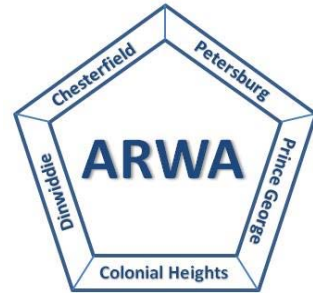


Appomattox
River
Water
Authority



21300 Chesdin Rd. - S. Chesterfield, VA 23803 - Phone (804) 590-1145 - Fax (804) 590-9285

Appomattox River Water Authority
Board of Directors Meeting

DATE: September 21, 2017

TIME: 2:00 PM

LOCATION: Appomattox River Water Authority
Board Room, Administration Building
21300 Chesdin Road
South Chesterfield, Virginia 23803

AGENDA

1. Call to Order/Roll Call
2. Approval of Minutes: Minutes of the Regular Board Meeting on August 17, 2017
3. Public Comment
4. Executive Director's Report:
 - Reservoir Status Update for August/September 2017
 - "In-Plant" Project Engineer Discusses Equipment Pre-Purchase
 - Davenport Update Discussion on Funding the Capital "In-Plant" Project
 - Davenport Progress Report on Raftelis Analysis
 - Hazen Presentation on Chesdin Reservoir Storage Management Plan
 - Update from Chesterfield County on Discussions With Federal/State Elected Officials Related to Raising the Dam
 - Virginia Department of Environmental Quality Letter
 - Status Report: Ongoing Projects/Operational/Financial
5. Items from Counsel
6. Closed Session
7. Other Items from Board Members/Staff Not on Agenda:
8. Adjourn

Cc: W. Dupler/George Hayes, Chesterfield
D. Harrison, Petersburg Public Works
W. Henley, Colonial Heights
R. Wilson, Dinwiddie Water Authority
A. Anderson, McGuire Woods

1. Call to Order/Roll Call

2. Approval of Minutes: Minutes of the Regular Board Meeting on August 17, 2017

Following are the Minutes of the Regular Board Meeting on August 17, 2017.

Absent any corrections or revisions, we recommend approval of the minutes as submitted.

BOARD OF DIRECTORS MEETING

**Appomattox River Water Authority
August 17, 2017 at 2:00 p.m.
Location: Appomattox River Water Authority
21300 Chesdin Road, S. Chesterfield, Virginia**

PRESENT:

Percy Ashcraft, Chairman (Prince George)
Kevin Massengill, Secretary/Treasurer (Dinwiddie)
Aretha Ferrell-Benavides, (Petersburg)
Douglas Smith, (Colonial Heights)
George Hayes, (Alternate, Chesterfield)
Robert B. Wilson (Alternate, Dinwiddie)
Jerry Byerly, (Alternate, Petersburg)
Dickie Thompson, (Alternate, Prince George)

ABSENT:

Joseph Casey, Vice Chairman (Chesterfield)
William Henley, (Alternate, Colonial Heights)
William Dupler, (Alternate, Chesterfield)
Daniel Harrison (Alternate, Petersburg)

STAFF:

Robert C. Wichser, Executive Director, (ARWA & SCWWA)
James C. Gordon, Asst. Executive Director (ARWA & SCWWA)
Arthur Anderson, (McGuire Woods)
Melissa Wilkins, Accounting/Office Manager (ARWA & SCWWA)
Kathy Summerson, Administrative Assistant (SCWWA)

OTHERS:

Jack Berry, (Petersburg)
Chris Tabor, (Hazen & Sawyer)
Mike Wooden, (Arcadis)
Scott Morris, (Chesterfield County Utilities)
Mark Krueger, (Chesterfield Resident)

Mr. Ashcraft, Chairman, called the meeting to order at 2:20 p.m.

1. Call to Order/Roll Call.

The roll was called.

2. Approval of Minutes: Minutes of the Regular Board Meeting on July 20, 2017:

Upon a motion made by Mr. Hayes and seconded by Mr. Massengill the following resolution was adopted:

RESOLVED, that the minutes of the Regular Meeting of the Board on July 20, 2017 are hereby approved with deletion of first editor's note:

For: 5 Against: 0 Abstain: 0

3. Public Comment

There were no public comments.

4. Executive Director's Report

• Reservoir Status Update for July/August 2017

Dr. Wichser reported on the Reservoir Status Update for July/August 2017. He stated that as of today the reservoir is down 8.6 inches. Based on recent NOAA model results, there is no drought predicted for our area through August, September and October.

• Review of Kruger (KEI) Hydro-Facility Amended Deed of Easement

Dr. Wichser stated that Dr. Casey asked for a review on the Kruger Amended Deed of Easement. He further stated what was developed is a co-authored memo with Mr. Anderson.

Mr. Anderson reported on the history of the original Easement for the Hydro-Electric Facility and the events leading up to the approval of the Amended Easement. He further reported that on March 17, 2016 the ARWA Board approved the Amended Easement and authorized the ARWA Chairman to sign it. The vote was "For-4, Against-0". Jay Stegmaier was absent, (William Dupler and George Hayes were present, but arrived after the

vote). On March 31, 2016, ARWA Chairman Tom Mattis signed the Amended Easement. Mr. Hayes stated that Chesterfield did arrive after the vote was taken. He further stated that in reading the January 2015 minutes he came away with the impression that one was led to believe that the Board stopped evaluating the dam raise project all together, which is not the case. If you read through the January 2015 minutes the motion that was passed was to suspend any further investment at that time into the dam raise project but direct staff to continue to monitor this alternative with an annual update to the Board. This was originally proposed every five years but was amended to one year. The dam raise project was always on the table to be considered.

Dr. Wichser reported that ARWA staff has stated over the past three years to the Board and continues to believe that the environmental (wetlands & streams) related permit is the most difficult hurdle for the raising of the dam. He further stated that in review of the Authority's alternatives to potentially increase availability of raw water (raising the dam and off-site water storage facility), it appears that the federal agencies will base their regulatory approval on the alternative that is the most practicable and has the least environmental impacts. He further stated that presently we know raising the dam impacts 17,149 credits for streams and 144 acres of wetlands. At least two well recognized environmental engineering firms have estimated the mitigation costs between \$10.7 million and \$14.33 million in mitigation credits to offset the streams and wetlands impacts.

Mr. Hayes commented on the word "practicable" and stated to understand the definition of that word you have to go back to 40CFR, the Federal Register to get the definition. He further stated there are three things to be taken into consideration what the meanings are: (1) the means available and capable of being done after taking into consideration cost, existing technology and logistics of the overall project purpose. The first one is cost. He stated from the ARWA report from September 25, 2014, we still know that the dam raise project is the least cost out of all the options for raw water supply. The other options are 3.4 to 5 times higher than the dam raise project. He stated it's still an alternative that should be considered. Chesterfield's concern is the lack of long term planning and strategies that provide flexibilities. He further stated that they do not expect Board members to read every single contract moving forward, but in hindsight they wish there was a way they could have had something in the contract that would have recognized the option to provide reasonable and long term solutions to raw water supply. He stated this is something he thinks the Authority can improve on.

- **Board Discussion on Phase 1, Step 1 & 2-Brasfield Dam Raise Project**

Dr. Wichser reported on Phase 1, Step 1 & 2-Brasfield Dam Raise Project. He stated staff did a detailed presentation in July 2017 on the expected FERC requirements and also estimated costs. He further stated at that time the Board decided to review the information related to this and then bring back to the August Board meeting for a further discussion.

Mr. Ashcraft gave a status update for the newer Board members. He stated the status of this was determined by a vote and an update was brought forth a year later as explained in the minutes. He further stated we are now exploring the possibility of moving forward given the fact that there is also a grant that is pending from the General Assembly. He stated the financial implications are on the Estimated Phasing Schedule. Dr. Wichser stated the Phasing Schedule was requested by Chesterfield County and the Board of Directors to be put together by the Staff. The Board asked that we develop the first group of Phases and Steps with an estimated cost of 10 million dollars. He stated if you look at the Phasing Schedule, Step 2, you'll notice the only number we were able to put in the years 2018-2020 was \$450,000 on top of the Step 1 which was \$150,000 for the DEQ work. Dr. Wichser further commented that after discussions with our environmental and dam experts, who were working with FERC, we now realize it could be \$1.6 million to \$2.2 million to get through Step 1 and Step 2. He further stated that Step 1 is completed. He reported that we have contacted DEQ and they deferred to the federal agency FERC. He further stated the next step would be that ARWA would need to pen a legal agreement with Kruger (KEI), and once it has been penned, we would meet and discuss who is going to pay for the cost of all the additional engineering studies and also indemnification release and liabilities. He stated that would be presented to FERC and FERC would give guidance on moving forward, both with the technical studies and also any regulatory consultation with all of the agencies and public. He further stated what was supplied to the Board in July 2017 were a series of consultation agencies and contacts that would have to be notified. Mr. Ashcraft asked Dr. Wichser if the \$150,000 had been expended and Dr. Wichser replied it has not and stated everything you see to-date has been done in-house. Dr. Wichser said Chesterfield County did ask if there were similar projects across the nation, and according to FERC Washington, there is only one project that was somewhat similar and that was Denver Water's Gross Reservoir Hydroelectric Project where their dam was going to be raised approximately 131 feet, which was very different than raising a dam 18 inches. Mr. Ashcraft stated a couple of meetings back the original feeling of the Board was to move forward with the first Phase which is the \$150,000, and Dr. Wichser replied that was for discussions with DEQ and the Corp of Engineers in determining what would be needed and any studies or modeling they would request.

Mr. Massengill stated that Chesterfield and Dinwiddie met with the Speaker of the House, Delegate Cox, and the Governor's Budget proposals will be presented in December. He further asked that now that FERC is the controlling agency in this, from a timing standpoint if we were to move forward, are we in a position where we can do that before the General Assembly? He stated we need to give Delegate Cox some kind of direction on this. He further stated that we need to meet with our legislatures before the General Assembly, and if we decide to move forward with this, he asked is it even feasible to get this completed before the General Assembly. None of these cost phase items are covered under the grant and Dr. Wichser replied in his discussions it was stated the only thing the \$5 million grant would apply to would be construction. Mr. Massengill stated we don't have much time to adequately advise the General Assembly where we are with this, and there are costs associated with this. He further stated that we as five members need to have some discussion if it is to be moved forward and who is paying for it. He stated he would like the Board to not drag its feet to the point that we have to have another meeting with the Speaker now mid-session and not having some clear direction if this entity wants to move forward or not. He stated from the last meeting it was clearly stated that this was the last extension, and Delegate Cox wants to be kept abreast of our progress. Mr. Ashcraft stated if we are going to do something then we need to do it or not based on the recommendations from the two different firms that studied this. Mr. Ashcraft asked about the original vote and if there were studies done about going in another direction besides raising the dam. Dr. Wichser answered that was correct. Mr. Ashcraft stated that he is not speaking for any other locality, but to him that was the major reason that this project did not pass. He further stated it looked like there was another alternative in the long range future and that the capacity of water was adequate up to that point. Mr. Ashcraft stated he didn't know of anything that had changed except just a lot of staff time in defining the steps in order if we were to move forward which is the only thing different from what it was a year or so ago. He commented if there was a willingness to advance it, then someone needs to make a motion and if there is further analysis that needs to be done, or if we just want to move forward and who is going to pay using \$5 million that the General Assembly has set aside for us which is a small part of the complete project.

