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**RWSA BOARD OF DIRECTORS
Minutes of Regular Meeting
October 24, 2017**

A regular meeting of the Rivanna Water & Sewer Authority (RWSA) Board of Directors was held on Tuesday, October 24, 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 (left meeting at 3:31 p.m.); Ms. Lauren Hildebrand; Mr. Maurice Jones; Mr. Gary O’Connell; and Dr. Liz Palmer.

Board Members Absent: Mr. Doug Walker.

Staff Present: Ms. Miranda Baird, Mr. Tim Castillo, Ms. Victoria Fort, Mr. Tom Freeman, Dr. Richard Gullick, Ms. Katie McIlwee, Mr. Doug March, Mr. Bill Mawyer, Ms. Betsy Nemeth, Mr. Scott Schiller, Ms. Michelle Simpson, Ms. Andrea Terry, Ms. Jennifer Whitaker, and Mr. Lonnie Wood.

Also Present: Mr. Kurt Krueger, RWSA counsel 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, October 24, 2017 at 2:16 p.m.

2.0 Minutes of Previous Board Meetings

- a) *Minutes of Regular Board Meeting on September 26, 2017*
- b) *Minutes of Special Emergency Board Meeting October 5, 2017*

Mr. Jones moved to approve the RWSA Board meeting minutes of September 26, 2017 and October 5, 2017. Dr. Palmer seconded the motion, which passed by a vote of 6-0. Mr. Walker was absent from the meeting and the vote.

3.0 Recognition

There were no recognitions.

4.0 Executive Director’s Report

Mr. Mawyer introduced Katie McIlwee, Rivanna's new Executive Assistant to the Executive Director and Communications Manager. He stated that Ms. McIlwee holds a bachelor's degree in classical studies and art history and a master's degree in library science, as well as significant experience with software, communications and administration with private firms and NGIC. He thanked Miranda Baird for helping to bridge the gap after Teri Kent's departure.

Mr. Mawyer reported that reservoir conditions had improved, and between October 5 and today the South Fork Rivanna Reservoir level has increased from 42% to 60% full, and about 160 million gallons have been added to the reservoir, a 2.5 foot increase in the water level. He stated that these numbers were more recent than what the Board has in their meeting materials. Mr. Mawyer reported that Rivanna is pleased that the measures taken by the Board to implement mandatory restrictions have been effective, and usage has declined from day to day – where it had normally averaged about 10 MGD but had a few days down to 8 MGD. He noted that operational changes were working, as staff has switched the load from the South Rivanna Water Treatment Plant to the Observatory Water Treatment Plant. He explained that they used to make 8 MGD at the Rivanna plant and 2 MGD at the Observatory plant, but have switched that to 5 MGD at the SRWTP and 5 MGD at the OWTP, and the 3 MGD switched to production at the Observatory WTP fed from the Ragged Mountain Reservoir helped maintain the South Fork Rivanna Reservoir. Mr. Mawyer noted that DEQ had also allowed Rivanna to reduce the instream release to the Rivanna River from the South Fork Rivanna dam.

Mr. Gaffney asked for confirmation that indications were that the previous day's rain were still accumulating.

Mr. Mawyer responded that the accumulations were still coming in, and Rivanna would continue these measures until the South Fork Rivanna Reservoir was full, working with DEQ to define what "full" means and at what point they would be comfortable with the release requirements and minimizing those when the time is right to lessen the drought stages. He stated that they have been adding about 1% a day to the storage in the SFRR, so the hope is to reach 90% in the next 30 days, at which time they would have the discussion regarding minimization of the drought measures.

Mr. O'Connell mentioned that the time given in the daily report was for the prior day.

Mr. Mawyer replied that it was through midnight, which is when the reservoir levels are measured, and on the daily report the production at the treatment plants is for the prior day.

Mr. Mawyer reported that Rivanna has continued with its community outreach program and had participated in the "Imagine a Day Without Water" program on the Downtown mall. He stated that Wastewater Manager Tim Castillo had students from Sutherland Middle School and the STEM team visit the Moore's Creek plant and learn about advanced wastewater treatment. Mr. Mawyer stated that Senior Civil Engineer Victoria Fort had met with 1st year engineering students at UVA and provided a realistic discussion of what it means to become a civil engineer – particularly what engineers do for Rivanna.

Mr. Mawyer reported that the Rivanna strategic plan was moving forward, with a work session

scheduled with both Rivanna boards on November 14th to present the steering team's draft plans to the boards and get their comments, with intent that the strategic plan would be ready for consideration and approval on December 12th.

