Wastewater	**(673,900)**	355,437	4,070	1,264,670	1,089,800
Crozet Water	**(18,600)**	17,618	7,630	(37,070)	45,100
Scottsville Water	**30,200**	11,382	8,580	28,880	13,000
Glenmore Wastewater	**(5,300)**	(1,896)	(21,380)	1,920	21,400
Scottsville Wastewater	**7,900**	(6,263)	(20,900)	(6,210)	(7,100)
	$ (546,000)	$ 432,261	$ 257,390	$ 1,550,500	$ 1,387,600

To summarize the year-end process, one of the Authority's financial policies is to keep the operations account, defined here as cash and cash equivalents, financially sound with 60 days of cash for normal operating cash flow needs. That goal will continue to be met and the reserves will continue to provide for the yearly variances in budget versus actual results. The previous years' results are shown for comparison to show how reserves are used and accumulated to maintain a sound operating account. As any given year progresses, the operations account temporarily funds rate center deficits and accumulates surpluses, and a reconciliation of the results to allocate the respective surpluses and deficits is performed annually after the year-end audit is complete. The Board has taken similar action for the previous 12 years.

Attached is a summary of the ending reserves for Fiscal Year 2017.

Board Action Requested:

Board action is requested to transfer funds to/(from) the respective reserves for FY 2017 ending results to or from the operations account as follows:

Urban Water	$ 113,700	Urban Wastewater	$ (673,900)
Crozet Water	$ (18,600)	Glenmore Wastewater	$ (5,300)

Scottsville Water $ 30,200 Scottsville Wastewater $ 7,900

Attachment

Rivanna Water and Sewer Authority
Statement of Reserve Balances
June 2017 Reserves

	June FY 2017 Ending Balance	FROM (TO) OPERATIONS ACCOUNT FY 2017 ending results reserve adjustment proposed Board action needed **	Adjusted FY 2017 Ending Balance
Urban Water			
Discretionary Reserve	$ 11,516,129	$ 113,700	$ 11,629,829
Rate Stabilization Fund	1,000,000		1,000,000
Watershed Management Fund	281,440		281,440
Subtotal	$ 12,797,569		$ 12,911,269
Urban Wastewater			
Discretionary Reserve	$ 10,008,698	(673,900)	$ 9,334,798
Rate Stabilization Fund	1,000,000		1,000,000
Subtotal	$ 11,008,698		$ 10,334,798
Crozet Water			
Discretionary Reserve	$ 490,591	(18,600)	$ 471,991
Scottsville Water			
Discretionary Reserve	$ 203,899	30,200	$ 234,099
Glenmore Wastewater			
Discretionary Reserve	$ 78,368	(5,300)	$ 73,068
Scottsville Wastewater			
Discretionary Reserve	$ 62,608	7,900	$ 70,508
Capital Fund			
Specific Capital Projects	$ 7,409,166		$ 7,409,166
Vehicle Replacement Fund	$ 911,201		$ 911,201
Subtotal Discretionary Reserves	$ 32,962,100	$ (546,000)	$ 32,416,100
Indenture Restricted Minimum	$ 500,000		$ 500,000
Total Reserves *	**$ 33,462,100**		**$ 32,916,100**

*** - Agrees to investment balances - audited.**

**** - Proposed Board action**

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **LONNIE WOOD, DIRECTOR OF FINANCE AND ADMINISTRATION**

SUBJECT: **SEPTEMBER MONTHLY FINANCIAL SUMMARY – FY 2018**

DATE: **OCTOBER 24, 2017**

Urban Water flows and rate revenues are 15% over budget estimates for first quarter of this fiscal year, and Urban Wastewater flows and rate revenues are 14% under budget. Revenues and expenses are summarized in the table below:

	Urban Water	Urban Wastewater	Total Other Rate Centers	Total Authority
Operations				
Revenues	$ 1,968,075	$ 1,622,306	$ 501,097	$ 4,091,478
Expenses	(1,494,369)	(1,719,584)	(423,282)	(3,637,235)
Surplus (deficit)	$ 473,706	$ (97,278)	$ 77,815	$ 454,243
Debt Service				
Revenues	$ 1,455,232	$ 2,154,618	$ 211,107	$ 3,820,957
Expenses	(1,408,863)	(2,068,091)	(211,046)	(3,688,000)
Surplus (deficit)	$ 46,369	$ 86,527	$ 61	$ 132,957
Total				
Revenues	$ 3,423,307	$ 3,776,924	$ 712,204	$ 7,912,435
Expenses	(2,903,232)	(3,787,675)	(634,328)	(7,325,235)
Surplus (deficit)	$ 520,075	$ (10,751)	$ 77,876	$ 587,200

Urban Wastewater received the annual Nutrient Exchange Credit of $87,105 and Albemarle County's annual septage receiving support of $109,441 in July.

Some expense categories are over the prorated year-to-date budget as follows:

A. Personnel Costs (Administration, Lab - pages 8, 10) – The annual contribution to health savings accounts that was posted in July is pushing Personnel Costs over the prorated budget for the Administration Department, but this will even out over the year. Lab salaries are over budget due to the August payment of accumulated leave

to the lab director upon his retirement, and due to overlapping salaries in July for the former lab director and his replacement.

B. Other Services & Charges (Urban Wastewater, Administration, Maintenance, Engineering - pages 5, 8, 10, 11) - The annual property and liability insurance premium of $111,600 was paid in July. This cost will even out over time compared to budget estimates. The Engineering Department paid two quarterly bills for water and sewer system modeling services in July, including the quarter ending in June.

C. Communications (Maintenance – page 10) – The annual payment of $21,200 to the County of Albemarle for Rivanna's share of the radio system maintenance cost was made in July.

D. Information Technology (Engineering – page 11) – Engineering paid $25,000 to renew an annual computer software license agreement.

E. Operations and Maintenance (Administration, Maintenance – pages 8, 9) – The Maintenance Department spent about $8,000 for concrete flooring repairs, as budgeted. Unbudgeted repairs were made to the steps outside the Administration building along with tree pruning, totaling about $8,000.

Attachments

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017
Fiscal Year 2018

Consolidated
Revenues and Expenses Summary

Operating Budget vs. Actual

	Notes	*Budget FY 2018*	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Revenues						
Operations Rate Revenue		$ 15,403,127	$ 3,850,782	$ 3,859,664	$ 8,883	0.23%
Lease Revenue		64,000	16,000	31,125	15,125	94.53%
Administration & Maintenance Revenue		410,000	102,500	106,430	3,930	3.83%
Other Revenues		534,630	133,658	194,398	60,741	45.45%
Use of Watershed Management Funds		80,000	20,000	-	(20,000)	
Interest Allocation		15,000	3,750	6,290	2,540	67.73%
Total Operating Revenues		**$ 16,506,757**	**$ 4,126,689**	**$ 4,197,908**	**$ 71,219**	**1.73%**
Expenses						
Personnel Cost	**A**	$ 7,841,522	$ 1,848,904	$ 1,776,111	$ 72,792	3.94%
Professional Services		590,350	147,588	84,077	63,510	43.03%
Other Services & Charges	**B**	2,552,662	638,166	686,184	(48,018)	-7.52%
Communications	**C**	142,605	35,651	41,021	(5,370)	-15.06%
Information Technology	**D**	324,400	81,100	58,154	22,946	28.29%
Supplies		44,970	11,243	10,842	400	3.56%
Operations & Maintenance	**E**	3,613,450	903,363	765,531	137,831	15.26%
Equipment Purchases		336,300	84,075	56,621	27,454	32.65%
Depreciation		788,000	197,000	197,000	(0)	0.00%
Reserve Transfers		272,500	68,125	68,125	0	
Total Operating Expenses		**$ 16,506,759**	**$ 4,015,213**	**$ 3,743,665**	**$ 271,548**	**6.76%**
Operating Surplus/(Deficit)		**$ (2)**	**$ 111,476**	**$ 454,243**		

Debt Service Budget vs. Actual

Revenues						
Debt Service Rate Revenue		$ 13,561,158	$ 3,390,290	$ 3,390,291	$ 2	0.00%
Use of Reserves for 2016 Bond DS		600,000	150,000	150,000	-	0.00%
Septage Receiving Support - County		109,440	27,360	109,441	82,081	300.00%
Buck Mountain Surcharge		84,000	21,000	63,200	42,200	200.95%
Buck Mountain Lease Revenue		1,600	400	1,309	909	227.18%
Trust Fund Interest		46,400	11,600	19,741	8,141	70.18%
Reserve Fund Interest		100,500	25,125	86,974	61,849	246.16%
Total Debt Service Revenues		**$ 14,503,098**	**$ 3,625,775**	**$ 3,820,956**	**$ 195,181**	**5.38%**
Debt Service Costs						
Total Principal & Interest		$ 12,370,200	$ 3,092,550	$ 3,092,550	$ -	0.00%
Reserve Additions-Interest		99,000	24,750	86,974	(62,224)	-251.41%
Debt Service Ratio Charge		725,000	181,250	181,250	-	0.00%
Reserve Additions-CIP Growth		1,308,900	327,225	327,225	-	0.00%
Total Debt Service Costs		**$ 14,503,100**	**$ 3,625,775**	**$ 3,687,999**	**$ (62,224)**	**-1.72%**
Debt Service Surplus/(Deficit)		**$ (2)**	**$ (1)**	**$ 132,957**		

Summary

Total Revenues	$ 31,009,855	$ 7,752,464	$ 8,018,864	$ 266,400	3.44%
Total Expenses	31,009,859	7,640,988	7,431,664	209,324	2.74%
Surplus/(Deficit)	**$ (4)**	**$ 111,476**	**$ 587,200**		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Urban Water Rate Center
Revenues and Expenses Summary

	Budget FY 2018	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Operating Budget vs. Actual					
Notes					
Revenues					
Operations Rate Revenue	$ 6,758,077	$ 1,689,519	$ 1,943,454	$ 253,935	15.03%
Lease Revenue	35,000	8,750	21,983	13,233	151.23%
Miscellaneous	7,000	1,750	-	(1,750)	-100.00%
Use of Reserves	40,000	10,000	-	(10,000)	
Interest Allocation	6,300	1,575	2,638	1,063	67.47%
Total Operating Revenues	**$ 6,846,377**	**$ 1,711,594**	**$ 1,968,075**	**$ 256,481**	**14.98%**
Expenses					
Personnel Cost	$ 1,828,852	$ 432,403	$ 414,531	$ 17,872	4.13%
Professional Services	142,450	35,613	24,414	11,198	31.45%
Other Services & Charges	606,100	151,525	151,649	(124)	-0.08%
Communications	64,690	16,173	12,468	3,705	22.91%
Information Technology	65,300	16,325	9,061	7,264	44.49%
Supplies	7,000	1,750	1,247	503	28.75%
Operations & Maintenance	1,522,660	380,665	270,035	110,630	29.06%
Equipment Purchases	106,500	26,625	6,477	20,148	75.67%
Depreciation	260,000	65,000	65,000	(0)	0.00%
Reserve Transfers	250,000	62,500	62,500	0	0.00%
Subtotal Before Allocations	$ 4,853,552	$ 1,188,578	$ 1,017,382	$ 171,195	14.40%
Allocation of Support Departments	1,992,824	473,031	476,986	(3,955)	-0.84%
Total Operating Expenses	**$ 6,846,377**	**$ 1,661,609**	**$ 1,494,369**	**$ 167,240**	**10.06%**
Operating Surplus/(Deficit)	**$ 0**	**$ 49,985**	**$ 473,706**		
Debt Service Budget vs. Actual					
Revenues					
Debt Service Rate Revenue	$ 5,345,730	$ 1,336,433	$ 1,336,434	$ 2	0.00%
Trust Fund Interest	18,000	4,500	7,758	3,258	72.41%
Reserve Fund Interest	18,000	4,500	46,531	42,031	934.02%
Buck Mountain Surcharge	84,000	21,000	63,200	42,200	200.95%
Lease Revenue	1,600	400	1,309	909	227.18%
Total Debt Service Revenues	**$ 5,467,330**	**$ 1,366,833**	**$ 1,455,232**	**$ 88,400**	**6.47%**
Debt Service Costs					
Total Principal & Interest	$ 4,242,130	$ 1,060,533	$ 1,060,533	$ -	0.00%
Reserve Additions-Interest	18,000	4,500	46,531	(42,031)	-934.02%
Debt Service Ratio Charge	400,000	100,000	100,000	-	0.00%
Reserve Additions-CIP Growth	807,200	201,800	201,800	-	0.00%
Total Debt Service Costs	**$ 5,467,330**	**$ 1,366,833**	**$ 1,408,864**	**$ (42,031)**	**-3.08%**
Debt Service Surplus/(Deficit)	**$ -**	**$ -**	**$ 46,369**		

Rate Center Summary

Total Revenues	$ 12,313,707	$ 3,078,427	$ 3,423,307	$ 344,880	11.20%
Total Expenses	12,313,707	3,028,442	2,903,232	125,209	4.13%
Surplus/(Deficit)	**$ 0**	**$ 49,985**	**$ 520,075**		
Costs per 1000 Gallons	1.99		1.51		
Thousand Gallons Treated	3,432,018	858,005	987,026	129,022	15.04%
or					
Flow (MGD)	9.403		10.729		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Crozet Water Rate Center
Revenues and Expenses Summary

Operating Budget vs. Actual

	Notes	*Budget FY 2018*	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Revenues						
Operations Rate Revenue		$ 915,336	$ 228,834	$ 228,834	$ -	0.00%
Lease Revenues		29,000	7,250	9,142	1,892	26.10%
Use of Reserves		24,000	6,000	-	(6,000)	
Interest Allocation		900	225	398	173	76.95%
Total Operating Revenues		**$ 969,236**	**$ 242,309**	**$ 238,375**	**$ (3,934)**	**-1.62%**
Expenses						
Personnel Cost		$ 289,212	$ 68,421	$ 65,062	$ 3,360	4.91%
Professional Services		47,000	11,750	12,457	(707)	-6.02%
Other Services & Charges		121,480	30,370	24,798	5,572	18.35%
Communications		4,230	1,058	1,378	(321)	-30.32%
Information Technology		14,200	3,550	509	3,041	85.65%
Supplies		670	168	236	(68)	-40.72%
Operations & Maintenance		233,630	58,408	45,222	13,186	22.58%
Equipment Purchases		26,400	6,600	6,261	339	5.13%
Depreciation		25,000	6,250	6,250	0	0.00%
Reserve Transfers		20,000	5,000	5,000	(0)	0.00%
Subtotal Before Allocations		$ 781,822	$ 191,574	$ 167,173	$ 24,400	12.74%
Allocation of Support Departments		187,417	44,487	45,060	(573)	-1.29%
Total Operating Expenses		**$ 969,238**	**$ 236,060**	**$ 212,233**	**$ 23,827**	**10.09%**
Operating Surplus/(Deficit)		**$ (2)**	**$ 6,249**	**$ 26,141**		

Debt Service Budget vs. Actual

Revenues						
Debt Service Rate Revenue		$ 691,476	$ 172,869	$ 172,869	$ -	0.00%
Trust Fund Interest		1,800	450	750	300	66.70%
Reserve Fund Interest		2,700	675	1,305	630	93.27%
Total Debt Service Revenues		**$ 695,976**	**$ 173,994**	**$ 174,924**	**$ 930**	**0.53%**
Debt Service Costs						
Total Principal & Interest		$ 426,977	$ 106,744	$ 106,744	$ -	0.00%
Reserve Additions-Interest		2,700	675	1,305	(630)	-93.27%
Reserve Additions-CIP Growth		266,300	66,575	66,575	-	0.00%
Total Debt Service Costs		**$ 695,977**	**$ 173,994**	**$ 174,624**	**$ (630)**	**-0.36%**
Debt Service Surplus/(Deficit)		**$ (1)**	**$ (0)**	**$ 300**		

Rate Center Summary

Total Revenues	$ 1,665,212	$ 416,303	$ 413,298	$ (3,005)	-0.72%
Total Expenses	1,665,215	410,055	386,857	23,197	5.66%
Surplus/(Deficit)	**$ (3)**	**$ 6,248**	**$ 26,441**		
Costs per 1000 Gallons	5.31		3.81		
Thousand Gallons Treated	182,610	45,653	55,768	10,116	22.16%
Flow (MGD)	0.500		0.606		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Scottsville Water Rate Center
Revenues and Expenses Summary

	Budget FY 2018	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Operating Budget vs. Actual					
Notes					
Revenues					
Operations Rate Revenue	$ 412,236	$ 103,059	$ 103,059	$ -	0.00%
Use of Reserves	16,000	4,000	-	(4,000)	
Interest Allocation	400	100	167	67	66.55%
Total Operating Revenues	**$ 428,636**	**$ 107,159**	**$ 103,226**	**$ (3,933)**	**-3.67%**
Expenses					
Personnel Cost	$ 154,467	$ 36,565	$ 34,253	$ 2,312	6.32%
Professional Services	26,000	6,500	-	6,500	100.00%
Other Services & Charges	19,490	4,873	4,688	185	3.80%
Communications	3,210	803	1,088	(286)	-35.58%
Information Technology	7,000	1,750	619	1,131	64.60%
Supplies	750	188	-	188	100.00%
Operations & Maintenance	66,570	16,643	2,832	13,810	82.98%
Equipment Purchases	14,400	3,600	425	3,175	88.19%
Depreciation	17,000	4,250	4,250	(0)	0.00%
Reserve Transfers	2,500	625	625	0	0.00%
Subtotal Before Allocations	$ 311,387	$ 75,795	$ 48,780	$ 27,015	35.64%
Allocation of Support Departments	117,247	27,843	28,317	(474)	-1.70%
Total Operating Expenses	**$ 428,634**	**$ 103,638**	**$ 77,097**	**$ 26,541**	**25.61%**
Operating Surplus/(Deficit)	**$ 2**	**$ 3,521**	**$ 26,128**		
Debt Service Budget vs. Actual					
Revenues					
Debt Service Rate Revenue	$ 129,448	$ 32,362	$ 32,361	$ (1)	0.00%
Trust Fund Interest	400	100	217	117	117.17%
Reserve Fund Interest	1,500	375	696	321	85.54%
Total Debt Service Revenues	**$ 131,348**	**$ 32,837**	**$ 33,274**	**$ 437**	**1.33%**
Debt Service Costs					
Total Principal & Interest	$ 129,848	$ 32,462	$ 32,462	$ -	0.00%
Reserve Additions-Interest	-	-	696	(696)	
Reserve Additions-CIP Growth	1,500	375	375	-	
Total Debt Service Costs	**$ 131,348**	**$ 32,837**	**$ 33,533**	**$ (696)**	**-2.12%**
Debt Service Surplus/(Deficit)	**$ -**	**$ -**	**$ (259)**		

Rate Center Summary

Total Revenues	$ 559,984	$ 139,996	$ 136,500	$ (3,496)	-2.50%
Total Expenses	559,982	136,475	110,630	25,845	18.94%
Surplus/(Deficit)	**$ 2**	**$ 3,521**	**$ 25,870**		
Costs per 1000 Gallons	22.39		17.56		
Thousand Gallons Treated	19,143	4,786	4,390	(396)	-8.27%
or					
Flow (MGD)	0.052		0.048		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Urban Wastewater Rate Center
Revenues and Expenses Summary

Operating Budget vs. Actual

	Notes	Budget FY 2018	Budget Year-to-Date	Actual Year-to-Date	Budget vs. Actual	Variance Percentage
Revenues						
Operations Rate Revenue		$ 6,680,446	$ 1,670,112	$ 1,425,059	$ (245,052)	-14.67%
Stone Robinson WWTP		27,630	6,908	5,392	(1,516)	-21.94%
Septage Acceptance		390,000	97,500	101,901	4,401	4.51%
Nutrient Credits		100,000	25,000	87,105	62,105	248.42%
Miscellaneous Revenue		10,000	2,500	-	(2,500)	-100.00%
Interest Allocation		6,800	1,700	2,849	1,149	67.57%
Total Operating Revenues		**$ 7,214,876**	**$ 1,803,719**	**$ 1,622,306**	**$ (181,413)**	**-10.06%**
Expenses						
Personnel Cost		$ 1,230,128	$ 290,525	$ 248,289	$ 42,236	14.54%
Professional Services		54,000	13,500	7,000	6,500	48.15%
Other Services & Charges	**B**	1,571,400	392,850	409,433	(16,583)	-4.22%
Communications		10,430	2,608	5,074	(2,467)	-94.60%
Information Technology		57,300	14,325	5,017	9,308	64.98%
Supplies		2,700	675	191	484	71.67%
Operations & Maintenance		1,390,300	347,575	339,341	8,234	2.37%
Equipment Purchases		54,000	13,500	14,173	(673)	-4.99%
Depreciation		465,000	116,250	116,250	-	0.00%
Reserve Transfers		-	-	-	-	
Subtotal Before Allocations		$ 4,835,258	$ 1,191,808	$ 1,144,769	$ 47,039	3.95%
Allocation of Support Departments		2,379,618	564,865	574,815	(9,950)	-1.76%
Total Operating Expenses		**$ 7,214,876**	**$ 1,756,673**	**$ 1,719,584**	**$ 37,089**	**2.11%**
Operating Surplus/(Deficit)		**$ 0**	**$ 47,046**	**$ (97,278)**		

Debt Service Budget vs. Actual

	Budget FY 2018	Budget Year-to-Date	Actual Year-to-Date	Budget vs. Actual	Variance Percentage
Revenues					
Debt Service Rate Revenue	$ 7,384,689	$ 1,846,172	$ 1,846,173	$ 1	0.00%
Use of Reserves for 2016 Bond DS	600,000	150,000	150,000	-	0.00%
Septage Receiving Support - County	109,440	27,360	109,441	82,081	300.00%
Trust Fund Interest	26,200	6,550	10,996	4,446	67.88%
Reserve Fund Interest	77,300	19,325	38,008	18,683	96.68%
Total Debt Service Revenues	**$ 8,197,629**	**$ 2,049,407**	**$ 2,154,618**	**$ 105,210**	**5.13%**
Debt Service Costs					
Total Principal & Interest	$ 7,561,430	$ 1,890,358	$ 1,890,358	$ -	0.00%
Reserve Additions-Interest	77,300	19,325	38,008	(18,683)	-96.68%
Debt Service Ratio Charge	325,000	81,250	81,250	-	0.00%
Reserve Additions-CIP Growth	233,900	58,475	58,475	-	0.00%
Total Debt Service Costs	**$ 8,197,630**	**$ 2,049,408**	**$ 2,068,090**	**$ (18,683)**	**-0.91%**
Debt Service Surplus/(Deficit)	**$ (1)**	**$ (0)**	**$ 86,527**		

Rate Center Summary

	Budget FY 2018	Budget Year-to-Date	Actual Year-to-Date	Budget vs. Actual	Variance Percentage
Total Revenues	$ 15,412,505	$ 3,853,126	$ 3,776,924	$ (76,203)	-1.98%
Total Expenses	15,412,506	3,806,081	3,787,674	18,406	0.48%
Surplus/(Deficit)	**$ (1)**	**$ 47,046**	**$ (10,751)**		
Costs per 1000 Gallons	2.11		2.35		
Thousand Gallons Treated	3,424,639	856,160	730,425	(125,735)	-14.69%
or					
Flow (MGD)	9.383		7.939		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Glenmore Wastewater Rate Center
Revenues and Expenses Summary

	Budget FY 2018	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Operating Budget vs. Actual					
Notes					
Revenues					
Operations Rate Revenue	$ 352,344	$ 88,086	$ 88,086	$ -	0.00%
Interest Allocation	300	75	132	57	76.11%
Total Operating Revenues	**$ 352,644**	**$ 88,161**	**$ 88,218**	**$ 57**	**0.06%**
Expenses					
Personnel Cost	$ 90,823	$ 21,455	$ 18,266	$ 3,189	14.87%
Professional Services	3,000	750	-	750	
Other Services & Charges	31,490	7,873	7,668	204	2.59%
Communications	2,600	650	542	108	16.60%
Information Technology	3,500	875	-	875	100.00%
Supplies	100	25	-	25	100.00%
Operations & Maintenance	121,450	30,363	24,026	6,337	20.87%
Equipment Purchases	3,100	775	650	125	16.13%
Depreciation	5,000	1,250	1,250	(0)	0.00%
Subtotal Before Allocations	$ 261,063	$ 64,015	$ 52,402	$ 11,613	18.14%
Allocation of Support Departments	91,584	21,768	22,157	(389)	-1.79%
Total Operating Expenses	**$ 352,647**	**$ 85,783**	**$ 74,559**	**$ 11,224**	**13.08%**
Operating Surplus/(Deficit)	**$ (3)**	**$ 2,378**	**$ 13,659**		
Debt Service Budget vs. Actual					
Revenues					
Debt Service Rate Revenue	$ 1,582	$ 396	$ 396	$ 1	0.13%
Trust Fund Interest	-	-	-	-	
Reserve Fund Interest	600	150	261	111	73.95%
Total Debt Service Revenues	**$ 2,182**	**$ 546**	**$ 657**	**$ 1**	**0.09%**
Debt Service Costs					
Total Principal & Interest	$ 1,582	$ 396	$ 396	$ -	0.00%
Reserve Additions-Interest	600	150	261	(111)	-73.95%
Total Debt Service Costs	**$ 2,182**	**$ 546**	**$ 656**	**$ (111)**	**-20.34%**
Debt Service Surplus/(Deficit)	**$ -**	**$ -**	**$ 1**		

Rate Center Summary

Total Revenues	$ 354,826	$ 88,707	$ 88,875	$ 169	0.19%
Total Expenses	354,829	86,329	75,215	11,113	12.87%
Surplus/(Deficit)	**$ (3)**	**$ 2,378**	**$ 13,660**		
Costs per 1000 Gallons	8.12		8.20		
Thousand Gallons Treated	43,412	10,853	9,090	(1,763)	**-16.24%**
or					
Flow (MGD)	0.119		0.099		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Scottsville Wastewater Rate Center
Revenues and Expenses Summary

Operating Budget vs. Actual

	Notes	Budget FY 2018	Budget Year-to-Date	Actual Year-to-Date	Budget vs. Actual	Variance Percentage
Revenues						
Operations Rate Revenue		$ 284,688	$ 71,172	$ 71,172	$ -	0.00%
Interest Allocation		300	75	107	32	42.57%
Total Operating Revenues		**$ 284,988**	**$ 71,247**	**$ 71,279**	**$ 32**	**0.04%**
Expenses						
Personnel Cost		$ 90,848	$ 21,461	$ 18,265	$ 3,196	14.89%
Professional Services		2,000	500	-	500	100.00%
Other Services & Charges		22,900	5,725	8,297	(2,572)	-44.93%
Communications		2,630	658	1,216	(558)	-84.93%
Information Technology		4,400	1,100	-	1,100	100.00%
Supplies		100	25	-	25	100.00%
Operations & Maintenance		57,850	14,463	6,462	8,001	55.32%
Equipment Purchases		3,400	850	650	200	23.53%
Depreciation		16,000	4,000	4,000	0	0.00%
Subtotal Before Allocations		$ 200,128	$ 48,781	$ 38,890	$ 9,891	20.28%
Allocation of Support Departments		84,858	20,168	20,503	(335)	-1.66%
Total Operating Expenses		**$ 284,987**	**$ 68,949**	**$ 59,393**	**$ 9,556**	**13.86%**
Operating Surplus/(Deficit)		**$ 1**	**$ 2,298**	**$ 11,886**		