Mr. Hayes stated that Delegate Cox does deserve a response. There is more on the table besides a \$5 million matching grant. He further stated there was a lot of political capital put into this. Mr. Hayes said on behalf of Dr. Casey, who couldn't be here today, when he found out FERC was involved he met with Dave Bratt who indicated he would be an advocate for the Authority with FERC. He further stated that on Phase 1 we didn't spend any of the \$150,000 that we had authorized, so there is some funding there. Dr. Casey indicated to him that he intends to speak with other legislators on the Federal level to see if there is any assistance that could be provided there. Mr. Hayes stated from what he is reading in the Agenda package, Phase 2 has a lot more scope than what was presented a couple months ago with the \$450,000 for the FERC review. There are things included in there about purchasing easements, related costs and different studies that he did not visualize in Phase 2. He further stated that the other concern he has is that as far as a consultant engineer, he's not sure how he was retained or brought on. Mr. Hayes stated he thinks we should have a reputable engineering firm that was selected through an RFP process that could better define the scope and costs so they are not changing by almost \$2 million or \$1.5 million every month. Mr. Hayes believes there are other options that could be explored. He further stated that he didn't know if anyone had approached the hydro-electrical facility and had a discussion on what that facility is worth because if that facility does get decommissioned you don't deal with FERC anymore, you go back to DEQ. Mr. Hayes stated that Scott Kutlas with DEQ is 100% in support of the dam raise project. He further stated that Chesterfield doesn't feel like the issue is dead and wants to keep all options on the table. He thinks the off line water reservoir is still an option that needs to be considered, but at this time it appears to be cost prohibited to move forward with any kind of storage facility and the dam project appears to be the lowest cost per MGD. Mr. Hayes stated that at some time we are going to have to respond to DEQ on how our water supply is. He further stated that his suggestion is to see if we can get any more support with the Federal legislation, if we need to go to FERC to continue conversations with the hydro-electrical facility to see what the options are available so we can make a fully informed decision.

Mr. Smith asked what was the anticipated funding for the \$1.5 to 2.2 million ranges for Step 1 and 2 together and Dr. Wichser answered there was no present funding in the budget. Mr. Ashcraft stated that Staff has been responsive to the requests that have been raised. His concern is either we as a Board are not giving them clarity they need as it seems that every time we discuss this matter there is something that is either left out, over analyzed or whatever. There has been a lot of staff time put into this. Mr. Massengill stated when we decided to move forward with this particular Phase, he doesn't know how specifically each member jurisdiction feels like raising the dam is necessary. He further stated that in the graph in the memo to DEQ and you look at specifically when raw water is needed by. He stated what motivated us to go to the Speaker was the \$5 million that was unaccounted for and if we are going to use it or not. Mr. Massengill stated that as Chesterfield has said this is a cheap way of being able to add to capacity, but the question is when it is needed. He believes all five jurisdictions need to put their cards on the table. If this project is not important to some and it is important to others we need to say that. If it's important to the sum and not the whole who is going to pay for it. He further stated we are talking about a project's permitting costs that jump from \$450,000 to \$1.5 million to \$2 million that is not budgeted for.

Mr. Massengill stated if the intention is if one jurisdiction or multiple jurisdictions can get their head around funding still moving forward then that's a conversation we need to have. He stated he just doesn't want to get to December/January session and come back and not have a plan to spend these funds. Chesterfield is the fastest growing jurisdiction and this is important to them, and if they want to spend the next 30-60 days soliciting support from legislators let them do it. He stated the question would be if this is an Authority wide supported initiative, which he doesn't know that it is. He feels we owe it to Chesterfield to give them thirty days. Mr. Ashcraft stated that as Chairman he is willing to do whatever it takes to get every drop of information that helps. He stated if we had to vote today his position would be no, but he doesn't want to do that if there was some other way. Mr. Massengill asked Mr. Anderson if any one municipality could move forward and obtains the \$5 million funds and Mr. Anderson replied that was his understanding and originally the amount could be matched from other localities. Mr. Massengill stated he thought it would be fair to Chesterfield for all localities to spend the next thirty days having that question in mind. He further stated if this is an Authority project then the Authority should pay and if it is not an Authority project then we need to figure out who those two or three may be. If Dr. Casey is working the legislature at the Federal level, then we should give him time to do that and maybe we will have a substantial update at the September meeting. Mr. Ashcraft stated we will authorize Staff that this will be an agenda item at the September meeting for further information to be disclosed by anybody.

Mr. Hayes made a motion and recommended that in addition to discussing this at the next Board meeting that we make sure that we have all the available data to make an informed decision, and we request that in addition to deferring the item that the Executive Director continue to work with KEI to look at all options that will be available and costs for those options, so if they are willing to have a buy out from facilities and what costs will be involved, he thinks we can do that in-house. He further stated if we needed to have consultants or legal fees, he felt we could do it under the amount that is already authorized. Dr. Wichser stated that KEI is a family owned organization managed out of Montreal and their response times are generally very slow. After the Board meeting in July he approached KEI about initial capital costs of building the FERC unit and the replacement costs, and they said they would get it to him. They still have not responded to this request. He further stated he thought November would be the earliest time we could get something back from KEI and noted that there is no October Board meeting. Mr. Ashcraft stated that he felt someone from Chesterfield should go with the Executive Director and be part of those discussions with KEI as he senses there is a little bit of concern that Staff is not pushing the envelope as far as the locality would like it to. He wants Chesterfield to be present so they could see firsthand the comments that are made to the Executive Director. This will be brought back at the September Board meeting.

Upon a motion made by Mr. Hayes and seconded by Mr. Massengill the following resolution was adopted:

RESOLVED, that the Brasfield Dam Raise Project will be on the Agenda for the Board meeting of September 21, 2017 and that the Executive Director and a representative from Chesterfield be part of the discussions with KEI regarding what options are available to the Authority:

For: 5 Against: 0 Abstain: 0

- **Permit Required Letter to Virginia DEQ**

Dr. Wichser reported on the permit required annual letter to DEQ documenting the progress towards procurement of a future source of raw water supply. He stated it's not that we find an alternative immediately; it's that we have an alternative in hand and how we are progressing by October 10, 2028. He further stated that we do have ten years to determine what the alternative is to increase the raw water supply. Mr. Hayes wanted to commend the Executive Director on getting this letter to members early so they would have time to review it.

- **Board Discussion on Amendment Four to the 1964 Water Service Agreement**

Dr. Wichser reported on Amendment Four to the 1964 Water Service Agreement. He stated that at the July meeting both Dinwiddie County and Chesterfield County stated they would be reviewing and potentially coming back to the Board with some additions or edits to the Resolution. Mr. Massengill stated he had an agenda discussion with his Chairman and explained to him that at our last meeting Chesterfield wanted to offer some friendly modifications to it. He further stated his Chairman didn't see it necessary to be bringing the Service Agreement as written to their Board. Mr. Massengill stated they felt like they would prefer to see those modifications so they would not be voting on something when they know there are friendly modifications coming forward. He further stated Dinwiddie may have one or two modifications to add to the proposed Amendment Four to the 1964 Service Agreement.

Mr. Hayes stated that his understanding is that Dr. Casey has met individually with Board members and there is not much support on the Amendment as written. He further stated that out of respect to the new City Manager of

Petersburg they weren't sure what her philosophies are on the Amendment and sale of capacity. He stated he thought we were looking at options where we could have more support than a 3/2 support for it. He spoke about it being a transaction specific amendment, where the evaluation of an MGD by Davenport/Raftelis was going to be considered. He stated until we get that evaluation, a transaction specific amendment can't be made. He also stated that in bringing something back we want more than just having Chesterfield involved. Mr. Ashcraft stated what he is hearing is that the current amendment is not acceptable to all five localities, and we want to continue to look for an amendment that is acceptable to all of us. He asked if individually we could contact Staff and let them know what should be in the Amended Service Agreement and have them bring back a draft. Mr. Massengill stated as a point of procedure we, as an Authority, voted for the Service Agreement modification and had to go back to all five municipalities with three supporting and two not. He further stated that inaction meant we still maintain the current Service Agreement today and Mr. Anderson replied correct. Mr. Massengill stated if there is going to be a change and a new resolution presented, would it not need to come forward to this Board again, and a new one offered and sent back to the five municipalities and Mr. Ashcraft agreed.

Mr. Massengill referred back to the May/June time frame when Mr. Tyrrell asked for this to be done and wanted it done expeditiously. He further stated that three jurisdictions were for it, and it was his understanding that Petersburg has an asset and they want to move forward with those who wanted to purchase. He stated that Dinwiddie wanted to do everything they could to help the City of Petersburg move forward. He further stated that maybe Dinwiddie and Chesterfield could put together a new draft and bring it back at the next meeting. Mr. Ashcraft stated he wanted to remind everyone that out of respect for Petersburg the infusing of cash that might be delivered there is an asset to them which helps everybody. He further commented that we would like assurances that we have additional capacity because we are not going to buy something we don't want. He stated that by not being able to do that sometime in the future it's going to be detrimental to the economic growth of Prince George. He further stated he would like to see us continue to do something related to the Service Agreement that would be satisfactory to everybody. Ms. Ferrell-Benavides stated when we started this process and discussion they were making sure how they were having a cash flow issue. She further stated that things are improving and some of the issues that were urgent are not, even though they are still looking for a cash revenue event but not at the same speed. She stated that they want to make sure that they don't go down this discussion and start discussions of even selling capacity and still can't come to an agreement of what that capacity is worth. She stated as far as urgency on her part you will not hear that. She further stated that part of the reason is that she has to understand what are all the factors involved. It's not that she doesn't want to support her neighboring communities if she has capacity and you need capacity. At the same time she wants to make sure that we are all happy at the end of the day. She stated she has to look for other cash like holding people accountable to start to feel confidence. They are looking at how to operate better and take away some of the strain that you are seeing. She stated for us not to feel like we have to agree to this today because of them. She further stated part of what they have to do is figure out if you agree on it, and they come back and say the value of the MGD is not what they expected it to be, then they haven't moved very far. Those are some of the factors they are still going to have to work through. Mr. Anderson stated to Ms. Ferrell-Benavides that we are supposed to have a desktop number on an evaluation of the system about seven weeks under the study, so he thinks that would help a lot in forming your considerations. Mr. Ashcraft stated to let this rest until the Authority study comes back.

Dr. Wichser stated in going back to the previous item on Phase 1, Step 1 dam raise unbudgeted fund of \$150,000, the Authority is being hit with an additional \$50,000 unbudgeted item for the Raftelis study. He further stated that as we move forward, all the unbudgeted items that keep hitting the Authority is going to have an impact on us.

- **Status Report: Ongoing Projects/Operational/Financial**

Mr. Gordon reported on the Status Report of Ongoing Projects/Operational/and Financial. He further stated that ARWA's financial reports are preliminary until the Financial Audit is completed.

Dr. Wichser stated we have had additional contact with Virginia Resources Authority and Mr. Cole and Mr. Anderson will be briefing the Board on particular financial options for the "In-Plant" project at the September meeting. He further stated that we are also going to have one of the engineering firms that are working on the "In-Plant" design, brief the Board on their recommendation on pre-purchase of equipment. The cost could be about \$6 million to \$7 million dollars related to the pre-purchase of equipment for this project.

5. Items from Counsel

There were no items from Counsel.

6. Closed Session

Mr. Anderson read the Resolution to go into Closed Session (attached).