5.0 Items from the Public

Ms. Dede Smith addressed the Board and noted that she is a city resident and water user, noting that she was not here to criticize the community water supply plan. Ms. Smith stated that this was not a "test" of it, and not all the pieces were in place for the plan. She stated that Rivanna had done an honorable job of getting Observatory Water Treatment Plant up to speed, even though it had come with some criticism. Ms. Smith stated that she was very impressed with the conservation impact, and with the rise in the South Fork Rivanna Reservoir levels – but it is at the expense of the Rivanna River. She emphasized that a 1 MGD release to Rivanna is "horrifying," and noted that she has eight years' worth of Rivanna daily flow reports for DEQ, which reflect what is taken out for water and what percentage of that goes back into the river. Ms. Smith suggested comparing this to the times when it was below crest, and reported that the South Fork Rivanna Dam has greatly impeded the ability to serve the Rivanna. She stated that she hoped in their drought report at this meeting, they would talk about the impact of the drought and particularly the South Fork Rivanna Reservoir on the water quality, whether they've needed to kick in the granular-activated carbon (GAC) system, whether there is an increase in the load of sediment, and whether there are unexpected impacts like algae. Ms. Smith stated that these are just pieces of the puzzle that would be great information as they weigh options for the future.

Mr. Mawyer stated that he did not have any detailed comments prepared regarding water quality, but he was not aware of any change in it related to a drought situation. He noted that Rivanna had not implemented the GAC system at any plants yet, with Crozet right at the threshold, and they could look at water quality but was not aware of any drought-related problems.

Dr. Gullick confirmed that there had not been any change in water quality parameters necessitating treatment adjustments.

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) *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

Dr. Palmer moved to approve the Consent Agenda as presented.

Mr. O’Connell asked Mr. Mawyer if staff would address the water plants when they did the drought status report, including the current status of the Observatory project.

Mr. Mawyer responded that they were working on projects to expand the facility.

Mr. O’Connell seconded the motion, which passed by a 6-0 vote. Mr. Walker was absent from the meeting and the vote.

8.0 Other Business

a) Drought Status Update

Mr. Mawyer reported that he had prepared a short update on the drought for the Board, and several Board members had forwarded numerous questions to him, including questions that had been received by the Service Authority. He stated that he expanded the presentation and staff had provided that information to the Board separately at this meeting, although it was not in their packets distributed earlier in the week. Mr. Mawyer stated that at the October 5th emergency meeting, staff had presented pictures of the South Fork Rivanna Reservoir and indications of drought conditions.

Mr. Mawyer presented a chronology of the status, beginning with August 3rd when the SFRR was 100% full; September 15th, when the SFRR was 77% full; and in early October, when the SFRR had declined over 32% to 45% full – with drought watch measures implemented on October 3rd and an emergency meeting of the RWSA Board on October 5th, then going to drought warning procedures. He stated that in the first week of October, Rivanna began implementing operational changes of switching from the South Fork Rivanna treatment plant to the Observatory plant, as well as contacting DEQ about the minimum instream flow release.

Mr. Mawyer reported that the mandatory water restrictions were approved by City Council and the Board of Supervisors, as well as the Albemarle County Service Authority Board of Directors. He stated that these measures appear to have been helping, as demand dropped from 10 MGD to about 8 MGD on certain days. Mr. Mawyer reported they decreased water treatment at the South Rivanna plant and increased it at the Observatory plant, leveling each at about 5 MGD and thus saving about 3 MGD that would not have to be taken out of the SFRR. He stated that Rivanna had been working with DEQ through a phased implementation, with Rivanna typically required to release 10 MGD from the SFRR, representing 70% of the inflow. He stated that DEQ allowed this to be reduced to 50%, then to 10% of the inflow – or about 2 MGD – on October 9th.

Mr. Mawyer stated that Rivanna moved from a low of 42% of reservoir capacity to 54% by October 18, and now at 60% – with water levels rising by 2.5 feet and 160 million gallons total storage filled.

He stated that they need to complete infrastructure projects to fulfill the community water supply plan and complete the triangle of three urban reservoirs working more cohesively and collectively. Mr. Mawyer noted that staff has presented information on the South Fork Rivanna Reservoir – Ragged Mountain Reservoir waterline and would continue reporting on all of these projects, with the Board having approved a contract to design the location of the pipe and procure the property and the easements to put the pipe in. He stated that construction would be the next phase, and Rivanna was moving forward with a project to upgrade and expand the Observatory Water Treatment Plant, which is estimated at \$10-15 million. Mr. Mawyer noted that currently, Rivanna's permit indicates they can produce 7 MGD at Observatory, with the goal of making Observatory self-sustaining for the entire urban area – with staff considering recalibrating to bring that level to 10 MGD. He mentioned that he and Ms. Hildebrand had met earlier in the week with UVA Assistant Vice President and Chief Facilities Officer Don Sundgren regarding renewal of the contract agreement between the City and UVA, and the lease on the Observatory Water Treatment Plant. He stated that this was a positive discussion, and they plan to meet with Mr. Sundgren again the week prior to Thanksgiving.

Mr. Mawyer stated that Rivanna had provided UVA with a master plan of what properties were needed for the next 100 years to grow the Observatory plant from 7 to 10 to 20 MGD of capacity, with a map of how that would occur and what the facilities would look like in terms of a footprint and where they would be located. He stated they have proposed to UVA that they need about 7.8 acres to fulfill that master plan.

