

Appomattox River Water Authority

Board of Directors Meeting

DATE: September 12, 2019

TIME: 2:00 PM

LOCATION: South Central Wastewater Authority
Board Room, Administration Building
900 Magazine Road
Petersburg, Virginia 23803

AGENDA

1. Call to Order/Roll Call
2. Approval of Minutes: Minutes of the Regular Board Meeting on July 25, 2019
3. Public Comment
4. Executive Director's Report:
 - Reservoir Status Update for July/August 2019
 - Davenport Review/Recommendation on Refunding Series 2010 VRA Loan
 - Award of American Water Works Association Partnership of Safe Water 20 Year Directors Award for Constant Vigilance to Improve Water Quality
 - Board Discussion on Alum Litigation Refunding
 - Board Discussion on Requirement for Irrigation Permit to Withdrawal Water
 - Information Requested related to ARWA on-going "In-Plant" upgrade project
 - Status Report: Ongoing Projects/Operations/Financials
5. Items from Counsel
6. Closed Session: Personnel/Executive Directors Annual Review
7. Other Items from Board Members/Staff Not on Agenda
8. Adjourn

Cc: W. Dupler/George Hayes, Chesterfield
L. Lyons, Petersburg
W. Henley, Colonial Heights
F. Haltom, Prince George
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 July 25, 2019

Following are minutes of the Regular Scheduled Board Meeting held on July 25, 2019.

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

BOARD OF DIRECTORS MEETING
Appomattox River Water Authority
July 25, 2019 at 2:00 p.m.
Location: Appomattox River Water Authority
21300 Chesdin Road, S. Chesterfield, VA 23803

MEMBERS PRESENT:

Doug Smith, Chairman (Colonial Heights)
Kevin Massengill, Vice-Chairman (Dinwiddie)
Joseph Casey, (Chesterfield)

ALTERNATES PRESENT:

Robert B. Wilson, (Alternate, Dinwiddie)
George Hayes, Secretary/Treasurer (Alternate, Chesterfield)
Lionel Lyons, (Alternate, Petersburg)
Frank Haltom, (Alternate, Prince George)

ABSENT:

Aretha Ferrell-Benavides, (Petersburg)
Percy Ashcraft, (Prince George)
William Dupler, (Alternate, Chesterfield)
William Henley, (Alternate, Colonial Heights)

STAFF PRESENT:

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

STAFF ABSENT:

James C. Gordon, Asst. Executive Director (ARWA & SCWWA)

OTHERS PRESENT:

Chris Tabor, (Hazen and Sawyer)
Mary Martin Selby, Director of Human Resources (Chesterfield)
Keith Boswell, (VGR)

Mr. Smith, Chairman, called the meeting to order at 2:08 p.m.

1. Call to Order/Roll Call

The roll was called.

Mr. Smith requested an amendment to the Agenda to discuss recruitment materials for the Executive Director position. He stated this will be discussed after Item #4 of the Executive Director's report.

2. Approval of Minutes: Minutes of the Regular Board Meeting May 16, 2019 and Minutes of the June 13, 2019 Special Board Meeting

Upon a motion made by Dr. Casey and seconded by Mr. Haltom the following resolution was adopted:

RESOLVED, that the Minutes of the Regular Board Meeting May 16, 2019 and Minutes of the June 13, 2019 Special Board Meeting are hereby approved:

For: 4 Against: 0 Abstain: 0

3. Public Comment

There were no public comments.

4. Executive Director's Report

• Reservoir Status Update for June/July 2019

Dr. Wichser gave a Reservoir Status Update for June/July 2019. He stated year to date rainfall, we were six inches above normal year to date.

• Approval of Services for Work for U.S. EPA Required Compliance with the America's Water Infrastructure Act

Dr. Wichser reported on needed Engineering Services related to the U.S. EPA Required Compliance with the America's Water Infrastructure Act.

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

RESOLVED, that the Board hereby grants approval of the award of the services to provide for the compliance with the America's Water Infrastructure Act as required by U.S.EPA by March 21, 2020 for a lump sum not to exceed the amount of \$145,442 to Whitman, Requardt & Associates, LLP Consulting Engineers. Any additional funds expended will be at the discretion of the Executive Director, not to exceed ten percent of the lump sum fee:

For: 4 Against: 0 Abstain: 0

- **Approval of Services for Work for Development of a Long-Term Hydrilla Management Plan**

Dr. Wichser reported on the need for Engineering of Services related to the development of a Long-Term Hydrilla Management Plan.

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

RESOLVED, that the Board hereby grants approval of the award of the services for two (2) years to provide for the development of a long-term Hydrilla Management Plan for a lump sum not to exceed the amount of \$152,400 to Golder Associates Inc. Consulting Engineers. Any additional funds expended will be at the discretion of the Executive Director, not to exceed ten percent of the lump sum fee:

For: 4 Against: 0 Abstain: 0

- **Alum Settlement Payment Review/Discussion**

Dr. Wichser reported on the Alum Settlement Payments to Capital Reserve Account. He stated from the lawsuit settlement to-date ARWA has received \$141,773 with a total expected of \$857,000. He further stated we are expecting about \$716,000 more to come in, but we don't know when. He stated SCWWA has received \$21,000. Dr. Wichser stated the question is what happens to these funds that are coming in as a result of the alum legal case settlement. Mr. Smith stated to put this on hold until additional funds come in. Mr. Haltom asked if we could send out a formula of flow versus allocation of how they'll be reimbursed, and Ms. Wilkins answered that we could do that. Dr. Casey stated to do this by what we have in the bank today. Ms. Wilkins stated the \$141,773, which we have received through June 30th this prior fiscal, will be reported as below the line just for financial purposes. She further stated our audit will be complete and CAFR will be distributed prior to whenever we know what we are going to receive from this total legal settlement. She stated until then, that is where those figures will appear on our financial statements, and those dollars will be in our operating account until you decide how you would like to distribute them. Mr. Smith stated this would be discussed further at our next meeting.

- **Status Report: Status Report: Ongoing Projects/Operations/Financials**

Dr. Wichser reported on Ongoing Projects/Operations/Financials. Chesterfield County Administrator Dr. Casey requested that information be presented at the September 12th ARWA Board Meeting providing a short review related to the ARWA on-going "In-Plant" upgrade project as it relates to the project's Bond issuance timing and pre-purchase by owner of the major project equipment.