Debt Service Budget vs. Actual

	Budget FY 2018	Budget Year-to-Date	Actual Year-to-Date	Budget vs. Actual	Variance Percentage
Revenues					
Debt Service Rate Revenue	$ 8,233	$ 2,058	$ 2,058	$ (0)	-0.01%
Trust Fund Interest	-	-	20	20	
Reserve Fund Interest	400	100	174	74	73.93%
Total Debt Service Revenues	**$ 8,633**	**$ 2,158**	**$ 2,252**	**$ 93**	**4.33%**
Debt Service Costs					
Total Principal & Interest	$ 8,233	$ 2,058	$ 2,058	$ -	0.00%
Reserve Additions-Interest	400	100	174	(74)	-73.93%
Estimated New Principal & Interest	-	-	-	-	
Total Debt Service Costs	**$ 8,633**	**$ 2,158**	**$ 2,232**	**$ (74)**	**-3.43%**
Debt Service Surplus/(Deficit)	**$ -**	**$ -**	**$ 19**		

Rate Center Summary

	Budget FY 2018	Budget Year-to-Date	Actual Year-to-Date	Budget vs. Actual	Variance Percentage
Total Revenues	$ 293,621	$ 73,405	$ 73,531	$ 125	0.17%
Total Expenses	293,620	71,108	61,625	9,482	13.34%
Surplus/(Deficit)	**$ 1**	**$ 2,298**	**$ 11,905**		
Costs per 1000 Gallons	14.27		15.11		
Thousand Gallons Treated	19,967	4,992	3,932	(1,060)	**-21.23%**
or					
Flow (MGD)	0.055		0.043		

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Administration

Operating Budget vs. Actual

	Notes	*Budget FY 2018*	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Revenues						
Payment for Services SWA		$ 409,000	$ 102,250	$ 102,250	$ (0)	0.00%
Miscellaneous Revenue		1,000	250	584	334	133.74%
Total Operating Revenues		**$ 410,000**	**$ 102,500**	**$ 102,834**	**$ 334**	**0.33%**
Expenses						
Personnel Cost	**A**	$ 1,544,126	$ 362,713	$ 369,416	$ (6,702)	-1.85%
Professional Services		171,900	42,975	39,908	3,067	7.14%
Other Services & Charges	**B**	111,940	27,985	44,426	(16,441)	-58.75%
Communications		21,280	5,320	3,669	1,651	31.03%
Information Technology		118,000	29,500	12,235	17,265	58.53%
Supplies		22,000	5,500	7,429	(1,929)	-35.07%
Operations & Maintenance	**E**	36,600	9,150	18,557	(9,407)	-102.81%
Equipment Purchases		8,300	2,075	2,075	(0)	0.00%
Depreciation		-	-	-	-	
Total Operating Expenses		**$ 2,034,146**	**$ 485,218**	**$ 497,714**	**$ (12,496)**	**-2.58%**

Department Summary

Net Costs Allocable to Rate Centers		**$ (1,624,146)**	**$ (382,718)**	**$ (394,880)**	**$ 12,162**	**-3.18%**
Allocations to the Rate Centers						
Urban Water	44.00%	**$ 714,624**	**$ 168,396**	**$ 173,747**	**$ (5,351)**	
Crozet Water	4.00%	**$ 64,966**	**15,309**	**15,795**	**(486)**	
Scottsville Water	2.00%	**$ 32,483**	**7,654**	**7,898**	**(243)**	
Urban Wastewater	48.00%	**$ 779,590**	**183,705**	**189,542**	**(5,838)**	
Glenmore Wastewater	1.00%	**$ 16,241**	**3,827**	**3,949**	**(122)**	
Scottsville Wastewater	1.00%	**$ 16,241**	**3,827**	**3,949**	**(122)**	
	100.00%	**$ 1,624,146**	**$ 382,718**	**$ 394,880**	**$ (12,162)**	

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Maintenance

Operating Budget vs. Actual

	Notes	*Budget FY 2018*	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Revenues						
Miscellaneous Revenue		-	-	3,595	3,595	
Total Operating Revenues		**$ -**	**$ -**	**$ 3,595**	**$ 3,595**	
Expenses						
Personnel Cost		$ 1,150,821	$ 271,401	$ 270,264	$ 1,137	0.42%
Professional Services		-	-	-	-	
Other Services & Charges	**B**	12,300	3,075	8,640	(5,565)	-180.97%
Communications	**C**	15,635	3,909	9,223	(5,314)	-135.95%
Information Technology		6,500	1,625	2,328	(703)	-43.26%
Supplies		500	125	49	77	61.20%
Operations & Maintenance	**E**	64,450	16,113	23,464	(7,352)	-45.63%
Equipment Purchases		94,850	23,713	20,300	3,413	14.39%
Depreciation		-	-	-	-	
Total Operating Expenses		**$ 1,345,056**	**$ 319,960**	**$ 334,267**	**$ (14,307)**	**-4.47%**

Department Summary

Net Costs Allocable to Rate Centers		**$ (1,345,056)**	**$ (319,960)**	**$ (330,672)**	**$ 17,903**	**-5.60%**
Allocations to the Rate Centers						
Urban Water	30.00%	**$ 403,517**	**$ 95,988**	**$ 99,202**	**$ (3,214)**	
Crozet Water	3.50%	**47,077**	**11,199**	**11,574**	**(375)**	
Scottsville Water	3.50%	**47,077**	**11,199**	**11,574**	**(375)**	
Urban Wastewater	56.50%	**759,957**	**180,777**	**186,830**	**(6,052)**	
Glenmore Wastewater	3.50%	**47,077**	**11,199**	**11,574**	**(375)**	
Scottsville Wastewater	3.00%	**40,352**	**9,599**	**9,920**	**(321)**	
	100.00%	**$ 1,345,056**	**$ 319,960**	**$ 330,672**	**$ (10,712)**	

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Laboratory

Operating Budget vs. Actual

	Notes	*Budget FY 2018*	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Revenues						
N/A						
Expenses						
Personnel Cost	**A**	$ 293,948	$ 69,167	$ 105,747	$ (36,580)	-52.89%
Professional Services		-	-	-	-	
Other Services & Charges		10,412	2,603	4,649	(2,046)	-78.62%
Communications		600	150	350	(200)	
Information Technology		2,200	550	70	480	87.29%
Supplies		1,650	413	707	(295)	-71.44%
Operations & Maintenance		55,000	13,750	16,131	(2,381)	-17.32%
Equipment Purchases		1,500	375	250	125	33.34%
Depreciation		-	-	-	-	
Total Operating Expenses		**$ 365,310**	**$ 87,007**	**$ 127,904**	**$ (40,897)**	**-47.00%**

Department Summary

Net Costs Allocable to Rate Centers		**$ (365,310)**	**$ (87,007)**	**$ (127,904)**	**$ 40,897**	**-47.00%**
Allocations to the Rate Centers						
Urban Water	44.00%	**$ 160,736**	**$ 38,283**	**$ 56,278**	**$ (17,995)**	
Crozet Water	4.00%	**14,612**	**3,480**	**5,116**	**(1,636)**	
Scottsville Water	2.00%	**7,306**	**1,740**	**2,558**	**(818)**	
Urban Wastewater	47.00%	**171,696**	**40,893**	**60,115**	**(19,222)**	
Glenmore Wastewater	1.50%	**5,480**	**1,305**	**1,919**	**(613)**	
Scottsville Wastewater	1.50%	**5,480**	**1,305**	**1,919**	**(613)**	
	100.00%	**$ 365,310**	**$ 87,007**	**$ 127,904**	**$ (40,897)**	

Rivanna Water & Sewer Authority
Monthly Financial Statements - September 2017

Engineering

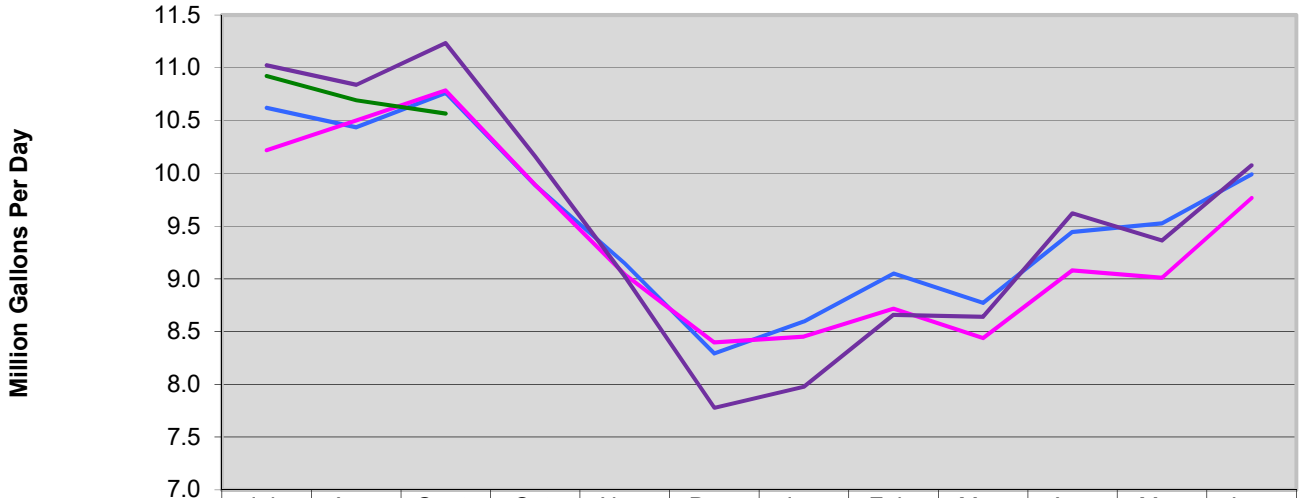
Operating Budget vs. Actual

		Budget FY 2018	*Budget Year-to-Date*	*Actual Year-to-Date*	*Budget vs. Actual*	*Variance Percentage*
Revenues						
N/A						
Expenses						
Personnel Cost		$ 1,168,296	$ 274,792	$ 232,018	$ 42,773	15.57%
Professional Services		144,000	36,000	298	35,702	99.17%
Other Services & Charges	**B**	45,150	11,288	21,936	(10,648)	-94.34%
Communications		17,300	4,325	6,013	(1,688)	-39.02%
Information Technology	**D**	46,000	11,500	28,315	(16,815)	-146.21%
Supplies		9,500	2,375	984	1,391	58.59%
Operations & Maintenance		64,940	16,235	19,461	(3,226)	-19.87%
Equipment Purchases		23,850	5,963	5,359	604	10.12%
Depreciation & Capital Reserve Transfers		-	-	-	-	
Total Operating Expenses		**$ 1,519,036**	**$ 362,477**	**$ 314,382**	**$ 48,094**	**13.27%**

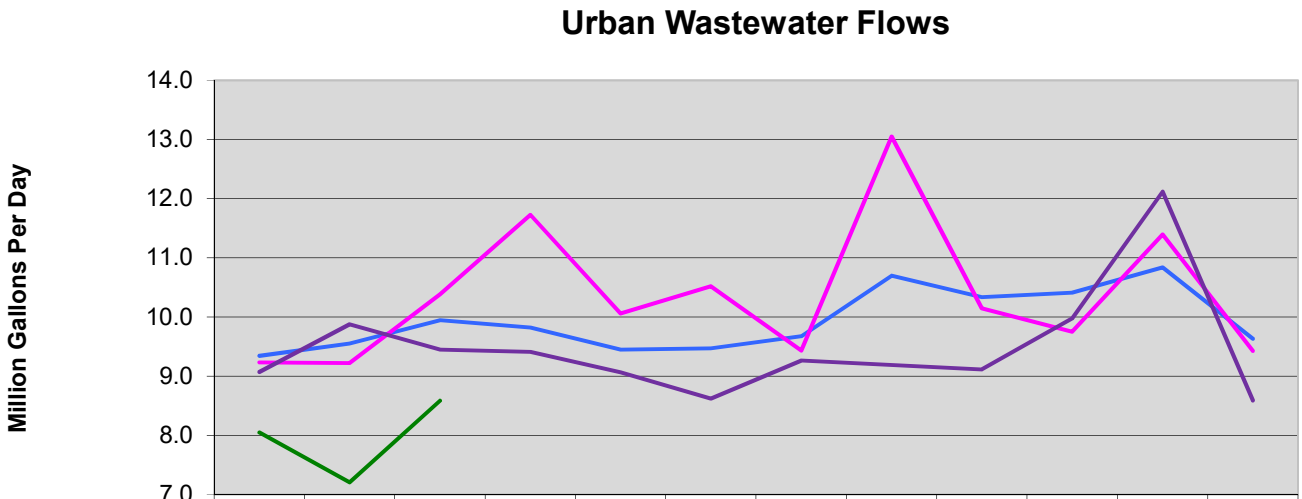
Department Summary

Net Costs Allocable to Rate Centers		**$ (1,519,036)**	**$ (362,477)**	**$ (314,382)**	**$ (48,094)**	**13.27%**
Allocations to the Rate Centers						
Urban Water	47.00%	**$ 713,947**	**$ 170,364**	**$ 147,760**	**$ 22,604**	
Crozet Water	4.00%	**60,761**	**14,499**	**12,575**	**1,924**	
Scottsville Water	2.00%	**30,381**	**7,250**	**6,288**	**962**	
Urban Wastewater	44.00%	**668,376**	**159,490**	**138,328**	**21,161**	
Glenmore Wastewater	1.50%	**22,786**	**5,437**	**4,716**	**721**	
Scottsville Wastewater	1.50%	**22,786**	**5,437**	**4,716**	**721**	
	100.00%	**$ 1,519,036**	**$ 362,477**	**$ 314,382**	**$ 48,094**	

Rivanna Water and Sewer Authority
Flow Graphs



	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
5 YR AVG.	10.62	10.44	10.76	9.89	9.15	8.29	8.60	9.05	8.77	9.45	9.53	9.99
FY 2016	10.22	10.50	10.79	9.89	9.04	8.40	8.45	8.72	8.44	9.08	9.01	9.77
FY 2017	11.02	10.84	11.23	10.16	9.02	7.78	7.98	8.66	8.64	9.62	9.36	10.07
FY 2018	10.92	10.69	10.57									



	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
5 YR AVG	9.34	9.55	9.95	9.82	9.45	9.47	9.67	10.70	10.33	10.41	10.84	9.63
FY 2016	9.23	9.22	10.38	11.73	10.06	10.52	9.43	13.05	10.15	9.75	11.39	9.43
FY 2017	9.07	9.87	9.45	9.41	9.06	8.62	9.26	9.19	9.12	9.97	12.12	8.59
FY 2018	8.05	7.20	8.59									

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **DAVE TUNGATE, WATER MANAGER**
TIMOTHY CASTILLO, WASTEWATER MANAGER

REVIEWED BY: **BILL MAWYER, EXECUTIVE DIRECTOR**
RICHARD GULLICK, DIRECTOR OF OPERATIONS

SUBJECT: **OPERATIONS REPORT FOR SEPTEMBER 2017**

DATE: **OCTOBER 24, 2017**

WATER OPERATIONS:

The average daily/monthly total water distributed for September 2017 was as follows:

Water Treatment Plant	***Average Daily Production (MGD)***	***Total Monthly Production (MG)***	***Maximum Daily Production in the Month (MGD)***
Observatory	1.76	52.76	---
South Rivanna	8.39	251.94	---
North Rivanna	0.41	12.28	---
Urban Total	10.56	316.98	12.12 (09/28/17)
Crozet	0.59	17.61	0.785 (9/28/17)
Scottsville	0.040	1.22	0.058 (09/27/17)
RWSA Total	11.19	335.81	---

- All RWSA water treatment facilities were in regulatory compliance during the month of September.

Status of Reservoirs (as of October 18, 2017):

- Urban Reservoirs: 71.7 % of Total Useable Capacity
- Ragged Mountain Reservoir is –5.6 feet (80.7%)
- Sugar Hollow Reservoir is – 5.62 feet (77.1%)
- South Rivanna Reservoir is – 5.17 feet (54.2%)
- Beaver Creek Reservoir is – 3.37 feet (78.3%)
- Totier Creek Reservoir is full (100%)

WASTEWATER OPERATIONS:

All RWSA Water Resource Recovery Facilities (WRRFs) were in regulatory compliance with their effluent limitations during the month of September 2017. Performance of the WRRFs in September was as follows compared to the respective VADEQ permit limits:

WRRF	*Average Daily Effluent Flow (mgd)*	*Average $CBOD_5$ (ppm)*		*Average Total Suspended Solids (ppm)*		*Average Ammonia (ppm)*	
		RESULT	*LIMIT*	*RESULT*	*LIMIT*	*RESULT*	*LIMIT*
Moores Creek	8.77	2.3	11	0.2	22	0.12	8.6
Glenmore	0.099	1.8	15	2.2	30	0.08	NL
Scottsville	0.043	4.0	25	4.0	30	0.43	NL
Stone Robinson	0.002	NR	30	NR	30	NR	NL

NR = Not Required
NL = No Limit
<QL: Less than analytical method quantitative level (2 ppm for CBOD, and 1 ppm for TSS) is reported as zero.

Nutrient discharges at the Moores Creek AWRRF were as follows for September 2017:

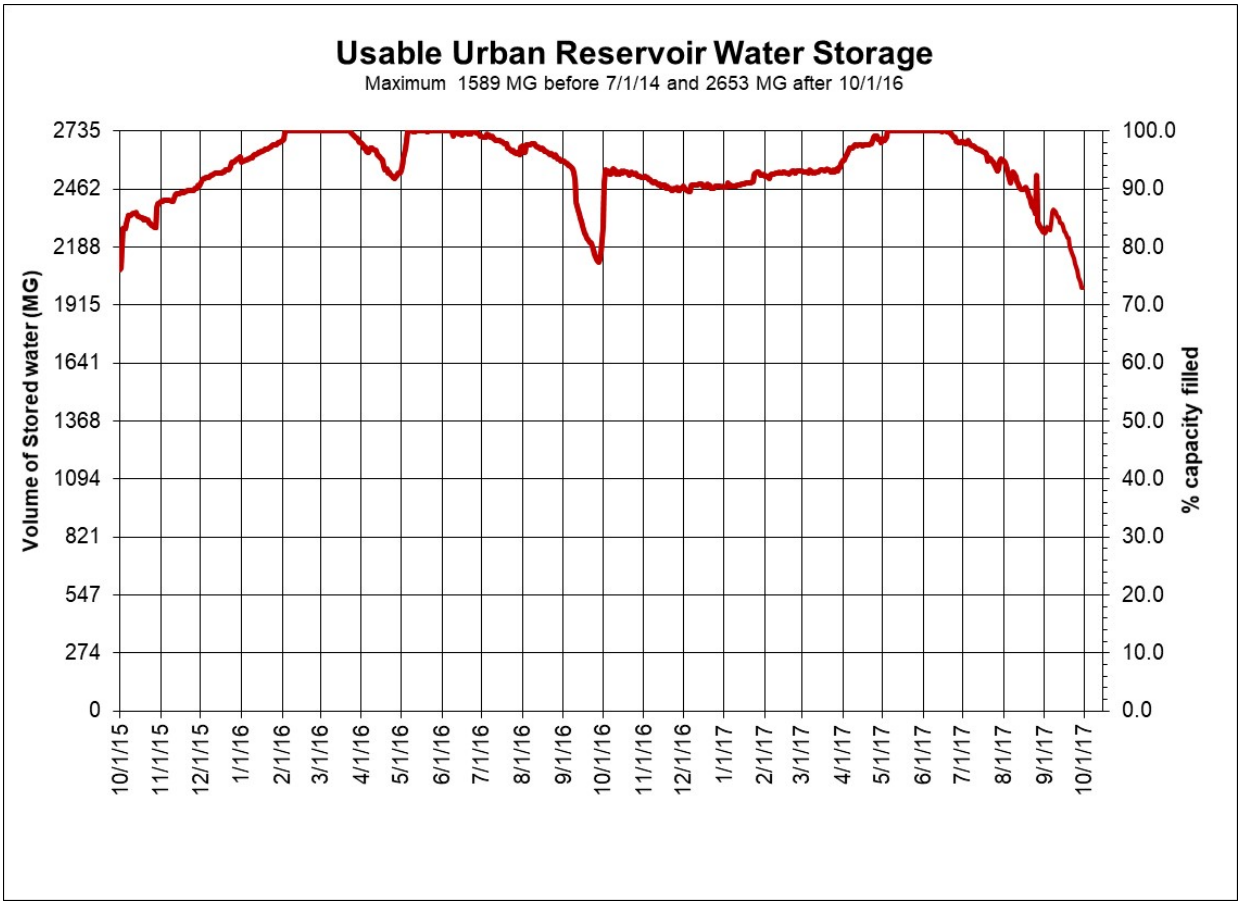
State Annual Allocation (lb./yr.)		*Average Monthly Allocation (lb./mo.)**	*Moores Creek Discharge (lb./mo.)*	*Performance as % of Average Allocation**
Nitrogen	282,994	23,583	1,760	7%
Phosphorous	18,525	1,544	318	21%

*State allocations are expressed as annual amounts. One-twelfth of that allocation is an internal monthly benchmark for comparative purposes only.

WATER AND WASTEWATER DATA:

The following graphs are provided for review:

- Usable Urban Reservoir Water Storage
- Urban Water and Wastewater Flows versus Rainfall
- Moores Creek AWRRF BOD and TSS Loadings to Receiving Stream
- Moores Creek AWRRF Effluent Monthly Average Ammonia Concentrations
- Moores Creek AWRRF Total Phosphorus Discharged
- Moores Creek AWRRF Total Nitrogen Discharged