Dr. Palmer asked about the timing of the capacity increase.

Mr. Mawyer responded that they thought they were going to 10 MGD for a few decades, but with the drought experience they felt it would be beneficial to have redundancy – and they had conducted a regional exercise with a hypothetical situation in which a plane hit the South Fork Rivanna dam and put it out of service. He reported that this helped lead them to a conclusion that they should upgrade the Observatory capacity to 10 MGD now, which would be accomplished over the next 4-5 years, and to 20 million MGD by 2060. He noted that they would have the expansion designed, bid and constructed within the next 5 years.

Dr. Palmer asked how much acreage would be required to achieve 10 MGD at Observatory.

Mr. Mawyer responded that it would be 7.8 acres, and he pointed out that there was very little difference in the footprints for 10 and 20 MGD capacity. He also noted that they would be at the end of a 99-year lease in 2021 but were trying to look another 99 years down the road, which was the footprint Rivanna was asking UVA to include in the agreement.

Mr. Gaffney asked what the current footprint is.

Mr. Mawyer explained that the lease was put together in 1922 and one document says 5 acres,

but another document seems to conflict with this a bit. He stated that they have approximately 5 acres, but the discussion with UVA yielded the decision to prepare a plat without trying to reconcile what they already had – with 7.8 acres total for the footprint of the 100-year plan. He mentioned that the acreage was all open space, and the initial conversation with Mr. Sungren indicated there was no concern about the footprint as proposed.

Mr. Krueger mentioned that in the 1930s and 40s, the lease was amended to add and subtract small pieces of property – with no surveys done, just handwritten drawings. He stated that while they don't have surveys, they do have clarification of the boundaries based on those drawings.

Ms. Galvin asked what was meant by making Observatory “self-sustaining.”

Mr. Mawyer responded that this pertained to the urban area, independent of SRWTP – with each able to produce enough water to serve the city and urban areas of the county. He explained that the next project – the Avon to Pantops waterline – was a critical component of the plan. He noted that there were three parts: water supply, water treatment, and water distribution. Mr. Mawyer emphasized that it would take several projects to create the desired redundancy, and all projects were in the engineering phase. He noted that this would all be presented in the CIP, with information forthcoming in terms of impact on rates.

Mr. Mawyer reported that at the September 26th Board meeting, it was discussed that there was a less than 3% chance of the combined reservoir levels to be less than 75% in the next 12 weeks – but over the following next few days, Rivanna changed its view and declared a drought watch on October 3rd and brought the drought warning request to the Board on October 5th. Mr. Mawyer explained that Rivanna had utilized the regional drought management plan, which stated to run the hydrologic model, which collectively considered rainfall, history of the area, runoff, and demand for the three urban reservoirs: Observatory, Sugar Hollow, and Rivanna. He stated that staff felt that the hydrologic model in the plan was not giving the whole story, with the SFRR declining rapidly and agreement that it was prudent to move forward with drought management measures so that water in the SFRR could be conserved.

Mr. Mawyer explained that the water supply had dropped to approximately 22 days, and there were questions as to how that could have occurred without any public warning – when the worst level in 2002 was 60 days and the community was then extremely worried. He stated that the graph indicates that on August 3rd, the SFRR was 100% full, and there was a gradual decline until September 1 when it rained and supply went up above 80%. Mr. Mawyer reported that on September 15, the Rivanna Reservoir was 77% full, which was not concerning for that time of year. He noted that the model indicated that collective water storage was above the criteria and therefore indicated there was no drought, adding that it was a complicated drought management criteria when there is a probability of a percentage.

Mr. Krueger asked for confirmation that the hydrologic study studies all three reservoirs as a group in terms of storage.

Mr. Mawyer confirmed that it was a collective measurement, and the drought management plan uses a measure of how much water is collectively in the three reservoirs and not individually

each one. He stated that if all reservoirs were the same size and declined equally, it would be more meaningful, but with Ragged Mountain being twice the size of Rivanna, Rivanna gets to the bottom a lot quicker. Mr. Mawyer pointed out that in addition to water conservation measures, they implemented operational measures and worked with DEQ on regulatory issues. He explained that the mathematical answer as to why they went from acceptable levels on September 26 to drought conditions on October 3 is that the water coming in to the Rivanna Reservoir was less than the water going out – with the amount taken out for the treatment plant and the amount released to the river, as well as natural evaporation, all being factors.

Mr. Mawyer reported that Ragged Mountain had been nearly 90% full for most of this time, and the question arose as to why the new reservoir was not providing enough water to offset South Fork. He noted that water could not be transferred from Ragged Mountain to South Fork, and they must have both treatment plants – Observatory and SRWTP – in operation, to provide the needed capacity for the entire urban area. He stated that the Rivanna Reservoir was the concern, and when it declined to 42% it triggered the drought policy.