- **Executive Director Recruitment Process**

Ms. Mary Martin Selby, Director of Human Resources of Chesterfield County, presented the Executive Director Recruitment package. Mr. Anderson asked Ms. Selby if she had to have Board action before extending the offer, and Ms. Selby stated it's conditioned on the Board's approval at its next meeting.

Mr. Smith stated the panel could be the Manager positions of all localities but also have the alternates here as well. Dr. Casey stated if two or more members met together, you would have to have a formal meeting and go into Closed Session. Ms. Selby stated she would make the changes and get it back to members for final review. Dr. Casey stated Mr. Dupler has announced his retirement in October 2019.

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

RESOLVED, that the Board hereby grants approval to proceed with advertising for the Executive Director for the Appomattox River Water Authority and the South Central Wastewater Authority upon finalization of the changes in the Recruitment Process:

For: 4 Against: 0 Abstain: 0

5. Items from Counsel

There were no items from Counsel.

6. Closed Session: Personnel/Executive Director's Annual Review/Legal Matters

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

Upon a motion made by Mr. Massengill and seconded by Mr. Haltom the Board went into Closed Session at 3:14 p.m.

For: 4 Against: 0 Abstain: 0

Mr. Lyons arrived at 3:27 p.m.

Upon a motion made by Mr. Haltom and seconded by Mr. Massengill the Board came out of Closed Session at 4:25 p.m.

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

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

8. Adjourn

Mr. Smith stated, if there's no other business, and asked for motion to adjourn.

Upon a motion made by Mr. Lyons and seconded by Mr. Massengill the meeting was adjourned at 4:27 p.m.

MINUTES APPROVED BY:

George Hayes
Secretary/Treasurer

CLOSED MEETING RESOLUTION

APPOMATTOX RIVER WATER AUTHORITY

July 25, 2019

I move that we go into a closed meeting for (i) discussion and consideration of the performance and resignation of specific public officers of the Authority, specifically concerning the Executive Director's annual review and retirement, as permitted by Section 2.2-3711A.1. of the Virginia Freedom of Information Act ("FOIA"), and (ii) consultation with legal counsel retained by the Authority regarding specific legal matters requiring the provision of legal advice by such counsel, as permitted by Section 2.2-3711A.8. of FOIA:

MOTION: Massengill

SECOND: Haltom

VOTE

| | |
|-------------------|--------|
| Haltom | Aye |
| Casey | Aye |
| Ferrell-Benavides | Absent |
| Massengill | Aye |
| Smith | Aye |

ABSENT DURING VOTE: Ms. Ferrell-Benavides was absent from the meeting. Mr. Lyons arrived after the closed meeting began.

ABSENT DURING CLOSED MEETING: See above.

SESSION DATE: July 25, 2019

CERTIFICATION OF CLOSED MEETING

WHEREAS, the Board of the Appomattox River Water Authority (the "Authority") convened a closed meeting on July 25, 2019, 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: Haltom

SECOND: Massengill

VOTE

| | |
|------------|-----|
| Haltom | Aye |
| Casey | Aye |
| Lyons | Aye |
| Massengill | Aye |
| Smith | Aye |

ABSENT DURING VOTE: None.

ABSENT DURING CLOSED MEETING: See above.

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 July/August 2019**

- **Davenport Review/Recommendation on Refunding Series 2010 VRA Loan**

Following is an email and information received from Peter D'Alema with Virginia Resources Authority concerning refunding the Series 2010 VRA Loan, a refunding summary from Davenport and Company, and a resolution for refunding the Series 2010 VRA Loan.

From: Peter G. DAlema [<mailto:PDalema@VirginiaResources.org>]
Sent: Wednesday, August 28, 2019 12:26 PM
To: Robert Wichser
Cc: Cole, Ted
Subject: RE: [EXTERNAL] FW: Appomattox River Water Authority - Potential Refunding Opportunity

Hi Bob:

As a follow up to my prior email, attached please find an refunding analysis for the ARWA 2010C loan based on estimated taxable market rates as of 8/27/19. Please let me know if you have any questions once you've had a chance to review this.

Thank you,
Peter

Peter D'Alema
Director of Program Management
(804) 644-3100 main office
(804) 616-3446 direct dial
(804) 644-3109 fax
pdalema@virginiareources.org



1111 East Main Street | Suite 1920 | Richmond, VA 23219

SOURCES AND USES OF FUNDS

Virginia Resources Authority
Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
Preliminary Numbers; Estimated Rates as of August 27, 2019

Sources:

| | |
|----------------|---------------------|
| Bond Proceeds: | |
| Par Amount | 6,740,000.00 |
| | <u>6,740,000.00</u> |

Uses:

| | |
|----------------------------|---------------------|
| Refunding Escrow Deposits: | |
| Cash Deposit | 0.32 |
| SLGS Purchases | <u>6,667,977.00</u> |
| | 6,667,977.32 |
| Delivery Date Expenses: | |
| Cost of Issuance | 33,480.00 |
| Underwriter's Discount | <u>33,700.00</u> |
| | 67,180.00 |
| Other Uses of Funds: | |
| Additional Proceeds | <u>4,842.68</u> |
| | <u>6,740,000.00</u> |

BOND PRICING

Virginia Resources Authority
 Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
 Preliminary Numbers; Estimated Rates as of August 27, 2019