Usable Urban Reservoir Water Storage
Maximum 1589 MG before 7/1/14 and 2653 MG after 10/1/16
Volume of Stored water (MG)
% capacity filled
2735
2462
2188
1915
1641
1368
1094
821
547
274
0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
10/1/15
11/1/15
12/1/15
1/1/16
2/1/16
3/1/16
4/1/16
5/1/16
6/1/16
7/1/16
8/1/16
9/1/16
10/1/16
11/1/16
12/1/16
1/1/17
2/1/17
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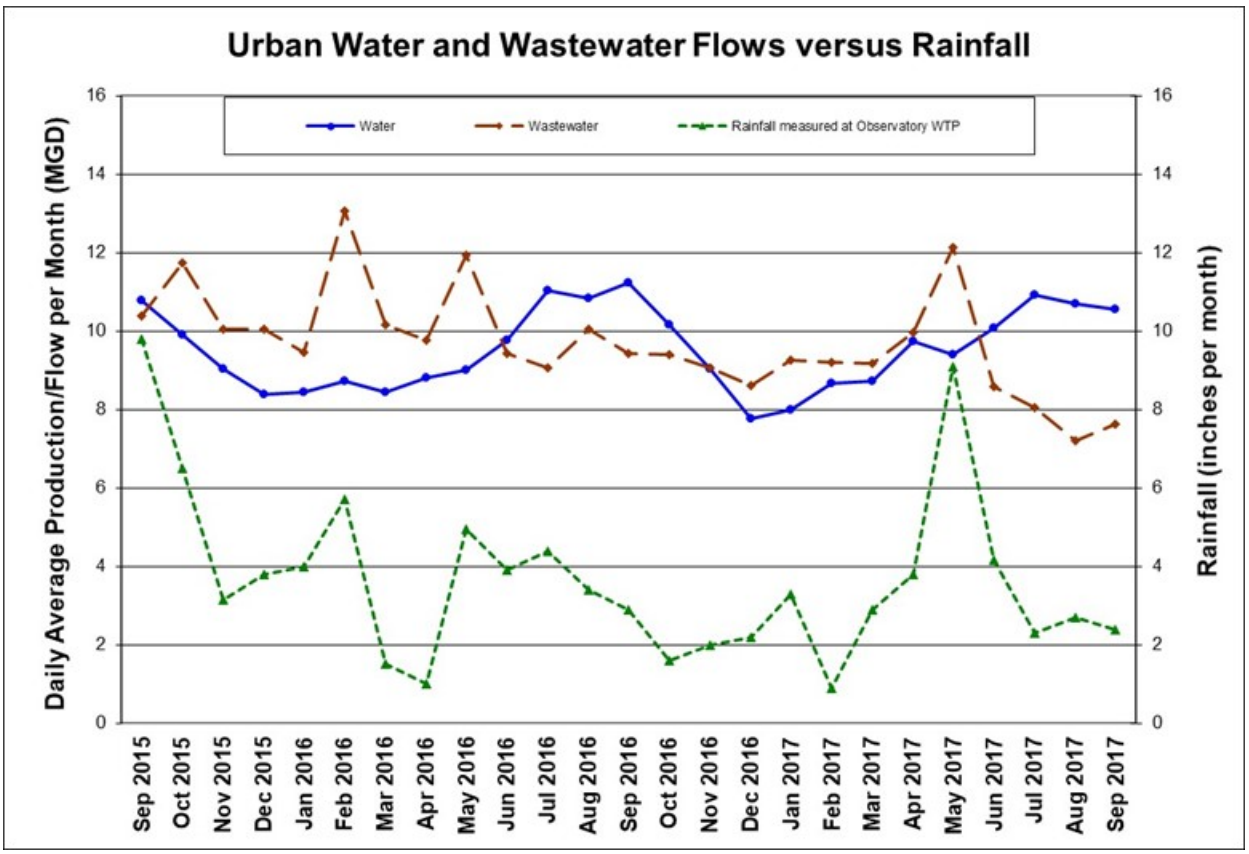
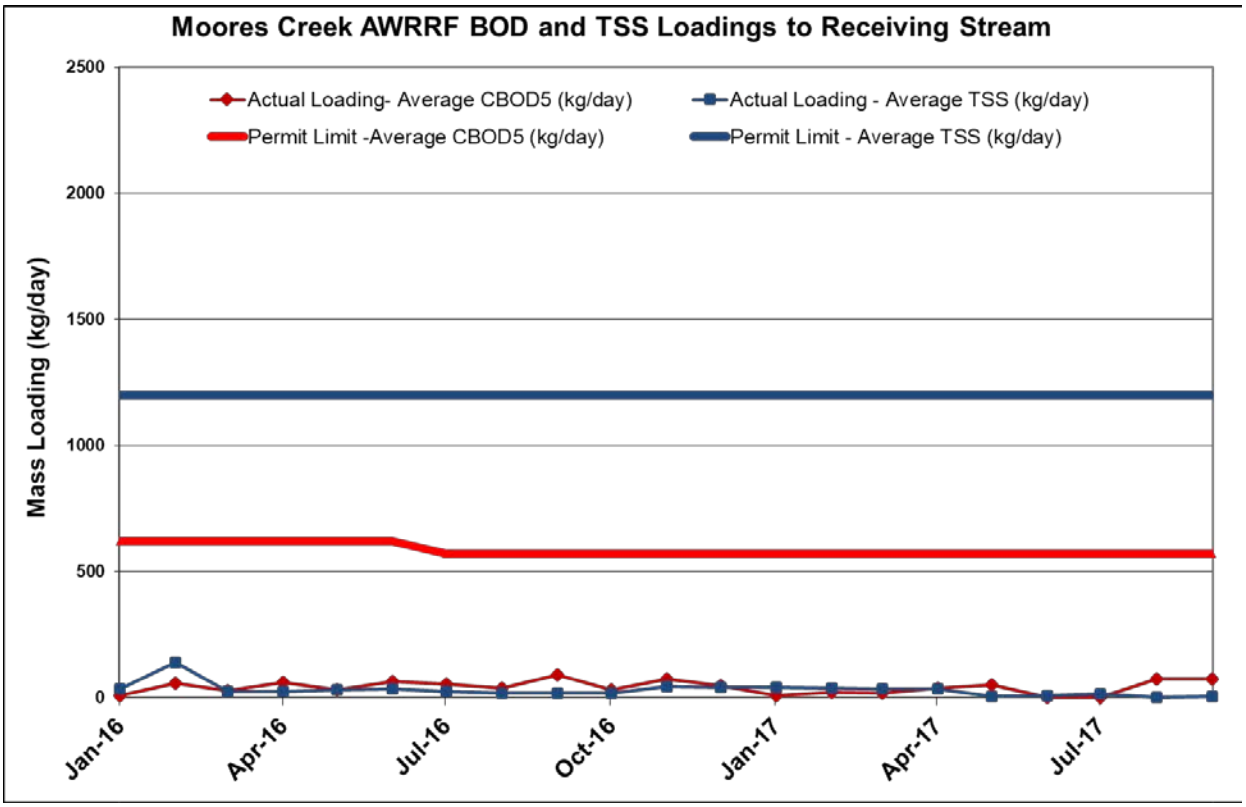
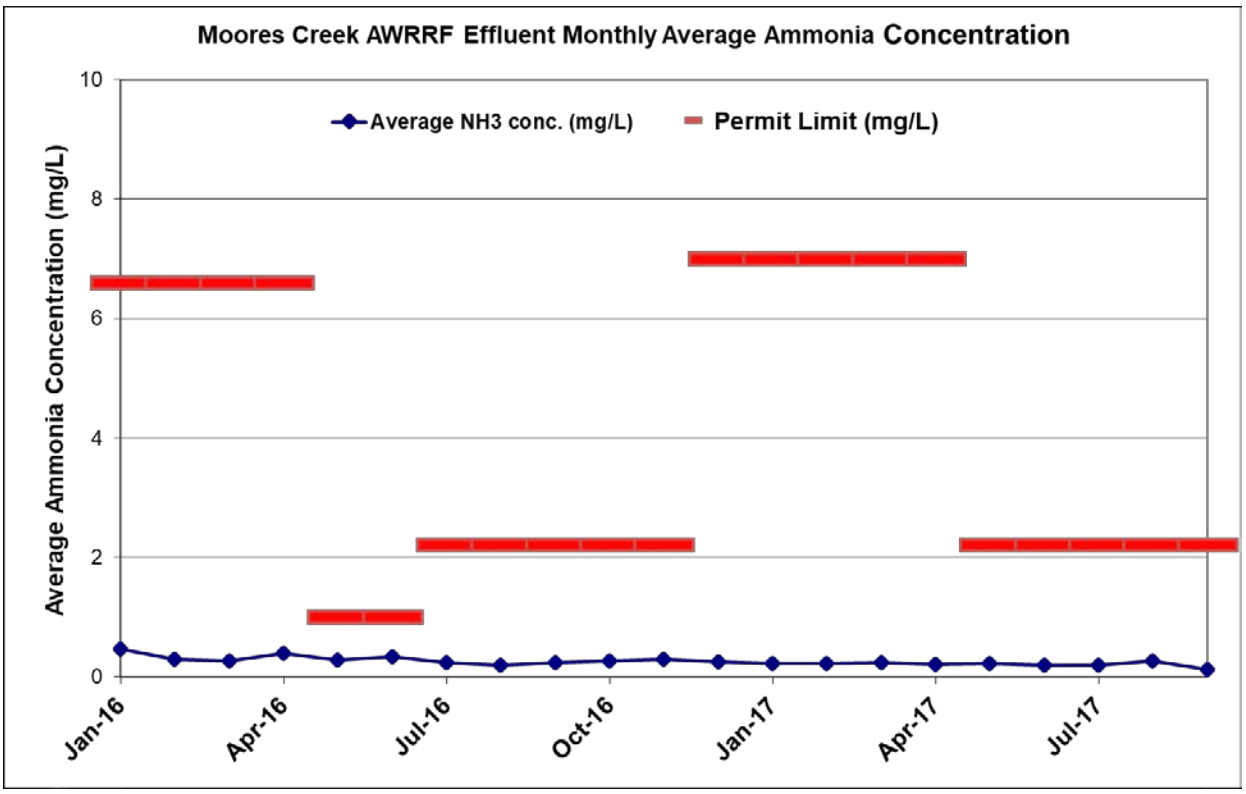
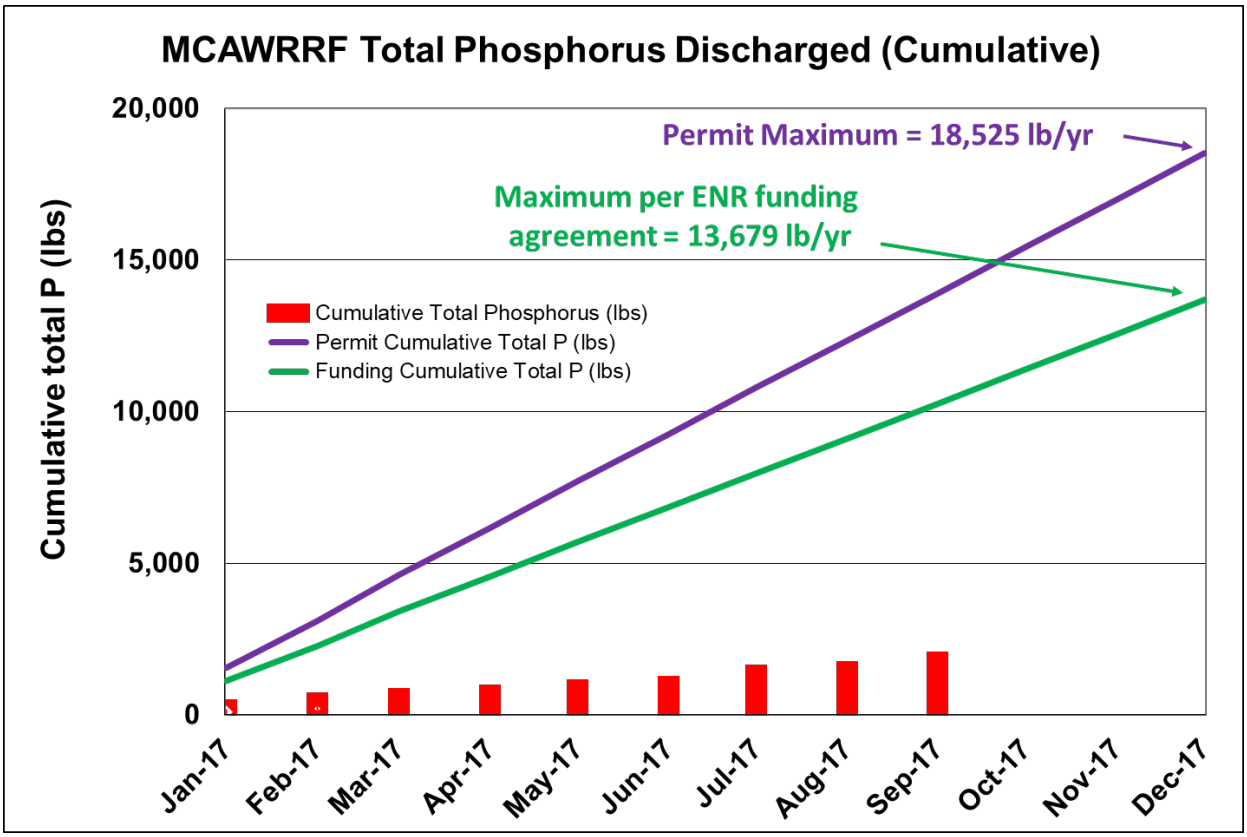
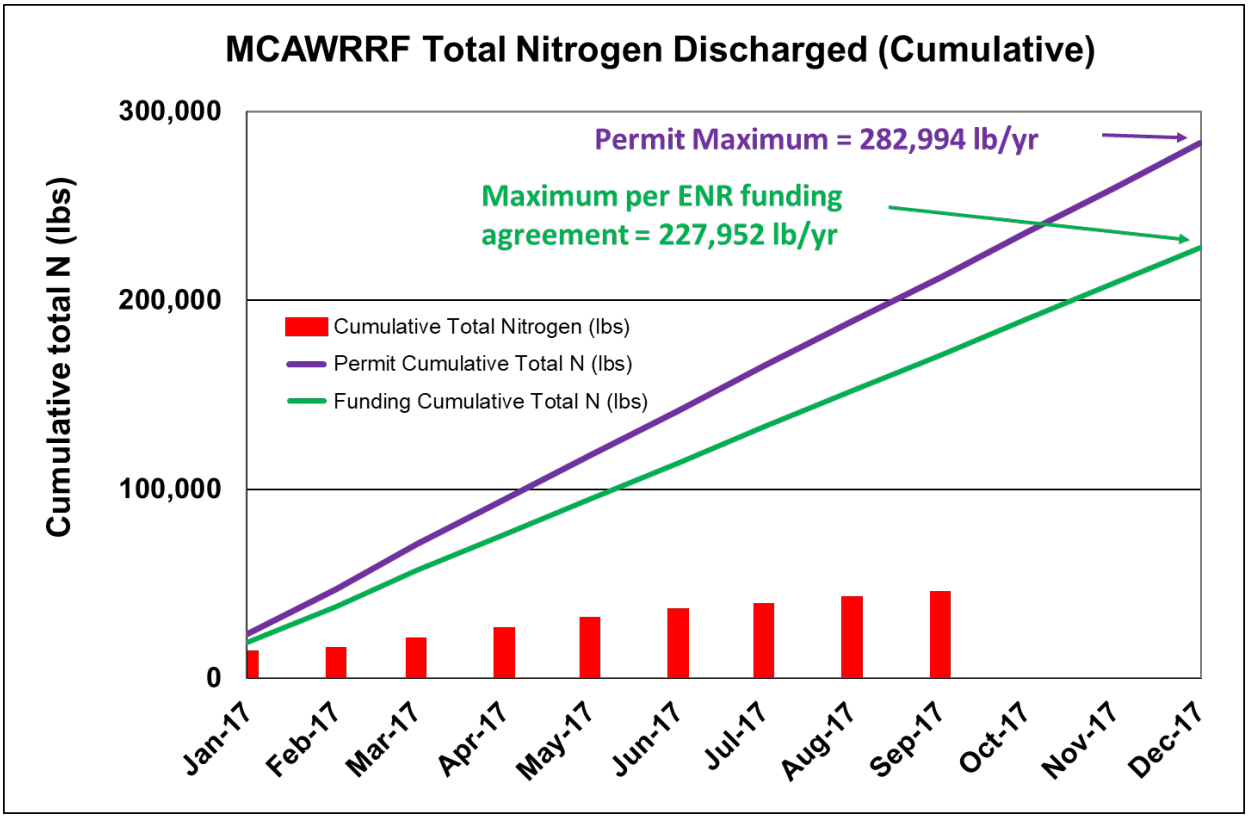
7/1/17
8/1/17
9/1/17
10/1/17


Urban Water and Wastewater Flows versus Rainfall
Water
Wastewater
Rainfall measured at Observatory WTP
Daily Average Production/Flow per Month (MGD)
Rainfall (inches per month)
16
14
12
10
8
6
4
2
0
Sep 2015
Oct 2015
Nov 2015
Dec 2015
Jan 2016
Feb 2016
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016
Dec 2016
Jan 2017
Feb 2017
Mar 2017
Apr 2017
May 2017
Jun 2017
Jul 2017
Aug 2017
Sep 2017


Moores Creek AWRRF BOD and TSS Loadings to Receiving Stream
Actual Loading- Average CBOD5 (kg/day)
Actual Loading - Average TSS (kg/day)
Permit Limit -Average CBOD5 (kg/day)
Permit Limit - Average TSS (kg/day)
Mass Loading (kg/day)
2500
2000
1500
1000
500
0
Jan-16
Apr-16
Jul-16
Oct-16
Jan-17
Apr-17
Jul-17


Moores Creek AWRRF Effluent Monthly Average Ammonia Concentration
Average NH3 conc. (mg/L)
Permit Limit (mg/L)
Average Ammonia Concentration (mg/L)
10
8
6
4
2
0
Jan-16
Apr-16
Jul-16
Oct-16
Jan-17
Apr-17
Jul-17


MCAWRRF Total Phosphorus Discharged (Cumulative)
Cumulative total P (lbs)
20,000
15,000
10,000
5,000
0
Permit Maximum = 18,525 lb/yr
Maximum per ENR funding agreement = 13,679 lb/yr
Cumulative Total Phosphorus (lbs)
Permit Cumulative Total P (lbs)
Funding Cumulative Total P (lbs)
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17


MCAWRRF Total Nitrogen Discharged (Cumulative)
Cumulative total N (lbs)
300,000
200,000
100,000
0
Permit Maximum = 282,994 lb/yr
Maximum per ENR funding agreement = 227,952 lb/yr
Cumulative Total Nitrogen (lbs)
Permit Cumulative Total N (lbs)
Funding Cumulative Total N (lbs)
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **JENNIFER WHITAKER, DIRECTOR OF ENGINEERING & MAINTENANCE**

REVIEWED BY: **BILL MAWYER, EXECUTIVE DIRECTOR**

SUBJECT: **STATUS REPORT: ONGOING PROJECTS**

DATE: **OCTOBER 24, 2017**

This memorandum reports on the status of the following Capital Projects as well as other significant operations, maintenance and planning projects.

Under Construction

1. Drinking Water Activated Carbon and Water Treatment Plant Improvements
2. Wholesale Water Master Metering
3. Rivanna Pump Station Improvements
4. Moores Creek AWRRF Odor Control Phase 2, Bridge Repairs & Second Centrifuge
5. Crozet Finished Water Pump Station
6. Moores Creek AWRRF Roof Replacements
7. Interceptor Sewer & Manhole Repair
8. Urgent and Emergency Repairs

Design and Bidding

9. Observatory Water Treatment Plant Expansion
10. South Rivanna Water Treatment Plant Improvements
11. Crozet Water Treatment Plant Expansion
12. Interconnect Lower Sugar Hollow and Ragged Mountain Raw Water Mains
13. Sugar Hollow Reservoir to Ragged Mountain Reservoir Transfer Flow Meter
14. Route 29 Pump Station and Pipeline
15. Piney Mountain Tank Rehabilitation
16. Avon to Pantops Water Main
17. Crozet Interceptor Pump Stations Bypass & Isolation Valves
18. Crozet Flow Equalization Tank

Planning and Studies

19. Strategic Plan
20. Reservoir Management Plan
21. South Fork Rivanna Reservoir to Ragged Mountain Reservoir Water Line Right-of-Way
22. South Rivanna Hydropower Plant Decommissioning
23. Drinking Water Infrastructure Plan – Crozet Area

1. Drinking Water Activated Carbon and WTP Improvements

Design Engineer:	Hazen and Sawyer
Construction Contractor:	Ulliman Shutte Construction, LLC
Construction Start:	April 2015
Percent Complete:	92%
Base Construction Contract + Change Orders to Date = Current Value:	$22,563,000 + $974,710 = $23,537,710
Expected Completion Date:	February 2018
Total Capital Project Budget:	Urban GAC: $24,000,000 Crozet GAC: $3,418,390 Scottsville GAC: $1,600,000

Current Status:

Crozet WTP – The Granular Activated Carbon (GAC) system has under gone start-up procedures. The GAC material was installed in the contactors on October 11-12 and should be in operation in October.. The GAC building, GAC contactors and piping, and chemical feed systems are 100% complete. Interior electrical conduit and wiring systems, as well as HVAC systems have been completed. Landscaping, stormwater management facilities, fencing and paving is almost complete.

Scottsville WTP – The GAC system is scheduled to be in operation by the end of October. The GAC metal building, and GAC contactor and piping is 100% complete. Interior electrical work is nearing completion. Asphalt paving, exterior fencing and lawn restoration is on-going.

North Rivanna WTP – The GAC system is scheduled to be in operation in December. The GAC metal building, and GAC contactors and piping have been completed. Building finishes, electrical conduit and wiring, and HVAC system installations are being completed. The filter backwash line is in service, and the contractor has begun selective demolition work in the existing filter plant. The electrical system rehabilitation and improvement work in the existing filter building has started. A new fiber optic line for SCADA controls to the raw water pump station is in service, and SCADA controls are being updated. The existing generator has been relocated and is in the process of having electrical equipment transferred over to it.

South Rivanna WTP – The GAC system is scheduled to be in operation in December. The GAC metal building, and GAC contactors and piping have been completed. Chemical feed systems are being worked on. The filter air scour system will be completed and started up when the electrical room for the GAC building is in service. The liquid lime feed tanks have been set, and work is progressing on the interior piping layout. The liquid lime feed building is approximately 98% complete. All clarifier and filter work is complete and in service. Electrical installations have been started, and GAC building electrical service work should be ready to start by end of October.

Observatory WTP - The GAC system is scheduled to be in operation in December. The GAC building, Intermediate Pump Station building, and chlorine contact tank are essentially complete, except for some interior painting and finishes. The electrical conduit and wiring installation for the buildings is ongoing. The new potable water service line and booster pump system is scheduled to be complete and in service by the end of October. Landscape retaining walls and storm sewer systems have been installed.

We plan to have a press release upon completion of all GAC systems, likely in January 2018, along with individual on-site celebration events for Scottsville, Crozet and the Urban System (South Rivanna Water Treatment Plant).

History:

In 2006, the US EPA promulgated the Stage 2 Disinfectant and Disinfection Byproducts (D/DBP) Rule, which limits the maximum levels of certain disinfection byproducts in water distribution systems. RWSA hired Hazen and Sawyer to evaluate alternatives to reduce disinfection byproducts and ensure compliance with the Stage 2 D/DPR Rule. Hazen and Sawyer presented possible alternatives to assure continuous compliance with the Stage 2 D/DBP Rule, and the Board selected installation of granular activated carbon contactors. At the March 2015 RWSA board meeting, the Board approved a construction award to USC in the amount of $22,014,250 and a construction management work authorization in the amount of $1,686,700 to Hazen and Sawyer. In addition, the Board approved changes to the 2015-2019 Capital Improvement Plan (CIP) as follows: (1) Combined the Crozet GAC and Crozet Water Treatment Plant Improvements projects and increased the budget by $550,800 for a new total project budget of $3,190,000; (2) Increased the budget for Scottsville GAC by $382,100 for a new total project budget of $1,600,000; and (3) Combined the Urban Water GAC, South Fork Rivanna Water Treatment Plant Improvements, and the North Fork Water Treatment Plant Improvements projects into a single account with a combined total project budget of $24,000,494.

An additional CIP amendment was approved by the RWSA Board at the March 22, 2016 meeting. This adjustment increased the Crozet Water GAC and Water Treatment Plant Improvements project to $3,418,390. The RWSA Board also approved an additional change order amount to Ulliman Schutte of $840,356 at the December 15, 2015 meeting. This additional cost is for Observatory WTP flocculator upgrades, and is funded from a separate CIP project (Observatory WTP improvements).

2. Wholesale Water Master Metering

Design Engineer:	Michael Baker International (Baker)
Construction Contractor:	Linco, Inc.
Construction Start:	January 2016
Percent Complete:	92%
Base Construction Contract + Change Orders to Date = Current Value:	$2,228,254 - $155,149 = $2,073,105
Expected Completion Date:	November 2017
Total Capital Project Budget:	$3,600,000

Current Status:

The three water treatment plant flow meters and 23 of 25 distribution system flow meters have been completed. Based on recent progress and the continuation of three crews working on the two remaining sites, staff anticipates completion of the meters in November of 2017 with final completion in December. However, this schedule may be impacted by site access difficulties with the last meter site located adjacent to Ivy Road which must be coordinated with DVP.

History:

In January 2012, a Water Cost Allocation Agreement was signed by the City of Charlottesville (City) and ACSA designating how the two agencies would share in the financing of the New Ragged Mountain Dam project. Within the agreement is a general provision developed by the ACSA and City to enhance measurement of the water usage by each of the distribution agencies.

The Board authorized staff in August of 2012 to enter into an agreement with Michael Baker International, Inc. (Baker) to complete an engineering study on metering plan alternatives. Baker's study identified several alternatives for a metering plan based on combinations of metering and estimating methodologies. Based on feedback from ACSA, the City, and RWSA, Baker recommended a Jurisdictional Approach which included installation of water meters at 34 locations at the City/County corporate boundary and at each of the three urban water treatment plants at an estimated cost of $6.4 million. At its September 2013 meeting, the RWSA Board of Directors requested staff to proceed with the Jurisdictional Coverage Approach. In February 2014, the Board of Directors authorized Baker to complete preliminary and final design for the project and to provide bid-phase services. The final design includes construction of 25 metering systems in underground vaults and required acquisition of twenty (20) permanent water line easements and one (1) permanent access easement.

Staff met with the ACSA and the City on July 12, 2017 and established a plan for implementation of the new meters in accordance with the 2012 Water Cost Allocation Agreement and the Baker Study.

3. Rivanna Pump Station Improvements

Design Engineer:	Hazen and Sawyer
Construction Contractor:	Adams Robinson Enterprises, Inc.
Construction Start:	March 2014
Percent Complete:	99.5%
Base Construction Contract + Change Orders to Date = Current Value:	$23,327,000 + $1,046,833 = $24,373,833
Expected Completion Date:	October 2017
Total Capital Project Budget:	$32,000,000

Current Status:

Operation of the new pump station was turned over to RWSA in May 2017, and demolition of the existing pump station has been completed along with restoration at all sites. A ribbon-cutting event and tours of the new pump station were held on October 5th.

RWSA has decided not to pursue any additional work with ARCO so they will return to the site and complete final punch list items in October 2017.

History:

A system-wide flow monitoring program was completed for RWSA as part of the Comprehensive Sanitary Sewer Study. The future wet weather pumping firm capacity of the influent pump station from the Rivanna Interceptor to the Moores Creek AWRRF was established in consultation with the City and ACSA with a peak wet weather flow rate equivalent to 53 million gallons per day (mgd). Hazen and Sawyer performed an evaluation of conceptual alternatives for the needed expansion of pumping capacity. At the December 2011 meeting, the Board selected Concept E (pump station at Moores Creek AWRRF and tunnel) and authorized the start of design. RWSA submitted the project schedule for the design and construction of Concept E to DEQ prior to the December 31, 2011 deadline. Design efforts were completed in September 2013, with a bid opening in November of the same year.

Work at the Moores Creek site has included rock blasting for the tunnel entrance shaft and pump station, installation and backfill grouting of the new 60-inch interceptor pipe inside the tunnel, and construction of the pump station superstructure, building, piping, pumps, switchgear, HVAC, and backup generator.

4. Moores Creek AWRRF Odor Control Phase 2, Bridge Repairs and Second Centrifuge

Design Engineer:	Hazen and Sawyer
Construction Contractor:	MEB General Contractors
Construction Start:	June 2016
Percent Complete:	70%
Base Construction Contract + Change Orders to Date = Current Value:	$6,796,000 + $1,317,873 = $8,113,873
Expected Completion Date:	February 2018

Total Capital Project Budget:	Odor Control Phase 2 - $10,108,000 MC Bridge Repairs - $330,000 Second Centrifuge - $1,290,000

Current Status:

The bio-scrubber has been assembled and startup is anticipated in October. The equalization basin bypass line installation is complete. The headworks facility has been taken out of service for the next few months to install the protective concrete coating system and new covers. Bridge repairs and installation of the centrifuge are underway.

In addition to the above construction activities, the following initiatives are being conducted as part of the overall Odor Control program:

- Digester Coating ($540,000 budgeted). Odor-causing gases have been found to be emitted from the digester roofs. This project is intended to seal the interior of the digesters, reducing gas emission as well as protecting the integrity of the existing digester roof from harmful corrosion. Bids were received on August 3, 2017, and the Board approved the award at the September 2017 BOD meeting. Construction is expected to be completed by April 2018.

- Holding Pond Cleanout ($500,000 budgeted). Over time, grit and organic material have accumulated in the Wet Weather Holding Ponds and Equalization Basins and have been a source of odor. This project is to remove these accumulated solids in the summer of 2018 after the other components of the Odor Control project have been completed.

- Solids Handling ($550,000 budgeted). RWSA purchased covered trailers to load biosolids directly from the centrifuge's conveyor system. Conveyor system modifications are complete and the new trailers are being utilized.

History:

At its September 2013 meeting, members of City Council inquired about the possibility to add another phase of odor control to the current Capital Program in response to citizen complaints. Staff asked Hazen at that time to compile conceptual costs to implement the next phases of odor control from the 2007 master plan, which were estimated over $10 million dollars. In an effort to better define our next steps for odor control while being cost effective, Hazen performed an operations audit over the winter and two rounds of air and liquid phase sampling at the wastewater treatment facility in summer and fall of 2014. Hazen attended the Board of Directors meeting in December and presented a summary of recommendations and estimated project costs for a project that would significantly control odors from traveling beyond the MCAWRRF fence line.

At the January 27, 2015 meeting, the Board approved this project with a budget of $9,330,000 and adopted it with the 2015-2019 CIP. DEQ issued the Certificate to Construct in early November 2015. This project advertised for bid on November 6, 2015

and bids were opened on December 17, 2015. Unfortunately, all of the bids were considerably over the project budget and subsequently were rejected. The design engineers, Hazen and Short Elliot Hendrickson, Inc. evaluated ways to reduce the scope of work without sacrificing the odor control goals. The redesigned project with reduced scope advertised for bid on February 5, 2016 and bids were opened on March 30, 2016. The Board of Directors approved award of the construction contract to MEB General Contractors, Inc. at the April 2016 Board Meeting with an associated capital budget increase.