Mr. Mawyer stated that people in the community noticed and commented on the dramatic reduction and asked why it took so long for Rivanna to address it, and he referenced the graph that showed things being normal in early August then going back up, but in the latter part of September there was a longer decline in the reservoir and it went from 77% to 42% in just a two-week period. He stated that it would have been good if the RWSA had acted about a week earlier, but there was not much time prior to that between September 15 and when they took action on October 3rd.

Mr. Krueger pointed out that the reason the Ragged Mountain to South Fork pipeline has always been part of the water supply plan is because it provides the transferability for raw water between those reservoirs that currently does not exist.

Mr. Mawyer explained that there had been another question from the public regarding 10 MGD being released from the Rivanna reservoir, and Rivanna's initial review of the inflow and outflow data revealed that there was about 10 MGD unaccounted for but no certainty as to where it was going – and it was still unclear where it went or if it was “real.” He explained that inflow was measured at a gauge at Garth Road and the Mechums River, with the Rivanna Reservoir being supplied by Moormans and Mechums but no gauge existing in Moormans. He reported that using the gauge at Mechums, they did a hydrologic correlation that stated if Mechums was flowing at 2 MGD then Moormans was assumed to be 1 MGD and collectively the Rivanna reservoir should be receiving 3 MGD as a theoretical example. He stated that this gauge was what they used to measure inflow, but the gauge was out at Garth Road and DEQ managed it – with data periodically revised, and inflow data revised to indicate that it was 15% less than originally thought. Mr. Mawyer emphasized that they were still working on the flow balance of inflow to outflow in the reservoir, and they were not sure if the lack of 10 million gallons was real, but there is no evidence of a hole in the floor in the reservoir because the inflow and outflow has now balanced – with water being added and numbers starting to make sense.

Dr. Palmer asked how many millions of gallons the 15% would have accounted for.

Mr. Mawyer responded that it would depend on how many days it was for, and DEQ sometimes revises it back for a week, but there was not an exact number to calculate. He stated that in reading the number and correlating how much they have to release in the river, so they have to read it and release it every day – and when they go back and update their data, it could indicate that not that much needed to be released, but the water was already gone.

Mr. Gaffney asked if Rivanna was considering putting in its own meters in the rivers.

Mr. Mawyer responded that they had not discussed this but it was a possibility, and they would have to talk to DEQ and USGS – with the USGS owning the meter and DEQ maintaining it.

Mr. O'Connell asked if the meter measuring the flows released in the river was below the dam.

Mr. Mawyer explained that there were three pipes in the Rivanna reservoir dam that let water out – the north gate, which is a pipe that lets water out; the south gate, which has the meter on it that is used to measure outflow to be sure they're meeting minimum instream release; and a third outlet running through the old hydro plant. He noted that two of the gates are three-foot diameter pipes, and the pipe that goes through the old hydro plant is six feet in diameter. Mr. Mawyer noted when they talk about gates to control the flow, the pipe and steel flow containment piece were built in 1966 – with some leakage by the north gate and through the hydro plant gate. He stated that they had been leaking about 3 MGD out of the north gate and hydro plant and not taking credit for it in the instream release calculation, so some days they were over releasing. He stated that they only have an instream release on days when the reservoir was not overflowing, and if it was overflowing that's more than the release.

Mr. Mawyer noted that a brand new flow meter was installed in 2016, and the manufacturer was present to verify correct installation. He stated that Rivanna has a question as to whether it measures flow correctly at higher release volumes, and now that they are down to a release of 1-2 MGD, it appears to be reading correctly. He added that they would be testing the meter to verify that the release of 20 MGD earlier in the summer was also reading correctly.

Dr. Palmer asked about the 3 MGD leakage in two of the outlets, and whether those were closed during this period of time and if they were still leaking.

Mr. Mawyer responded that they were closed, but there was still water going past at about 0.5 MGD.

Dr. Palmer asked how they were fixed.

Mr. Mawyer responded that they were fixed, and explained that there was some speculation that the dam gates malfunctioned and released excess water to the river – but Rivanna does not feel that was the real cause of the sudden drop in the reservoir. He stated that the gates are actually a slide going down into a pipe, and two of the pipes were three feet in diameter, with one being six feet in diameter, and he presented a visual depiction of the top of the dam and the stem of the gate that goes all the way down to the bottom of the reservoir to try to close the pipe.

Mr. Mawyer stated this was not an exact science, and it was not possible to turn a dial that provides an exact amount of release in a given day, as streamflow was a significant factor. He explained that two operators had to work in tandem, with one coming down and pushing a button for an electric operator to lower or raise the gate. He stated that this operator then radios the other person to see how the flow would be reduced, and troubleshooting until the level is correct. Mr. Mawyer pointed out that they typically adjust the gates at 9 a.m., but have to measure the release from midnight to midnight – so nine hours of water has already gone through. He noted that the plant manager does the math and decides what would need to be released and how the gates need to be adjusted. Mr. Mawyer added that the release requirement with DEQ is a minimum, and they don't want to be below – so a greater release is acceptable in trying not to be too far below the minimum. He acknowledged that some days in August had releases that substantially exceeded the release amount needed, but that was a lesson learned in the process and as they go forward they may need to adjust the gate daily based on summer and/or drought conditions.