| Bond Component | Maturity Date | Amount | Rate | Yield | Price |
|--|---------------|-----------|--------|--------|---------|
| Taxable Infrastructure Revenue Serial Bonds: | | | | | |
| | 11/01/2020 | 60,000 | 1.750% | 1.750% | 100.000 |
| | 11/01/2021 | 380,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2022 | 390,000 | 1.800% | 1.800% | 100.000 |
| | 11/01/2023 | 395,000 | 1.750% | 1.750% | 100.000 |
| | 11/01/2024 | 405,000 | 1.800% | 1.800% | 100.000 |
| | 11/01/2025 | 415,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2026 | 430,000 | 2.000% | 2.000% | 100.000 |
| | 11/01/2027 | 430,000 | 2.050% | 2.050% | 100.000 |
| | 11/01/2028 | 435,000 | 2.100% | 2.100% | 100.000 |
| | 11/01/2029 | 445,000 | 2.150% | 2.150% | 100.000 |
| | 11/01/2030 | 460,000 | 2.250% | 2.250% | 100.000 |
| | 11/01/2031 | 470,000 | 2.300% | 2.300% | 100.000 |
| | 11/01/2032 | | 2.350% | 2.350% | 100.000 |
| | 11/01/2033 | | 2.400% | 2.400% | 100.000 |
| | 11/01/2034 | | 2.450% | 2.450% | 100.000 |
| | 11/01/2035 | | 2.500% | 2.500% | 100.000 |
| | 11/01/2036 | | 2.550% | 2.550% | 100.000 |
| | 11/01/2037 | | 2.600% | 2.600% | 100.000 |
| | 11/01/2038 | | 2.650% | 2.650% | 100.000 |
| | 11/01/2039 | | 2.700% | 2.700% | 100.000 |
| | 11/01/2040 | | 2.750% | 2.750% | 100.000 |
| | | 4,715,000 | | | |
| Taxable Moral Obligation Serial Bonds: | | | | | |
| | 11/01/2020 | 30,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2021 | 165,000 | 1.950% | 1.950% | 100.000 |
| | 11/01/2022 | 165,000 | 1.900% | 1.900% | 100.000 |
| | 11/01/2023 | 170,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2024 | 175,000 | 1.900% | 1.900% | 100.000 |
| | 11/01/2025 | 175,000 | 1.950% | 1.950% | 100.000 |
| | 11/01/2026 | 180,000 | 2.100% | 2.100% | 100.000 |
| | 11/01/2027 | 185,000 | 2.150% | 2.150% | 100.000 |
| | 11/01/2028 | 190,000 | 2.200% | 2.200% | 100.000 |
| | 11/01/2029 | 195,000 | 2.250% | 2.250% | 100.000 |
| | 11/01/2030 | 195,000 | 2.350% | 2.350% | 100.000 |
| | 11/01/2031 | 200,000 | 2.400% | 2.400% | 100.000 |
| | 11/01/2032 | | 2.450% | 2.450% | 100.000 |
| | 11/01/2033 | | 2.500% | 2.500% | 100.000 |
| | 11/01/2034 | | 2.550% | 2.550% | 100.000 |
| | 11/01/2035 | | 2.600% | 2.600% | 100.000 |
| | 11/01/2036 | | 2.650% | 2.650% | 100.000 |
| | 11/01/2037 | | 2.700% | 2.700% | 100.000 |
| | 11/01/2038 | | 2.750% | 2.750% | 100.000 |
| | 11/01/2039 | | 2.800% | 2.800% | 100.000 |
| | 11/01/2040 | | 2.850% | 2.850% | 100.000 |
| | | 2,025,000 | | | |
| | | 6,740,000 | | | |

| | | |
|-------------------------|--------------|-------------|
| Dated Date | 11/13/2019 | |
| Delivery Date | 11/13/2019 | |
| First Coupon | 05/01/2020 | |
| Par Amount | 6,740,000.00 | |
| Original Issue Discount | | |
| Production | 6,740,000.00 | 100.000000% |
| Underwriter's Discount | (33,700.00) | (0.500000%) |
| Purchase Price | 6,706,300.00 | 99.500000% |
| Accrued Interest | | |
| Net Proceeds | 6,706,300.00 | |

BOND SUMMARY STATISTICS

Virginia Resources Authority
Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
Preliminary Numbers; Estimated Rates as of August 27, 2019

| | |
|-----------------------------------|--------------|
| Dated Date | 11/13/2019 |
| Delivery Date | 11/13/2019 |
| Last Maturity | 11/01/2031 |
| Arbitrage Yield | 1.503572% |
| True Interest Cost (TIC) | 2.181845% |
| Net Interest Cost (NIC) | 2.179796% |
| All-In TIC | 2.384888% |
| Average Coupon | 2.109265% |
| Average Life (years) | 7.089 |
| Weighted Average Maturity (years) | |
| Duration of Issue (years) | 6.535 |
| Par Amount | 6,740,000.00 |
| Bond Proceeds | 6,740,000.00 |
| Total Interest | 1,007,814.00 |
| Net Interest | 1,041,514.00 |
| Total Debt Service | 7,747,814.00 |
| Maximum Annual Debt Service | 692,985.00 |
| Average Annual Debt Service | 647,449.64 |
| Underwriter's Fees (per \$1000) | |
| Average Takedown | |
| Other Fee | 5.000000 |
| Total Underwriter's Discount | 5.000000 |
| Bid Price | 99.500000 |

| Bond Component | Par Value | Price | Average Coupon | Average Life |
|---|--------------|---------|----------------|--------------|
| Taxable Moral Obligation Serial Bonds | 2,025,000.00 | 100.000 | 2.179% | 7.080 |
| Taxable Infrastructure Revenue Serial Bonds | 4,715,000.00 | 100.000 | 2.079% | 7.093 |
| | 6,740,000.00 | | | 7.089 |

| | TIC | All-In TIC | Arbitrage Yield |
|----------------------------|--------------|--------------|-----------------|
| Par Value | 6,740,000.00 | 6,740,000.00 | |
| + Accrued Interest | | | |
| + Premium (Discount) | | | |
| - Underwriter's Discount | (33,700.00) | (33,700.00) | |
| - Cost of Issuance Expense | | (33,480.00) | |
| - Other Amounts | | | |
| Target Value | 6,706,300.00 | 6,672,820.00 | |
| Target Date | 11/13/2019 | 11/13/2019 | 11/13/2019 |
| Yield | 2.181845% | 2.384888% | 1.503572% |

SUMMARY OF REFUNDING RESULTS

Virginia Resources Authority
Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
Preliminary Numbers; Estimated Rates as of August 27, 2019

| | |
|--|--------------|
| Dated Date | 11/13/2019 |
| Delivery Date | 11/13/2019 |
| Arbitrage yield | 1.503572% |
| Escrow yield | 1.745639% |
| Value of Negative Arbitrage | (15,313.55) |
| Bond Par Amount | 6,740,000.00 |
| True Interest Cost | 2.181845% |
| Net Interest Cost | 2.179796% |
| All-In TIC | 2.384888% |
| Average Coupon | 2.109265% |
| Average Life | 7.089 |
| Par amount of refunded bonds | 6,475,000.00 |
| Average coupon of refunded bonds | 4.690111% |
| Average life of refunded bonds | 7.434 |
| PV of prior debt to 11/13/2019 @ 2.181845% | 7,623,128.83 |
| Net PV Savings | 867,420.52 |
| Percentage savings of refunded bonds | 13.396456% |