5. <u>Crozet Finished Water Pump Station</u>

Design Engineer:	Short Elliot Hendrickson (SEH)
Construction Contractor:	Anderson Construction, Inc.
Construction Start:	May 2017
Percent Complete:	20 %
Base Construction Contract + Change Orders to Date = Current Value:	$1,941,000
Expected Completion Date:	September 2018
Total Capital Project Budget:	$2,600,000

<u>Current Status</u>:

The contractor has completed excavation and shoring for the pump station foundation. The pump cans are scheduled to be delivered, installed and the excavation backfilled, by the end of October. Once complete, the contractor will begin the reinforced concrete foundation for the building.

<u>History</u>:

Bids were received and opened for the project on March 7, 2017. The apparent low bidder was Anderson Construction, Inc. from Lynchburg, VA. The Board of Directors approved the contract bid award of $1,941,000 at the March 2017 meeting, a Notice of Award was issued on April 10, 2017, and a Notice to Proceed was issued on May 3, 2017.

The filter plant effluent line to the ground storage tank has been installed, tested, disinfected and placed into service. The existing generator and electrical lines have been relocated and placed into a temporary location. The pipeline and generator were relocated in order to make room for the new pump station foundation excavation. Partial removal of old, existing asbestos cement (transite) pipe was completed in July.

As part of the current FY 2016 CIP, the Crozet Water Treatment Plant is being studied to expand the treatment capacity to secure future demand needs of the Crozet community. Prior to any plant expansion, it has been determined that the finished water pumping facilities are in need of replacement. The existing pump station is very small and was constructed as part of the original plant construction in the late 1960s. The pumping equipment and controls are outdated, and reduce operational reliability and efficiency. The pump house is located in a low, poorly drained area near the ground storage clearwell, and drainage issues exist. Due to the age and condition of pumps, electrical systems, building

systems and controls, it has been determined that a full station replacement is necessary. An Alternatives Analysis Report was completed in June 2016, and the chosen alternative is to construct a new, larger building uphill from the existing clearwell tank. The new pump station building will be of similar construction as what is being proposed for the GAC facility at Crozet WTP.

6. Moores Creek AWRRF Roof Replacements

Design Engineer:	Hazen and Sawyer
Project Status:	5% Construction Complete
Construction Start:	October 2017
Completion:	July 2018
Total Capital Project Budget:	$1,264,000

Current Status:

Construction bids were received on September 7, 2017 to replace the metal roof on eight buildings and award of the project was approved by the Board at the September Board Meeting. A Notice of Award was provided to Triangle Roofing Services, Inc. on October 10, 2017 and final Contract Documents are in the process of being executed.

History:

The majority of the buildings at the Moores Creek Advanced Water Resource Recovery Facility were constructed in 1981 and 1982 during a major expansion of the existing treatment plant. All buildings constructed at that time were built with a metal roof system. In 2014, deficiencies were identified in the roof at the Administration Building and the roof was replaced. The materials of the original roof at the Administration Building are the same as the roof material on the other buildings. Likewise, many of the buildings have started to experience leaks and structural deficiencies. As a result, the purpose of this project is to replace the roof systems at the following buildings at the Moores Creek AWRRF: Blower Building, Moores Creek Pump Station, Sludge Pump Station No. 2, Maintenance Building 1, and Maintenance Building 2. Following additional review of the conditions of various buildings located at the Moores Creek AWRRF, this project also now includes replacement of the roof systems Sludge Pumping Building, the Primary Pump Building, and the Effluent Pump Building.

In December 2016, the Board of Directors authorized staff to enter into a work authorization with Hazen and Sawyer to design bidding documents to replace the identified roofs at Moores Creek AWRRF. A kick-off meeting was held with plant operations and maintenance staff; asbestos testing was performed to determine impacts during demolition activities; and design is ongoing. An application was submitted to the Albemarle County Architectural Review Board and approval has been obtained.

7. Interceptor Sewer and Manhole Repair

Design Engineer:	Frazier Engineering
Project Start:	July 2017
Project Status:	5% Construction Complete

Construction Start: October 2017
Completion: 2020
Total Capital Project Budget: $1,962,389

Current Status:

Three work authorizations with Frazier Engineering have been finalized to complete condition assessments on the Upper Rivanna, Morey Creek, Maury Hills Branch, Upper Moores Creek, Lower Moores Creek, and Crozet Interceptors, and development of a bid package for the procurement of a sewer rehabilitation contractor. Frazier Engineering continues to conduct condition assessment activities and has completed a preliminary review of previous CCTV results. Frazier recommendations based on the CCTV results and previous manhole inspections will be the basis for the initial work authorization provided to the upcoming new sewer rehabilitation contractor. Bids were received on September 14, 2017 for a sewer rehabilitation contractor based on the bid package developed by Frazier Engineering. A recommendation for award is being brought to the Board this month.

History:

Results from sewer flow monitoring and modeling under the Comprehensive Sanitary Sewer Study provided awareness to specific inflow and infiltration (I&I) concerns in the collection system and resulted in strengthened commitments from the City, ACSA and RWSA to continue professional engineering services to aid in the rehabilitation and repair of the sewer collection system. Engineering services will be used for sewer infrastructure condition assessments and the development of a sewer rehabilitation bid package for the procurement of a contractor to perform the recommended rehabilitation work.

8. Urgent and Emergency Repairs

Staff is currently working on several urgent and emergency repairs within the water and wastewater systems as listed below.

Current Repairs:

Project No.	Project Description	Approx. Cost
2015-02	Pantops Water Line - Stream Bank Erosion at Bland Circle	$155,000
2016-05	Rivanna Interceptor - Pipe Exposure in Creek near Penn Park	$118,000
2017-01	Morey Creek Interceptor - Pipe Exposure at Creek Crossing	$72,000

- Pantops Water Line – Stream Bank Erosion at Bland Circle

  RWSA contacted Faulconer Construction regarding this repair work and visited the site with them to review the conditions and develop a plan for repairing the line. RWSA also met with the Army Corp of Engineers to confirm that no regulatory coordination was necessary. Faulconer provided preliminary pricing and the proposed work was approved at the August 2017 Board Meeting. Work began on October 4, 2017

following completion of the Morey Creek Interceptor repair and is anticipated to continue with final restoration being completed the week of October 16, 2017.

- Rivanna Interceptor – Pipe Exposure in Creek near Penn Park

  RWSA met with the Army Corp of Engineers on April 12, 2017 and confirmed that natural stream restoration will not be required for this repair. Faulconer Construction was contacted and a site visit was conducted to review the conditions and develop a plan for repairing the stream crossing. Faulconer provided preliminary pricing and this work was approved at the June 2017 Board Meeting. Work began on August 14, 2017 and final restoration was completed on September 14, 2017.

- Morey Creek Interceptor – Pipe Exposure at Creek Crossing

  An inspection by the Maintenance Department identified the erosion of the embankment at an aerial creek crossing of the Morey Creek Interceptor between manholes MRI-MH-33 and MRI-MH-34. Erosion of the bank had undermined the concrete support and repairs to the support were necessary along with installation of a concrete anchor to secure the pipe at the crossing. RWSA met with the Army Corp of Engineers on April 24, 2017 and confirmed the extents of the stream bank repairs. Faulconer Construction was contacted and a site visit was conducted to review conditions and develop a plan for repairing the stream crossing this summer. Faulconer provided preliminary pricing and a Construction Work Authorization has been finalized to perform the work. Construction activities began on September 14, 2017 and the crossing repair was completed along with final restoration on October 3, 2017. A picture of the completed repair is shown below:

9. Observatory WTP Expansion

Design Engineer:	Short Elliot Hendrickson, Inc. (SEH)
Project Start:	October 2017
Project Status:	Preliminary Engineering Report

Construction Start:	2019
Completion:	2021
Total Capital Project Budget:	$10,000,000

Current Status:

SEH has completed a scope of work and design fee estimate for a Preliminary Engineering Report (PER) for this project. The PER will consider the design and costs for upgrading the plant systems to achieve a consistent 7 MGD plant capacity, as well as consider the costs involved with upgrading the plant to a 10 MGD capacity.

History:

Much of the Observatory Water Treatment Plant is original to the 1953 construction. In an effort to better understand the needed future improvements, a Condition Assessment Report was completed by SEH in October of 2013. The approved Capital Improvement Plan project was based on the findings from this report. A portion of this project was expedited in order to repair and replace old, existing equipment that was not functional. The flocculator systems have been replaced and upgraded as part of the Drinking Water Activated Carbon and WTP Improvements project (GAC). The second flocculator system was started up in May 2017, and both systems are currently in full service. The contractor needs to address some minor punchlist items in order to reach final completion.

10. South Rivanna Water Treatment Plant Improvements

Design Engineer:	Short Elliot Hendrickson (SEH)
Project Start:	October 2017
Project Status:	Preliminary Engineering Report
Construction Start:	2020
Completion:	2022
Total Capital Project Budget:	$5,430,000

Current Status:

A Preliminary Engineering Report will be performed in conjunction with the Observatory WTP Improvements project. The basic work items for this project include expansion of the coagulant storage facilities; installation of additional filters to meet firm capacity needs; the addition of a second variable frequency drive at the Raw Water Pump Station; the relocation for the electrical gear from a sub terrain location at the Sludge Pumping Station; a new building on site for additional office, lab, control room and storage space; improvements to storm sewers to accept allowable WTP discharges; and the construction of a new metal building to cover the existing liquid lime feed piping and tanks.

History:

The South Rivanna Water Treatment Plant is currently undergoing significant upgrades as part of the Granular Activated Carbon Project. Several other significant needs have also been identified and have been assembled into a single project. The projects herein include:

expansion of the coagulant storage facilities; installation of additional filters to meet firm capacity needs; the additional of a second variable frequency drive at the raw water pump station; the relocation of the electrical gear at the Sludge Pump Station, the up fit of the office, lab control room and storage space, and the NPDES discharge piping and outfall. The scope of this project will not increase plant treatment capacity.

11. Crozet WTP Expansion

Design Engineer:	Short Elliot Hendrickson (SEH)
Project Start:	August 2016
Project Status:	20% Design Complete
Construction Start:	September 2018
Completion:	December 2020
Total Capital Project Budget:	$7,000,000

Current Status:

SEH has completed the Preliminary Engineering Report (PER) for this project, and is in the process of addressing comments from the Virginia Department of Health. Some preliminary watershed modeling and data collection was also performed as part of this work. In addition, raw water jar testing has been performed to finalize the type of treatment parameters necessary for the upgrade work, and the testing results were incorporated into the PER. The proposed new work will provide needed updates to equipment, as well as a plant capacity upgrade to approximately 1.5 - 2.0 million gallons per day.

A new Work Authorization with SEH was executed to perform preliminary and final design documents, as well as construction administration services. A design kick-off meeting will be held in October.

History:

This project was created to analyze the feasibility of increasing the supply capacity of the existing Crozet WTP by modernizing plant systems. The goal is to not drastically increase the plant footprint in regards to existing filter plant, flocculation tanks, and sedimentation basins. By modernizing the outdated equipment within these treatment systems, the plant discharge capacity can be improved by approximately 50-100%. The project currently only includes study and design funding.

12. Interconnection Lower Sugar Hollow and Ragged Mountain Raw Water Mains

Design Engineer:	Dewberry Engineers
Project Start:	October 2017
Project Status:	5% Design
Construction Start:	May 2018
Completion:	October 2018
Total Capital Project Budget:	$225,000

Current Status:

Negotiating with Dewberry, one of our term contract design engineers, regarding fees for design services.

History:

The two 18-inch water mains that supply water from Ragged Mountain Reservoir to Observatory Water Treatment Plant are 71 and 109 years old. The mains are interconnected at the top of the Ragged Mountain Dam, with one serving the 1920's Royal Pump Station and the other serving the more modern Stadium Road Pump Station. Both pump stations provide raw water to the Observatory Water Treatment Plant. This project will serve to interconnect the two raw water lines near the Route 29/Fontaine Avenue Intersection, which will provide improved reliability and operability in the event of raw water line breaks.

13. Sugar Hollow to Ragged Mountain Reservoir Transfer Flow Meter

Design Engineer:	Michael Baker International (Baker)
Project Start:	July 2017
Project Status:	100% Design Complete
Construction Contractor:	G.L. Howard
Construction Start:	July 2018
Completion:	September 2018
Total Capital Project Budget:	$350,000

Current Status:

This project will require the Sugar Hollow to Ragged Mt. Reservoir transfer line to be out of service and unavailable for approximately 4 weeks. Due to the current Drought Watch Restrictions, staff believes that losing the option to transfer water between the two reservoirs, even for a short time period, is not recommended. Therefore, we are delaying this project until reservoir storage capacities improve and transfers from Sugar Hollow are not needed.

History:

RWSA staff has worked with the design engineers to complete plan and profile design drawings for this project. The project will include installation of a flow meter on the 18-inch diameter Sugar Hollow Reservoir discharge pipe, and a control valve that can be operated remotely through the Observatory WTP SCADA system. The control valve will modulate the amount of flow being transferred between the two reservoirs, the flow meter will record data, and staff will be able to remotely monitor the data through the SCADA system. Additional work has been added to this project including replacement of an existing, original gate valve at the site, demolition of two existing small utility structures that have not been used in many years, demolition of the existing Gatekeeper's House, and a separate control valve vault that will optimize the accuracy of the new flow meter by creating adequate separation distance between the meter and modulating control valve. The structures to be demolished and removed have been inspected and tested for asbestos

containing materials and lead based paint. There will be some special abatement work required, and the contractor will have to include these costs in their estimate.

After initial cost estimating discussions with the contractor and RWSA staff, it was found that the current project budget is not enough to complete all of the identified work aspects. The Capital Improvement Program budget will likely have to be increased in order to perform all the work in one project.

14. Route 29 Pump Station and Pipeline

Design Engineer:	Michael Baker International (Baker)
Project Start:	July 2018
Project Status:	Update Existing Design Report
Construction Start:	2019
Completion:	2021
Total Capital Project Budget:	$6,000,000

Current Status:

This project will include construction of a 2 mgd drinking water pump station and two 1,000,000 gallon ground water storage tanks, as well as completion of a 24-inch diameter pipeline along the Meeting Street corridor. This project has been identified as a need in the County Comprehensive Plan and RWSA Capital Improvement Plan.

Work is currently underway to review and update the 2008 preliminary engineering report, including analysis of current water demand projections. Portions of the work have already been completed, including a temporary bypass pumping location near Kohl's department store, and the abandonment of existing pipeline in the median of Rte. 29 from the south end of Hollymead Town Center to Timberwood Boulevard. Other portions of the project have been completed including the Pump Station Site Acquisition and new 24-inch pipeline installed as part of the Rt. 29 VDOT Betterment project. Once the report update has been completed, the preliminary design of the remaining pipeline and the pump station will be started. Preliminary and final design along with construction funding will be included in the 2019-2023 CIP.

History:

A report and technical memorandum on this project was previously completed in 2008. The future pump station and tanks, along with a new transmission pipeline between the pump station and the South Rivanna Water Treatment Plant, will provide an interconnection between the areas presently served by the South Rivanna WTP and the North Rivanna WTP. The interconnection is needed for redundancy of service in the event of an emergency, during drought conditions, and to adequately serve the growing needs of the Rt. 29 area generally north of Hollymead Town Center and Airport Road.

At the May 2017 Board Meeting, a 1.6-acre parcel of land was acquired through condemnation proceedings which included a public hearing. The site location was identified in a prior project report from 2008 (completed by Michael Baker), and is also

identified in the current County Comprehensive Plan. The land value of the parcel was estimated through a March 16, 2017 Property Appraisal completed by CRES, Inc., a professional real estate and appraiser company. After negotiations with the current landowner to acquire the property were unsuccessful, and final offers were refused, the land was acquired after a Certificate of Take was recorded. This property will be utilized for future construction of a new drinking water pump station and ground storage tanks.

15. Piney Mountain Tank Rehabilitation

Design Engineer:	Johnson, Mirmiran & Thompson (JMT)
Project Start:	September 2017
Project Status:	30% Design Complete
Construction Start:	April 2018
Completion:	October 2018
Total Capital Project Budget:	$500,000

Current Status:

RWSA has negotiated a scope and fee with JMT for design, bidding, and construction phase services. Preparation of construction documents is underway.

History:

The 700,000 gallon Piney Mountain Tank serves the North Rivanna pressure zone. A routine inspection of the Piney Mountain Tank in April of 2012 revealed several deformed roof rafters, indicating the potential for structural deficiency. An in-depth structural inspection was performed in May of 2013 and a list of recommended roof repairs provided. This project includes consultant services for design and bidding of necessary roof repairs and other ancillary items, as well as construction, construction administration, and inspection services. Long term plans for the Rt. 29 service area include the modification or elimination of this facility. The current recommended improvements are needed in order to maintain the existing tank in service for at least the next 10 years.

16. Avon to Pantops Water Main

Design Engineer:	Michael Baker International (Baker)
Project Start:	August 2017
Project Status:	5% Preliminary Design Complete
Construction Start:	2020
Completion:	2023
Total Capital Project Budget:	$13,000,000

Current Status:

Route alignment determination, hydraulic modeling, and preliminary design are underway.

History:

An engineering contract has been negotiated and was approved by the Board of Directors in July 2017.

The focus of this project is on the southern half of the urban area water system which is currently served predominantly by the Avon Street and Pantops water storage tanks. The Avon Street tank is hydraulically well connected to the Observatory Water Treatment Plant while the Pantops tank is well connected to the South Rivanna Water Treatment Plant. The hydraulic connectivity between the two tanks, however, is less than desired, creating operational challenges and reduced system flexibility. In 1987, the City and ACSA developed the Southern Loop Agreement which laid out two key phases (with the first being built at the time). The 1987 Agreement and planning efforts will service as a starting point for this current project.

17. <u>Crozet Interceptor Pump Stations Bypass and Isolation Valves</u>

Design Engineer:	Johnson, Mirmiran & Thompson (JMT)
Project Start:	August 2017
Project Status:	35% Design Complete
Construction Start:	January 2018
Expected Completion Date:	July 2018
Total Capital Project Budget:	$720,000

<u>Current Status</u>:

A work authorization with JMT was finalized to provide design, bidding and construction administration related services for this project. Design services began in August. Bidding is anticipated for November with a contract award at the December Board Meeting.

<u>History:</u>

There are four pump stations located in the Crozet Interceptor system that help convey flow from the Crozet Area into the Morey Creek Interceptor and the rest of the urban collection system. These pump stations were constructed in the 1980s and provided no means of isolating each pump station from its downstream force main. This condition complicates maintenance-related activities as each time a pump station component needs to be serviced or replaced, the volume of wastewater within the force main must be addressed at the pump station as it drains back to the wet well. In addition, the Crozet Interceptor pump stations also have limited storage within their wet wells, and any reduction of down time as a result of dealing with the impacts of no isolation valves, decreases the amount of time available to work on the equipment. In order to alleviate this condition, temporary valves called "line stops" will be temporarily installed on the force mains downstream of the pump stations to allow enough time for a new isolation valve to be installed. Isolation valves will be located in order to provide the maximum amount of down time available based on current system conditions for future pump station maintenance activities. While line stops are in place, bypass connections will also be provided at each pump station. These will allow staff the option of bringing in bypass pumps for more significant pump station shutdowns required for maintenance activities or repairs for which the isolation valves alone cannot account.

18. Crozet Flow Equalization Tank

Design Engineer:	Greeley and Hansen (G&H)
Project Start:	October 2016
Project Status:	Siting Study 100% Complete
Construction Start:	2019
Completion:	2020
Total Capital Project Budget:	$2,325,000

Current Status:

G&H has completed a report documenting potential tank locations within the drainage basin. A meeting was held with ACSA on October 9, 2017 and a tank location was agreed upon for additional investigation work and preliminary engineering activities.

G&H has submitted a work authorization to continue the project through construction, which is currently being reviewed by RWSA in anticipation of bringing it to the Board at the November 2017 meeting for approval.

History:

A Work Authorization with G&H to perform a siting study for the flow equalization tank project was issued in October 2016 and with completion expected in 2017. These services include the sizing of the flow equalization tank and the pumping station based on information from the updated model, a preliminary site selection process based on the sizing requirements identified in order to narrow down the number of sites, and an alternatives analysis performed for each selected site to evaluate the feasibility of locating the facility. This is the first step in the site selection process and will be followed by a more in depth analysis of the potential tank locations and the eventual selection of a final site. As part of the first task, pump tests are being performed at all four Crozet Pump Stations to confirm existing capacities.

Rehabilitation work in the RWSA and Albemarle County Service Authority sewer systems is on-going to meet inflow and infiltration (I&I) reduction goals in the Crozet Interceptor sewer basin based on the flow metering and modeling results of the Comprehensive Sanitary Sewer Model and Study conducted in 2006. The intent was to reduce I&I in the system to meet the 2020 two-year storm flow targets.

A 2016 update to the 2006 model was completed which evaluated the I&I reduction goals previously established and future capital project needs. Based on the results of that study, it was determined that the Crozet Interceptor system and namely the existing Crozet Pump Stations (1 through 4) have adequate capacity to handle the 2015 peak wet weather flow from the Crozet Service Area during a two-year storm. However, as projected growth in the service area occurs, peak wet weather flows in the area under the storm conditions established in the updated model will begin to exceed the firm capacities of the pump stations by 2025. Additional I&I reductions in order to reduce flows enough to not exceed the pump station firm capacities are not feasible and as a result, the construction of a flow equalization tank was identified as the best method to alleviate wet weather capacity issues.

While the study indicates that capacity should not be an issue until 2025, a flow equalization tank would also provide a significant benefit to the maintenance of the Crozet Pumping Station system which currently lacks system storage necessary to allow adequate time to perform repairs on the pumps and the associated force mains while the system is down. As a result, it is important to progress into the siting study for the flow equalization tank to ensure that it can be constructed in time for the 2025 flow targets but also to facilitate less complicated and more thorough maintenance on the system that has not been possible previously.

19. <u>Strategic Plan</u>

Consultant:	Raftelis Financial Consultants, Inc.
Project Start:	June 2017
Project Status:	60% Complete
Completion:	December 2017
Total Contract Cost:	$82,195

<u>Current Status</u>:

Six strategic goals were drafted by the Project Steering Committee (PSC) during a Strategy Workshop on October 12. Goal Teams presented implementation details to achieve each goal over the next five years.

Raftelis will provide the draft Strategic Plan for discussion by both Rivanna Boards in a joint work session during the regular Board meetings on November 14. We are on schedule to approve the Strategic Plan during the Board meetings on December 19.

<u>History:</u>

The joint RWSA and RSWA Authorities issued RFP #17-08 for the development of a Strategic Plan. Proposals from six interested firms were received on May 5, 2017. Interviews with three firms were conducted on May 19, 2017. A public kickoff meeting with Raftelis and the project steering committee, including several RWSA/RSWA Board Members and staff, was held on June 15. One-on-one interviews with Board Members, staff and community stakeholders are being completed. We will host a Public Meeting entitled "Strategic Planning Input Session" at 6 pm on August 3 at the downtown CommunitySpace to receive additional input from the community. Raftelis has completed 20 one-on-one interviews with regulatory and community organizations to ensure we have extensive community involvement.

The project schedule includes:

June 26 – July 14:	On-Line Survey for All Employees and Board Members
June 26 – 29:	Employee Focus Group meetings; and one-on-one External Stakeholder Interviews with Raftelis

August 3rd:	Public Meeting (evening) hosted by Rivanna and Raftelis
August 22:	Work Session #1 with the Boards, after the regular Board meetings
August 31:	Project Steering Committee meeting #2, (full day, 9 a – 4 p): "Foundation Workshop"
Sept. 19 – 21:	Goal Teams Workshops (employee teams)
October 12:	Project Steering Committee and employee Goal Teams meeting, (full day, 9 a – 4p "Strategy Workshop")
November 14:	Work Session #2 with the Boards, after the regular Board meetings
December 19:	Work Session #3 with the Boards, after the regular Board meetings, to Finalize the Strategic Plan (special meeting for RSWA)

20. Reservoir Management Plan

Consultant:	DiNatale Water Consultants
Project Start:	November 2014
Project Status:	80% Complete
Completion:	February 2018
Total Contract Cost:	$336,475

Current Status:

The second year of water quality monitoring for this project is in progress. An intensive week of sampling took place in June. A project team meeting was held on June 16 to discuss the results. Sediment sampling at Beaver Creek Reservoir and South Fork Rivanna Reservoir took place in July. The final report with recommendations is expected by February 2018.

History:

The Phase 1 report is complete, along with a related public information document, and both have been distributed to the Board and are also available for public review at www.rivanna.org/reservoir-study. In June 2014 staff received proposals for services to develop a Reservoir Management Plan to include all five reservoirs that RWSA manages for water supply (Beaver Creek, Ragged Mountain, South Fork Rivanna, Sugar Hollow, and Totier Creek). A selection committee represented by staff from RWSA, ACSA, and the City reviewed proposals and selected two firms for interviews. DiNatale Water Consultants was awarded this contract in the amount of the $176,334, and the contract was executed in November 2014. The contract was extended in 2016, with $160,141 being approved by the Board in August 2016 for Phase 2, for a total approved contract amount of $336,475.

21. South Fork Rivanna Reservoir to Ragged Mtn. Reservoir Water Line Right-of-Way

Design Engineer:	Michael Baker International (Baker)
Project Start:	October 2017
Project Status:	5 % Complete
Completion:	2021
Total Capital Project Budget:	$2,295,000

Current Status:

RWSA has negotiated a scope and fee with Michael Baker International for the routing study, preliminary design, plat creation and easement acquisition process. Preliminary design work will begin in October 2017. Final design and construction of the water line are not included in the current project scope.

History:

The approved 50-year Community Water Supply Plan includes the future construction of a raw water line from the South Fork Rivanna Reservoir to the Ragged Mountain Reservoir. This water line will replace the existing Upper Sugar Hollow Pipeline along an alternative alignment to increase raw water transfer capacity in the Urban Water System. The preliminary route for the water line followed the proposed Route 29 Charlottesville Bypass; however, the Bypass project was suspended by VDOT in 2014, requiring a more detailed routing study for the future water line. This project includes a routing study, preliminary design and preparation of easement documents, as well as acquisition of water line easements along the approved route.

22. South Rivanna Hydropower Plant Decommissioning

Consultant:	Gomez and Sullivan
Project Start:	October 2016
Project Status:	Exemption Surrender Process – Phase 2 Underway
Construction Start:	2019
Completion:	2020
Total Capital Project Budget:	$1,000,000

Current Status:

Work associated with the first phase of the exemption surrender process with Gomez and Sullivan and Van Ness Feldman was completed confirming with FERC what the next steps in the surrender process would include. A work authorization with Gomez and Sullivan for Phase 2 of the exemption surrender process was finalized in August 2017 and includes tasks to manage the local regulatory agencies consultation process and development of the surrender application and decommissioning plan. Work associated with the development of a consultation document to be provided to local regulatory agencies has begun with the intent of hosting a meeting with agencies to discuss the decommissioning process in late October.