Mr. Mawyer noted that none of the flows coming out of the dam were sealed 100% tight, and one was supposed to be open with two closed, and the 3 MGD was now down to about 0.5 MGD, through Rivanna's maintenance efforts. He confirmed that there were no meters on those, so they had to calculate and estimate – and if there was 0.5 million going out with 2 million required for release, they use that in the calculation and try to set the third gate so the sum equals the required amount and no additional release is made.

Mr. O'Connell asked if those gates were wide open if the reservoirs were full and overflowing.

Mr. Mawyer responded that they were closed if the conditions were overflowing.

Mr. O'Connell commented that this was reflecting what was coming in above versus what was leaving, so there was a balance being achieved.

Mr. Mawyer confirmed this, adding that other than the 5-8 MGD pulled out to treat, the inflow would equal the outflow when it was overflowing.

Mr. Mawyer stated that if it didn't rain and there was an abnormally dry winter, Rivanna would use other tools in the event of a declining reservoir situation: water stored in the Sugar Hollow Reservoir that could be released, and water in the Beaver Creek Reservoir that has excess capacity. He noted that Rivanna would work with DEQ on the river release and whether they would agree to go to a less than 10% release. Mr. Mawyer also mentioned that there was a pool of water below the "usable storage" that could be pumped out and used, even though it may not necessarily be the highest water quality, and that water can be treated for use.

Mr. Gaffney asked if what he explained was the typical order that would be followed.

Mr. Mawyer responded that it was, adding that DEQ would probably not compromise much more if all the tools in the box were not utilized.

Mr. Mawyer stated that there were concerns that the water supply plan was broken, but the plan is working and additional water supply was created by the new Ragged Mountain Reservoir – with a plan to complete the water supply plan by constructing the Ragged Mountain to Rivanna pipeline and expanding the Observatory water treatment plant, as well as a plan for the Avon to Pantops pipeline. He stated that Rivanna did not have permits to remove the sediment from South Fork nor any location to dispose of the dredge material, so this was not a viable option.

Mr. Mawyer presented information on rainfall differences from 2015, 2016, and 2017. He stated that from June-September of 2017, there were 10 inches of rain, which was less than rainfall for the same period in 2015, 2016, and the normal. He reported that from January-September, there was 31 inches of rainfall, which was less than rainfall for the same period in 2015, 2016, and the normal. Mr. Mawyer presented information on the data points used to determine when the emergency water restrictions would be declared by the Board, and Rivanna did not see emergency water restrictions in the foreseeable future because water was continuing to be added to the Rivanna reservoir. He stated if they were to get to an emergency situation, they would look at the water level in the Rivanna Reservoir – and they would also look at how significant the decline is, over a longer period of time, as well as weather forecasts and the water levels in the Sugar Hollow Reservoir and Beaver Creek. Mr. Mawyer stated if they did have to go to emergency water restrictions, they would notify the community through media channels, the website, social media, and through customer contacts at ACSA and the city.

Mr. Krueger asked if the hydrologic models used several weeks earlier, which measured the reservoirs on a composite basis, provided a bit of a false outlook. He also asked if that same model also provided a picture of each individual reservoir, so they could consider that in addition to the composite.

Mr. Mawyer responded that it was part of Rivanna's future action plan to use the model with all of its capability – collectively and individually.

Dr. Palmer asked if the DEQ would need to be involved with the change of reservoir management.

Mr. Mawyer responded that the management criteria were contained in Rivanna's permit, and those were the conditions asked for by Rivanna and granted by the DEQ – and they have already begun discussion as to how to improve the permit and the drought management plan. He stated that the hope was to supplement the permit and the plan, not to do a rewrite.

Mr. Gaffney noted that they could always increase production at the Observatory plant much earlier, prior to them building a pipeline.

Mr. Mawyer agreed, stating that one of the things learned was that they could use Observatory WTP sooner, and they would need to discuss when to use Sugar Hollow because there is a plan to use it earlier in the process rather than holding it as they are now to see if Rivanna gets really low. He mentioned that the consultant's plan says to use Sugar Hollow sooner, which would mean sending it down to South Fork or Ragged Mountain, and this was in the operating procedures from Hydrologics. Mr. Mawyer noted that the drought management plan addresses

what the conditions are and the steps to use Chris Greene and Lake Albemarle, which are small tools that present significant challenges in getting water from them.

Dr. Palmer commented that it seems to her the situation is a very dry period coupled with operational management changes that should be done prior to rewriting instream flow requirements.