SAVINGS

Virginia Resources Authority
 Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
 Preliminary Numbers; Estimated Rates as of August 27, 2019

| Date | Prior Debt Service | Refunding Debt Service | Refunding Expenses | Refunding Net Cash Flow | Savings | Present Value to 11/13/2019 @ 2.1818453% |
|------------|-----------------------|---------------------------|-----------------------|----------------------------|------------|--|
| 06/30/2020 | 155,550.00 | 63,819.00 | 3,931.67 | 67,750.67 | 87,799.33 | 86,914.69 |
| 06/30/2021 | 311,100.00 | 225,952.50 | 8,368.75 | 234,321.25 | 76,778.75 | 74,299.19 |
| 06/30/2022 | 759,370.00 | 675,026.25 | 7,971.88 | 682,998.13 | 76,371.87 | 72,379.15 |
| 06/30/2023 | 755,400.00 | 674,825.00 | 7,284.38 | 682,109.38 | 73,290.62 | 68,005.25 |
| 06/30/2024 | 756,670.00 | 674,718.75 | 6,584.38 | 681,303.13 | 75,366.87 | 68,510.90 |
| 06/30/2025 | 758,065.00 | 679,382.50 | 5,868.76 | 685,251.26 | 72,813.74 | 64,810.38 |
| 06/30/2026 | 757,622.50 | 678,530.00 | 5,137.51 | 683,667.51 | 73,954.99 | 64,492.06 |
| 06/30/2027 | 765,125.00 | 686,795.00 | 4,387.51 | 691,182.51 | 73,942.49 | 63,167.39 |
| 06/30/2028 | 756,300.00 | 679,208.75 | 3,621.88 | 682,830.63 | 73,469.37 | 61,484.89 |
| 06/30/2029 | 756,300.00 | 676,155.00 | 2,846.88 | 679,001.88 | 77,298.12 | 63,390.48 |
| 06/30/2030 | 754,895.00 | 677,520.00 | 2,056.26 | 679,576.26 | 75,318.74 | 60,510.77 |
| 06/30/2031 | 752,035.00 | 678,076.25 | 1,246.88 | 679,323.13 | 72,711.87 | 57,232.94 |
| 06/30/2032 | 752,617.50 | 677,805.00 | 418.75 | 678,223.75 | 74,393.75 | 57,379.76 |
| <hr/> | | | | | | |
| | 8,791,050.00 | 7,747,814.00 | 59,725.49 | 7,807,539.49 | 983,510.51 | 862,577.84 |

Savings Summary

| | |
|-------------------------------|------------|
| PV of savings from cash flow | 862,577.84 |
| Plus: Refunding funds on hand | 4,842.68 |
| Net PV Savings | 867,420.52 |

SUMMARY OF BONDS REFUNDED

Virginia Resources Authority
Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
Preliminary Numbers; Estimated Rates as of August 27, 2019

| Bond | Maturity Date | Interest Rate | Par Amount | Call Date | Call Price |
|--|---------------|---------------|--------------|------------|------------|
| Appomattox River Water Authority Series 2010C, 10C_ARWA: | | | | | |
| SEN | 11/01/2021 | 5.000% | 325,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2022 | 5.000% | 340,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2023 | 5.000% | 355,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2024 | 5.000% | 370,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2025 | 5.000% | 390,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2026 | 5.000% | 415,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2027 | 5.000% | 430,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2028 | 5.000% | 445,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2029 | 5.000% | 465,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2030 | 5.000% | 490,000.00 | 11/01/2020 | 100.000 |
| SR_TM | 11/01/2031 | 5.000% | 510,000.00 | 11/01/2020 | 100.000 |
| SUB | 11/01/2021 | 5.000% | 135,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2022 | 5.000% | 140,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2023 | 3.150% | 150,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2024 | 3.250% | 160,000.00 | 11/01/2020 | 100.000 |
| SUB_TM | 11/01/2025 | 4.000% | 165,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2026 | 4.000% | 175,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2027 | 4.000% | 180,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2028 | 4.000% | 195,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2029 | 4.000% | 205,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2030 | 4.000% | 210,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2031 | 4.000% | 225,000.00 | 11/01/2020 | 100.000 |
| | | | 6,475,000.00 | | |

ESCROW REQUIREMENTS

Virginia Resources Authority
Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
Preliminary Numbers; Estimated Rates as of August 27, 2019

Dated Date 11/13/2019
Delivery Date 11/13/2019

| Period Ending | Interest | Principal Redeemed | Total |
|------------------|------------|-----------------------|--------------|
| 05/01/2020 | 152,312.50 | | 152,312.50 |
| 11/01/2020 | 152,312.50 | 6,475,000.00 | 6,627,312.50 |
| | 304,625.00 | 6,475,000.00 | 6,779,625.00 |

SAMPLE

ESCROW STATISTICS

Virginia Resources Authority
 Appomattox Regional Water Authority Refunding of VRA 2010C Bonds (Taxable)
 Preliminary Numbers; Estimated Rates as of August 27, 2019

| Total Escrow Cost | Modified Duration (years) | PV of 1 bp change | Yield to Receipt Date | Yield to Disbursement Date | Perfect Escrow Cost | Value of Negative Arbitrage | Cost of Dead Time |
|----------------------|---------------------------------|----------------------|-----------------------------|----------------------------------|---------------------------|-----------------------------------|----------------------|
| 6,667,977.32 | 0.947 | 631.46 | 1.745639% | 1.745639% | 6,683,290.87 | (15,313.55) | |
| 6,667,977.32 | | 631.46 | | | 6,683,290.87 | (15,313.55) | 0.00 |

Delivery date 11/13/2019
 Arbitrage yield 1.503572%

SAMPLE

VRA Refunding Summary – 2010C VRA Bonds

Appomattox River Water Authority



September 6, 2019

Overview of Series 2010C VRA Bonds

- In November 2010, the Authority issued \$9,750,000 of Series 2010C Bonds through the Virginia Resources Authority ("VRA").
 - The Bonds initially had interest rates ranging from 2.000% to 5.000%.
 - The Bonds were sold with a final maturity of 11/1/2031 and a call date of 11/1/2020.
 - The Bonds are not eligible for a tax-exempt advance refunding, but the advance refunding could be facilitated through a taxable issuance.
 - The Bonds eligible for advance refunding are as follows:
 - Maturities: 11/1/2021 – 11/1/2031
 - Par Amount: \$6,475,000
 - Interest Rates: 3.150% - 5.000%
- The Authority may have an opportunity to advance refund the callable 2010C VRA Bonds through the VRA 2019 Fall Pool issuance to achieve debt service savings.
- Should the Authority decide to move forward with this refunding, VRA requires approval from the Authority Board by mid-October.