History:

RWSA constructed a hydropower plant at the South Fork Rivanna Dam in 1987. Power generation at the plant was limited for a number of years due to various mechanical issues and has been completely offline for the past four years. In December 2011, RWSA retained HDR to perform a mechanical and electrical equipment assessment and to provide recommendations for capital expenditures and continued operation. This assessment identified the need to perform a number of mechanical and electrical modifications to improve operation of the hydropower plant. On June 16, 2013, while the plant was down for testing associated with repairs to the speed reducer and generator, the powerhouse flooded during a heavy rainfall event. A post-flood inspection indicated that the rising water damaged the electrical equipment. In addition to electrical system issues, the turbine blades were "stuck" and inoperable prior to the flood event. Prior to beginning any rehabilitation work on the hydropower plant, it was determined that a feasibility study should be performed that reviewed previous recommendations and took into account interaction with the Federal Energy Regulatory Commission (FERC) to determine if it was cost effective for RWSA to rehabilitate the facility. The feasibility study was conducted by Gomez and Sullivan and concluded that rehabilitation of the facility would most likely not provide a return on investment based on current market conditions. Staff recommended that RWSA proceed with surrendering the exemption to licensure with FERC and decommission the facility. During the meeting on October 25, 2016, the Board of Directors agreed with the recommendation and staff began to proceed with the surrender process.

23. Drinking Water Infrastructure Plan – Crozet Area

Design Engineer:	Hazen and Sawyer
Project Start:	June 2017
Project Status:	20% Complete
Completion:	Fall 2018
Total Capital Project Budget:	$300,000

Current Status:

Hazen is currently reviewing RWSA and ACSA historical average and peak day water demand data, as well as County zoning and land use data, to develop water demand forecasts.

RWSA staff has provided Hazen with existing data, reports and service area history to start their analysis. A design team kick-off meeting has been held, and additional meetings with county staff and the VA DEQ will be scheduled this Fall, when future demand analyses have been completed. Field investigation of hydraulic data is being scheduled, however, hydrant flow testing will be suspended until the current Drought Watch restrictions have been lifted.

History:

Preliminary meetings with an Albemarle County Board member and Community Development representatives were held in May. A meeting with the Crozet Community

Advisory Committee was held on June 21, 2017.

This project was previously entitled the Crozet Water Master Plan, and is identified in the current Capital Improvement Plan as such. The project name has been changed to avoid confusion with the separate Crozet Master Plan document. The Crozet water service area continues to see expanded growth in the average and maximum day water demands. Discussion with county and ACSA officials have confirmed recent growth trends that water use is increasing in Crozet. While some projects ae currently underway to address the immediate need in Crozet, this project will develop a comprehensive mid and long range plan (50 years) for the entire water system including; raw water supply, raw water pumping and conveyance, finished water treatment, finished water pumping, and finished water distribution and storage. Future water demand projections will be an important part of this project. At the June 27, 2017 Board Meeting, it was approved to award this planning project to the consulting engineering firm of Hazen and Sawyer. An Engineering Services Agreement was executed on July 5, 2017, as well as Work Authorization No. 1 for the fee of $269,120.

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MEMORANDUM

TO: **RIVANNA WATER AND SEWER AUTHORITY BOARDS OF DIRECTORS**

FROM: **JENNIFER WHITAKER, DIRECTOR OF ENGINEERING & MAINTENACE**

REVIEWED BY: **BILL MAWYER, EXECUTIVE DIRECTOR**

SUBJECT: **ENGINEERING SERVICES - GEOTECHNICAL, MATERIALS TESTING, AND PROFESSIONAL ENGINEERING SERVICES – SCHNABEL ENGINEERING, LLC**

DATE: **OCTOBER 24, 2017**

The RWSA and RSWA have needs for various materials testing and professional engineering services of a geotechnical consultant for on-going and future projects. A Request for Proposals (RFP 17-09) for a new term contract to serve both Authorities was developed and advertised on August 10, 2017. Two proposals were received on August 29, 2017.

Based on the qualifications of the firms the RFP selection committee decided to schedule interviews with both firms. Interviews were conducted on October 2 and October 4, 2017, and the committee determined that Schnabel Engineering, LLC was the most meritorious candidate and selection of this firm would be in the best interests of the Authorities. Work tasks under this contract may include items such as: construction investigations of subsurface conditions, soil borings, foundation analysis, materials testing, steel inspections and other professional engineering services as needed. The first project RSWA will be looking to utilize this contract for will be the construction of the New Ivy Solid Waste Transfer Station where extensive site work will require foundation analysis, steel building inspection, as well as soil compaction, concrete, and asphalt testing.

Board Action Requested:

Staff requests that the Board of Directors authorize the Executive Director to execute an Engineering Services Agreement with Schnabel Engineering, LLC for a Term Contract for Geotechnical, Materials Testing, and Professional Engineering Services. The contract will be awarded for one (1) year, with the option for up to four (4) additional one (1) year renewals for a total contract length not to exceed five (5) years. Staff also requests the Board to authorize the Executive Director to execute future work authorizations under the contract prepared as necessary in accordance with all Term Agreement requirements as stated in the request for proposal and the Virginia Public Procurement Act, to the extent that funding for such authorizations is within the Board's approved budget.

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **JENNIFER A. WHITAKER, CHIEF ENGINEER**

REVIEWED BY: **BILL MAWYER, EXECUTIVE DIRECTOR**

SUBJECT: **ENGINEERING SERVICES – PRELIMINARY ENGINEERING REPORT FOR OBSERVATORY AND SOUTH RIVANNA WATER TREATMENT PLANT IMPROVEMENT PROJECTS - SHORT, ELLIOT AND HENDRICKSON ENGINEERS**

DATE: **OCTOBER 24, 2017**

The Observatory Water Treatment Plant (OWTP) and South Rivanna Water Treatment Plant (SRWTP) both are in need of improvements, and the OWTP needs to be expanded in treatment capacity from 7 to 10 mgd. Both projects are included in the current FY 2017 - 2021 Capital Improvement Program. In an effort to save time and money, staff decided to combine both projects into one Preliminary Engineering Report, which will include an analysis of the needs for both the OWTP and SRWTP. Short Elliot and Hendrickson (SEH) is the engineering design consultant selected to perform this work. SEH is also completing the design to expand the Crozet Water Treatment Plant.

Many of the treatment systems at the OWTP have not significantly changed since the plant was constructed in the late 1950s, and while operational, these systems have reached the end of their service life. Some of the anticipated improvements include:

- upgrades to sedimentation basins, filters, filter gallery control valves, SCADA, chemical and electrical systems
- raw water pump station upgrades
- settled water flume structural improvements.

As part of the Preliminary Engineering Report, SEH will also evaluate the improvements and costs required to increase the capacity of the OWTP.

SRWTP is the largest producer of finished water within the RWSA system. Improvements to be evaluated include:

- adding two filters and air scour extensions
- an additional variable frequency motor drive
- electrical upgrades at the raw water pump station
- additional coagulant storage facilities
- electrical system upgrades at the waste sludge pumping station
- piping improvements to allow decanted filter backwash water to be conveyed to storm sewers per the updated discharge permit

- adding a control and laboratory building, as well as a metal building to cover the existing liquid lime feed storage/pumping facilities.

Staff has negotiated a fee with SEH in the amount of $110,000 to complete a Preliminary Engineering Report for both the OWTP and SRWTP Improvement projects.

The existing Capital Improvement Plan currently includes funding for both WTP Improvement Projects. It is anticipated that by completing the Preliminary Engineering Report first, staff will be able to more accurately determine the needs at the plants, and then refine costs estimates associated with performing the work.

Board Action Requested:

Staff requests that the Board of Directors authorize the Executive Director to execute a work authorization with Short Elliot Hendrickson, Inc. for a combined Preliminary Engineering Report for the Observatory and South Rivanna Water Treatment Plant projects, for an amount not to exceed $110,000, and that the Executive Director be authorized to execute necessary amendments in additional amounts, if deemed necessary to complete design of the improvements identified above, not to exceed 10% of the initial authorization.

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **BILL MAWYER, EXECUTIVE DIRECTOR**

SUBJECT: **DROUGHT STATUS UPDATE**

DATE: **OCTOBER 24, 2017**

The South Fork Rivanna Reservoir (SFRR) was last full on August 3, 2017. Due to the lack of rainfall and drought conditions throughout central Virginia, water storage in the SFRR significantly declined during the last two weeks of September. In response, the following actions were taken to reduce water demand:

- The RWSA, ACSA and City of Charlottesville jointly issued a Drought Watch requesting voluntary water conservation measures on October 3, 2017.
- The drought stage was upgraded to a Drought Warning by RWSA on October 5, 2017 due to the continued rapid loss of water storage at the SFRR.
- The ACSA Board of Directors requested mandatory water restrictions on October 9, 2017.
- City Council and the Albemarle County Board of Supervisor enacted mandatory water restrictions on October 11, 2017.

Also in response to the rapid decrease in water volume at SFRR, staff initiated the following operational and regulatory actions:

- Production was reduced at the South Rivanna Water Treatment Plant and increased at the Observatory Water Treatment Plant to reduce withdrawals from the SFRR.
- A request was coordinated with the Virginia Department of Environmental Quality (VDEQ) to reduce the downstream release requirements from the SFRR.

Through these combined actions and recent rainfall, reservoir storage has increased to 54% of capacity on October 18 from a low of 42% on October 5, 2017.

In addition, staff is coordinating with the VDEQ to supplement the drought identification criteria, including criteria for the Drought Emergency Stage, included in our water withdrawal permit and the Regional Drought Management Plan.

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Board Action Requested:

No action requested at this time.

Drought Update

for the
Rivanna Water and Sewer Authority
Board of Directors

Presented by:

Bill Mawyer, Executive Director

October 24, 2017

South Fork Rivanna Reservoir

Image taken October 4, 2017

South Fork Rivanna Reservoir

Image taken October 4, 2017

South Fork Rivanna Reservoir

- August 3rd — 100% Full
- September 15th — 77%
- October 5th — 42%

RWSA implements operational changes; contacts DEQ

Drought Management Measures Implemented

1. Mandatory water restrictions to reduce demand
2. Operational changes:
   - Decreased water treatment at the South Rivanna Water Treatment Plant
   - Increased water treatment at the Observatory Water Treatment Plant

	SRWTP	OWTP
Typical	8 mgd	2 mgd
October 5th	5 mgd	5 mgd

3. Reduced required release to the river

Typical	10 mgd
October 10th	2 mgd

South Fork Rivanna Reservoir

	Reservoir Capacity	Level (feet)
October 5th	42%	-6.9
October 18th*	54%	-5.2

*110 million gallons added during this period

Complete Infrastructure Projects

- SFRR to RM Reservoir Waterline
  - $70 – 100 million
- Observatory Water Treatment Plant Expansion
  - $10-15 million
- Avon to Pantops Waterline
  - $13 million

1. At the September 26, 2017 Board meeting, RWSA staff stated there was a “3% chance for the combined reservoir levels to be less than 75% after the next 12 weeks”. On October 2, 2017, a week later, a Drought Watch was declared. Two days later, RWSA declared a Drought Warning with a request to the City and the County for mandatory restrictions. Please explain the sudden changes after it was said that the water supply was “in relatively good shape”?

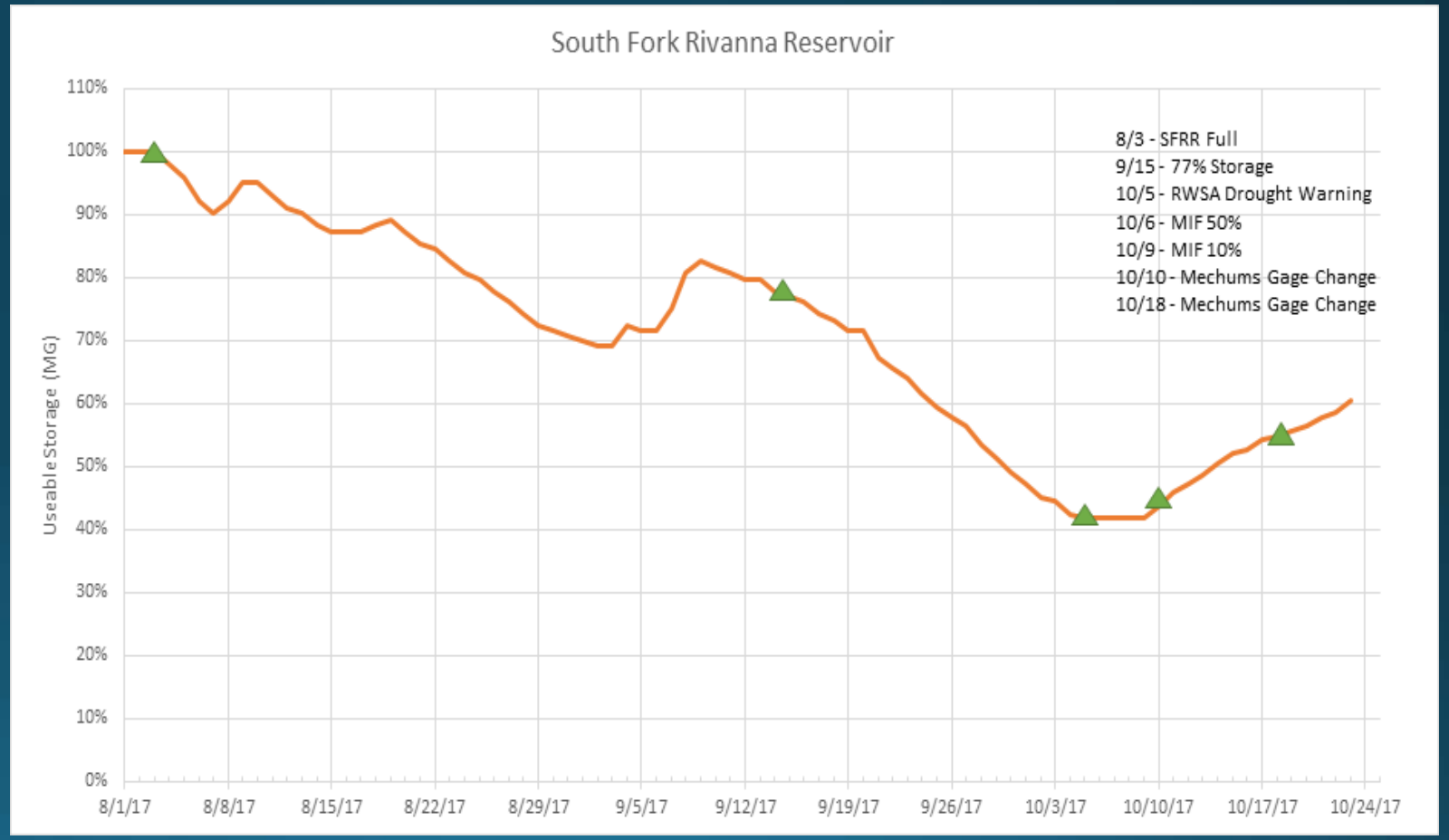
a. Staff used the hydrologic model required by the Regional Drought Management Plan and provided the results to the RWSA Board on September 26, 2017.

b. Thereafter, staff saw the rapid decline of the South Fork Rivanna Reservoir (SFRR) and moved forward with drought management measures to conserve water storage in the SFRR.

2. The South Fork Rivanna Reservoir (SFRR) water supply dropped to about 22 days. How could that have occurred without any public warning, when the worst level in 2002 was 60 days, and the community then was "extremely worried"?

a. There was a 32% decline in the South Fork Rivanna Reservoir (SFRR) over a short period from September 15th to October 5th.

b. Drought management measures were implemented on October 3rd when the consistent decline in the SFRR was identified.



3. How did we go from the South Fork Rivanna Reservoir (SFRR) being full on August 3rd to a Drought Watch level on October 3rd?

a. Water inflows to the South Fork Rivanna Reservoir (SFRR) were exceeded by the amount of water taken out of the SFRR for treatment, for water to be released to the river, and for water lost through natural evaporation.

4. The Ragged Mountain Reservoir (RMR) has been nearly 90% full during most of this time. Why is the new RMR not providing enough water to offset the loss at South Fork Rivanna Reservoir?

a. Water cannot be transferred from the Ragged Mountain Reservoir to the South Fork Rivanna Reservoir.

b. Water treatment capacity of the Observatory Water Treatment Plant cannot fully replace water treatment requirements of the South Rivanna Water Treatment Plant. Water must be produced at both treatment plants to serve Charlottesville and the urban areas of Albemarle County.

5. People in the community have noticed, and commented on, the dramatic reduction in water levels at South Fork Rivanna Reservoir. Why did it take so long for RWSA to publicly address the situation?

a. Drought management measures were implemented as soon as the consistent decline of the South Fork Rivanna Reservoir (SFRR) was identified.

b. The SFRR was 100% full on August 3rd and 77% full on September 15th before declining to 45% on October 2nd.

6. Where did the 10 million gallons a day go that was initially talked about? Some have speculated there is a hole in the bottom of the reservoir?

a. Ten million gallons initially identified by staff as the difference between inflow and outflow from the reservoir.

b. Inflow data has been recently reduced by about 15%.

c. We will test our new meter installed in September 2017 to verify accuracy at all flow volumes.

d. No evidence of a hole in the floor of the reservoir.

7. There is some speculation that the dam gates malfunctioned and released excess water to the river. Is that the real cause of the sudden drop in the reservoir level?

a. Two gates, constructed in 1966, were releasing about three million gallons per day. This release has now been decreased to 0.5 million gallons per day.
b. The 3rd gate has a new meter installed in September 2016. Installation of the meter was certified by the on-site manufacturer's representative.
c. We will test the new meter to ensure it is measuring flow correctly.

8. If it doesn’t rain and we have an abnormally dry winter, as some long-range forecasts are predicting, what plan does RWSA have to provide the community with an adequate supply of drinking water?

a. Release water from Sugar Hollow Reservoir to supply the SFRR.

b. Release water from the Beaver Creek Reservoir to supply SFRR.

c. Request a reduction in the release to the river to less than 10%.

d. Use pumps to access additional water in the lower level of SFRR. This water has not been included in our calculations of “useable” reservoir storage.

9. How do you address the statement that “the water supply plan is broken, and the in-stream releases required in the permit drained the reservoir?” Is this the cause of the water conservation measures?

a. The Water Supply Plan is working. The additional water supply created by constructing the new Ragged Mountain Reservoir (RMR) has increased our water supply by one billion gallons. Additional projects included in the Water Supply Plan are in progress, including:
   i. Alignment acquisition for a water line from the RMR to SFRR
   ii. An expansion of the Observatory Water Treatment Plant to allow treatment of a greater volume of water stored in the RMR

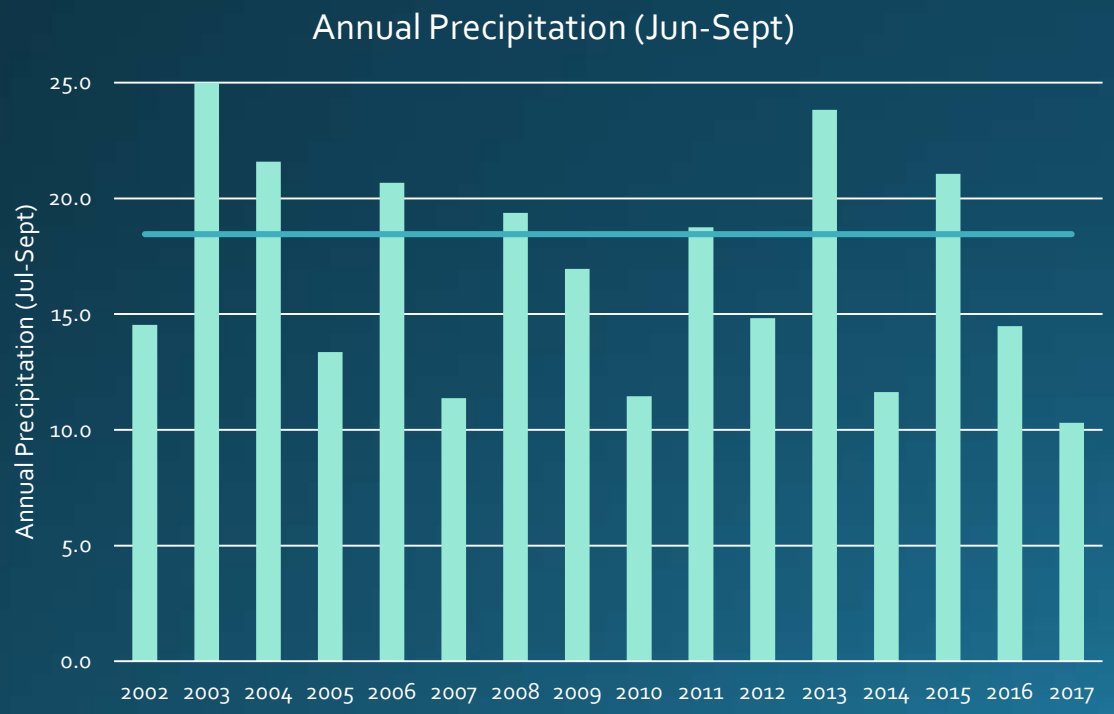
b. Another important project is underway to extend a major water line from Avon Street to Pantops Mountain (completion of the Southern Loop).

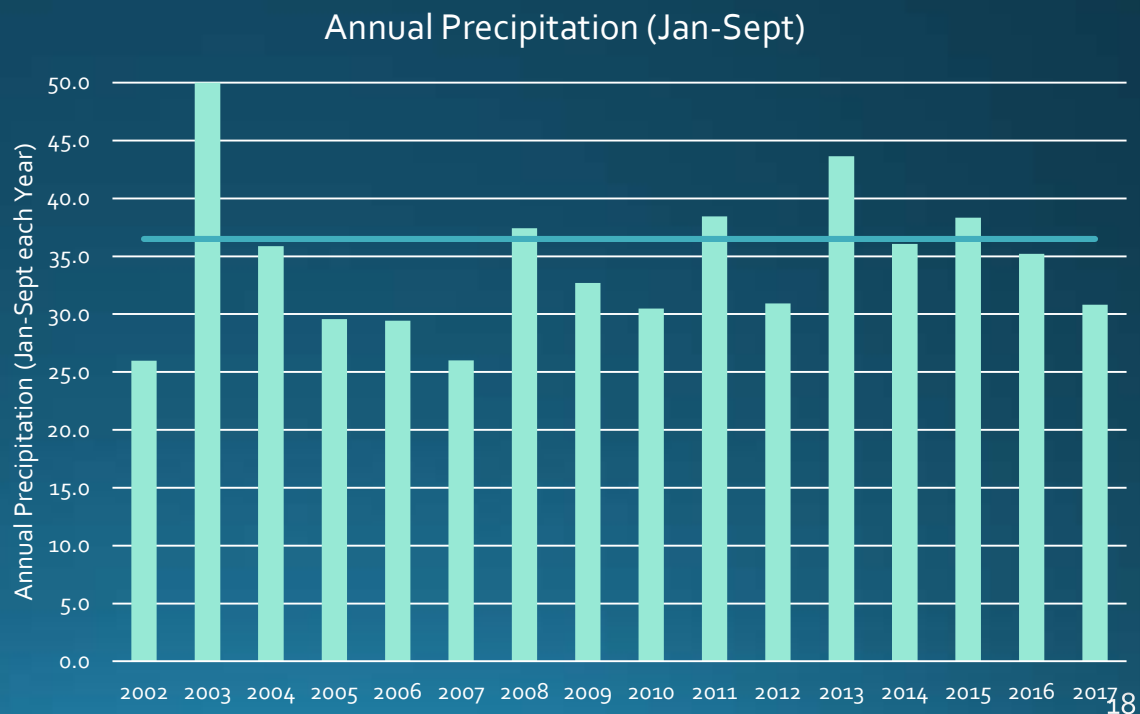
10. Is now the time to remove the sediment since the South Fork Rivanna Reservoir is down?

a. The time required to obtain permits to perform a dredging project would be lengthy. In addition, a location for dredge material has not been determined.

11. What are the differences in rainfall from August to mid-September in 2015, 2016, and 2017?

	Rainfall (Inches)	
	June – September	January – September
2017	10	31
2016	14	35
2015	21	38
Normal	18	36





12. What “data driven points” determine when Emergency Water Restrictions would be declared by the RWSA Board? How do we give the community adequate notice that such restrictions are forthcoming?

a. Emergency restrictions are not anticipated in the foreseeable future as the water level in the SFRR has been increasing daily since October 5th. Considerations for declaring an Emergency will include:
   i. The water level in the SFRR
   ii. A significant decline in the water level in the SFRR
   iii. Short and long-term weather forecasts
   iv. The water level in the Sugar Hollow Reservoir
   v. The water level in the Beaver Creek Reservoir

b. If emergency measures are necessary, the community will be notified through media channels, the Rivanna webpage, and social media.

13. Did RWSA lower the reservoirs in anticipation of the hurricane season?

a. We did not lower the SFRR anticipating a major storm due to the uncertainty of storms impacting our area.

14. Does the current Drought Management Plan work? If not, will the Drought Management Plan be revised?

a. The Drought Management Plan works, but will be reviewed with VDEQ, and supplemented as needed to capture the benefits realized through out experiences this year.

15. Going forward, what is RWSA doing to prevent a water shortage from happening next summer and fall?

a. This is the first summer/fall since the new Ragged Mountain Dam was constructed and filled (2014-2015), and the initial opportunity to exercise the revised drought management program for the three urban reservoirs. Through this experience we will be better positioned with our operational and facility procedures to effectively manage our water supply, treatment, and distributions resources and minimize future water shortages.

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MEMORANDUM

TO: **RIVANNA WATER & SEWER AUTHORITY BOARD OF DIRECTORS**

FROM: **JENNIFER WHITAKER, DIRECTOR OF ENGINEERING & MAINTENANCE**

REVIEWED BY: **BILL MAWYER, EXECUTIVE DIRECTOR**

SUBJECT: **CONSTRUCTION CONTRACT AWARD – 2017 SANITARY SEWER REHABILITATION AND REPAIR - IPR NORTHEAST, LLC**

DATE: **OCTOBER 24, 2017**

The Comprehensive Sanitary Sewer Study used in-pipe flow metering data and hydraulic modelling to quantify the impacts of inflow and infiltration (I&I) in the collection system. The City, ACSA, and RWSA have committed to on-going programs which implement rehabilitation and repair of the sewer collection systems, in an effort to reduce these adverse effects.

The Authority hired an Engineering firm that specializes in sanitary sewer rehabilitation to perform sewer infrastructure condition assessments and the firm developed a sewer rehabilitation bid package. The sewer rehabilitation bid package includes all basic rehabilitation methods that may be necessary for RWSA collection system improvements and as a result, has a number of unit price bid items. The bid package was set up to provide a total bid based on the sum of these unit price bid items for comparative purposes. The actual work associated with this contract will be administered through individual construction work authorizations in accordance with the unit price bid items included in the bid package and work to be performed in accordance with the specifications. This method of bidding and rehabilitation construction is often referred to as the "find and fix method."