Mr. Mawyer agreed that they could start using Observatory sooner and monitor the gates at Rivanna more closely.

Dr. Palmer asked if the two leaky gates would remain closed.

Mr. Mawyer responded that they would continue to have the 0.5 million release, which they would take credit for in the release requirements, and given that the valves were from 1966 there was a question as to whether it made sense to spend the money to replace them just to save the 0.5 million used in calculations for minimum instream flow.

Dr. Palmer stated if they got to a situation in which they were reducing instream flow in the Moormans, they would have to weigh that as a factor because it was about 0.4 MGD.

Mr. Mawyer responded that they were also putting out about 1 MGD out of Sugar Hollow.

Mr. Krueger pointed out that DEQ would never let Rivanna get below the 0.5 MGD Rivanna release anyway, so those leaky gates wouldn't really be a factor.

Dr. Palmer agreed, but noted that if they are leaky now they may get leakier over time and should be addressed.

Mr. Mawyer agreed, stating that when the dam is overflowing and the water is flowing, a few million gallons coming out the gates didn't matter much – but in drought times, every million gallon counts.

Dr. Palmer reiterated that they need to make sure the gates are working properly and can be controlled. She asked what percentage of the loss is from leaky gates versus the reduction in rainfall, as she was just trying to figure out what to expect with the next dry spell.

Mr. Gaffney responded that if they're counting 0.5 million at each leaky gate for the minimum release calculation, then it is not the cause of the reservoir going down.

Dr. Palmer stated that the 2.5 MGD is the issue, and she was trying to gauge how relevant that was to the situation.

Mr. Mawyer explained that before they took drought measures, they were taking out 9 MGD for treatment and releasing 9 MGD, for a total of 18 MGD – then they were releasing another 3 MGD they weren't counting. He stated that was approximately 15% of the quantity due to the leaking gates.

Mr. O'Connell stated that at that point, the Mechums and Moormans streamflow fell off, which was not making up the difference and started the reservoir level dropping.

Mr. Mawyer noted that the overflow stopped and they had to start measuring the inflow, taking 70% and trying to release that. He noted that the question is whether the amount measured at the Mechums gauge was correct or not, and whether the water was even reaching the Rivanna reservoir – specifically whether the correlation between the Mechums and Moormans was correct at a flow that low. He stated that the correlation of the model was likely looking at an average, and this may have been well below the average.

Ms. Whitaker pointed out that one of the biggest factors here was the hydropower facility and the 72-inch tunnel, and when they decommission that, one of the items in the plan is to seal it off – so that shouldn't be an issue going forward. She stated that this should happen within 18 to 24 months.

Mr. O'Connell asked how much water was going through that.

Mr. Mawyer responded that it was 2.75 MGD between the north gate and the hydro.

Mr. Jones asked when they anticipated going over this with DEQ and bringing it back to the Board, including next steps.

Mr. Mawyer replied that he anticipated this to occur over the next few months, stating that Rivanna sends DEQ information every day and talks to them via telephone every week regarding reservoir levels. He stated that DEQ tests whether to continue the variance to reduce minimum instream release, and once the reservoir levels were full again, Rivanna would get with DEQ and establish what the permit stipulates and what might need to be refined.

Mr. O'Connell noted that DEQ gets the data every day.

Ms. Whitaker responded that there is a compliance submission, and it was currently sent to them daily as part of this process. She confirmed that data from all the reservoirs was sent to DEQ.

Mr. Mawyer explained that the reservoirs were not lowered because of the hurricanes but might in the future if they felt with high certainty that a storm would hit on a specific day and dump a lot of water in – but the storms that were forecast in 2017 were uncertain and did not reach the area.

Mr. O'Connell asked if that was more routinely done before Ragged Mountain was rebuilt.

Ms. Whitaker stated that with every hurricane season and prediction, Rivanna looks at this from a dam safety standpoint at every dam, and the issue was understanding how certain the predictions were, the timeline to get the water down, and the risks and rewards for action. She stated that this season, hurricane trajectories were moving away from our area, so there wasn't a

need to respond, and with the reservoirs down a bit they had the capacity to handle the level of rainfall called for.

Mr. Mawyer addressed the question of whether the drought management plan worked, stating that Rivanna feels it does work but needs to be supplemented through work with DEQ to capture the lessons learned this fall.

Mr. Mawyer stated that in going forward, to prevent a water shortage from happening in the future, Rivanna would capture the experiences gained and integrate them into the plan to be better prepared with all resources the next time. He noted that this was the first year of implementing the updated drought management plan – because Ragged Mountain was built in 2014, filled in 2015, and there was no drought in 2016 so this was the first experience.