Refunding of Series 2010C VRA Bonds

Current Market Rates – VRA Public Sale



Summary of Refunding Results

| | | | |
|----|----------------------------------|-------------------|-----------|
| 1 | Bonds Refunded | | |
| 2 | Par Refunded | \$ | 6,475,000 |
| 3 | Coupon | 3.15% - 5.00% | |
| 4 | Call Date | 11/1/2020 | |
| 5 | Call Price | 100.00% | |
| 6 | Maturities Refunded | 11/1/21 - 11/1/31 | |
| 7 | | | |
| 8 | Refunding Bonds | | |
| 9 | Bond Par Amount | \$ | 6,840,000 |
| 10 | Final Maturity | 11/1/2031 | |
| 11 | True Interest Cost | 2.307% | |
| 12 | All-In TIC | 2.616% | |
| 13 | Assumed Call Date | 11/1/2029 | |
| 14 | | | |
| 15 | Savings | | |
| 16 | Gross Savings | \$ | 869,307 |
| 17 | Net PV Savings | \$ | 770,009 |
| 18 | Net PV Savings % | 11.892% | |
| 19 | Average Annual Savings | \$ | 66,870 |
| 20 | | | |
| 21 | Key Escrow Statistics | | |
| 22 | Escrow Maturity Date | 11/1/2020 | |
| 23 | Average Coupon of Escrowed Bonds | 4.690% | |
| 24 | Earnings Rate on Escrowed Bonds | 1.746% | |

Annual Savings

| Year | Net Prior Bond Debt Service | Net Refunding Debt Service | Annual Savings |
|--------------|-----------------------------|----------------------------|-------------------|
| 6/30/2020 | 152,313 | 68,738 | 83,575 |
| 6/30/2021 | 311,100 | 246,343 | 64,758 |
| 6/30/2022 | 759,600 | 694,827 | 64,773 |
| 6/30/2023 | 755,640 | 688,789 | 66,851 |
| 6/30/2024 | 756,923 | 692,838 | 64,084 |
| 6/30/2025 | 758,330 | 691,644 | 66,686 |
| 6/30/2026 | 757,900 | 694,911 | 62,989 |
| 6/30/2027 | 765,420 | 702,216 | 63,204 |
| 6/30/2028 | 756,605 | 688,701 | 67,904 |
| 6/30/2029 | 756,620 | 689,707 | 66,913 |
| 6/30/2030 | 755,230 | 690,056 | 65,174 |
| 6/30/2031 | 752,385 | 684,628 | 67,758 |
| 6/30/2032 | 752,985 | 688,345 | 64,640 |
| Total | \$ 8,791,050 | \$ 7,921,743 | \$ 869,307 |

Notes:

- Savings net of estimated Fixed Cost of Issuance of \$133,480 and Underwriter's Discount of \$34,200. Costs are allocated based on expected size of current VRA Pool. Preliminary and subject to change.
- Interest rates as of 8/27/2019 are preliminary and subject to change.
- Assumes a closing date of 11/13/2019.

Refunding of Series 2010C VRA Bonds– Sensitivity Analysis



Current Market Rates – VRA Public Sale

| | A | B | C | D | E |
|-------------------------------|---|----------------|-----------------------|-----------------------|----------------|
| Closing Date | | 11/13/2019 | 11/13/2019 | 11/13/2019 | 11/2/2020 |
| Tax Status | | Taxable | Taxable | Taxable | Tax-Exempt |
| Rates | | Current Market | Current Market +10bps | Current Market -10bps | Current Market |
| 1 Gross Savings | | \$ 869,307 | \$ 817,364 | \$ 918,775 | \$ 1,162,903 |
| 2 Net Present Value Savings | | \$ 770,009 | \$ 721,082 | \$ 818,967 | \$ 1,065,302 |
| 3 % Net Present Value Savings | | 11.89% | 11.14% | 12.65% | 16.45% |
| 4 Breakeven Interest Rate | | N/A | N/A | N/A | + 70bps |
| 5 Annual Savings | | | | | |
| 6 2020 | | \$ 83,575 | \$ 80,348 | \$ 86,772 | \$ - |
| 7 2021 | | 64,758 | 62,843 | 71,558 | 12,975 |
| 8 2022 | | 64,773 | 63,085 | 71,248 | 104,234 |
| 9 2023 | | 66,851 | 60,666 | 67,817 | 105,390 |
| 10 2024 | | 64,084 | 63,415 | 69,531 | 102,813 |
| 11 2025 | | 66,686 | 61,549 | 71,554 | 106,514 |
| 12 2026 | | 62,989 | 63,396 | 67,265 | 104,531 |
| 13 2027 | | 63,204 | 59,169 | 66,870 | 102,036 |
| 14 2028 | | 67,904 | 59,546 | 70,953 | 104,486 |
| 15 2029 | | 66,913 | 59,298 | 69,337 | 106,792 |
| 16 2030 | | 65,174 | 63,259 | 66,955 | 104,102 |
| 17 2031 | | 67,758 | 61,557 | 68,881 | 106,366 |
| 18 2032 | | 64,640 | 59,234 | 70,036 | 102,663 |
| 19 Total | | \$ 869,307 | \$ 817,364 | \$ 918,775 | \$ 1,162,903 |