Bids for the 2017 Sanitary Sewer Rehabilitation and Repair Contract were opened on September 14, 2017, and five bids were received. While five bids were received, the initial apparent low bidder withdrew their bid resulting in four responsive and responsible bids with total values of all unit price items ranging from $1,221,751.34 to $1,950,988.00. The apparent low bidder was IPR Northeast for a total bid value of $1,221,751.34. Frazier Engineering has reviewed the bid documents submitted by IPR Northeast and verified that the documents are acceptable. The current Capital Improvement Plan budget for sewer rehabilitation work is $1,124,900 which is less than the total bid value submitted by IPR Northeast. As a result, negotiations took place with IPR Northeast that adjusted assumed quantities of unit price bid items and reduced the total bid value

to $1,000,838.79. IPR Northeast has agreed to the modified quantities and if the Board of Directors approves the award of this contract to IPR Northeast, a Change Order No. 1 will be issued along with the executed Contract Documents formally modifying the total bid value. Based on these conditions, Frazier Engineering has recommended awarding the construction project to IPR Northeast.

Board Action Requested:

Staff recommends that the Board of Directors award the construction contract for the 2017 Sanitary Sewer Rehabilitation and Repair Contract (RFB No. 337) to IPR Northeast, LLC in the amount of $1,000,838.79, based on the issuance of Change Order No. 1 with the executed contract modifying the submitted total bid amount. Staff further requests the Board of Directors to authorize the Executive Director to execute the contract and Change Order No. 1 with IPR Northeast and to approve any additional change orders to the contract, only when necessary for the completion of this project, provided the total amount of all change orders does not exceed 10% of the awarded contract amount.

Financial Review

October 24, 2017

RIVANNA

WATER & SEWER AUTHORITY

CAPITAL ACTIVITY
SINCE FY2009

Capital Funding:

Total Capital Expenses	$ 209,701,000
Used Reserves to fund CIP	$ 29,200,000
	14.0%

Savings on future cash flow (Debt Avoidance)
at 4.0%

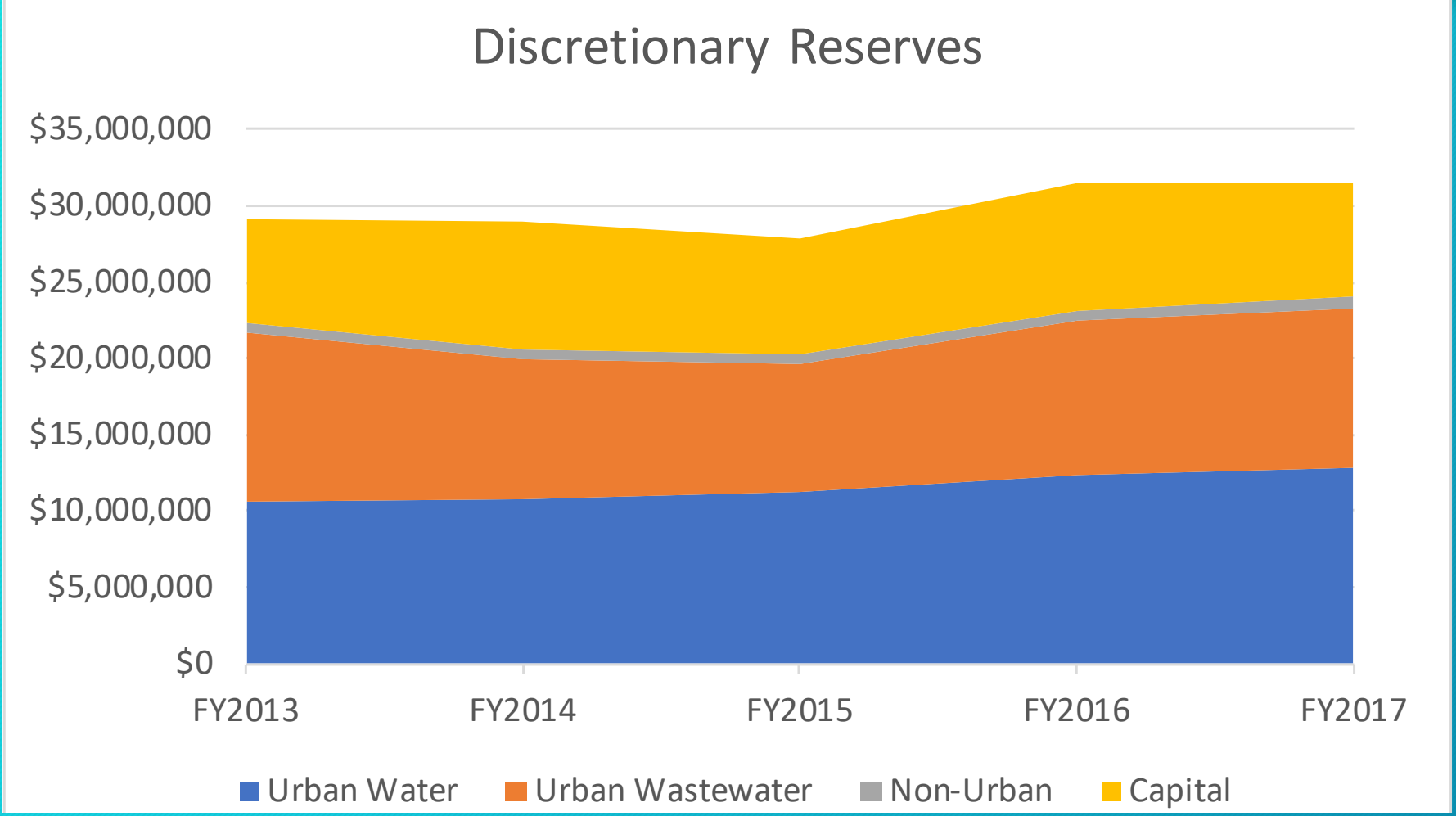
Interest saving over 30 years	$ 22,000,000

Balance Sheet Review

	June 30, 2010	June 30, 2017	2010 - 2017 Comparison	Increase
ASSETS:				
Current Unrestricted Assets	$ 28,084,000	$ 39,099,000	$ 11,015,000	39%
Current Restricted Assets	10,224,000	21,224,000	$ 11,000,000	108%
Capital Assets:				
Plant and Equipment	$ 167,152,000	$ 346,921,000		
Less: Depreciation	(53,703,000)	(83,069,000)		
Total Capital Assets	$ 113,450,000	$ 263,852,000	$ 150,402,000	133%
Ratio of Current Unrestricted to Capital Assets:	24.8%	14.8%		
LIABILITIES:				
Short Term	$ 6,042,000	$ 13,514,000		
Revenue Bonded Debt	54,793,000	170,772,000		
Total Liabilities	$ 60,835,000	$ 184,286,000	$ 123,451,000	203%

On August 23, 2011, policies were adopted that guide the Authority on budgeting for operations and capital needs, debt policy and reserves.

Below is a snapshot of the reserve levels at year end for the past five years.



3. Third tier reserves are those reserves internally restricted by the Authority. Those include Discretionary Rate Center reserves for each rate center, a Capital Fund, Watershed Management reserves, and a Vehicle replacement reserve. Although the Rate Stabilization reserves are mentioned in the Bond Indenture and listed in the second tier of reserves, they are controlled and funded much like tier three reserves. These reserves are defined as follows:

Discretionary Reserves – these reserves are central reserve depository for ea
depreciation from t
excess rate revenu
reserves. Yearly d
reserves to repleni
each rate center, o
restricted to Board
to fund those years
transfers, and sig
otherwise would re

Rate Stabilizatio
Wastewater Rate
recognition of the
for its services, the
for the purposes o
flow periods of
conditions. Each
extreme low flo
restrictions enacte
provides for a mo
be used in addit
available, in recognition that mid-year rate increases during severe drought conditions are undesirable.

Watershed/Water Quality Reserves – These reserves were set up in FY 2004 and were funded from the Urban Water rate center and will be considered each year in the budget cycle for continued funding. These reserves are to be used for water quality and watershed projects to preserve, protect or rehabilitate specific or targeted raw water resources of the Authority and is used at the Board's discretion. In FY 2010, the annual set aside was stopped; however, the reserve does still have funds available.

Source: Adopted Financial Policies 8/23/2011

Discretionary Reserves - these reserves are central reserve depository for each rate center and the Capital Fund. Planned depreciation from the operating budgets, yearly surpluses and planned excess rate revenues from the CIP Growth Rate are deposited in the reserves. Yearly deficits if they occur are also funded from these reserves to replenish the operating account. There is one reserve for each rate center, or a total of six reserves. Uses of these reserves are restricted to Board action for such items as normal rate stabilization to fund those years when deficits occur, Capital Fund yearly planned transfers, and significant repairs or changes in operations that otherwise would require a rate increase to fund them.

	June 30, 2017 Ending Balance	
Urban Water		
Discretionary Reserve	**$ 11,516,129**	($1.5 earmarked for FY 2018 Capital Transfers)
Rate Stabilization Fund	**1,000,000**	Use in the event of major drought restrictions.
Watershed Management Fund	**281,440**	
Subtotal	**$ 12,797,569**	
Urban Wastewater		
Discretionary Reserve	**$ 10,008,698**	($1.1 earmarked for FY 2018 Capital Transfers & Debt Payments)
Rate Stabilization Fund	**1,000,000**	Use in the event of major drought restrictions.
Subtotal	**$ 11,008,698**	
Crozet Water		
Discretionary Reserve	**$ 490,591**	($100,000 earmarked for FY 2018 Capital Transfers)
Scottsville Water		
Discretionary Reserve	**$ 203,899**	
Glenmore Wastewater		
Discretionary Reserve	**$ 78,368**	
Scottsville Wastewater		
Discretionary Reserve	**$ 62,608**	
Capital Fund		
Non Debt Funded Capital Projects	**$ 7,409,166**	Designated for Capital Projects in progress
Vehicle Replacement Fund	**$ 911,201**	
Required Balance	**$ 500,000**	
Total Discretionary Reserves	**$ 33,462,100**	

Total Discretionary Reserves

Reserves are used for Operational needs and unexpected repairs.

If adequate reserves had not been in place for past repairs, the Authority's Board would have had to increase rates mid-year (multiple times) to pay for such projects that could not be delayed.

Reserves Provide Operational and Management Flexibility

Other past uses of reserves

- Odor Control 2017 – temporary odor control measures were put in place at the Moores Creek facility.
- Composting Operations – were stopped at the Moores Creek facility in mid-year. This was a $500,000 annual impact to the budget.
- $1.675 million settlement with a previous contractor - FY 2015.
- Bond Validation Law Suit – roughly $6-8 million was used for construction awaiting legal process to work its way through the court system – FY 2012.

Financial Credit Profile Review
Davenport LLC

Financial Policies Adopted in 2011 and updated in 2014

Increased Cash Reserve position over last 8-10 years

Bond Ratings

	Moody's	S&P
2012	Aa2	AA+
2010	Aa2	
2005	Aa3	AA
1999	Aa3	A+

Financial Review and Capital Funding Analysis

Rivanna Water & Sewer Authority

October 24, 2017

DAVENPORT & COMPANY
Member NYSE | FINRA | SIPC

Goals and Objectives

- Provide a brief overview of the current status and trends in the Municipal Credit Markets.
- Review key utility-related credit factors and ratios.
- Review Rivanna's historical and budgeted performance relative to these key utility credit ratios and financial policies.
- Provide perspective on Rivanna's financial strengths and weaknesses relative to key financial ratios through a series of peer comparatives.
- Provide perspective on the Authority's debt capacity under its financial policies and a series of assumed growth rate scenarios.

Municipal Market and Credit Rating Overview

Current Bond Ratings

Current Bond Ratings

- The Authority is currently rated Aa2 by Moody's (October 2012) and AA+ by Standard and Poor's (September 2012).

- The Authority must continually update the Rating Agencies on a wide variety of topics relevant to financial performance and prospects. This takes place at the time of each new debt issuance or roughly every other year under each rating agency's surveillance program. The goal being to maintain or enhance the Authority's bond rating.
  - This rating process may result in the affirmation of the Authority's existing ratings, an upgrade, or a downgrade.

- Maintaining and/or enhancing the Authority's credit rating is critical to obtaining the lowest cost of funds.

Rating Scale

Moody's Investors Service	Standard & Poor's	Fitch Ratings
Aaa	AAA	AAA
Aa1	AA+	AA+
Aa2	AA	AA
Aa3	AA-	AA-
A1	A+	A+
A2	A	A
A3	A-	A-
Baa1	BBB+	BBB+
Baa2	BBB	BBB
Baa3	BBB-	BBB-
Non Investment Grade		

Rating Agency Commentary

Moody's (10/4/2012)

- Strengths:
  - Stable service area
  - Strong liquidity position
- Challenges:
  - Above average debt ratio that is expected to increase with current issuance
- What could make the rating go up:
  - Improved liquidity position
  - Increased debt service coverage
  - Reduced debt ratio
- What could make the rating go down:
  - Reduced liquidity position
  - Decrease in debt service coverage
  - Increased debt ratio

S&P (9/28/2012)

- The AA+ rating is based on S&P's assessment of the Authority's:
  - Participation in the Charlottesville, Va. metropolitan statistical area;
  - Standing as a wholesale service provider that bills only two customers;
  - Historically strong coverage and liquidity ratios; and
  - Updated comprehensive five-year (2012-2016) capital plan that totals $201 million with half being funded with debt.
- Outlook
  - The stable outlook reflects our expectation that the authority will continue to maintain at least a strong financial position as it successfully addresses the system's capital needs, which include the issuance of additional debt. We do not expect that the rating will change within the two-year parameter of the stable outlook as we anticipate the authority continuing to maintain consistently strong reserve levels.

Rating Agency Methodology Updates

Moody's

Category	Rating Percentage	Short Term Control	Long Term Control
Economy / Tax Base	30%		✓
Finances	30%	✓	✓
Management	20%	✓	✓
Debt / Pensions	20%	✓	✓

- The information shown above outlines the *Quantitative* elements of the rating methodology. In addition to these factors, other *Qualitative* elements are considered in the ultimate rating outcome.

S&P

Category	Rating Percentage	Short Term Control	Long Term Control
Institutional Framework	10%		✓
Economy	30%		✓
Management	20%	✓	✓
Budget Flexibility	10%	✓	✓
Budgetary Performance	10%	✓	✓
Liquidity	10%	✓	✓
Debt and Contingent Liabilities	10%	✓	✓

- The information shown above outlines the *Quantitative* elements of the rating methodology. In addition to these factors, other *Qualitative* elements are considered in the ultimate rating outcome.

Credit Overview: Key Ratios

- Debt Service Coverage – Ratio of Net Operating Revenues available to pay Debt Service needs to meet minimum targets.
  - Net Operating Revenues (Operating and Non-Operating Revenues minus Operating Expenditures (excluding Depreciation)) divided by Debt Service.
  - Parity Requirement 1.00x – For every $1.00 of Parity Debt Service, the Authority must have $1.00 of Net Revenues available to pay.
  - Adopted Policy: "The Authority will set rates and charges so as to target a minimum debt service coverage on all parity indebtedness of 1.50 times."

- System Reserves – Cumulative Funds available after Operations and Debt Service needs to be established at a minimum acceptable level.
  - Often referred to as "liquidity" and measured as a percentage of Operations & Maintenance, or Days Cash on Hand.
  - Adopted Policy: "It is recommended that the Authority target a combined total of all Tier 2 and Tier 3 operating account and reserve funds equal to 150% of the Authority's Operating and Maintenance budget or the equivalent of 548 days operating cash on hand."

Peer Group

- In order to provide perspective on the Authority's historical and projected performance in relation to the Key Credit Ratios previously discussed, Davenport has developed a Peer Group for comparative purposes.

- Throughout this presentation, the following group of Utility providers will be used in peer comparatives:

National Water and Sewer Authority/Enterprise Medians:
Moody's 'Aaa' Rated
Moody's 'Aa1' Rated
Moody's 'Aa2' Rated

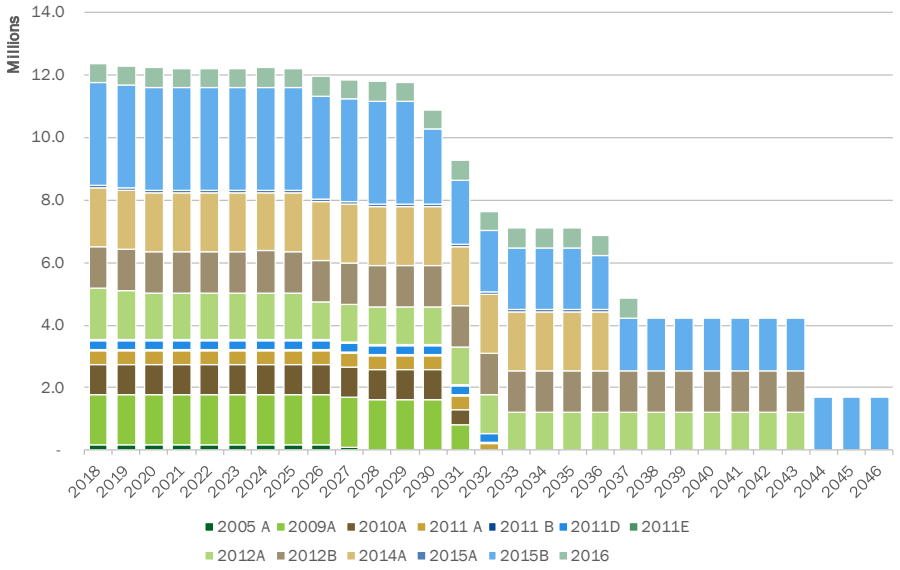
Select Virginia Water only or Sewer Only Authorities/Enterprises:	
Fairfax Water (Aaa / AAA / AAA)	Newport News Water (Aa1 / AAA / nr)
Fairfax Sewer (Aaa / AAA / AAA)	Norfolk Water (Aa2 / AA+ / AA+)
Hampton Roads Sanitation District (Aa2 / AA+ / AA+)	Upper Occoquan Sewerage Authority ("UOSA") (Aa1 / AAA / AA+)

Moody's 'Aa' or higher Rated Virginia Water and Sewer Authorities/Enterprises:	
City of Chesapeake Water and Sewer Enterprise	Loudoun County Sanitation Authority
Chesterfield County Water and Sewer Enterprise	Prince William County Service Authority ("PWCSA")
Henrico County Water and Sewer Enterprise	Spotsylvania County Water and Sewer Enterprise
James City Service Authority ("JCSA")	City of Virginia Beach Water and Sewer Enterprise

Financial Profile

Existing Debt Profile

Debt Service by Series



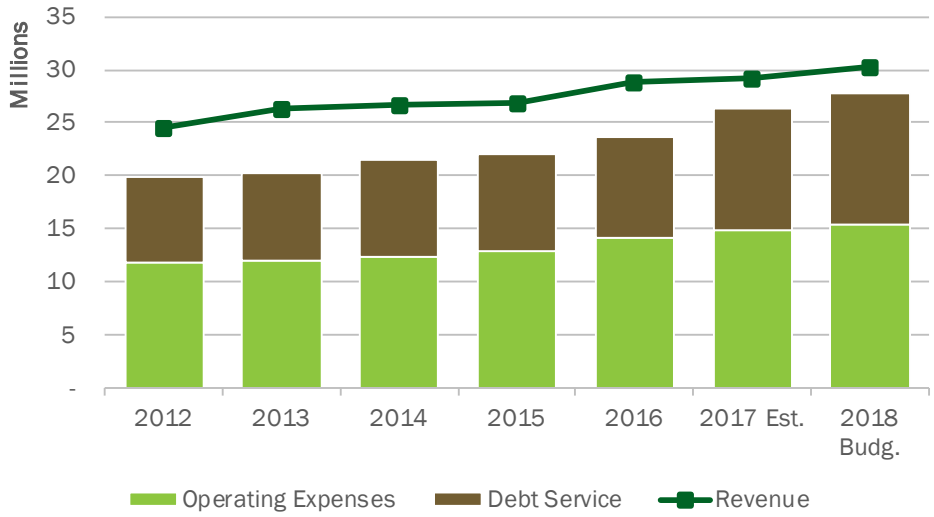
Debt Service – Principal and Interest

Existing Debt Service

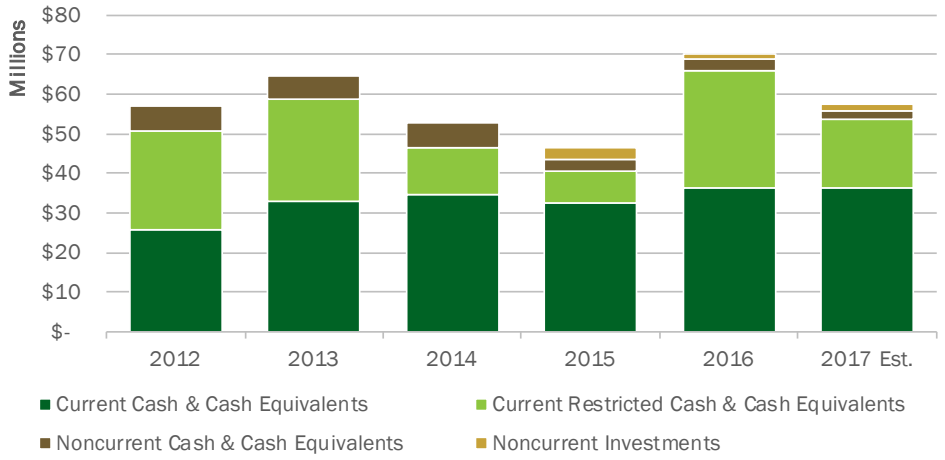
FY	Principal	Interest	Total	Payout Ratio
Total	167,411,132	69,229,096	236,640,228	
2018	6,868,007	5,502,190	12,370,197	46.3%
2019	7,014,528	5,280,871	12,295,399	49.4%
2020	7,163,267	5,055,164	12,218,431	53.0%
2021	7,383,279	4,830,886	12,214,165	56.4%
2022	7,611,621	4,597,961	12,209,582	59.1%
2023	7,873,348	4,342,994	12,216,342	61.0%
2024	8,146,521	4,074,804	12,221,325	62.7%
2025	8,413,199	3,802,465	12,215,664	64.8%
2026	8,397,444	3,540,847	11,938,292	67.2%
2027	8,570,651	3,284,726	11,855,377	69.9%
2028	8,756,948	3,021,540	11,778,487	71.1%
2029	9,025,354	2,747,406	11,772,760	71.9%
2030	8,387,441	2,494,780	10,882,221	73.0%
2031	6,997,914	2,267,867	9,265,780	74.9%
2032	5,571,856	2,077,521	7,649,377	78.1%
2033	5,198,839	1,899,209	7,098,048	83.1%
2034	5,370,195	1,726,437	7,096,632	89.7%
2035	5,553,610	1,550,901	7,104,511	92.1%
2036	5,488,110	1,372,179	6,860,289	95.3%
2037	3,659,000	1,205,326	4,864,326	100.0%
2038	3,170,000	1,070,013	4,240,013	100.0%
2039	3,310,000	929,966	4,239,966	100.0%
2040	3,455,000	784,209	4,239,209	100.0%
2041	3,605,000	633,281	4,238,281	100.0%
2042	3,765,000	476,319	4,241,319	100.0%
2043	3,930,000	311,388	4,241,388	100.0%
2044	1,500,000	191,044	1,691,044	100.0%
2045	1,575,000	117,147	1,692,147	100.0%
2046	1,650,000	39,656	1,689,656	100.0%

Financial Profile

Revenues vs. Expenditures



Cash Balances



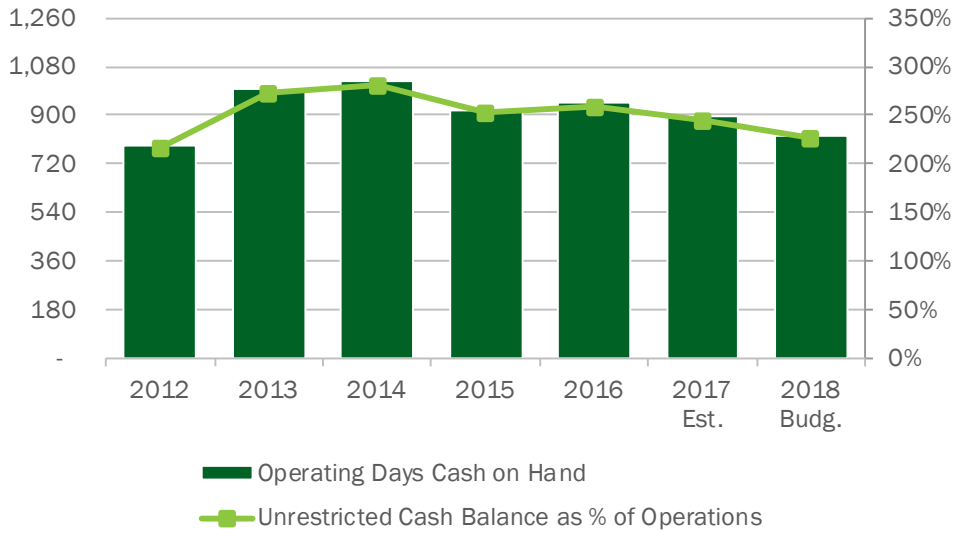
		2012 Audited	2013 Audited	2014 Audited	2015 Audited	2016 Audited	2017 Estimated	2018 Budgeted
1	Revenue	24,549,651	26,335,505	26,664,195	26,940,652	28,936,917	29,244,031	30,329,855
2	Operating Expenses[1]	11,880,393	12,025,713	12,401,578	12,875,366	14,075,953	14,847,611	15,446,500
3	Net Revenue Available For Debt Service	12,669,258	14,309,792	14,262,617	14,065,286	14,860,964	14,396,420	14,883,355
4								
5	Debt Service	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197
6	Net Revenue Available After Debt Service	4,684,990	6,075,623	5,172,915	4,970,553	5,293,594	2,853,954	2,513,158
7								
8	Debt Service Coverage	1.59x	1.74x	1.57x	1.55x	1.55x	1.25x	1.20x
9								
10	Unrestricted Cash Balance[2]	25,720,645	32,910,784	34,887,436	32,448,097	36,488,314	36,460,494	34,960,494
11	Total Cash and Investments	56,977,565	64,736,834	52,725,509	46,487,319	70,019,669	57,684,780	57,684,780
12								
13	Unrestricted Cash Balance as % of Operations	216%	274%	281%	252%	259%	246%	226%
14	Operating Days Cash on Hand	790	999	1,027	920	946	896	826

[1] Excludes non-cash items such as Depreciation. FY 2017 excludes $400,000 of Retirement Expense and Pension Liability that are non-cash items.

[2] The Authority anticipates drawing down its unrestricted cash balance by $1.5 million in FY 2018 for capital expenditures.