Upon a motion made by Mr. Massengill and seconded by Mr. Hayes the Board went into Closed Session at 3:51 p.m.

For: 5 Against: 0 Abstain: 0

Upon a motion made by Mr. Hayes and seconded by Mr. Massengill the Board came out of Closed Session at 5:17 p.m.

For: 5 Against: 0 Abstain: 0

Mr. Anderson read the Certification regarding the Closed Session and, upon a motion made by Mr. Massengill and seconded by Mr. Smith, it was approved by a unanimous roll call vote (attached).

7. Executive Director's Annual Review

Mr. Ashcraft stated to Dr. Wichser that Dr. Casey and he would be setting up an appointment with him to discuss his evaluation.

8. Other Items from Board Members/Staff Not on Agenda

There were no other items from Board Members/Staff Not on Agenda.

- **Change in location for September Board Meeting: ARWA not SCWWA**

Dr. Wichser stated due to construction at SCWWA, the September 21, 2017 Board Meeting's location will be at ARWA.

9. Adjourn

Upon a motion made by Mr. Massengill and seconded by Ms. Ferrell-Benavides the meeting was adjourned at 5:19 p.m.

The next regularly scheduled Board meeting is Thursday, September 21, 2017 at 2:00 p.m. at the Appomattox River Water Authority.

MINUTES APPROVED BY:

Kevin Massengill
Secretary/Treasurer

CLOSED MEETING RESOLUTION

APPOMATTOX RIVER WATER AUTHORITY

August 17, 2017

I move that we go into a closed meeting for (i) discussion and consideration of the assignment, appointment, promotion, performance, demotion, salaries, disciplining, or resignation of specific public officers, appointees, or employees of the Authority, as permitted by Section 2.2-3711A.1. of the Virginia Freedom of Information Act ("FOIA") and (ii) discussion and consideration of the acquisition by the Authority of real property for a public purpose pertaining to various options for side-stream storage reservoirs where discussion in an open meeting would adversely affect the Authority's bargaining position and negotiating strategy as permitted by Section 2.2-3711A.3 of FOIA:

MOTION: Massengill

SECOND: Hayes

VOTE

Ashcraft	Aye
Ferrell-Benavides	Aye
Hayes	Aye
Massengill	Aye
Smith	Aye

ABSENT DURING VOTE: None.

ABSENT DURING CLOSED MEETING: None.

SESSION DATE: August 17, 2017

CERTIFICATION OF CLOSED MEETING

WHEREAS, the Board of the Appomattox River Water Authority (the "Authority") convened a closed meeting on August 17, 2017, pursuant to an affirmative recorded vote and in accordance with the provisions of the Virginia Freedom of Information Act; and

WHEREAS, Section 2.2-3712 of the Code of Virginia requires a certification by this Board that such closed meeting was conducted in conformity with Virginia law;

NOW THEREFORE, BE IT RESOLVED that the Board of the Authority hereby certifies that, to the best of each member's knowledge, (i) only public business matters lawfully exempted from open meeting requirements by the Virginia Freedom of Information Act were discussed in the closed meeting to which this certification resolution applies, and (ii) only such public business matters as were identified in the motion convening the closed meeting were heard, discussed or considered by the Board.

MOTION: Massengill

SECOND: Smith

VOTE

Ashcraft	Aye
Ferrell-Benavides	Aye
Hayes	Aye
Massengill	Aye
Smith	Aye

ABSENT DURING VOTE: None.

ABSENT DURING CLOSED MEETING: None.

3. Public Comment

The Guidelines for Public Comment are:

GUIDELINES FOR PUBLIC COMMENT AT SCWWA/ARWA BOARD OF DIRECTORS MEETINGS

If you wish to address the SCWWA/ARWA 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 "Public Comment Period." 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 the Public Comment Period, 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 meeting, 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. If speaking for a group, state your organizational affiliation;
- 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 Period 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.

4. Executive Director's Report:

- **Reservoir Status Update for August/September 2017**

- **“In-Plant” Project Engineer Discusses Equipment Pre-Purchase**

Following is a presentation provided by the In-Plant Project Engineer concerning the pre-purchase of equipment.



APPOMATTOX RIVER WATER AUTHORITY

Hazen

IN-PLANT CAPITAL PROJECT

REVIEW AND RECOMMENDATION ON PRE-PURCHASE OF EQUIPMENT

BOARD OF DIRECTORS MEETING



3040 Avemore Square Place
Charlottesville, VA 22911
Phone: 434-984-2700

September 21, 2017

www.wwassociates.net

P.O. Box 4119
Lynchburg, VA 24502
Phone: 434-316-6080

PROJECT SUMMARY



Raw Water Pump Station No. 1 –

- 3 – 16 MGD Variable Frequency Drive Pumps
- 1 – 16 MGD Constant Speed Pump
- Premium Efficiency Motors
- GOAL – High Efficiency, Process Control



Hazen



PROJECT SUMMARY



Finished Water Pump Station No. 1 –

PROPOSED UPGRADE

- 3 – 16 MGD Variable Frequency Drive Pumps
- 1 – 16 MGD Constant Speed Pump
- Premium Efficiency Motors
- GOAL – High Efficiency, Process Control



Hazen



PROJECT DEVELOPMENT



Finished Water Pump Station No. 1 –

OTHER PUMP UPGRADES

- Backwash pump
- Provide variable frequency drive for BWP
- Domestic water pumps D12, D13, P15 – Domestic water supply, downsize and VFD control



Domestic Water Pumps

Hazen



PROJECT SUMMARY



HYPOCHLORITE FEED SYSTEM UPGRADE

- **Eliminate “Carrier Water”**
- **Improve Process Control**
 - **Raw Water Feed**
 - **Filter Influent Feed**
 - **Clearwell No. 3 Influent Feed**
 - **Chlorine Boost Post Mixer No. 2**
 - **6 Pumps / Header**



Domestic Water Pumps

Hazen



PROJECT SUMMARY



Other Improvements –

FWPS1 BUILDING UPFIT

- Energy efficient windows / doors
- LED Lighting
- HVAC Equipment, including air conditioned space
- Painting / architecture



Building Upfit

**48” Magnetic Flow Meter (FE-3) –
Owner furnished / Contractor installed**

PROJECT SUMMARY



Electrical Equipment to be Replaced

- **RWPS 1**
 - Medium Voltage MCC-5
 - Low Voltage Switchgear LS-2
 - Low Voltage MCC-I

- **FWPS 1**
 - Medium Voltage Switchgear HS-1
 - Medium Voltage MCC-2
 - Low Voltage Switchgear LS-1
 - Low Voltage MCC-1
 - Standby Generator (1MW)

- **Revise 4160V to 480V**



Hazen



PROJECT SUMMARY



New Electrical Building to Serve RWPS 1

- Locates VFD / switchgear closer to pumps, eliminating need for larger wire and output filters
- Substantial simplification of electrical equipment replacement sequence
- Located above probable maximum flood elevation
- Pre-cast construction



PROJECT SUMMARY



PROJECT DEVELOPMENT



EQUIPMENT PRE-PURCHASE

- Takes approximately 1 year to acquire pumps / generator
- Issue equipment procurement contract as early deliverable in design process to get pumps on order
- Minimized Contractor markup

Hazen



PROJECT DEVELOPMENT



Standby Generator Procurement –

- Purchase a standby generator through a buying cooperative (NJPA – National Joint Power Alliance www.njpacoop.org)
 - Purchase price generally lower than on the open market
 - ARWA purchases generator, avoiding cost of markups from the installing contractor



Hazen



PROJECT ESTIMATED CAPITAL SUMMARY

TOTAL PROJECT COST	\$13.36 Mil
---------------------------	--------------------

<u>Equipment Pre-Purchase Request:</u>	
---	--

Raw Water Pump Station No. 1 Pumps	\$1.0 Mil
------------------------------------	-----------

Finished Water Pump Station No. 1 Pumps	\$1.25 Mil
---	------------

3 MW Generator	<u>\$1.30 Mil</u>
----------------	-------------------

TOTAL EQUIPMENT PRE-PURCHASE REQUEST	\$3.55 Mil *
---	---------------------

* This value is included in Total Project Cost.

Estimated potential savings = \$500,000.



PROJECT ESTIMATED CAPITAL SUMMARY



EQUIPMENT PRE-PURCHASE *(continued)*

- Pre-purchase allows project to progress for a pump install starting October 2018
- Pump outages allowed during low demand periods (October – April)
- Advances project schedule approximately 1 year

Hazen





APPOMATTOX RIVER WATER AUTHORITY

Hazen

IN-PLANT CAPITAL PROJECT

REVIEW AND RECOMMENDATION ON
PRE-PURCHASE OF EQUIPMENT

QUESTIONS



Board of Directors Meeting

September 21, 2017

www.wwassociates.net

3040 Avemore Square Place
Charlottesville, VA 22911
Phone: 434-984-2700

P.O. Box 4119
Lynchburg, VA 24502
Phone: 434-316-6080

- **Davenport Update Discussion on Funding the Capital “In-Plant” Project**

Following is a presentation concerning the In-Plant Capital Funding Options for ARWA from Davenport and Company

Capital Funding Options

Appomattox River Water Authority



September 21, 2017

Project Overview



- The Appomattox River Water Authority (“ARWA”) is considering funding the following projects (collectively the “Project”):

— Finished Water Improvements: \$7,773,965*

— Raw Water Improvements: \$4,642,525*

	A	B	C	D	E	F	G	H	
	Project	Amount	Chesterfield (69.31%)	Petersburg (16.69%)	Member Jurisdiction Share		Colonial Heights (4.39%)	Prince George (2.86%)	Total
1	Finished Water Improvements ^{1*}	\$ 7,773,965	\$ 5,388,135	\$ 1,297,475	\$ 524,743	\$ 341,277	\$ 222,335	\$ 7,773,965	
2	Raw Water Improvements ^{2*}	\$ 4,642,525	\$ 3,217,734	\$ 774,837	\$ 313,370	\$ 203,807	\$ 132,776	\$ 4,642,525	
3	Engineering	\$ 943,510	\$ 653,947	\$ 157,472	\$ 63,687	\$ 41,420	\$ 26,984	\$ 943,510	
4	Total	\$ 13,360,000	\$ 9,259,816	\$ 2,229,784	\$ 901,800	\$ 586,504	\$ 382,096	\$ 13,360,000	

¹ The electrical systems at the Raw and Finished stations will be upgraded in this project.

² The cost of the Generator is included in the price to upgrade the Finished Water Pump Station.

- ARWA anticipates completing design / engineering for the Project in December 2017, advertising for constructions bids in January – February 2018, and awarding the construction contract in March 2018. Construction / installation is expected to take between 18 and 22 months.
- The Authority’s Engineers have indicated that the Authority has the option to pre-purchase equipment for the projects in September 2017 at a cost of \$3,550,000. Payment would be due upon receipt of the equipment late in the Summer of 2018. Pre-purchasing equipment could result in Project cost savings of approximately \$500,000 and could reduce the construction timeframe by up to 12 months.