Mr. Mawyer mentioned that there were more detailed explanations in a white paper that would be issued to the community, and posted on the Rivanna website. He agreed to share the information electronically with the Board.

b) *Financial Review – Director of Finance/Administration*

Mr. Wood reported that in looking at his notes from the Board's previous discussion of finances, most of the Board's interest related to reserves, financial policies, and bond and debt capacity. He stated that he created another summary from that point until now to show the capital funding activity that has occurred, with approximately \$209 million spent on capital projects since 2009 and nearly \$30 million cash used to fund those projects – with a target of 10% cash use and actual achievement of 14% cash use. Mr. Wood stated that using cash for capital spending saved approximately \$22 million in interest payments over the next 30 years. He stated that over the past 7-8 years, Rivanna's assets have increased by 133%, with cash balances improving but not quite as strong as the capital assets. Mr. Wood mentioned that debt had also increased significantly – about 200% – with factors being the wet weather ENR project, the Ragged Mountain Dam, the pump stations, Meadowcreek sewer replacement, etc.

Mr. O'Connell commented that it was pretty remarkable to have that level of investment and still have the rates be fairly steady.

Mr. Wood responded that they have had a few rate increases. He explained that Rivanna had policies adopted in 2011 describing what the reserves are, how they are used and how they are built up over time as bonds are issued. Mr. Wood stated that overall, the reserves have been fairly even, and he presented reserve balance information showing that current levels ending in June 2017 were about \$33 million. He noted that each rate center had its own reserve to keep all the money separated, and the consent agenda had addressed that. Mr. Wood stated that reserves were set aside for repairs and emergencies, and without those reserves they would have to raise rates. He presented an image of emergency repairs at Moores Creek in which a clarifier had to be taken out of service, which greatly reduced capacity. He stated that reserves also provided management flexibility for unexpected financial events like the bond validation lawsuit. Rivanna would have had to stop construction on that project for about six months. Without reserves they

would not have been able to do the temporary odor control measures. He noted that Rivanna has had two increases in its bond ratings since 1999.

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

Mr. Ted Cole of Davenport & Co. addressed the Board and presented several slides related to Rivanna's bonds, noting that as an authority they are rated AA2 by Moody's and AA+ by Standard and Poor's. He stated that the highest rating is AAA, and the goal was to reach that. Mr. Cole stated that Rivanna interacts with rating agencies when they do bond issues, and the agencies also interact when they need to ensure current ratings – with the last official write up of the Authority taking place in 2012. He stated that as they move forward with capital, there may be more conversations with bonding agencies, and overall there has been general positive performance at the Authority since 2012 – which could help set them up for continued improvement with ratings. Mr. Cole stated that better bond ratings equate to a lower cost of borrowing, which equates to better debt capacity and better debt affordability. He presented information on rating agency methodologies, stating that they have evolved into a more transparent approach over the past few years, with a scorecard used that weights categories of operations – the economy, the underlying service area, finances, management and debt. Mr. Cole noted that Rivanna has some short-term control over these things, but there are longer term factors such as the economy that the Board cannot control.

Mr. Cole stated that two key credit factors tying back to Rivanna policies include debt service coverage, meaning that as an Authority, the only collateral or security they can offer a bond holder is a lien on net revenues – so there are revenues coming in from Rivanna's two customers, operating expenses must be paid, and there is net revenue that is the pledge a bond holder receives. He stated that one of the things a bond holder considers is the net revenue available to pay debt, a concept called "debt service coverage," which is a one-time coverage that relies on available dollars to pay it. Mr. Cole noted that it was not uncommon for a wholesaler like Rivanna to have a one-times coverage, and in 2011 the Authority adopted policies that stated they would be held to 1.5 times coverage – which is a higher standard that provides additional buffer to the bond holders in the event expenses are up or revenues are down. He stated that in general, higher coverage was better from a credit perspective and the rating agencies pay a lot of attention to that – which is one of the reasons that policy was adopted in 2011, to put a bit more conservatism in the debt service coverage ratio.

Mr. Cole stated that the other factor was liquidity, and Rivanna's reserves have been tracking relatively stable since 2010 – with restricted versus non-restricted reserves being managed well, and bond documents requiring certain reserve levels that must be met year in and year out. He stated that beyond that, they have more discretionary reserves at the Board level that they can choose to fund and maintain. Mr. Cole mentioned that the Board had adopted a policy in 2011 to have "Tier Two" and "Tier Three" reserves, as defined in the bond indenture, equal to 1.5 times the budget.

Mr. Cole reported that Davenport subscribes to a database that is maintained by Moody's, and he presented some peer systems across the country and within Virginia: AAA-rated utilities, AA1-rated utilities, and AA2-rated utilities. He stated that they were looking at those with equal

ratings and those that were above, with six different systems in Virginia that are either water only or sewer only – with Upper Occoquan being a wholesaler like Rivanna, serving four or five different communities, and other systems selling directly to households and commercial enterprises. Mr. Cole noted that there were a few other comparables included that are AA or higher, as rated by Moody's.