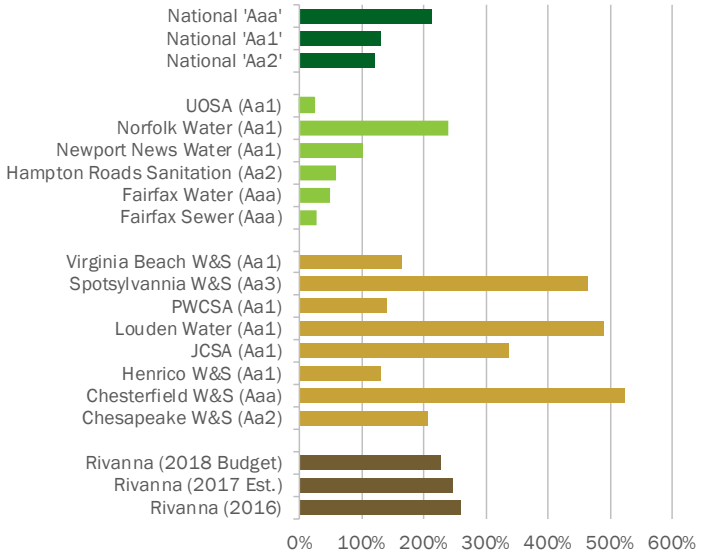
Liquidity

Liquidity



- Cumulative Funds available after Operations and Debt Service needs
- Days Cash on Hand = Unrestricted Cash ÷ (Operating Expenditures ÷ 365)
- Unrestricted Cash as % of O&M = Unrestricted Cash ÷ Operating Expenditures
- Standard and Poor's criteria for Water and Sewer Credit defines categories of Days Cash on Hand as:
  - <30 days: Low
  - 30 - 60 days: Adequate
  - 60 - 120 days: Good
  - > 120 days: Strong

Peer Comparative: Unrestricted Cash as a % of O&M

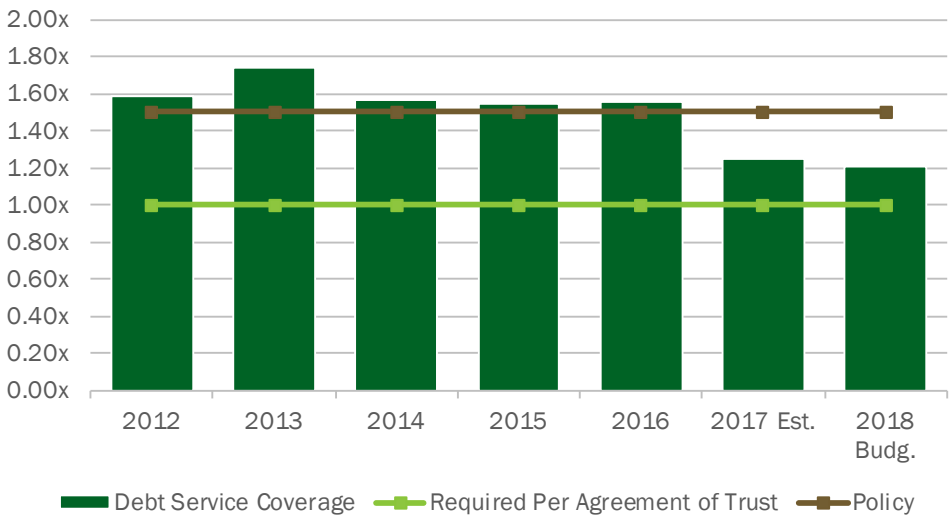


- The Authority has adopted a Liquidity policy stating:
  - *It is recommended that the Authority target a combined total of all Tier 2 and Tier 3 operating account and reserve funds equal to 150% of the Authority's Operating and Maintenance budget or the equivalent of 548 days operating cash on hand.*

Source: Moody's MFRA

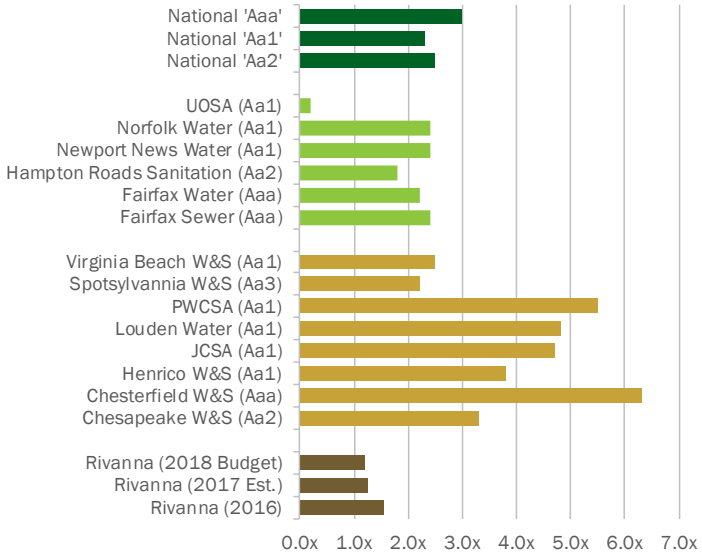
Debt Service Coverage Ratio ("DSCR")

Debt Service Coverage Ratio



- Measure of ability to meet operating and debt service obligations.
- DSCR = Net Revenue Available for Debt service ÷ Annual Debt Service.
- Standard and Poor's criteria for Water and Sewer Credit defines categories of Debt Service Coverage Ratio as:
  - <1.0x: Insufficient
  - 1.0x-1.25x: Adequate
  - 1.26x-1.50x: Good
  - >1.50x: Strong

Peer Comparative: Debt Service Coverage Ratio



- The Authority has adopted a Debt Service Coverage Ratio Policy, stating:
  - *The Authority will set rates and charges so as to target a minimum debt service coverage on all parity indebtedness of 1.50 times.*

Source: Moody's MFRA

Virginia Aa2 Median Comparison

	A	B	C	D
	Selected Financials and other Datapoints	Rivanna W&S Authority, VA Most Recent Available (AA:6/30/2016)	VA Aa2 Medians Most Recent Available	Comparisons
1	**General Entity Information**			
2	Current Senior Most Rating*	Aa2	Aa2	
3	Revenue Backed Rating Description	LT SR REV	N/A	
4	State	VA	N/A	
5	**Financial Data : Income Statement Data**			
6	Total Operating Revenues ($000)	27,814	67,607	Worse
7	Connection Fees ($000)	N/A	4,289	N/A
8	Gross Revenues ($000)	28,937	72,941	Worse
9	Total O&M Expenses ($000)	14,507	41,028	Better
10	Depreciation & Amortization Expenses ($000)	5,396	14,803	Better
11	Total Operating Expenses, Including Depreciation and Amortization ($000)	19,903	55,830	Better
12	Net Revenues ($000)	14,430	31,913	Worse
13	Total Annual Senior Lien Debt Service ($000)	8,865	8,865	Better
14	Total Annual Debt Service ($000)	8,865	9,734	Better
15	Maximum Annual Debt Service ($000)	11,523	11,523	Better
16	Net Working Capital ($000)	33,018	109,068	Worse
17	**Financial Data : Balance Sheet Data**			
18	Total Current Cash, Cash Equivalents and Investments ($000)	36,488	84,054	Worse
19	Total Current Assets ($000)	68,460	99,529	Worse
20	Total Non-Current Assets ($000)	238,861	466,603	Worse
21	Total Assets ($000)	307,321	566,131	Worse
22	Total Current Liabilities ($000)	13,418	15,510	Better
23	Total Non-Current Liabilities ($000)	158,248	158,248	Better
24	Total Revenue Bonds ($000)	151,933	151,933	Better
25	Total General Obligation-backed Bonds ($000)	N/A	128,458	N/A
26	Total Long Term Debt ($000)	151,933	151,933	Better
27	Debt Service Funds and Reserves ($000)	3,336	6,574	Worse
28	Net Funded Debt ($000)	148,597	148,597	Better
29	Total Liabilities ($000)	171,666	171,666	Better
30	Net Fixed Assets ($000)	233,413	433,497	Worse
31	Total Net Assets ($000)	135,655	440,555	Worse
32	Total Unrestricted Net Assets ($000)	31,189	61,032	Worse
33	Total Net Assets Restricted for Debt Service ($000)	3,336	5,653	Worse
34	Total Net Assets Restricted for Capital Projects ($000)	N/A	N/A	N/A
35	**Financial Data : Key Financial Ratios**			
36	Operating ratio (%)	52.20	60.70	Better
37	Net Take-Down (%)	49.90	43.80	Better
38	Debt Service Safety Margin (%)	19.20	19.20	Better
39	Debt Ratio (%)	55.80	55.80	Better
40	Total Annual Senior Lien Debt Service Coverage (x)	1.60	1.70	Worse
41	Total Annual Debt Service Coverage (x)	1.60	1.70	Worse
42	Maximum Annual Debt Service Coverage(x)	1.30	1.50	Worse
43	Net Working Capital as a Percentage of O&M (%)	227.60	227.60	Better
44	Unrestricted Reserves as a Percentage of O&M (%)	251.50	204.90	Better

All Data Points "Better" than or Equal to Median	**18**
All Data Points "Worse" than Median	**16**
Ratios "Better" than or Equal to Median	**6**
Ratios "Worse" than Median	**3**

Source: Moody's MFRA

Debt Capacity

Debt Capacity Overview

Parameters

- In order to quantify the Authority's debt capacity, a number of parameters for the analysis must be determined, including:

- Debt Service Coverage Floor
  - The Authority has an adopted policy of 1.50x coverage.

- Minimum Cash Balance
  - The Authority has an adopted policy of 150% Unrestricted Cash as a % of O&M or the equivalent of 548 Days Operating Cash on Hand.

- Revenue Levels
  - Determined by system growth, flows, and rate levels.
  - For purposes of this analysis different levels of revenue growth assumed from 3% - 10%.

- Debt vs. Equity Capital Investment
  - Generally determined by policy.
  - The Authority currently uses a 10% cash funding requirement.

Other Assumptions

- Expense Growth: 3% annual growth

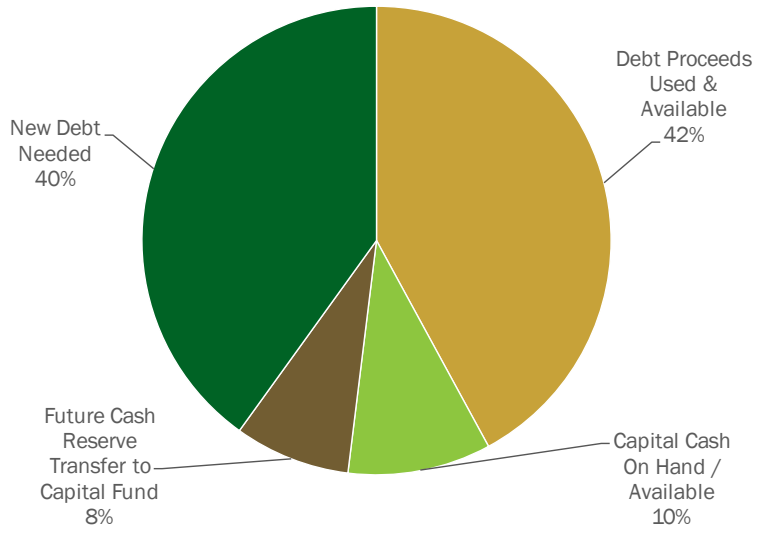
- Borrowing Assumptions
  - Amortization: Level Debt Service
  - Term: 25 years
  - Interest Rate: 5.00%
  - First Principal FY Following Issuance
  - First Interest FY Following Issuance

Estimated Debt Capacity

	Debt Capacity	Cash Capital Outlay Capacity	Total Capital Funding Capacity
3% Revenue Growth			
2018	-	15,803,902	15,803,902
2019	-	2,336,844	2,336,844
2020	-	2,850,260	2,850,260
2021	-	3,304,066	3,304,066
2022	-	3,771,677	3,771,677
Total	-	28,066,749	28,066,749
5% Revenue Growth			
2018	-	15,803,902	15,803,902
2019	-	2,941,762	2,941,762
2020	-	4,108,487	4,108,487
2021	10,791,091	5,266,962	16,058,053
2022	12,275,873	5,728,072	18,003,944
Total	23,066,964	33,849,184	56,916,148
7% Revenue Growth			
2018	-	15,803,902	15,803,902
2019	-	3,546,679	3,546,679
2020	18,194,515	5,390,911	23,585,427
2021	19,676,872	6,015,131	25,692,003
2022	21,080,162	6,688,778	27,768,940
Total	58,951,549	37,445,402	96,396,951
10% Revenue Growth			
2018	-	15,803,902	15,803,902
2019	18,478,538	4,454,054	22,932,592
2020	29,827,784	6,048,819	35,876,603
2021	33,132,362	7,083,385	40,215,747
2022	36,612,303	8,234,382	44,846,685
Total	118,050,988	41,624,542	159,675,530

Capital Improvement Plan

	Uses	2017	2018	2019	2020	2021	Total
2	Urban Water	20,736,091	6,925,814	4,265,193	9,564,000	7,346,000	**48,837,098**
3	Crozet Water	3,305,578	2,840,346	295,000	1,915,000	4,841,114	**13,197,038**
4	Scottsvile Water	910,000	374,335	100,000	-	-	**1,384,335**
5	Urban Wastewater	17,157,296	9,454,372	7,133,500	520,285	299,059	**34,564,512**
6	Glenmore Wastewater	-	-	-	-	-	**-**
7	Scottsville Wastewater	-	-	-	-	61,000	**61,000**
8	**Total**	**42,108,965**	**19,594,867**	**11,793,693**	**11,999,285**	**12,547,173**	**98,043,983**
9							
10							
11	**Sources**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
12	Debt Proceeds Used & Available	32,922,926	8,328,700	-	-	-	**41,251,626**
13	Capital Cash On Hand / Available	7,833,492	1,848,929	-	-	-	**9,682,421**
14	Future Cash Reserve Transfer to Capital Fund	1,200,000	2,000,000	1,750,000	1,520,285	1,360,059	**7,830,344**
15	New Debt Needed	152,547	7,417,238	10,043,693	10,479,000	11,187,114	**39,279,592**
16	**Total**	**42,108,965**	**19,594,867**	**11,793,693**	**11,999,285**	**12,547,173**	**98,043,983**



Observations and Next Step

- On an historical basis, the Authority has had solid financial performance.
  - Debt Service Coverage and Liquidity Ratios have been financial strengths for the Authority.
  - In recent years (FY 2017 and FY 2018), Debt Service Coverage has declined below the Authority's policy levels but is still in excess of legal requirements under the Agreement of Trust.

- The Authority currently compares favorably to its peer group for Liquidity medians but is below its peer group for Debt Service Coverage medians.

- The Authority has a significant but manageable CIP in place. However, certain key ratios will be stressed (e.g. debt service coverage) and revenue increases may be required (approximately 5-7%).

- Adopted Financial Policy Guidelines help ensure a thorough planning process and help to insulate the Authority from unexpected events.

- On a going forward basis, Staff and Davenport should evaluate the planned CIP and explore alternative CIP funding and debt structuring options to determine the optimal Plan of Finance for increasing debt capacity, minimizing rates/charges and maintaining strong debt ratios.

Appendix A

Detailed Cases

3% Revenue Growth

	2012 Audited	2013 Audited	2014 Audited	2015 Audited	2016 Audited	2017 Estimated	2018 Budgeted	2019 Projected	2020 Projected	2021 Projected	2022 Projected
Operating Revenue											
Metered Water Sales	11,058,083	11,728,840	11,353,630	12,555,666	13,014,328	13,753,977	14,252,303	14,679,872	15,120,268	15,573,876	16,041,093
Wastewater Service Charges	12,807,628	13,889,105	14,620,353	13,625,855	14,799,741	14,444,159	14,711,982	15,153,341	15,607,942	16,076,180	16,558,465
Miscellaneous	490,908	482,034	508,373	602,148	669,173	633,762	1,119,670	1,153,260	1,187,858	1,223,494	1,260,198
Total	24,356,619	26,099,979	26,482,356	26,783,669	28,483,242	28,831,898	30,083,955	30,986,474	31,916,068	32,873,550	33,859,756
Non-Operating Revenues											
Interest Income	124,832	157,526	92,839	82,083	369,675	296,433	161,900	166,757	171,760	176,913	182,220
Buck Mountain Surcharge	68,200	78,000	89,000	74,900	84,000	115,700	84,000	84,000	84,000	84,000	84,000
Other	-	-	-	-	-	-	-	-	-	-	-
Total	193,032	235,526	181,839	156,983	453,675	412,133	245,900	250,757	255,760	260,913	266,220
Total Revenue	**24,549,651**	**26,335,505**	**26,664,195**	**26,940,652**	**28,936,917**	**29,244,031**	**30,329,855**	**31,237,231**	**32,171,828**	**33,134,462**	**34,125,976**
Operating Expenditures	11,880,393	12,025,713	12,401,578	12,875,366	14,075,953	14,847,611	15,446,500	15,909,895	16,387,192	16,878,808	17,385,172
Net Revenue Available for Debt Service	**12,669,258**	**14,309,792**	**14,262,617**	**14,065,286**	**14,860,964**	**14,396,420**	**14,883,355**	**15,327,336**	**15,784,636**	**16,255,655**	**16,740,804**
Debt Service											
Existing	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	12,214,165	12,209,582
Planned	-	-	-	-	-	-	-	-	-	-	-
Total	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	12,214,165	12,209,582
DSCR- All Obligations	***1.59x***	***1.74x***	***1.57x***	***1.55x***	***1.55x***	***1.25x***	***1.20x***	***1.25x***	***1.29x***	***1.33x***	***1.37x***
Net Revenue after Debt Service	4,684,990	6,075,623	5,172,915	4,970,553	5,293,594	2,853,954	2,513,158	3,031,937	3,566,205	4,041,490	4,531,223
Capital Outlay	-	-	-	-	-	-	(15,803,902)	(2,336,844)	(2,850,260)	(3,304,066)	(3,771,677)
Other Sources (Uses)											
Previously Funded & Expensed	-	-	-	-	-	-	-	-	-	-	-
State Grant	-	-	-	-	-	-	-	-	-	-	-
Debt Funding (committed)	-	-	-	-	-	-	-	-	-	-	-
VRA Loans	-	-	-	-	-	-	-	-	-	-	-
Revenue Bonds	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
System Surplus (Deficit)	**4,684,990**	**6,075,623**	**5,172,915**	**4,970,553**	**5,293,594**	**2,853,954**	**(13,290,744)**	**695,093**	**715,945**	**737,424**	**759,546**
Beginning Unrestricted Cash							36,460,494	23,169,750	23,864,843	24,580,788	25,318,211
System Surplus (Deficit)							(13,290,744)	695,093	715,945	737,424	759,546
Ending Unrestricted Cash	25,720,645	32,910,784	34,887,436	32,448,097	36,488,314	36,460,494	23,169,750	23,864,843	24,580,788	25,318,211	26,077,758
Cash as % of Operating Expense	216.5%	273.7%	281.3%	252.0%	259.2%	245.6%	150.0%	150.0%	150.0%	150.0%	150.0%
Operating Days Cash on Hand	790	999	1,027	920	946	896	548	548	548	548	548

5% Revenue Growth

	2012 Audited	2013 Audited	2014 Audited	2015 Audited	2016 Audited	2017 Estimated	2018 Budgeted	2019 Projected	2020 Projected	2021 Projected	2022 Projected
Operating Revenue											
Metered Water Sales	11,058,083	11,728,840	11,353,630	12,555,666	13,014,328	13,753,977	14,252,303	14,964,918	15,713,164	16,498,822	17,323,763
Wastewater Service Charges	12,807,628	13,889,105	14,620,353	13,625,855	14,799,741	14,444,159	14,711,982	15,447,581	16,219,960	17,030,958	17,882,506
Miscellaneous	490,908	482,034	508,373	602,148	669,173	633,762	1,119,670	1,175,654	1,234,436	1,296,158	1,360,966
Total	24,356,619	26,099,979	26,482,356	26,783,669	28,483,242	28,831,898	30,083,955	31,588,153	33,167,560	34,825,938	36,567,235
Non-Operating Revenues											
Interest Income	124,832	157,526	92,839	82,083	369,675	296,433	161,900	169,995	178,495	187,419	196,790
Buck Mountain Surcharge	68,200	78,000	89,000	74,900	84,000	115,700	84,000	84,000	84,000	84,000	84,000
Other	-	-	-	-	-	-	-	-	-	-	-
Total	193,032	235,526	181,839	156,983	453,675	412,133	245,900	253,995	262,495	271,419	280,790
Total Revenue	**24,549,651**	**26,335,505**	**26,664,195**	**26,940,652**	**28,936,917**	**29,244,031**	**30,329,855**	**31,842,148**	**33,430,055**	**35,097,358**	**36,848,026**
Operating Expenditures	11,880,393	12,025,713	12,401,578	12,875,366	14,075,953	14,847,611	15,446,500	15,909,895	16,387,192	16,878,808	17,385,172
Net Revenue Available for Debt Service	**12,669,258**	**14,309,792**	**14,262,617**	**14,065,286**	**14,860,964**	**14,396,420**	**14,883,355**	**15,932,253**	**17,042,863**	**18,218,550**	**19,462,854**
Debt Service											
Existing	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	12,214,165	12,209,582
Planned	-	-	-	-	-	-	-	-	-	-	765,654
Total	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	12,214,165	12,975,236
DSCR- All Obligations	***1.59x***	***1.74x***	***1.57x***	***1.55x***	***1.55x***	***1.25x***	***1.20x***	***1.30x***	***1.39x***	***1.49x***	***1.50x***
Net Revenue after Debt Service	4,684,990	6,075,623	5,172,915	4,970,553	5,293,594	2,853,954	2,513,158	3,636,854	4,824,432	6,004,386	6,487,618
Capital Outlay	-	-	-	-	-	-	(15,803,902)	(2,941,762)	(4,108,487)	(16,058,053)	(18,003,944)
Other Sources (Uses)											
Previously Funded & Expensed	-	-	-	-	-	-	-	-	-	-	-
State Grant	-	-	-	-	-	-	-	-	-	-	-
Debt Funding (committed)	-	-	-	-	-	-	-	-	-	-	-
VRA Loans	-	-	-	-	-	-	-	-	-	-	-
Revenue Bonds	-	-	-	-	-	-	-	-	-	10,791,091	12,275,873
Other	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	10,791,091	12,275,873
System Surplus (Deficit)	**4,684,990**	**6,075,623**	**5,172,915**	**4,970,553**	**5,293,594**	**2,853,954**	**(13,290,744)**	**695,093**	**715,945**	**737,424**	**759,546**
Beginning Unrestricted Cash							36,460,494	23,169,750	23,864,843	24,580,788	25,318,211
System Surplus (Deficit)							(13,290,744)	695,093	715,945	737,424	759,546
Ending Unrestricted Cash	25,720,645	32,910,784	34,887,436	32,448,097	36,488,314	36,460,494	23,169,750	23,864,843	24,580,788	25,318,211	26,077,758
Cash as % of Operating Expense	216.5%	273.7%	281.3%	252.0%	259.2%	245.6%	150.0%	150.0%	150.0%	150.0%	150.0%
Operating Days Cash on Hand	790	999	1,027	920	946	896	548	548	548	548	548

7% Revenue Growth

	2012 Audited	2013 Audited	2014 Audited	2015 Audited	2016 Audited	2017 Estimated	2018 Budgeted	2019 Projected	2020 Projected	2021 Projected	2022 Projected
Operating Revenue											
Metered Water Sales	11,058,083	11,728,840	11,353,630	12,555,666	13,014,328	13,753,977	14,252,303	15,249,964	16,317,462	17,459,684	18,681,862
Wastewater Service Charges	12,807,628	13,889,105	14,620,353	13,625,855	14,799,741	14,444,159	14,711,982	15,741,821	16,843,748	18,022,811	19,284,407
Miscellaneous	490,908	482,034	508,373	602,148	669,173	633,762	1,119,670	1,198,047	1,281,910	1,371,644	1,467,659
Total	24,356,619	26,099,979	26,482,356	26,783,669	28,483,242	28,831,898	30,083,955	32,189,832	34,443,120	36,854,138	39,433,928
Non-Operating Revenues											
Interest Income	124,832	157,526	92,839	82,083	369,675	296,433	161,900	173,233	185,359	198,334	212,218
Buck Mountain Surcharge	68,200	78,000	89,000	74,900	84,000	115,700	84,000	84,000	84,000	84,000	84,000
Other	-	-	-	-	-	-	-	-	-	-	-
Total	193,032	235,526	181,839	156,983	453,675	412,133	245,900	257,233	269,359	282,334	296,218
Total Revenue	**24,549,651**	**26,335,505**	**26,664,195**	**26,940,652**	**28,936,917**	**29,244,031**	**30,329,855**	**32,447,065**	**34,712,479**	**37,136,473**	**39,730,146**
Operating Expenditures	11,880,393	12,025,713	12,401,578	12,875,366	14,075,953	14,847,611	15,446,500	15,909,895	16,387,192	16,878,808	17,385,172
Net Revenue Available for Debt Service	**12,669,258**	**14,309,792**	**14,262,617**	**14,065,286**	**14,860,964**	**14,396,420**	**14,883,355**	**16,537,170**	**18,325,288**	**20,257,665**	**22,344,974**
Debt Service											
Existing	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	12,214,165	12,209,582
Planned	-	-	-	-	-	-	-	-	-	1,290,946	2,687,068
Total	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	13,505,110	14,896,649
DSCR- All Obligations	***1.59x***	***1.74x***	***1.57x***	***1.55x***	***1.55x***	***1.25x***	***1.20x***	***1.34x***	***1.50x***	***1.50x***	***1.50x***
Net Revenue after Debt Service	4,684,990	6,075,623	5,172,915	4,970,553	5,293,594	2,853,954	2,513,158	4,241,771	6,106,857	6,752,555	7,448,325
Capital Outlay	-	-	-	-	-	-	(15,803,902)	(3,546,679)	(23,585,427)	(25,692,003)	(27,768,940)
Other Sources (Uses)											
Previously Funded & Expensed	-	-	-	-	-	-	-	-	-	-	-
State Grant	-	-	-	-	-	-	-	-	-	-	-
Debt Funding (committed)	-	-	-	-	-	-	-	-	-	-	-
VRA Loans	-	-	-	-	-	-	-	-	-	-	-
Revenue Bonds	-	-	-	-	-	-	-	-	18,194,515	19,676,872	21,080,162
Other	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	18,194,515	19,676,872	21,080,162
System Surplus (Deficit)	**4,684,990**	**6,075,623**	**5,172,915**	**4,970,553**	**5,293,594**	**2,853,954**	**(13,290,744)**	**695,093**	**715,945**	**737,424**	**759,546**
Beginning Unrestricted Cash							36,460,494	23,169,750	23,864,843	24,580,788	25,318,211
System Surplus (Deficit)							(13,290,744)	695,093	715,945	737,424	759,546
Ending Unrestricted Cash	25,720,645	32,910,784	34,887,436	32,448,097	36,488,314	36,460,494	23,169,750	23,864,843	24,580,788	25,318,211	26,077,758
Cash as % of Operating Expense	216.5%	273.7%	281.3%	252.0%	259.2%	245.6%	150.0%	150.0%	150.0%	150.0%	150.0%
Operating Days Cash on Hand	790	999	1,027	920	946	896	548	548	548	548	548