Project Funding Options



- ARWA could consider the following options to fund the identified Project:
 - Direct Bank Loan financing
 - Typically a 45-60 day process with interest rates locked in around day 30.
 - ARWA Board actions include selecting a winning bidder, approving a Bond Resolution, and approving the final documents.
 - VRA Spring, Summer, and/or Fall Pool financing (2017 Fall Pool application submitted on August 2nd)
 - VRA Fall Pool – 2017
 - Interest rates will not be finalized until approximately November 1st and ARWA would have funds in hand around November 15th.
 - ARWA Board actions include adopting a Resolution/Ordinance authorizing the bond issue and executing a local bond sale and financing agreement / lease by September 21st. Additional Member Jurisdiction approvals may be required depending on VRA Terms and Conditions.
 - VRA Spring Pool – 2018
 - Interest rates will not be finalized until approximately early to mid May and ARWA would have funds in hand around late May.
 - ARWA Board actions include adopting a Resolution/Ordinance authorizing the bond issue and executing a local bond sale and financing agreement / lease by late March. Additional Member Jurisdiction approvals may be required depending on VRA Terms and Conditions.
 - Public Issuance of ARWA Debt
 - Typically a 90 day process with interest rates locked in around day 75.
 - This approach would require the development of formal offering documents and the establishment of one or more ARWA Credit Ratings.

- Each of the funding options mentioned on the prior page will have its own credit process:
 - Direct Bank Loan financing
 - Through a Direct Bank Loan RFP process, lenders will conduct their own due diligence. No formal Credit Rating is anticipated to be required.
 - VRA Spring, Summer, and/or Fall Pool financing (2017 Fall Pool application submitted on August 2nd)
 - VRA has conducted their credit analysis / underwriting process to determine the creditworthiness of ARWA given the situation surrounding Petersburg.
 - VRA has developed a term sheet for the ARWA Board's consideration for full funding for the Project through the VRA Pool:
 - ARWA would issue a parity Water Revenue Bond to fund the full Project cost. Additionally, Moral Obligation pledges of the Counties of Chesterfield, Dinwiddie, and Prince George, and the City of Colonial Heights would be required to support 100% of the annual debt service. The Moral Obligation support may be allocated amongst the required four Member Jurisdictions, at their discretion.
 - It is anticipated that each Member Jurisdiction's support agreement will cover their respective share of the total debt service of the proposed loan, and each Member Jurisdiction's obligation under the related support agreement would be triggered only by that Member Jurisdiction's or the City of Petersburg's default under the water service agreement between the Borrower, the Member Jurisdictions, and the City of Petersburg.
 - Based upon the current VRA Term Sheet, Member Jurisdiction Approvals will be required.
 - Public Issuance of ARWA Debt
 - Credit due diligence is handled by the Authority with one or more Credit Rating Agencies. The Credit Rating(s) will be a key driver of investor review / approval.
 - Alternatively, for any of these funding options, Petersburg could consider pledging and/or selling all or a portion of its excess capacity back to ARWA or one or more of the other Member Jurisdictions in order to fund its respective share of the Project. This potential option would require further legal and financial due diligence.
 - A financing under this approach would likely not be able to close until early Calendar Year 2018 given the required analyses and approvals. The work being completed by Davenport / Raftelis will be helpful in better modeling this approach.

Project Timing



- As previously mentioned, ARWA anticipates completing design / engineering for the Project in December 2017, advertising for constructions bids in January – February 2018, and awarding the construction contract in March 2018. Construction is expected to take between 18 and 22 months.
- ARWA could potentially wait to secure funding for the Project until the Spring of 2018.
 - By February 2018, the full Project cost should be known. This will provide clarity on how much funding is required.
 - If the Authority moves forward with pre-purchasing equipment in September 2017, the Authority will commit to funding equipment invoices upon delivery of the equipment in late Summer 2018.
 - Delaying the funding process may allow for additional clarity with regards to the Petersburg situation and may give prospective lenders more comfort that the Petersburg issues have been resolved prior to making a commitment to lend.
 - Delaying the issuance process, however, will subject ARWA to interest rate movements (up or down) until the financing process is complete.
 - For perspective, a 25 basis point increase (0.25%) in interest rates on the full Project funding amount would result in approximately \$16,800 of additional annual debt service for ARWA on a 20 year financing. This equates to a total debt service increase of approximately \$334,000 over the full term of the financing. This increase translates into the following debt service impacts for the Member Jurisdictions:

– Chesterfield County (69.31%):	\$11,600 / year and \$232,000 over the full term of the financing
– City of Petersburg (16.69%):	\$2,800 / year and \$56,000 over the full term of the financing
– Dinwiddie County (6.75%):	\$1,100 / year and \$22,000 over the full term of the financing
– City of Colonial Heights (4.39%):	\$700 / year and \$14,000 over the full term of the financing
– Prince George County (2.86%):	\$500 / year and \$10,000 over the full term of the financing
 - Securing all or a portion of the Project funding now would insulate ARWA from any upward interest rate movements between now and funding completion.

Interest Rate Trends



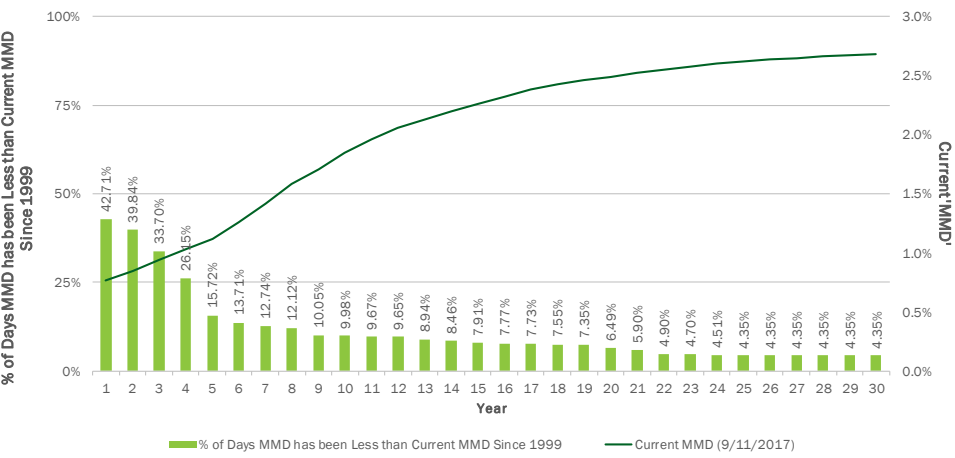
10-Year Treasury Movement – Since September 2016



10-Year Treasury Movement – Since March 2017



Historical MMD Since 1999



Next Steps



- Determine Timing of Borrowing:
 - Borrow for the entire Project now based on Engineer's 35% design estimates.
 - Borrow for a portion of the Project now and borrow for the remainder once Project bids are in-hand.
 - Delay borrowing until Project bids have been received.

- Debt Funding Approach:
 - Direct Bank Loan.
 - VRA (2017 Fall Pool application submitted on August 2nd, Board approval required by September 21st, Member Jurisdiction approvals in October).
 - VRA Spring Pool – 2018.
 - Public Issuance of ARWA Debt.
 - Some combination of the above.

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- **Davenport Progress Report on Raftelis Analysis**

Following is a memo from Davenport and Company concerning the Raftelis Preliminary Assessment Report.

To The Appomattox River Water Authority Board of Directors
From Davenport Public Finance
Date September 21, 2017
Subject Preliminary Assessment Report Status

Since the July 20th Board Meeting, the following work has been performed towards the completion of a draft Preliminary Assessment Report:

1. Raftelis has had a series of meetings and calls to gather information on the project.
2. Authority Staff and Davenport have gathered a series of informational items, as requested by Raftelis, as part of their due diligence process.
3. Davenport and Raftelis have had periodic review and update calls to identify the status of the Raftelis analysis and identify additional informational items needed, required follow-ups, and next steps.
4. Raftelis is nearing the completion of their initial draft Preliminary Assessment Report, which is anticipated to be distributed in early October.

Included as an attachment is a summary of the billings accrued to date. If this is acceptable to the Authority, Davenport will submit an invoice related to this work and continue to update the Authority on a monthly basis.



227 W. Trade Street
Suite 1400
Charlotte, NC 28202

Phone 704 . 373 . 1199
Fax 704 . 373 . 1113

www.raftelis.com

September 12, 2017

Invoice No: APVA1707-01.

Ted Cole
Davenport & Company LLC
901 East Cary Street
14th Floor
Richmond, VA 23219

Project R-APVA1707.00 R-APVA1707.00 Appomattox River Water Authority - Water System
Governance & Valuation Analysis and Related Consulting Services

Professional Services from July 1, 2017 to August 31, 2017

Phase Fee	001	Project Initiation and Info Gathering			
Billing Phase		Fee	Percent Complete	Previous Fee Billing	Current Fee Billing
Project Initiation & Gathering		8,260.00	100.00	0.00	8,260.00
Total Fee		8,260.00		0.00	8,260.00
		Total Fee			8,260.00
		Total this Phase			\$8,260.00
<hr style="border-top: 1px dashed black;"/>					
Phase Fee	002	Preliminary Valuation Assessment			
Billing Phase		Fee	Percent Complete	Previous Fee Billing	Current Fee Billing
Preliminary Valuation Assessment		24,090.00	25.00	0.00	6,022.50
Total Fee		24,090.00		0.00	6,022.50
		Total Fee			6,022.50
		Total this Phase			\$6,022.50
<hr style="border-top: 1px dashed black;"/>					
Phase Fee	003	Preliminary Governance & Ownership Eval			
Billing Phase		Fee	Percent Complete	Previous Fee Billing	Current Fee Billing
Preliminary Governance & Ownership Eval		15,570.00	25.00	0.00	3,892.50
Total Fee		15,570.00		0.00	3,892.50
		Total Fee			3,892.50
		Total this Phase			\$3,892.50
		Total this Invoice			\$18,175.00

Project	R-APVA1707.00	R-APVA1707.00 Appomattox RWA W Gov & Ana	Invoice	APVA1707-01.
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Billings to Date

	Current	Prior	Total	Received	A/R Balance
Fee	18,175.00	0.00	18,175.00		
Totals	18,175.00	0.00	18,175.00	0.00	18,175.00

Raftelis Financial Consultants

Work Performed to Date

Tasks		Total	9/12 Invoice	Balance
Phase 1 - Preliminary Assessment				
1	Project Initiation and Information Gathering	\$ 8,260	\$ 8,260	\$ -
2	Preliminary Valuation Assessment	\$ 24,090	\$ 6,023	\$ 18,068
3	Preliminary Governance & Ownership Evaluation	\$ 15,570	\$ 3,893	\$ 11,678
Phase 2 - Refined Assessment				
4	Refined Valuation Assessment	\$ 32,050	\$ -	\$ 32,050
5	Refined Governance Assessment	\$ 38,770	\$ -	\$ 38,770
6	Refined Ownership Assessment	\$ 19,970	\$ -	\$ 19,970
Total		\$138,710	\$ 18,175	\$120,535
7	Optional - Governance and Structure Workshops	\$ 9,840	\$ -	\$ 9,840

Appomattox River Water Authority
Davenport & Company Monthly Log

Date	Associate Vice President	First / Senior Vice President	Total	Task Billing Amount	Cumulative Billing Amount
Through 7/20				\$20,000.00	\$20,000.00
7/21 - 8/20	0.5	6.0	6.5	1,762.50	21,762.50
8/21-9/20	0.5	1.5	2.0	525.00	22,287.50
Total Hours	1.0	7.5	8.5	\$22,287.50	
Hourly Rate	\$ 225.00	\$ 275.00			
Hourly Charges	\$ 225.00	\$ 2,062.50			

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- **Hazen Presentation on Chesdin Reservoir Storage Management Plan**

Following is the presentation on the Chesdin Reservoir Storage Management Plan from Hazen.