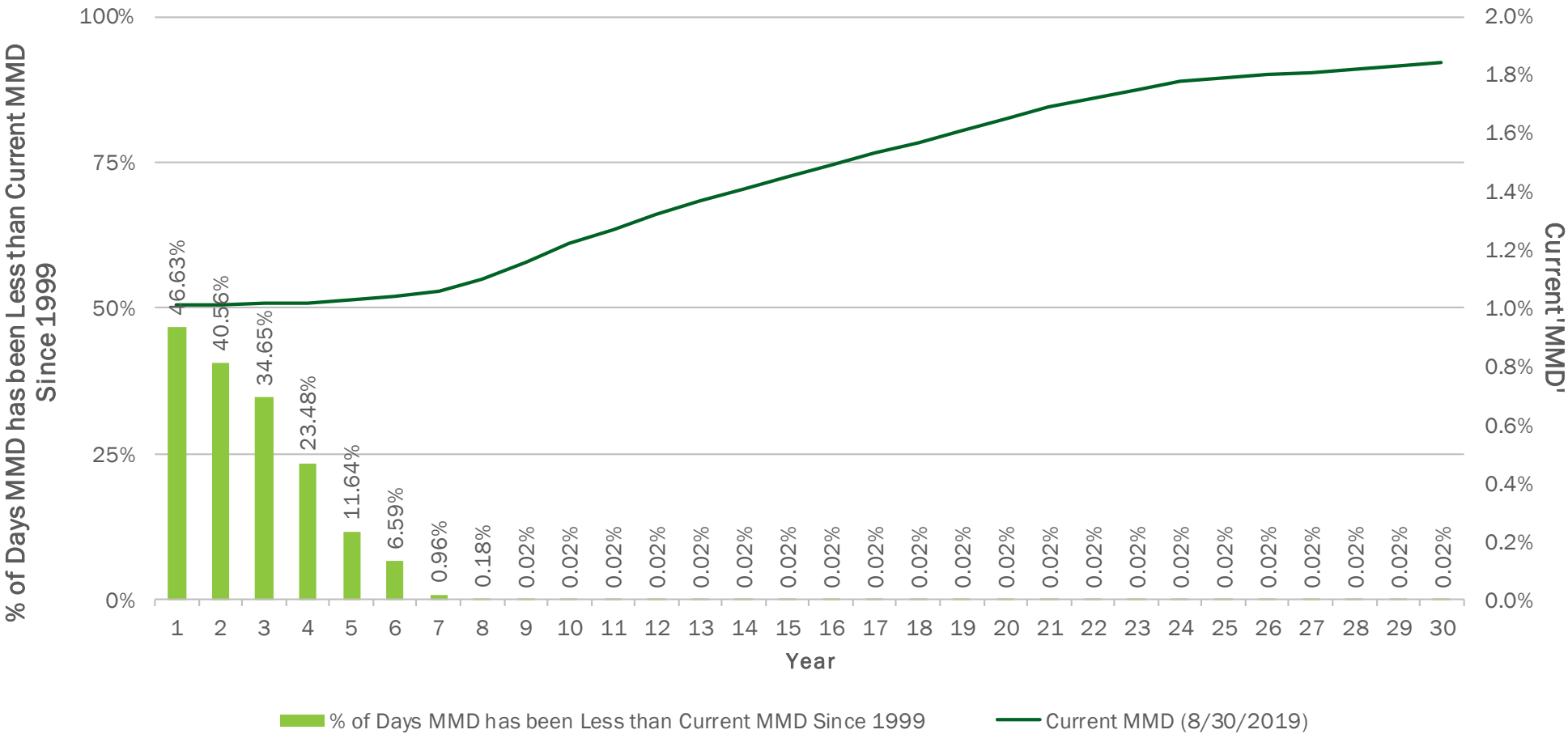
Current market rates as of 8/27/2019 - preliminary and subject to change. Municipal market interest rates are assumed to increase or decrease from the current market as shown. For purposes of this analysis, escrow yields