Mr. Cole reported that liquidity is measured in two different ways, including days' cash on hand, or how many days of operating expenses reserves can cover, with Rivanna finishing FY17 at about 900 days on hand. He stated that there is also a liquidity measure of "percent of budget," which is about 250% of budget. He emphasized that Rivanna has been maintaining very healthy reserves at two different levels – bond indenture and Board policy levels. Mr. Cole reported that measuring unrestricted cash as a percentage of operating and maintenance budget has Rivanna at 200% or above in all measures. He emphasized that most of the data was for 2016, with 2017 data just coming out now, but there are systems out there with much greater liquidity.

Mr. O'Connell asked whether the AAA-rated entities were more liquid because they were large.

Mr. Cole responded that it was also because of the median, but there is a point that as a percent of budget you don't need to keep squirreling away money, and upper limit versus lower limits among those entities probably capture a varied percentage.

Mr. Gaffney asked if Virginia Beach was part of that locality versus a standalone entity, so they benefit from the city's rating.

Mr. Cole confirmed that it is an enterprise system of the city, so it operates much like an authority in that it's cordoned off from tax revenue – but if they're issuing revenue bonds they would have a separate and distinct bond rating, which would be AAA in their case but wouldn't mandatorily be.

Mr. Cole presented information on net revenues covering debt service, and he noted that Rivanna's policy has been 1.5 times net revenues over debt service – and they have remained at that level for FY12-16 but would likely fall below that for FY17 due to drier weather and lower flows. He noted that sometimes flows compensate to help reach the 1.5, but that was unlikely in FY17, and even though they may have fallen short they were still above the minimum required in the bond indenture. Mr. Cole stated that on a comparative basis, in looking at various systems across the state and nationally, Rivanna was at the 1-1.5 times coverage. He noted that wholesalers often end up on the lower end of coverage, but their policy helps bring them to a stronger comparative level.

Mr. Cole presented information on debt capacity, stating that Davenport has tried to demonstrate what Rivanna's debt capacity is. He explained that all the numbers presented reflect the policies of 150% of unrestricted cash in reserves and 1.5 times coverage debt service coverage. He stated that they were using the revenue growth necessary to achieve those parameters and the resulting debt capacity, with revenue growth possibly being rates increasing, flow, number of accounts, flow per account, etc. Mr. Cole stated that they were not necessarily saying that rates needed to go up – just that revenues did – and how that would be generated would be a combination of

growth, flow, and rates. He stated that Rivanna embraced a balanced approach between debt and equity for capital, with 10% cash funding as a requirement. He stated that they have built in assumptions of 3% operating expense growth per year, with any debt assumed being a level debt structure and a 25-year term at 5%, which is above the current market.

Mr. Cole stated that in taking into account all that information, Davenport delineated this into four different results – assuming 3% revenue, 1.5 times coverage, the liquidity policy – with no additional debt capacity over the next five years, but cash funding available of about \$30 million for capital capacity. He emphasized that with 3% revenue growth, the debt capacity cannot increase, and 3% revenue growth is not sufficient to reach the 1.5 times debt service coverage or better. Mr. Cole stated that assuming 5% revenue growth, there is some debt capacity in 2021 and 2022, because the debt service minimum is achieved. He noted that this would equate to about \$23 million of debt and \$33 million of pay-as-you-go cash funding, totaling about \$55 million in capital funding capacity. Mr. Cole added that assuming 7% growth, debt capacity builds a bit more, as does cash, for a total of about \$96 million capital capacity – and at 10% revenue growth, it's even higher in terms of capacity.

Mr. O'Connell asked if this would include 2% growth from flows coming from more customers in each system, for example.

Mr. Cole confirmed this, adding that rate increases could also be on top of this, with a combination needed to enhance revenue growth.

Mr. Wood pointed out that staff had shown the Board the previous year that they would need a 5% increase in rates every year to fund the CIP, and this confirms that.

Mr. Cole agreed, stating that 7% growth gets them to about \$100 million between debt and equity over the next five years, and the current CIP is about \$98 million.

Mr. Wood stated that there were also some projects not yet on the list, so that amount was really a floor estimate.

Mr. Cole commented that staff had done a good job of tapping into lower interest rate loan programs, achieving better than Davenport's assumed 5% rate, and that should help the results here although the 5% was better for long-term planning, given market conditions. He also reiterated that they would like to see Rivanna's bond rating increase, with a strong City and County behind them.

9.0 Other Items from Board/Staff not on Agenda

Mr. Mawyer introduced a new staff member, Tom Freeman, a senior engineer coming from a consulting and VDOT background.

10.0 Closed Meeting

There was no closed meeting held.

11.0 Adjournment

At 3:48 p.m., Mr. Jones moved to adjourn the RWSA Board meeting. Mr. O'Connell seconded the motion, which was approved by a vote of 5-0. Mr. Walker was absent from the meeting and the vote. Ms. Galvin was absent from the vote.

There being no further business, the meeting adjourned at 3:48 p.m.

Respectfully submitted,



**Mr. Jeff Richardson
Secretary-Treasurer**