Appomattox River Water Authority

**Storage Management Plan Stakeholder Engagement Meeting
as required by Virginia Water Protection Permit (#01-1719)**

Storage Management Plan Purpose

- ARWA Virginia Water Protection permit **requires** a storage management plan for Chesdin Reservoir



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

VWP Individual Permit Number 01-1719

Effective Date: November 1, 2013

Expiration Date: October 31, 2028

VIRGINIA WATER PROTECTION PERMIT ISSUED PURSUANT TO THE STATE WATER CONTROL LAW AND SECTION 401 OF THE CLEAN WATER ACT

Based upon an examination of the information submitted by the owner, and in compliance with § 401 of the Clean Water Act as amended (33 USC 1341 et seq.) and the State Water Control Law and regulations adopted pursuant thereto, the State Water Control Board (board) has determined that there is a reasonable assurance that the activity authorized by this permit, if conducted in accordance with the conditions set forth herein, will protect instream beneficial uses and will not violate applicable water quality standards. The board finds that the effect of the impact, together with other existing or proposed impacts to surface waters, will not cause or contribute to a significant impairment to state waters or fish and wildlife resources.

Permittee: Appomattox River Water Authority

Address: 21300 Chesdin Road, Petersburg, Virginia 23803

Activity Location: The two raw water intakes are located on the Chesdin Reservoir, one adjacent to the Brasfield Dam and one within in the embankment of the dam, Chesterfield County, Virginia.

Activity Description: This permit authorizes the operation of a surface water withdrawal from two existing intakes located on the Chesdin Reservoir and the operation of the dam to provide instream flow downstream of the Brasfield Dam.

The permitted activity shall be in accordance with this Permit Cover Page, Part I - Special Conditions, and Part II - General Conditions.

Two handwritten signatures in black ink, likely representing the permittee and the state official.

ARWA Page 45 of 94

Overview



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

VWP Individual Permit Number 01-1719

Effective Date: November 1, 2013

Expiration Date: October 31, 2028

- a) Sedimentation Analysis
- b) Storage Management Alternatives
- c) Bathymetric Survey
- d) DEQ Reporting
- e) Stakeholder Participation

- 4. The permittee shall develop a Storage Management Plan for the Chesdin Reservoir for maintaining the storage volume during the permit term (the "Plan"). The Plan shall be submitted to DEQ for review and approval within four (4) years of permit issuance. Development of the plan shall be coordinated with DEQ. The Plan shall include, at a minimum, the following:
 - a. Stakeholder participation in the development of the Plan. The Plan shall include documentation of stakeholder involvement.
 - b. A description and analysis of the storage management alternatives considered in developing the Plan, including, at a minimum, raising the height of the Brasfield Dam, dredging, and offstream storage. The Plan shall acknowledge that any proposed dredging activity will require environmental permits from both state and federal agencies.
 - c. An analysis of the main sources of sedimentation to the reservoir from sources in Chesterfield and Dinwiddie Counties. This analysis should include sedimentation from instream as well as offstream sources and those actions proposed to manage these sources of sediment. This analysis shall be updated when a bathymetric survey is conducted.
 - d. Schedule for conducting a bathymetric survey of the reservoir to provide an updated analysis of sedimentation in the reservoir, including identification of areas of accumulated sediment and areas having a high potential for accumulation during the permit term. The survey shall be conducted at least once during the permit term but no later than year 10.
 - e. The permittee shall submit a report to DEQ documenting progress towards procurement of a preferred alternative for a future alternative source of supply every two (2) years, with the first report due two (2) years after permit issuance. The reports shall document actions taken to secure additional raw water supply by the end of the permit term, including a proposed timeline with implementation milestones. The reports shall include any applicable documentation of stakeholder involvement.

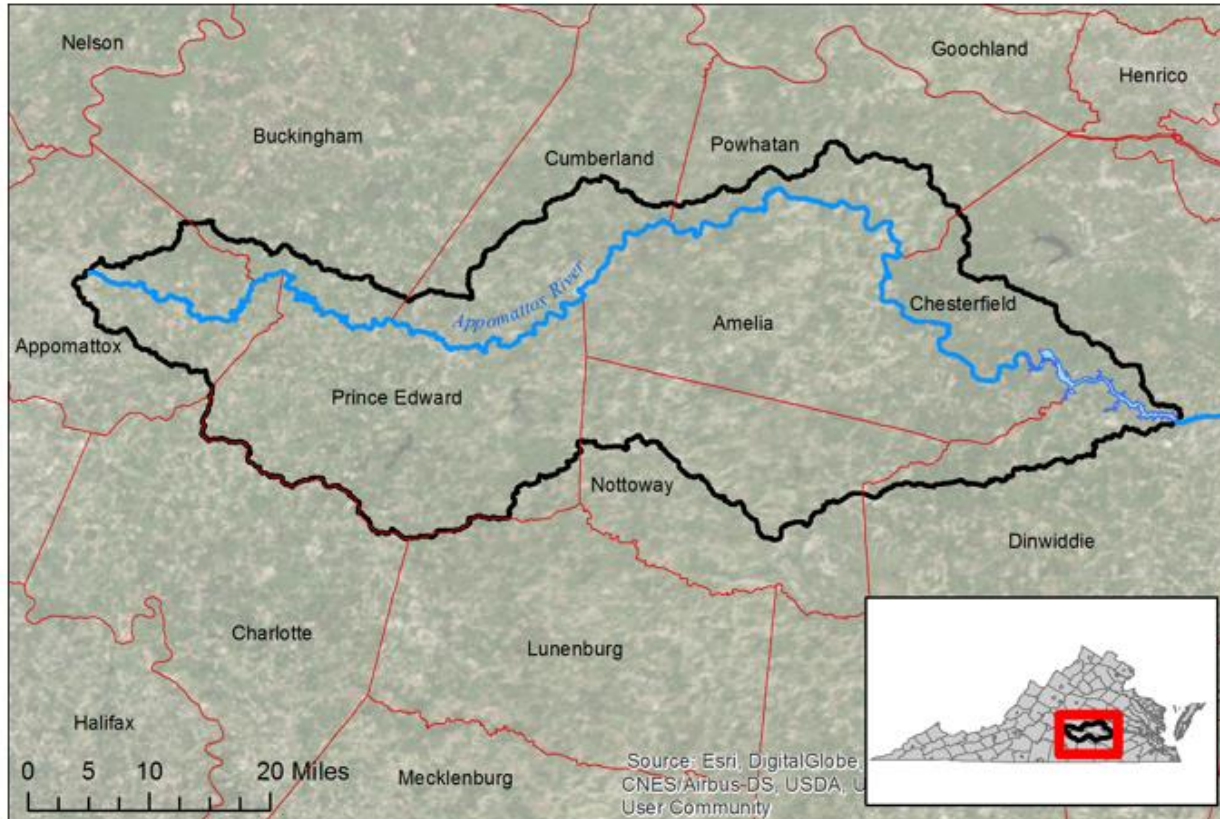
Introduction to Chesdin Reservoir Watershed

Chesdin Reservoir Background

- Impounded (1968) by George F. Brasfield Dam
- Primary purpose: water supply
 - Current average: 34.5 mgd
- Also provides:
 - Recreation
 - Hydropower
 - Downstream water quality & flood control
- Surface Area: 2,590 acres
- Storage Volume: 9.3 BG (2011 est.)
- ARWA easement to the 160 ft contour







Chesdin Reservoir Watershed



Drainage area of
1,330 sq. mi.

- 63% forested
- 18% agriculture
- 15% open water, wetlands, and other
- 4% developed

Legend

-  Chesdin Reservoir
-  Appomattox River
-  County Boundary
-  Chesdin Reservoir Watershed

ARWA Page 49 of 94

What is sedimentation?

- c. An analysis of the **main sources of sedimentation** to the reservoir from sources in Chesterfield and Dinwiddie Counties. This analysis should include sedimentation from instream as well as offstream sources and those actions proposed to manage these sources of sediment. This analysis shall be updated when a bathymetric survey is conducted.

Watershed Erosion

- Movement of soil particles is a normal, natural process.
- Some causes of increased rates of erosion include:
 - Agriculture
 - Livestock grazing
 - Construction sites
 - Unprotected stream crossings
 - Increased stream flows
 - Steep, unprotected banks



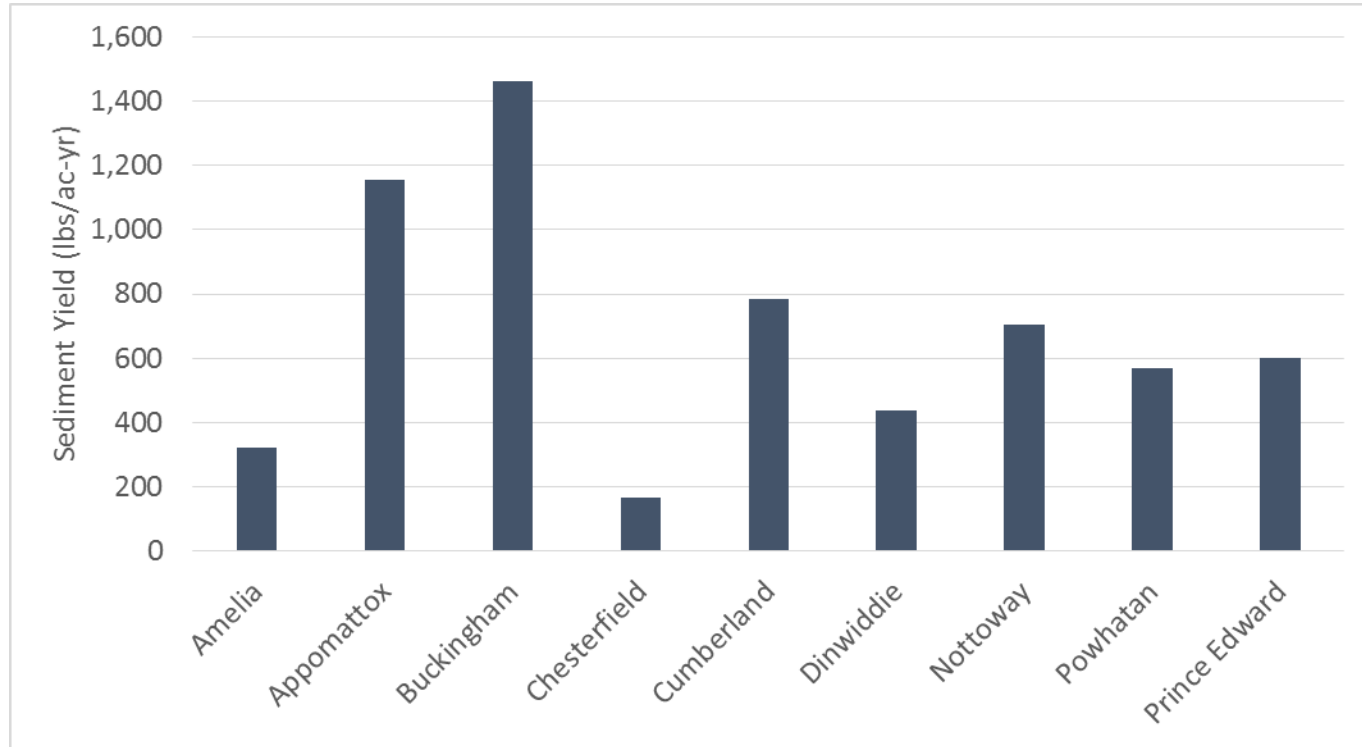
Implications of Sedimentation on the Reservoir