Appendix A

Historical MMD and Treasury Movement and Trends

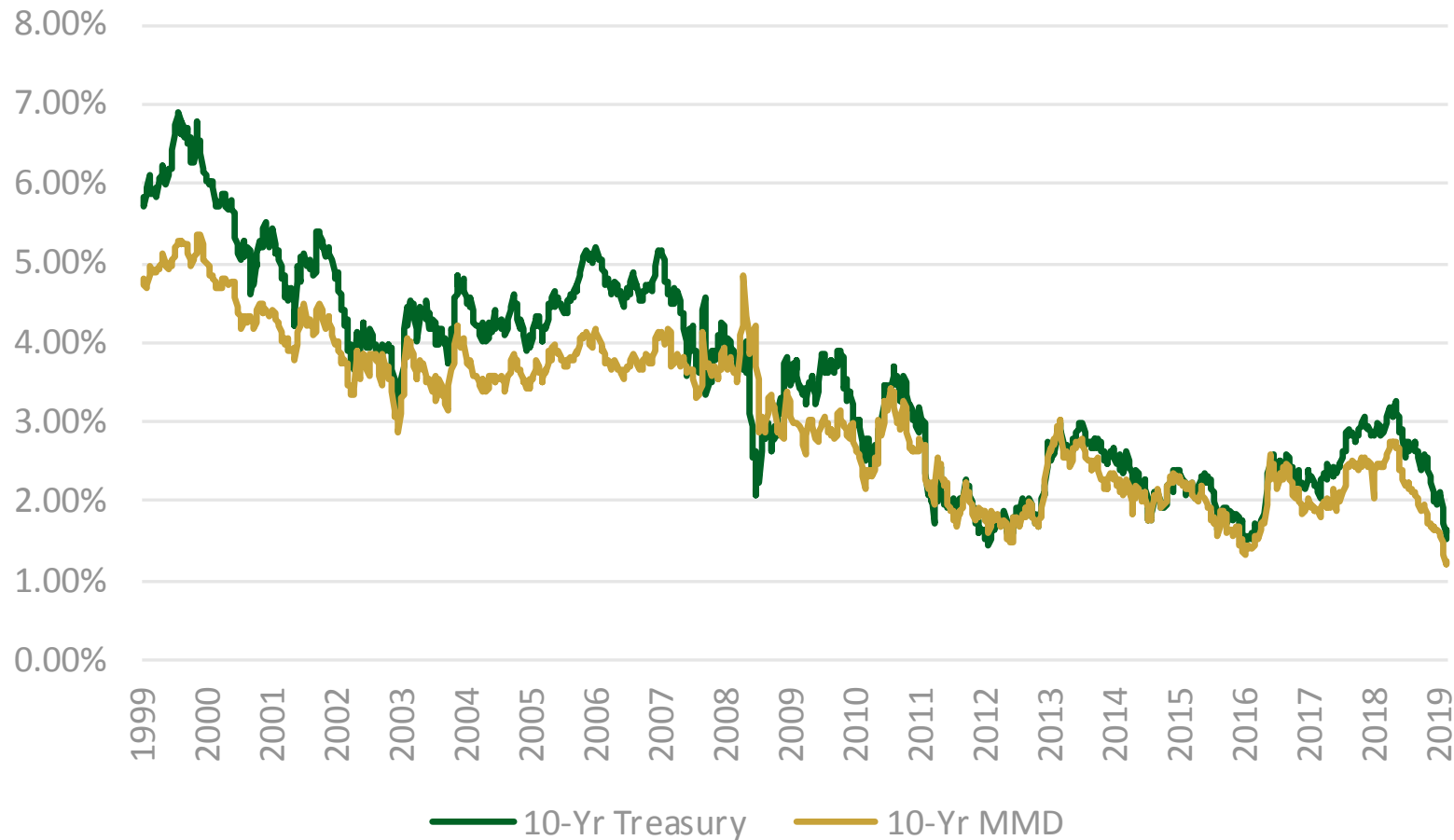
Historical MMD Trends

Since 1999



Historical 10-Year MMD vs. 10-Year Treasury

Since 1999



Historical MMD Movement

Annual Movement – August 2014 - August 2019



| Year | 8/30/2014 | 8/30/2015 | Movement | 8/30/2016 | Movement | 8/30/2017 | Movement | 8/30/2018 | Movement | 8/30/2019 | Movement |
|------|-----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|
| 1 | 0.12 | 0.23 | 0.11 | 0.50 | 0.27 | 0.77 | 0.27 | 1.60 | 0.83 | 1.01 | -0.59 |
| 2 | 0.30 | 0.59 | 0.29 | 0.59 | 0.00 | 0.85 | 0.26 | 1.70 | 0.85 | 1.01 | -0.69 |
| 3 | 0.55 | 0.86 | 0.31 | 0.67 | -0.19 | 0.94 | 0.27 | 1.81 | 0.87 | 1.02 | -0.79 |
| 4 | 0.80 | 1.12 | 0.32 | 0.76 | -0.36 | 1.02 | 0.26 | 1.92 | 0.90 | 1.02 | -0.90 |
| 5 | 1.08 | 1.33 | 0.25 | 0.86 | -0.47 | 1.12 | 0.26 | 2.02 | 0.90 | 1.03 | -0.99 |
| 6 | 1.37 | 1.61 | 0.24 | 1.04 | -0.57 | 1.26 | 0.22 | 2.13 | 0.87 | 1.04 | -1.09 |
| 7 | 1.60 | 1.81 | 0.21 | 1.15 | -0.66 | 1.43 | 0.28 | 2.22 | 0.79 | 1.06 | -1.16 |
| 8 | 1.82 | 1.93 | 0.11 | 1.24 | -0.69 | 1.59 | 0.35 | 2.32 | 0.73 | 1.10 | -1.22 |
| 9 | 1.97 | 2.05 | 0.08 | 1.33 | -0.72 | 1.72 | 0.39 | 2.38 | 0.66 | 1.16 | -1.22 |
| 10 | 2.07 | 2.16 | 0.09 | 1.42 | -0.74 | 1.86 | 0.44 | 2.44 | 0.58 | 1.22 | -1.22 |
| 11 | 2.17 | 2.28 | 0.11 | 1.51 | -0.77 | 1.97 | 0.46 | 2.50 | 0.53 | 1.27 | -1.23 |
| 12 | 2.28 | 2.37 | 0.09 | 1.59 | -0.78 | 2.07 | 0.48 | 2.56 | 0.49 | 1.32 | -1.24 |
| 13 | 2.36 | 2.46 | 0.10 | 1.66 | -0.80 | 2.16 | 0.50 | 2.62 | 0.46 | 1.37 | -1.25 |
| 14 | 2.44 | 2.55 | 0.11 | 1.71 | -0.84 | 2.23 | 0.52 | 2.66 | 0.43 | 1.41 | -1.25 |
| 15 | 2.51 | 2.63 | 0.12 | 1.76 | -0.87 | 2.29 | 0.53 | 2.71 | 0.42 | 1.45 | -1.26 |
| 16 | 2.57 | 2.71 | 0.14 | 1.81 | -0.90 | 2.35 | 0.54 | 2.76 | 0.41 | 1.49 | -1.27 |
| 17 | 2.63 | 2.76 | 0.13 | 1.86 | -0.90 | 2.41 | 0.55 | 2.80 | 0.39 | 1.53 | -1.27 |
| 18 | 2.69 | 2.81 | 0.12 | 1.91 | -0.90 | 2.46 | 0.55 | 2.84 | 0.38 | 1.57 | -1.27 |
| 19 | 2.74 | 2.85 | 0.11 | 1.96 | -0.89 | 2.49 | 0.53 | 2.88 | 0.39 | 1.61 | -1.27 |
| 20 | 2.79 | 2.88 | 0.09 | 2.00 | -0.88 | 2.52 | 0.52 | 2.91 | 0.39 | 1.65 | -1.26 |
| 21 | 2.84 | 2.92 | 0.08 | 2.02 | -0.90 | 2.55 | 0.53 | 2.93 | 0.38 | 1.69 | -1.24 |
| 22 | 2.89 | 2.95 | 0.06 | 2.04 | -0.91 | 2.58 | 0.54 | 2.95 | 0.37 | 1.72 | -1.23 |
| 23 | 2.93 | 2.98 | 0.05 | 2.05 | -0.93 | 2.61 | 0.56 | 2.96 | 0.35 | 1.75 | -1.21 |
| 24 | 2.96 | 3.01 | 0.05 | 2.06 | -0.95 | 2.63 | 0.57 | 2.97 | 0.34 | 1.78 | -1.19 |
| 25 | 2.98 | 3.04 | 0.06 | 2.07 | -0.97 | 2.65 | 0.58 | 2.98 | 0.33 | 1.79 | -1.19 |
| 26 | 3.00 | 3.06 | 0.06 | 2.08 | -0.98 | 2.67 | 0.59 | 2.99 | 0.32 | 1.80 | -1.19 |
| 27 | 3.01 | 3.07 | 0.06 | 2.09 | -0.98 | 2.68 | 0.59 | 3.00 | 0.32 | 1.81 | -1.19 |
| 28 | 3.02 | 3.08 | 0.06 | 2.10 | -0.98 | 2.69 | 0.59 | 3.01 | 0.32 | 1.82 | -1.19 |
| 29 | 3.03 | 3.09 | 0.06 | 2.11 | -0.98 | 2.70 | 0.59 | 3.02 | 0.32 | 1.83 | -1.19 |
| 30 | 3.03 | 3.10 | 0.07 | 2.12 | -0.98 | 2.71 | 0.59 | 3.03 | 0.32 | 1.84 | -1.19 |