10% Revenue Growth

	2012 Audited	2013 Audited	2014 Audited	2015 Audited	2016 Audited	2017 Estimated	2018 Budgeted	2019 Projected	2020 Projected	2021 Projected	2022 Projected
Operating Revenue											
Metered Water Sales	11,058,083	11,728,840	11,353,630	12,555,666	13,014,328	13,753,977	14,252,303	15,677,533	17,245,287	18,969,815	20,866,797
Wastewater Service Charges	12,807,628	13,889,105	14,620,353	13,625,855	14,799,741	14,444,159	14,711,982	16,183,180	17,801,498	19,581,648	21,539,813
Miscellaneous	490,908	482,034	508,373	602,148	669,173	633,762	1,119,670	1,231,637	1,354,801	1,490,281	1,639,309
Total	24,356,619	26,099,979	26,482,356	26,783,669	28,483,242	28,831,898	30,083,955	33,092,351	36,401,586	40,041,744	44,045,919
Non-Operating Revenues											
Interest Income	124,832	157,526	92,839	82,083	369,675	296,433	161,900	178,090	195,899	215,489	237,038
Buck Mountain Surcharge	68,200	78,000	89,000	74,900	84,000	115,700	84,000	84,000	84,000	84,000	84,000
Other	-	-	-	-	-	-	-	-	-	-	-
Total	193,032	235,526	181,839	156,983	453,675	412,133	245,900	262,090	279,899	299,489	321,038
Total Revenue	**24,549,651**	**26,335,505**	**26,664,195**	**26,940,652**	**28,936,917**	**29,244,031**	**30,329,855**	**33,354,441**	**36,681,485**	**40,341,233**	**44,366,956**
Operating Expenditures	11,880,393	12,025,713	12,401,578	12,875,366	14,075,953	14,847,611	15,446,500	15,909,895	16,387,192	16,878,808	17,385,172
Net Revenue Available for Debt Service	**12,669,258**	**14,309,792**	**14,262,617**	**14,065,286**	**14,860,964**	**14,396,420**	**14,883,355**	**17,444,546**	**20,294,293**	**23,462,425**	**26,981,784**
Debt Service											
Existing	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	12,218,431	12,214,165	12,209,582
Planned	-	-	-	-	-	-	-	-	1,311,098	3,427,452	5,778,275
Total	7,984,268	8,234,169	9,089,702	9,094,733	9,567,370	11,542,466	12,370,197	12,295,399	13,529,528	15,641,617	17,987,856
DSCR- All Obligations	***1.59x***	***1.74x***	***1.57x***	***1.55x***	***1.55x***	***1.25x***	***1.20x***	***1.42x***	***1.50x***	***1.50x***	***1.50x***
Net Revenue after Debt Service	4,684,990	6,075,623	5,172,915	4,970,553	5,293,594	2,853,954	2,513,158	5,149,147	6,764,764	7,820,808	8,993,928
Capital Outlay	-	-	-	-	-	-	(15,803,902)	(22,932,592)	(35,876,603)	(40,215,747)	(44,846,685)
Other Sources (Uses)											
Previously Funded & Expensed	-	-	-	-	-	-	-	-	-	-	-
State Grant	-	-	-	-	-	-	-	-	-	-	-
Debt Funding (committed)	-	-	-	-	-	-	-	-	-	-	-
VRA Loans	-	-	-	-	-	-	-	-	-	-	-
Revenue Bonds	-	-	-	-	-	-	-	18,478,538	29,827,784	33,132,362	36,612,303
Other	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	18,478,538	29,827,784	33,132,362	36,612,303
System Surplus (Deficit)	**4,684,990**	**6,075,623**	**5,172,915**	**4,970,553**	**5,293,594**	**2,853,954**	**(13,290,744)**	**695,093**	**715,945**	**737,424**	**759,546**
Beginning Unrestricted Cash							36,460,494	23,169,750	23,864,843	24,580,788	25,318,211
System Surplus (Deficit)							(13,290,744)	695,093	715,945	737,424	759,546
Ending Unrestricted Cash	25,720,645	32,910,784	34,887,436	32,448,097	36,488,314	36,460,494	23,169,750	23,864,843	24,580,788	25,318,211	26,077,758
Cash as % of Operating Expense	216.5%	273.7%	281.3%	252.0%	259.2%	245.6%	150.0%	150.0%	150.0%	150.0%	150.0%
Operating Days Cash on Hand	790	999	1,027	920	946	896	548	548	548	548	548

Appendix B

Existing Debt Detail

Existing Debt

FY	Principal	Interest	Total
Total	167,411,132	69,229,096	236,640,228
2018	6,868,007	5,502,190	12,370,197
2019	7,014,528	5,280,871	12,295,399
2020	7,163,267	5,055,164	12,218,431
2021	7,383,279	4,830,886	12,214,165
2022	7,611,621	4,597,961	12,209,582
2023	7,873,348	4,342,994	12,216,342
2024	8,146,521	4,074,804	12,221,325
2025	8,413,199	3,802,465	12,215,664
2026	8,397,444	3,540,847	11,938,292
2027	8,570,651	3,284,726	11,855,377
2028	8,756,948	3,021,540	11,778,487
2029	9,025,354	2,747,406	11,772,760
2030	8,387,441	2,494,780	10,882,221
2031	6,997,914	2,267,867	9,265,780
2032	5,571,856	2,077,521	7,649,377
2033	5,198,839	1,899,209	7,098,048
2034	5,370,195	1,726,437	7,096,632
2035	5,553,610	1,550,901	7,104,511
2036	5,488,110	1,372,179	6,860,289
2037	3,659,000	1,205,326	4,864,326
2038	3,170,000	1,070,013	4,240,013
2039	3,310,000	929,966	4,239,966
2040	3,455,000	784,209	4,239,209
2041	3,605,000	633,281	4,238,281
2042	3,765,000	476,319	4,241,319
2043	3,930,000	311,388	4,241,388
2044	1,500,000	191,044	1,691,044
2045	1,575,000	117,147	1,692,147
2046	1,650,000	39,656	1,689,656

Existing Debt

$2,340,929
2005A (VRA)

FY	Coupon	Principal	Interest	Total
Total		1,308,667	205,056	1,513,723
2018	3.000%	120,980	38,359	159,339
2019	3.000%	124,636	34,703	159,339
2020	3.000%	128,404	30,936	159,339
2021	3.000%	132,285	27,055	159,339
2022	3.000%	136,283	23,056	159,339
2023	3.000%	140,402	18,937	159,339
2024	3.000%	144,646	14,694	159,339
2025	3.000%	149,018	10,322	159,339
2026	3.000%	153,522	5,818	159,339
2027	3.000%	78,493	1,177	79,670
2028		-	-	-
2029		-	-	-
2030		-	-	-
2031		-	-	-
2032		-	-	-
2033		-	-	-
2034		-	-	-
2035		-	-	-
2036		-	-	-
2037		-	-	-
2038		-	-	-
2039		-	-	-
2040		-	-	-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	##########	Next Call:	N/A
Purpose:	Wastewater Plant	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

$24,000,000
2009A (VRA)

FY	Coupon	Principal	Interest	Total
Total		18,106,709	3,549,976	21,656,685
2018	2.650%	1,131,820	472,379	1,604,199
2019	2.650%	1,162,012	442,187	1,604,199
2020	2.650%	1,193,009	411,190	1,604,199
2021	2.650%	1,224,834	379,365	1,604,199
2022	2.650%	1,257,507	346,692	1,604,199
2023	2.650%	1,291,051	313,148	1,604,199
2024	2.650%	1,325,491	278,708	1,604,199
2025	2.650%	1,360,849	243,350	1,604,199
2026	2.650%	1,397,151	207,048	1,604,199
2027	2.650%	1,434,420	169,779	1,604,199
2028	2.650%	1,472,684	131,515	1,604,199
2029	2.650%	1,511,969	92,230	1,604,199
2030	2.650%	1,552,302	51,897	1,604,199
2031	2.650%	791,611	10,489	802,099
2032		-	-	-
2033		-	-	-
2034		-	-	-
2035		-	-	-
2036		-	-	-
2037		-	-	-
2038		-	-	-
2039		-	-	-
2040		-	-	-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	8/1/2009	Next Call:	N/A
Purpose:	Wastewater Plant	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

$15,179,718
2010A (VRA)

FY	Coupon	Principal	Interest	Total
Total		11,300,805	1,693,237	12,994,042
2018	2.050%	734,601	227,921	962,522
2019	2.050%	749,737	212,784	962,522
2020	2.050%	765,186	197,336	962,522
2021	2.050%	780,952	181,569	962,522
2022	2.050%	797,044	165,478	962,522
2023	2.050%	813,467	149,055	962,522
2024	2.050%	830,229	132,293	962,522
2025	2.050%	847,336	115,186	962,522
2026	2.050%	864,795	97,727	962,522
2027	2.050%	882,614	79,908	962,522
2028	2.050%	900,800	61,721	962,522
2029	2.050%	919,361	43,160	962,522
2030	2.050%	938,305	24,217	962,522
2031	2.050%	476,378	4,883	481,261
2032		-	-	-
2033		-	-	-
2034		-	-	-
2035		-	-	-
2036		-	-	-
2037		-	-	-
2038		-	-	-
2039		-	-	-
2040		-	-	-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	6/29/2010	Next Call:	N/A
Purpose:	W&S System	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

Existing Debt

$6,982,662
2011A (VRA)

FY	Coupon	Principal	Interest	Total
Total		5,540,058	892,261	6,432,319
2018	2.050%	331,728	111,880	443,608
2019	2.050%	338,564	105,044	443,608
2020	2.050%	345,540	98,068	443,608
2021	2.050%	352,660	90,948	443,608
2022	2.050%	359,926	83,682	443,608
2023	2.050%	367,343	76,266	443,608
2024	2.050%	374,912	68,696	443,608
2025	2.050%	382,637	60,971	443,608
2026	2.050%	390,521	53,087	443,608
2027	2.050%	398,568	45,040	443,608
2028	2.050%	406,780	36,828	443,608
2029	2.050%	415,162	28,446	443,608
2030	2.050%	423,716	19,892	443,608
2031	2.050%	432,447	11,161	443,608
2032	2.050%	219,554	2,250	221,804
2033		-	-	-
2034		-	-	-
2035		-	-	-
2036		-	-	-
2037		-	-	-
2038		-	-	-
2039		-	-	-
2040		-	-	-
2041		-	-	-
2042		-	-	-
2043		-	-	-
2044				-
2045				-
2046				-

Dated Date:	3/17/2011	Next Call:	N/A
Purpose:	Sewer System	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

$1,017,338
2011B (VRA)

FY	Coupon	Principal	Interest	Total
Total		790,924	127,383	918,307
2018	2.050%	47,359	15,972	63,332
2019	2.050%	48,335	14,997	63,332
2020	2.050%	49,331	14,001	63,332
2021	2.050%	50,347	12,984	63,332
2022	2.050%	51,385	11,947	63,332
2023	2.050%	52,444	10,888	63,332
2024	2.050%	53,524	9,807	63,332
2025	2.050%	54,627	8,705	63,332
2026	2.050%	55,753	7,579	63,332
2027	2.050%	56,901	6,430	63,332
2028	2.050%	58,074	5,258	63,332
2029	2.050%	59,270	4,061	63,332
2030	2.050%	60,492	2,840	63,332
2031	2.050%	61,738	1,593	63,332
2032	2.050%	31,345	321	31,666
2033		-	-	-
2034		-	-	-
2035		-	-	-
2036		-	-	-
2037		-	-	-
2038		-	-	-
2039		-	-	-
2040		-	-	-
2041		-	-	-
2042		-	-	-
2043				-
2044				-
2045				-
2046				-

Dated Date:	3/17/2011	Next Call:	N/A
Purpose:	Sewer System	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

$4,241,488
2011D (VRA)

FY	Coupon	Principal	Interest	Total
Total		3,457,846	576,401	4,034,247
2018	2.050%	199,079	69,871	268,950
2019	2.050%	203,181	65,769	268,950
2020	2.050%	207,368	61,582	268,950
2021	2.050%	211,640	57,309	268,950
2022	2.050%	216,001	52,948	268,950
2023	2.050%	220,452	48,498	268,950
2024	2.050%	224,994	43,955	268,950
2025	2.050%	229,630	39,319	268,950
2026	2.050%	234,362	34,588	268,950
2027	2.050%	239,191	29,759	268,950
2028	2.050%	244,120	24,830	268,950
2029	2.050%	249,150	19,800	268,950
2030	2.050%	254,283	14,666	268,950
2031	2.050%	259,523	9,427	268,950
2032	2.050%	264,871	4,079	268,950
2033		-	-	-
2034		-	-	-
2035		-	-	-
2036		-	-	-
2037		-	-	-
2038		-	-	-
2039		-	-	-
2040		-	-	-
2041		-	-	-
2042		-	-	-
2043				-
2044				-
2045				-
2046				-

Dated Date:	9/9/2011	Next Call:	N/A
Purpose:	W&S System	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

Existing Debt

$443,937
2011E (VRA)

FY	Coupon	Principal	Interest	Total
Total		359,923	59,997	419,920
2018	2.050%	20,722	7,273	27,995
2019	2.050%	21,149	6,846	27,995
2020	2.050%	21,585	6,410	27,995
2021	2.050%	22,029	5,965	27,995
2022	2.050%	22,483	5,511	27,995
2023	2.050%	22,947	5,048	27,995
2024	2.050%	23,419	4,575	27,995
2025	2.050%	23,902	4,093	27,995
2026	2.050%	24,394	3,600	27,995
2027	2.050%	24,897	3,098	27,995
2028	2.050%	25,410	2,585	27,995
2029	2.050%	25,934	2,061	27,995
2030	2.050%	26,468	1,527	27,995
2031	2.050%	27,013	981	27,995
2032	2.050%	27,570	425	27,995
2033				-
2034				-
2035				-
2036				-
2037				-
2038				-
2039				-
2040				-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	9/9/2011	Next Call:	N/A
Purpose:	W&S System	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1 / Oct 1

$25,100,000
2012A (VRA)

FY	Coupon	Principal	Interest	Total
Total		19,755,000	14,196,203	33,951,203
2018	5.125%	685,000	958,841	1,643,841
2019	4.241%	645,000	927,609	1,572,609
2020	5.125%	600,000	898,556	1,498,556
2021	5.125%	630,000	867,038	1,497,038
2022	4.232%	655,000	837,034	1,492,034
2023	4.833%	685,000	806,622	1,491,622
2024	5.125%	725,000	771,491	1,496,491
2025	5.125%	760,000	733,438	1,493,438
2026	5.125%	510,000	700,894	1,210,894
2027	4.508%	535,000	675,766	1,210,766
2028	4.518%	560,000	651,056	1,211,056
2029	4.527%	585,000	625,166	1,210,166
2030	5.125%	610,000	596,294	1,206,294
2031	5.125%	645,000	564,134	1,209,134
2032	5.125%	680,000	530,181	1,210,181
2033	5.125%	715,000	494,434	1,209,434
2034	4.825%	750,000	458,019	1,208,019
2035	5.125%	790,000	419,681	1,209,681
2036	5.125%	830,000	378,169	1,208,169
2037	5.125%	875,000	334,478	1,209,478
2038	5.125%	920,000	288,481	1,208,481
2039	5.125%	970,000	240,050	1,210,050
2040	5.125%	1,020,000	189,056	1,209,056
2041	4.826%	1,070,000	137,100	1,207,100
2042	4.827%	1,125,000	84,128	1,209,128
2043	4.828%	1,180,000	28,488	1,208,488
2044				-
2045				-
2046				-

Dated Date:	6/13/2012	Next Call:	10/1/2022
Purpose:	Refunding and W&S	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Oct 1

$26,240,000
2012B (Standalone)

FY	Coupon	Principal	Interest	Total
Total		23,960,000	10,872,459	34,832,459
2018	3.000%	615,000	726,331	1,341,331
2019	3.000%	630,000	707,656	1,337,656
2020	3.000%	650,000	688,456	1,338,456
2021	3.000%	670,000	668,656	1,338,656
2022	4.000%	695,000	644,706	1,339,706
2023	4.000%	725,000	616,306	1,341,306
2024	4.000%	755,000	586,706	1,341,706
2025	2.125%	775,000	563,372	1,338,372
2026	2.250%	795,000	546,194	1,341,194
2027	2.250%	810,000	528,138	1,338,138
2028	3.000%	835,000	506,500	1,341,500
2029	3.000%	860,000	481,075	1,341,075
2030	2.500%	885,000	457,113	1,342,113
2031	3.000%	905,000	432,475	1,337,475
2032	3.000%	935,000	404,875	1,339,875
2033	3.000%	965,000	376,375	1,341,375
2034	3.000%	990,000	347,050	1,337,050
2035	3.000%	1,025,000	316,825	1,341,825
2036	3.000%	1,055,000	285,625	1,340,625
2037	3.000%	1,085,000	253,525	1,338,525
2038	3.250%	1,120,000	219,050	1,339,050
2039	3.250%	1,155,000	182,081	1,337,081
2040	3.250%	1,195,000	143,894	1,338,894
2041	3.250%	1,235,000	104,406	1,339,406
2042	3.250%	1,275,000	63,619	1,338,619
2043	3.250%	1,320,000	21,450	1,341,450
2044				-
2045				-
2046				-

Dated Date:	10/30/2012	Next Call:	10/1/2022
Purpose:	Refunding and W&S	Insurance:	N/A
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Oct 1

Existing Debt

$29,043,290
2014A (RLF)

FY	Coupon	Principal	Interest	Total
Total		28,457,903	7,306,472	35,764,374
2018	2.450%	1,192,376	689,960	1,882,336
2019	2.450%	1,221,768	660,568	1,882,336
2020	2.450%	1,251,885	630,451	1,882,336
2021	2.450%	1,282,744	599,592	1,882,336
2022	2.450%	1,314,363	567,972	1,882,336
2023	2.450%	1,346,762	535,573	1,882,336
2024	2.450%	1,379,960	502,375	1,882,336
2025	2.450%	1,413,976	468,359	1,882,336
2026	2.450%	1,448,831	433,505	1,882,336
2027	2.450%	1,484,545	397,791	1,882,336
2028	2.450%	1,521,139	361,197	1,882,336
2029	2.450%	1,558,635	323,701	1,882,336
2030	2.450%	1,597,055	285,280	1,882,336
2031	2.450%	1,636,423	245,913	1,882,336
2032	2.450%	1,676,761	205,575	1,882,336
2033	2.450%	1,718,093	164,242	1,882,336
2034	2.450%	1,760,444	121,891	1,882,336
2035	2.450%	1,803,839	78,496	1,882,336
2036	2.450%	1,848,304	34,032	1,882,335
2037				-
2038				-
2039				-
2040				-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	Unknown	Next Call:	Unknown
Purpose:	Water & Sewer	Insurance:	Unknown
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1

$1,189,672
2015A (RLF)

FY	Coupon	Principal	Interest	Total
Total		1,163,298	177,961	1,341,259
2018	1.500%	53,342	17,250	70,593
2019	1.500%	54,146	16,447	70,593
2020	1.500%	54,961	15,632	70,593
2021	1.500%	55,788	14,804	70,593
2022	1.500%	56,628	13,964	70,593
2023	1.500%	57,481	13,112	70,593
2024	1.500%	58,346	12,246	70,593
2025	1.500%	59,225	11,368	70,593
2026	1.500%	60,116	10,476	70,593
2027	1.500%	61,022	9,571	70,593
2028	1.500%	61,940	8,652	70,593
2029	1.500%	62,873	7,720	70,593
2030	1.500%	63,820	6,773	70,593
2031	1.500%	64,780	5,812	70,593
2032	1.500%	65,756	4,837	70,593
2033	1.500%	66,746	3,847	70,593
2034	1.500%	67,751	2,842	70,593
2035	1.500%	68,771	1,822	70,593
2036	1.500%	69,806	786	70,593
2037				-
2038				-
2039				-
2040				-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	6/11/2015	Next Call:	Unknown
Purpose:	Water & Sewer	Insurance:	Unknown
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Apr 1

Existing Debt

$44,495,000
2015B (VRA)

FY	Coupon	Principal	Interest	Total
Total		43,210,000	27,038,741	70,248,741
2018	3.125% / 3.077%	1,340,000	1,935,806	3,275,806
2019	5.125% / 5.125%	1,410,000	1,865,338	3,275,338
2020	5.125% / 5.125%	1,480,000	1,791,281	3,271,281
2021	5.125% / 5.125%	1,545,000	1,724,216	3,269,216
2022	3.773% / 3.772%	1,615,000	1,653,691	3,268,691
2023	5.125% / 5.125%	1,705,000	1,568,616	3,273,616
2024	5.125% / 5.125%	1,795,000	1,478,928	3,273,928
2025	5.125% / 5.125%	1,890,000	1,384,500	3,274,500
2026	5.125% / 5.125%	1,985,000	1,291,953	3,276,953
2027	4.444% / 4.445%	2,075,000	1,201,266	3,276,266
2028	4.491% / 4.488%	2,170,000	1,106,038	3,276,038
2029	4.489% / 4.482%	2,265,000	1,006,541	3,271,541
2030	4.492% / 4.488%	1,450,000	933,044	2,383,044
2031	3.125% / 3.125%	1,160,000	892,263	2,052,263
2032	3.125% / 3.125%	1,120,000	849,038	1,969,038
2033	4.489% / 4.458%	1,170,000	797,472	1,967,472
2034	4.524% / 4.525%	1,225,000	747,203	1,972,203
2035	3.887% / 3.884%	1,275,000	698,369	1,973,369
2036	3.928% / 3.920%	1,080,000	651,913	1,731,913
2037	3.966% / 4.000%	1,080,000	610,050	1,690,050
2038	3.785%	1,130,000	562,481	1,692,481
2039	4.802%	1,185,000	507,834	1,692,834
2040	4.644%	1,240,000	451,259	1,691,259
2041	4.687%	1,300,000	391,775	1,691,775
2042	4.681%	1,365,000	328,572	1,693,572
2043	4.803%	1,430,000	261,450	1,691,450
2044	4.803%	1,500,000	191,044	1,691,044
2045	4.808%	1,575,000	117,147	1,692,147
2046	4.804%	1,650,000	39,656	1,689,656

Dated Date:	11/18/2015	Next Call:	11/1/2025
Purpose:	New Money / Refunding	Insurance:	n/a
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Oct 1

$10,000,000
2016 (Carter Bank)

FY	Coupon	Principal	Interest	Total
Total		10,000,000	2,532,948	12,532,948
2018	2.350%	396,000	230,347	626,347
2019	2.350%	406,000	220,924	626,924
2020	2.350%	416,000	211,265	627,265
2021	2.350%	425,000	201,383	626,383
2022	2.350%	435,000	191,278	626,278
2023	2.350%	446,000	180,927	626,927
2024	2.350%	456,000	170,328	626,328
2025	2.350%	467,000	159,483	626,483
2026	2.350%	478,000	148,379	626,379
2027	2.350%	490,000	137,005	627,005
2028	2.350%	501,000	125,361	626,361
2029	2.350%	513,000	113,446	626,446
2030	2.350%	526,000	101,238	627,238
2031	2.350%	538,000	88,736	626,736
2032	2.350%	551,000	75,940	626,940
2033	2.350%	564,000	62,839	626,839
2034	2.350%	577,000	49,432	626,432
2035	2.350%	591,000	35,708	626,708
2036	2.350%	605,000	21,655	626,655
2037	2.350%	619,000	7,273	626,273
2038				-
2039				-
2040				-
2041				-
2042				-
2043				-
2044				-
2045				-
2046				-

Dated Date:	12/8/2016	Next Call:	Current
Purpose:	Water & Sewer	Insurance:	Unknown
Coupon Dates:	Apr 1 / Oct 1	Maturity Date:	Oct 1

Appendix C

FY 2018 Budget Revenue Detail

Urban, Crozet, and Scottsville – Water

	Water	Urban	Crozet	Scottsville	Total
1	**Metered Water Sales**				
2	Revenue	6,758,077	915,336	412,236	8,085,649
3	Debt Service Rate Revenue - CITY	1,920,463	-	-	1,920,463
4	Debt Service Rate Revenue - ACSA	3,425,267	691,476	129,448	4,246,191
5	**Total**	**12,103,807**	**1,606,812**	**541,684**	**14,252,303**
6					
7	**Miscellaneous**				
8	Lease Revenues	35,000	-	-	35,000
9	Miscellaneous	7,000	-	-	7,000
10	Lease Revenue	1,600	-	-	1,600
11	Leases	-	29,000	-	29,000
12	**Total**	**43,600**	**29,000**	**-**	**72,600**
13					
14	**Interest Income**				
15	Interest Allocation	6,300	900	400	7,600
16	Trust Fund Interest	18,000	1,800	400	20,200
17	Reserve Fund Interest	18,000	2,700	1,500	22,200
18	**Total**	**42,300**	**5,400**	**2,300**	**50,000**
19					
20	**Buck Mountain Surcharge**				
21	Buck Mountain Surcharge	84,000	-	-	84,000
22					
23	**Revenue Items Excluded**				
24	Use of Reserves	40,000	24,000	16,000	80,000
25					
26	**Total**	**12,313,707**	**1,665,212**	**559,984**	**14,538,903**

Urban, Crozet, and Scottsville – Wastewater

	Wastewater	Urban	Crozet	Scottsville	Total
1	**Metered Wastewater Sales**				
2	Revenue	6,680,446	352,344	284,688	7,317,478
3	Debt Service Rate Revenue - CITY	4,714,093	-	-	4,714,093
4	Debt Service Rate Revenue - ACSA	2,670,596	1,582	8,233	2,680,411
5	**Total**	**14,065,135**	**353,926**	**292,921**	**14,711,982**
6					
7	**Miscellaneous**				
8	Stone Robinson WWTP	27,630	-	-	27,630
9	Septage Acceptance	390,000	-	-	390,000
10	Nutrient Credits	100,000	-	-	100,000
11	Miscellaneous Revenues	10,000	-	-	10,000
12	County MOU - Septage	109,440	-	-	109,440
13	**Total**	**637,070**	**-**	**-**	**637,070**
14					
15	**Interest Income**				
16	Interest Allocation	6,800	300	300	7,400
17	Trust Fund Interest	26,200	-	-	26,200
18	Reserve Fund Interest	77,300	600	400	78,300
19	**Total**	**110,300**	**900**	**700**	**111,900**
20					
21	**Buck Mountain Surcharge**				
22	Buck Mountain Surcharge	-	-	-	-
23					
24	**Revenue Items Excluded**				
25	Use of Reserves for 2016 Bond DS	600,000	-	-	600,000
26					
27	**Total**	**15,412,505**	**354,826**	**293,621**	**16,060,952**

Appendix D

Financial Policies

Appendix E

Rating Reports

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