- Reduced storage volume
- Reduced water quality
- Deposition at water supply and hydropower intakes
- Reduced accessibility in shallower areas

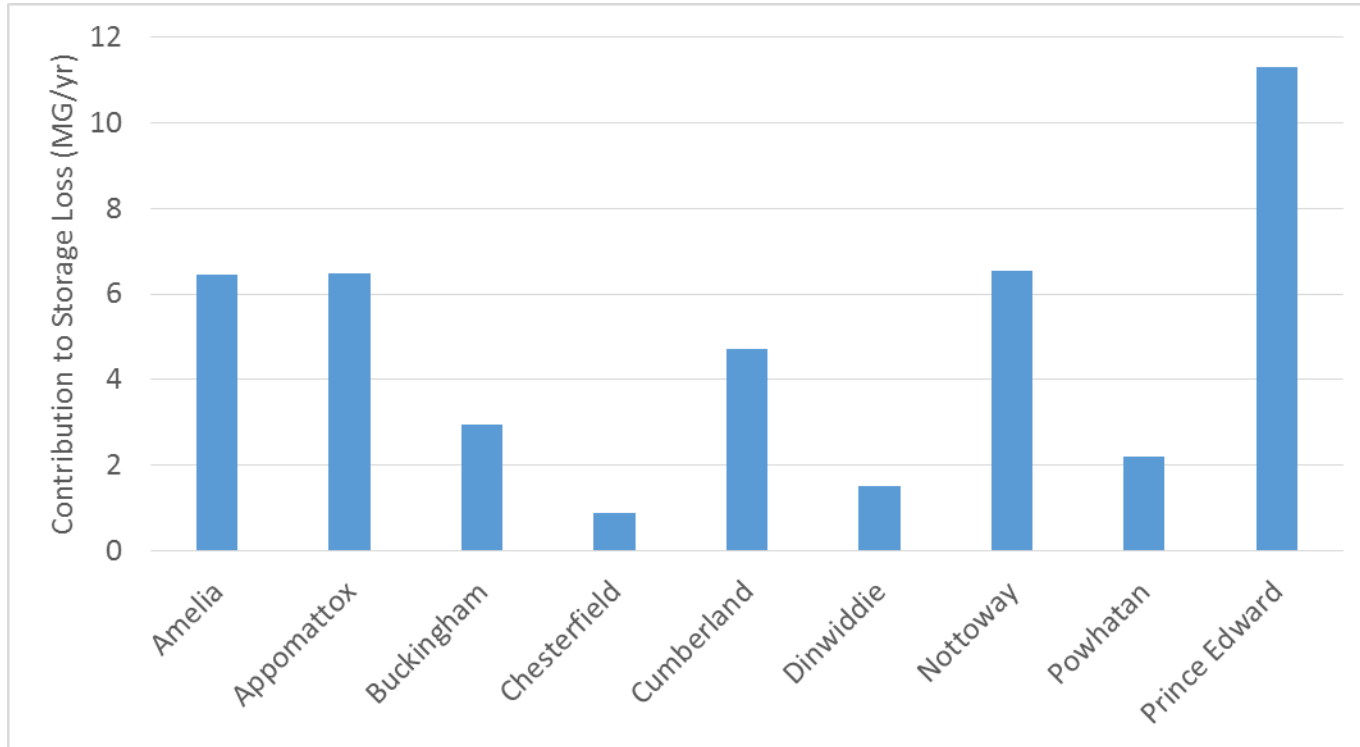
Quantifying Erosion and Reservoir Sedimentation at Chesdin Reservoir

- c. An analysis of the main sources of sedimentation to the reservoir from sources in Chesterfield and Dinwiddie Counties. This analysis should include sedimentation from instream as well as offstream sources and those actions proposed to manage these sources of sediment. This analysis shall be updated when a bathymetric survey is conducted.

Estimated Sediment Yield from Chesdin Reservoir Watershed

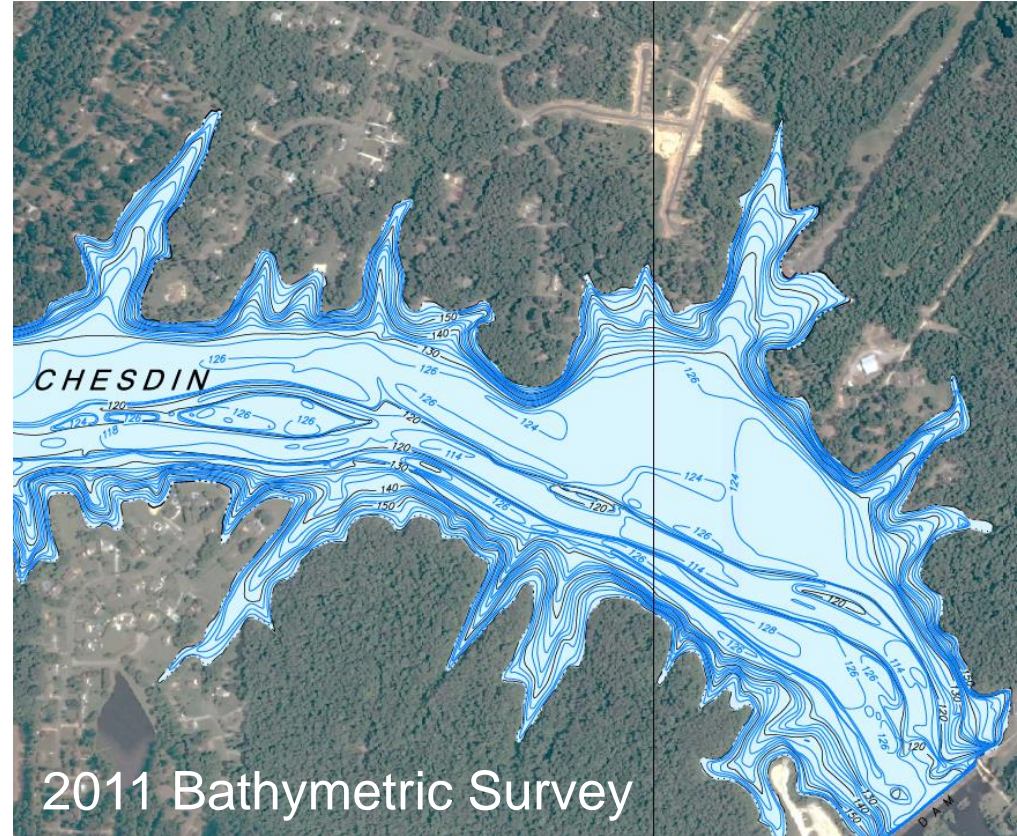
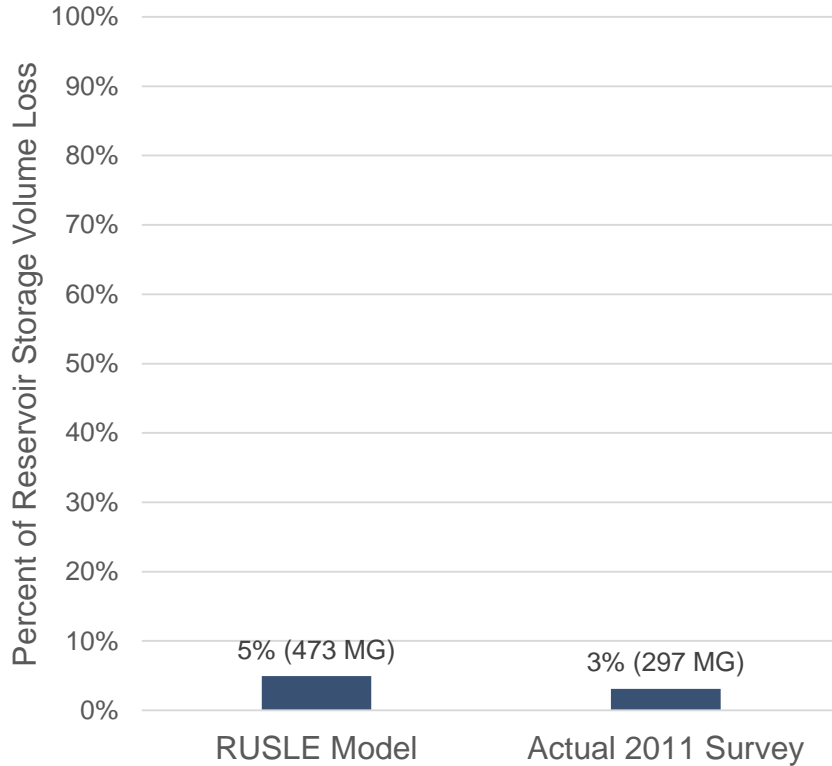


Estimated Sediment Yield from Chesdin Reservoir Watershed

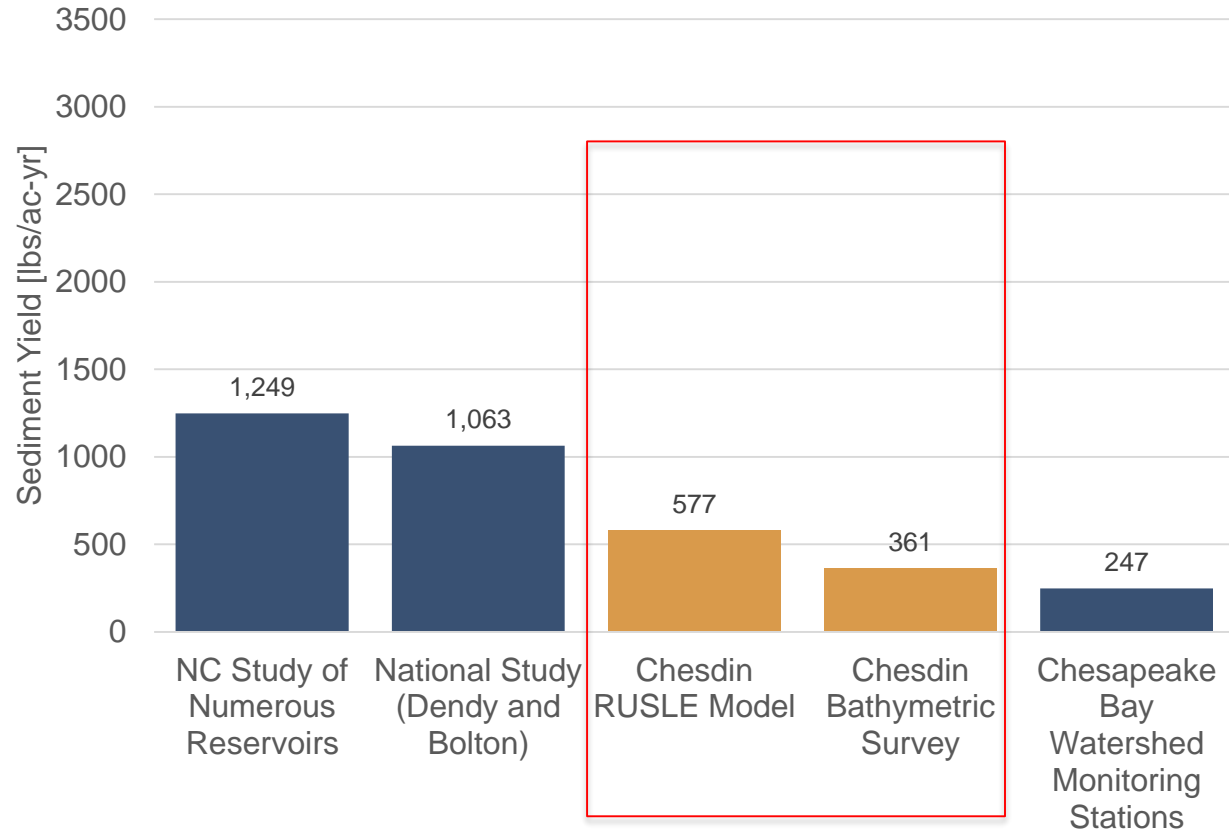


Sedimentation Model vs Actual Measured Storage Volume

Comparison of storage volume in 2000 and 2011



Comparison of Sediment Yield Estimates and References



Conclusions

- Chesdin Reservoir sediment movement is natural, but influenced by land use
- Chesdin Reservoir watershed is predominantly undeveloped
- Chesdin Reservoir sedimentation estimate is within the expected ranges
- Model can be used to identify areas of watershed that are more susceptible to increased rates of erosion

Storage Management Alternatives

Reliable Yield for Chesdin Reservoir

Current average withdrawals: 34.5 mgd

Estimate of future safe yield at current levels of sedimentation is 47.5 mgd in 2061 per Black and Veatch, 2012

Changes in regional demands will affect the timing of additional storage needed in the future

Storage Management Alternatives

Raise
Brasfield
Dam

Dredge
Chesdin
Reservoir

Develop
Offstream
Storage

Permit Requires:

- b. A description and analysis of the storage management alternatives considered in developing the Plan, including, at a minimum, raising the height of the Brasfield Dam, dredging, and offstream storage. The Plan shall acknowledge that any proposed dredging activity will require environmental permits from both state and federal agencies.

Raise Brasfield Dam

Raise Brasfield Dam

- Increase dam height
- Provides additional storage volume
- Pool level increases
- 2012 engineering work analyzed 3 alternatives
 - 18" = +1.9 BG
 - 24" = +2.55 BG
 - 36" = +3.86 BG



Raise Brasfield Dam Considerations

- Public & private infrastructure
 - Route 623 (Sutherland Road) and two bridges
 - Docks and bulkheads
 - Marinas
 - Wells/septic systems
- Permits
 - Environmental (USCOE, VDEQ, VMRC, JPA, local)
 - Historical / archeological sites
 - FEMA
 - Federal Energy Regulatory Commission (FERC)
- ARWA facility operation
- Aquatic

Dredging

Dredging

- Physically removes deposited sediment
- Recovers lost storage volume
- Pool level remains
- 2012 engineering work estimated 3-4 MCY resulting in 0.6 BG



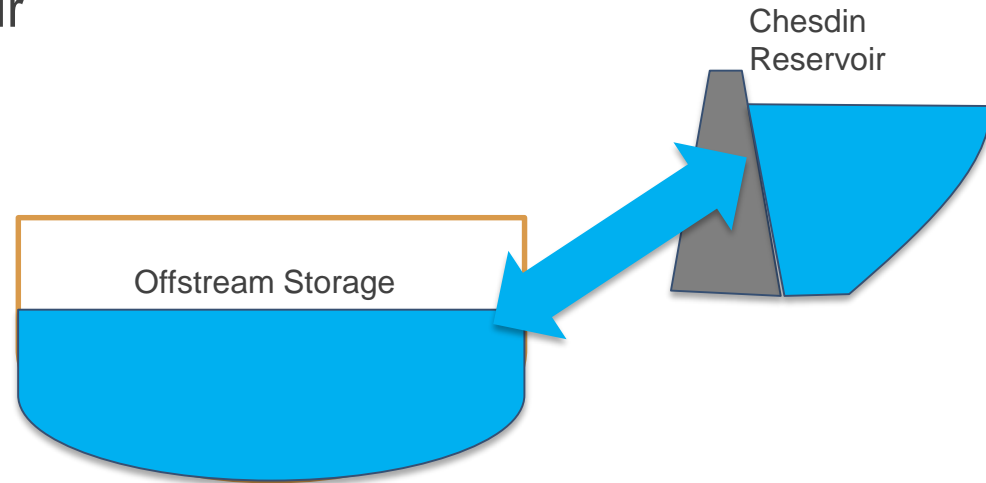
Dredging Considerations

- Disposal
 - Upper reaches
 - Dewatering area(s) adjacent to reservoir
 - Off-site
 - Traffic
- Permits
 - Environmental (USCOE, VMRC, VPDES, JPA, local)
 - Historic
- ARWA facility operation
- Aquatic

Offstream Storage

Offstream Storage

- Create a water impoundment external to Chesdin Reservoir
- High river flow conditions transfer water in
- Release/pump water from during drought conditions
- 2012 engineering work identified 7.08 BG



Offstream Storage Considerations

- Public & private infrastructure
 - Site
 - Piping/Pumping
 - Potential intake or bi-directional flow
- Permits
 - Environmental (USCOE, VDEQ VMRC, JPA, local)
 - Historical / archeological sites
- ARWA facility operation

Planning Level Estimates of Water Supply Volumes and Costs

Description	Raise Brasfield Dam 18"	Dredge Chesdin Reservoir	Offstream Storage
Storage Increase (BG)	1.9 ¹	0.6 ¹	5.0 - 7.0 ³
Safe Yield / Reliable Service Level Increase (mgd)	11 ¹ - 15 ⁴	3.5 ¹	20 - 33 ³
Estimated Construction Cost	\$24.4M - \$33M ²	\$23.5M ¹ - \$73M ⁵	\$91.6M - \$96.6M ³

1. Values taken from Raw Water Supply Alternatives Analysis by Black and Veatch, dated September 2012

2. ARWA Board Meeting minutes, February 23, 2017

3. Evaluation of ARWA Capacity Expansion Options, September 25, 2014

4. Potential Brasfield Dam Eighteen Inch Project Summary, September 25, 2014

5. ARWA Source Water Study by Gannett Fleming, February 2001

Planning Level Estimates of Water Supply Volumes and Costs

Raise
Brasfield
Dam

Dredge
Chesdin
Reservoir

Develop
Offstream
Storage

Federal & State Regulatory Agencies are required to approve the project with the “least environmentally damaging practicable alternative”

Section 404 of the Clean Water Act Memorandum of Agreement

<https://www.epa.gov/cwa-404/memorandum-agreement>

Bathymetric Survey



- d. Schedule for conducting a bathymetric survey of the reservoir to provide an updated analysis of sedimentation in the reservoir, including identification of areas of accumulated sediment and areas having a high potential for accumulation during the permit term. The survey shall be conducted at least once during the permit term but no later than year 10.

DEQ Reporting

- e. The permittee shall submit a report to DEQ documenting progress towards procurement of a preferred alternative for a future alternative source of supply every two (2) years, with the first report due two (2) years after permit issuance. The reports shall document actions taken to secure additional raw water supply by the end of the permit term, including a proposed timeline with implementation milestones. The reports shall include any applicable documentation of stakeholder involvement.

Stakeholder Participation

- a. Stakeholder participation in the development of the Plan. The Plan shall include documentation of stakeholder involvement.

Stakeholder Participation Overview

Conducted three meetings with different stakeholder groups/organizations

1. Public meeting on the evening of July 11, 2017
2. Presentation to watershed county's environmental and soil and water conservation district staff on August 8, 2017
3. Presentation at ARWA Board meeting September 21, 2017

Summary of Comments from Meeting 1

- There is confidence from the public that the current reservoir management lessens a threat of another water level crisis as experienced in 2010.
- There is solid consensus from property owners, residents and businesses that the water supply is critical to the livability and growth for the region.
- Discussion of sedimentation did not generate any comments.
- The discussion of storage management alternatives generated other public comments as follows:
 - Some property owners are uncertain regarding the sustainability of existing and future structures and amenities on their land.
 - There is confusion from some community stakeholders on continued planning and analysis by the Authority. Residents, property owners and business owners desire for continued transparency and on-going communications.

Meeting 1 – Additional Opportunity for Public Comment



APPOMATTOX RIVER WATER AUTHORITY

Submit Comments – Storage Management Plan Engagement Meeting [Click here](#)

The Appomattox River Water Authority (ARWA) provides safe, clean water to customers in Chesterfield, Dinwiddie and Prince George Counties, and the Cities of Petersburg and Colonial Heights, Virginia, from facilities located next to Brasfield Dam, at Chesdin Reservoir, in south-central Virginia.

<http://arwava.org/>

ARWA Page 79 of 94

Summary of Comments from Meeting 2

- Most counties in the watershed have stormwater management ordinances to limit erosion
- Designating Chesapeake Bay RPAs in other counties within the Chesdin Reservoir watershed could help to provide reductions in sedimentation.
- The Virginia Agricultural Cost-Share (VACS) program through the Department of Conservation and Recreation funds agricultural best management practices (BMPs) that reduce erosion.
- The agricultural community is aware of activities to protect water quality, such as keeping livestock out of streams and installing riparian buffers.

Conclusions and Recommendations

Storage Management Plan Conclusions

Sedimentation in the reservoir can result in a number of issues for the reservoir

Current rates of sedimentation are relatively low and do not represent a risk to near term water supply operations

Long term solutions to address future sedimentation risks are currently under investigation

Sediment management activities in the watershed are not recommended during the current permit period (expires Oct 2028)

Comments on Storage Management Plan

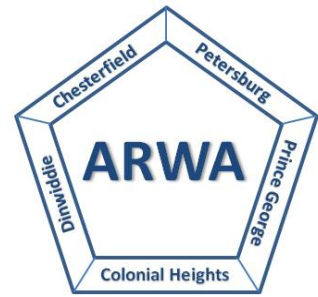
Thank you

- **Update from Chesterfield County on Discussions With Federal/State Elected Officials Related to Raising the Dam**

- **Virginia Department of Environmental Quality Letter**

Following is a copy of the revised letter ARWA intends to send to the Virginia Department of Environmental Quality as required in our VWP Permit

Appomattox River Water Authority



21300 Chesdin Rd. - S. Chesterfield VA 23803 - Phone (804) 590-1145 - Fax (804) 590-9285

October 23, 2017

Mr. Brian McGurk
Office of Water Supply
Commonwealth of Virginia
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

Re: Virginia Water Protection Individual Permit No. 01-1719

Dear Mr. McGurk:

As required by Part I, E, 4.e., the Appomattox River Water Authority (the Authority) is providing the permit required biannual report to the Department of Environmental Quality documenting the progress towards procurement of a future source of raw water supply that is due to you by November 1, 2017.

Based on extensive water resource modeling completed by the Authority in 2013, along with additional annual model runs, it appears that the previous demand projections in the Commonwealth's State Water Resource Plan (reflecting data taken from ARWA's Regional Water Supply Plan) have not developed as projected. Using ARWA Member 2015 provided demand projections for 2020, our Water Resource modeler, HydroLogics, ran their model and provided predictions based on Member expected 2020 demands. Actual 2015/2016 demands that ARWA experienced from our members were not utilized in the 2016 model prediction analysis but were used to verify model calibration.

The modeling results using the ARWA Member provided annual average 2020 demands projections indicated that the performance metric goal (Preserves 60-day supply) developed by ARWA could be met through an annual average demand of forty-two million gallons per day, with the modeling results indicating that the reservoir could meet water supply performance metric goals for at least the next ten years. Using the 2015 Member provided 2020, 2030, and 2040 projections to calculate the 2025 average daily demands of 39.8 mgd, all system performance metrics are met except the boating recreation drawdown greater than two feet. In fact, for the Member projected 2030 average daily demands of 44.4 mgd, again all system performance metrics are expected to be met except boating recreation drawdown greater than two feet. The Authority's annual modeling update results continue to conform to the 2013 model calibration. The Authority continues to pursue a preferred alternative for a future additional supply of raw water to enable compliance with any raw water withdrawal permit limits expected to be issued in 2028/2029 with a new permit.

The Authority has identified Offsite Storage and raising the Brasfield Dam as potential alternatives to enhance the supply of raw water. Presently the Authority has not selected the specific raw water enhancement project

to undertake. We expect that capital funding related to the expansion of the raw water supply would be made available when needed. We do want to alert you to the fact that the Authority's Board of Directors continues to discuss and evaluate the Commonwealth providing matching grant funds towards raising the Brasfield Dam.

If you have any questions, please contact me directly at 804-590-1145.

Sincerely,

Robert C. Wichser Ph.D., P.E., BCEE
Executive Director

- **Status Report: Ongoing Projects/Operational/Financial**

Following are status reports concerning the Ongoing Projects, Operations, and Financials for ARWA.

MEMORANDUM

TO: APPOMATTOX RIVER WATER AUTHORITY BOARD OF DIRECTORS

FROM: ROBERT C. WICHSER, EXECUTIVE DIRECTOR
JAMES C. GORDON, ASSISTANT EXECUTIVE DIRECTOR

SUBJECT: STATUS REPORT – ON-GOING PROJECTS

DATE: September 21, 2017

The following projects are underway. This report includes sections on Capital projects and large replacement projects.

In-Plant Capital Projects:

- The 35 percent design, cost estimate, and equipment pre-purchase documents have been received by the Authority.
- The preliminary engineering report is awaiting review by the Virginia Department of Health.
- Current task include CFD modeling and the Energy Audit.
- A 35 percent review meeting is scheduled for September 19, 2017.

Annual Maintenance Inspection

- Annual Maintenance Inspection was authorized the last week of August. A site meeting has been scheduled for September 26, 2017.

MEMORANDUM

TO: APPOMATTOX RIVER WATER AUTHORITY BOARD OF DIRECTORS

**FROM: ROBERT C. WICHSER, EXECUTIVE DIRECTOR
JAMES C. GORDON, ASST. EXECUTIVE DIRECTOR**

SUBJECT: OPERATING AND FINANCIAL STATUS REPORT

DATE: September 21, 2017

Operating Status Report

General:

- The next scheduled Board of Directors Meeting is **Thursday November 16, 2017** at the South Central Wastewater Authority at 2:00 pm.
- The ARWA's is still awaiting its draft VPDES permit. We were recently informed we were assigned a new permit writer.
- This board meeting is the third and final stakeholder meeting required by our VWP Permit.
- Staff continues to work with our auditors to finalize work for the November audit presentation.

Operations:

- Finished water met all permit requirements for the month of August. Copies of the VDH monitoring reports are available if anyone would like to see them.
- Staff is beginning the switch to 32% caustic in preparation for lower temperatures.
- Performing drop tests on our filters to confirm flow meter operation and plan to begin using the smartfilter analyzer to improve backwash cycle efficiency.

Maintenance:

- Working on the new alum feed room on old pre-chem building. Once complete they can begin updating the current alum feed room in the new pre-chem feed building.
- Work continues to progress on inputting our parts and machinery into the maintenance software
- Coordinating repairs of the stems for the gate valves for the sluice gate and 14' intake gate. Divers should be onsite the week of 10/16 to install these valve stems.
- Inspecting some pump motors for repair.
- Scheduling our boiler inspections

Instrumentation/IT:

- Working on one of our security cameras. We suspect a camera may have been damaged during a storm.
- Meeting with our system integrator to discuss current FY project scheduling and future system needs.
- Installing local displays on chemical storage tanks.

Laboratory:

- Preparing for Lake study to monitor blue-green algae levels and source water quality
- Awaiting arrival of new AA for monitoring manganese and iron.

- Preparing to conduct internal audits
- Performing WET testing per the Authorities VPDES.
- Working with the manufacturer to resolve an issue with the detectors on the GC.

Financial Status Report:

Following is the Executive Summary of the Monthly Financial Statement that includes the YTD Budget Performance and the Financial Statement for August 2017.

Appomattox River Water Authority
YTD Income Statement for the period ending August 31, 2017

Water Rate Center

Revenues and Expenses Summary

<i>Budget</i>	<i>Budget</i>	<i>Actual</i>	<i>Budget</i>	<i>Variance</i>
<i>FY 17/18</i>	<i>Year-to-Date</i>	<i>Year-to-Date</i>	<i>vs. Actual</i>	<i>Percentage</i>

Operating Budget vs. Actual

Revenues

Water Sales	\$ 9,649,733	\$ -	\$ -	\$ -	#DIV/0!
Rent Income	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Misc. Revenue	\$ 32,490	\$ 5,415	\$ 260	\$ (5,155)	-95.20%
Total Operating Revenues	\$ 9,682,223	\$ 5,415	\$ 260	\$ (5,155)	-95.20%

Expenses

Personnel Cost	\$ 2,240,100	\$ 373,323	\$ 357,284	\$ (16,039)	-4.30%
Contractual/Professional Services	\$ 809,200	\$ 134,879	\$ 121,994	\$ (12,885)	-9.55%
Utilities	\$ 798,000	\$ 133,000	\$ 134,321	\$ 1,321	0.99%
Communication	\$ 32,200	\$ 5,367	\$ 5,795	\$ 429	7.99%
Office/Lab/Purification Supplies	\$ 96,500	\$ 16,083	\$ 17,684	\$ 1,601	9.95%
Insurance	\$ 90,000	\$ 90,000	\$ 84,840	\$ (5,160)	-5.73%
Lease/Rental Equipment	\$ 20,000	\$ 3,333	\$ 5,333	\$ 2,000	60.00%
Travel/Training/Dues	\$ 46,400	\$ 7,733	\$ 4,436	\$ (3,297)	-42.64%
Safety/Uniforms	\$ 22,000	\$ 3,667	\$ 3,705	\$ 38	1.05%
Chemicals	\$ 2,200,000	\$ 366,667	\$ 442,625	\$ 75,959	20.72%
Repair/Maintenance Parts & Supplies	\$ 425,000	\$ 70,833	\$ 39,982	\$ (30,851)	-43.55%
Total Operating Expenses	\$ 6,779,400	\$ 1,204,885	\$ 1,218,000	\$ 13,114	1.09%
Operating Suplus/(Deficit)	\$ 2,902,823	\$ (1,199,470)	\$ (1,217,740)	\$ (18,269)	1.52%

Replacement Outlay Budget vs. Actual

Machinery & Motors	\$ 125,000	\$ 20,833	\$ 9,716	\$ (11,118)	-53.37%
Instrumentation	\$ 86,000	\$ 14,333	\$ -	\$ (14,333)	-100.00%
SCADA	\$ 230,000	\$ 38,333	\$ -	\$ (38,333)	-100.00%
Computer Equipment	\$ 10,000	\$ 1,667	\$ -	\$ (1,667)	-100.00%
Furniture/Fixtures	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Motor Vehicles	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Flocculation Basins	\$ -	\$ -	\$ 19,000	\$ 19,000	#DIV/0!
Valve Replacement	\$ 100,000	\$ 16,667	\$ -	\$ (16,667)	-100.00%
Warehouse Racks & Shelving	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Concrete	\$ 50,000	\$ 8,333	\$ -	\$ (8,333)	-100.00%
Pre-Chem Boiler	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Off-Site Reservoir	\$ 250,000	\$ 41,667	\$ -	\$ (41,667)	-100.00%
Reservoir Storage	\$ -	\$ -	\$ 21,373	\$ 21,373	#DIV/0!
Lime Feed Improvements	\$ -	\$ -	\$ -	\$ -	#DIV/0!
In-Plant Capital Upgrade	\$ -	\$ -	\$ 93,000	\$ 93,000	#DIV/0!
Replacement-Other	\$ -	\$ -	\$ 5,390	\$ 5,390	#DIV/0!
Total Capital Outlay	\$ 851,000	\$ 141,833	\$ 148,478	\$ 6,645	4.68%

Debt Service Budget vs. Actual

Interest Income	\$ -	\$ -	\$ 10,707	\$ 10,707	#DIV/0!
Interest Jurisdictions (Income)	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Interest Expense	\$ -	\$ -	\$ -	\$ -	#DIV/0!
Principal Payments	\$ 1,576,426	\$ -	\$ -	\$ -	#DIV/0!

Appomattox River Water Authority-Balance Sheet
For Month Ending August 31, 2017

Assets

Current Assets

Petty Cash	\$	400
SunTrust Operating Fund	\$	1,613,300
SunTrust Replacement Fund	\$	-
Total Unrestricted Cash	\$	1,613,700

Water Revenue	\$	3,677,733
Reserve Account	\$	1,878,650
Replacement Account	\$	684,770
Debt Service Reserve	\$	1,532,664
Bond Principal/Interest	\$	846,663
Total Restricted Cash	\$	8,620,480

Total Checking/Savings **\$ 10,234,180**

Accounts Receivable	\$	-
Other Current Assets	\$	16,310
Inventory	\$	131,470

Total Current Assets **\$ 10,381,961**

Fixed Assets

Land and Land Rights	\$	1,090,685
Water System	\$	85,248,334
Equipment	\$	1,094,840
Hydro	\$	34,873
Construction in Progress	\$	58,725
Accumulated Amortization	\$	(32,780)
Accumulated Depreciation	\$	(44,469,352)

Total Fixed Assets **\$ 43,025,324**

Other Assets

Pension **\$ 322,971**

Total Assets

\$ 53,730,255

Liabilities & Equity

Current Liabilities

Accounts Payable	\$	52,804
Retainage Payable	\$	-
Accrued Interest Payable	\$	120,374

Total Current Liabilities **\$ 173,178**

Long Term Liabilities

Pension	\$	326,043
Bonds Payable-2010	\$	8,200,000
Bonds Payable-2012	\$	2,815,000
Accrued Leave Payable	\$	170,612
Post Employment Benefit	\$	63,300

Total Long-Term Liabilities **\$ 11,574,955**

Total Liabilities

\$ 11,748,133

Equity

Retained Earnings	\$	(3,504,941)
Reserve for Operations	\$	3,068,942
Reserve for Water Revenue	\$	7,626,208
Reserve for Replacements	\$	500,000
Reserve for Bond Interest	\$	120,374
Reserve for Debt Service	\$	1,066,426
Reserve for Bond Principal	\$	598,000
Reserve for Reserve	\$	1,852,301
Fixed Assets, Net of Debt	\$	32,010,323

Net Income **\$ (1,355,511)**
Total Equity **\$ 41,982,122**

Total Liabilities & Equity

\$ 53,730,255

5. Items from Counsel

6. Closed Session

7. Other Items from Board Members/Staff Not on Agenda:

8. Adjourn