Historical MMD Movement

Monthly Movement – March 2019 - August 2019

| Year | 3/30/2019 | 4/30/2019 | Movement | 5/30/2019 | Movement | 6/30/2019 | Movement | 7/30/2019 | Movement | 8/30/2019 | Movement | Total Change |
|------|-----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|--------------|
| 1 | 1.48 | 1.55 | 0.07 | 1.40 | -0.15 | 1.24 | -0.16 | 1.07 | -0.17 | 1.01 | -0.06 | -0.47 |
| 2 | 1.49 | 1.57 | 0.08 | 1.41 | -0.16 | 1.25 | -0.16 | 1.07 | -0.18 | 1.01 | -0.06 | -0.48 |
| 3 | 1.50 | 1.59 | 0.09 | 1.42 | -0.17 | 1.26 | -0.16 | 1.08 | -0.18 | 1.02 | -0.06 | -0.48 |
| 4 | 1.53 | 1.61 | 0.08 | 1.43 | -0.18 | 1.27 | -0.16 | 1.09 | -0.18 | 1.02 | -0.07 | -0.51 |
| 5 | 1.57 | 1.63 | 0.06 | 1.44 | -0.19 | 1.31 | -0.13 | 1.11 | -0.20 | 1.03 | -0.08 | -0.54 |
| 6 | 1.62 | 1.66 | 0.04 | 1.47 | -0.19 | 1.36 | -0.11 | 1.19 | -0.17 | 1.04 | -0.15 | -0.58 |
| 7 | 1.67 | 1.69 | 0.02 | 1.51 | -0.18 | 1.42 | -0.09 | 1.28 | -0.14 | 1.06 | -0.22 | -0.61 |
| 8 | 1.72 | 1.73 | 0.01 | 1.55 | -0.18 | 1.49 | -0.06 | 1.37 | -0.12 | 1.10 | -0.27 | -0.62 |
| 9 | 1.78 | 1.78 | 0.00 | 1.61 | -0.17 | 1.56 | -0.05 | 1.45 | -0.11 | 1.16 | -0.29 | -0.62 |
| 10 | 1.86 | 1.86 | 0.00 | 1.68 | -0.18 | 1.63 | -0.05 | 1.52 | -0.11 | 1.22 | -0.30 | -0.64 |
| 11 | 1.95 | 1.94 | -0.01 | 1.75 | -0.19 | 1.70 | -0.05 | 1.59 | -0.11 | 1.27 | -0.32 | -0.68 |
| 12 | 2.04 | 2.01 | -0.03 | 1.82 | -0.19 | 1.76 | -0.06 | 1.66 | -0.10 | 1.32 | -0.34 | -0.72 |
| 13 | 2.11 | 2.08 | -0.03 | 1.88 | -0.20 | 1.82 | -0.06 | 1.72 | -0.10 | 1.37 | -0.35 | -0.74 |
| 14 | 2.17 | 2.14 | -0.03 | 1.94 | -0.20 | 1.87 | -0.07 | 1.77 | -0.10 | 1.41 | -0.36 | -0.76 |
| 15 | 2.21 | 2.19 | -0.02 | 1.98 | -0.21 | 1.92 | -0.06 | 1.82 | -0.10 | 1.45 | -0.37 | -0.76 |
| 16 | 2.26 | 2.23 | -0.03 | 2.02 | -0.21 | 1.96 | -0.06 | 1.87 | -0.09 | 1.49 | -0.38 | -0.77 |
| 17 | 2.31 | 2.27 | -0.04 | 2.06 | -0.21 | 2.00 | -0.06 | 1.91 | -0.09 | 1.53 | -0.38 | -0.78 |
| 18 | 2.36 | 2.31 | -0.05 | 2.10 | -0.21 | 2.04 | -0.06 | 1.95 | -0.09 | 1.57 | -0.38 | -0.79 |
| 19 | 2.40 | 2.35 | -0.05 | 2.14 | -0.21 | 2.08 | -0.06 | 1.99 | -0.09 | 1.61 | -0.38 | -0.79 |
| 20 | 2.44 | 2.39 | -0.05 | 2.18 | -0.21 | 2.12 | -0.06 | 2.03 | -0.09 | 1.65 | -0.38 | -0.79 |
| 21 | 2.47 | 2.42 | -0.05 | 2.22 | -0.20 | 2.16 | -0.06 | 2.07 | -0.09 | 1.69 | -0.38 | -0.78 |
| 22 | 2.50 | 2.45 | -0.05 | 2.25 | -0.20 | 2.20 | -0.05 | 2.11 | -0.09 | 1.72 | -0.39 | -0.78 |
| 23 | 2.52 | 2.47 | -0.05 | 2.28 | -0.19 | 2.23 | -0.05 | 2.15 | -0.08 | 1.75 | -0.40 | -0.77 |
| 24 | 2.54 | 2.49 | -0.05 | 2.30 | -0.19 | 2.25 | -0.05 | 2.18 | -0.07 | 1.78 | -0.40 | -0.76 |
| 25 | 2.55 | 2.50 | -0.05 | 2.31 | -0.19 | 2.26 | -0.05 | 2.19 | -0.07 | 1.79 | -0.40 | -0.76 |
| 26 | 2.56 | 2.51 | -0.05 | 2.32 | -0.19 | 2.27 | -0.05 | 2.20 | -0.07 | 1.80 | -0.40 | -0.76 |
| 27 | 2.57 | 2.52 | -0.05 | 2.33 | -0.19 | 2.28 | -0.05 | 2.21 | -0.07 | 1.81 | -0.40 | -0.76 |
| 28 | 2.58 | 2.53 | -0.05 | 2.34 | -0.19 | 2.29 | -0.05 | 2.22 | -0.07 | 1.82 | -0.40 | -0.76 |
| 29 | 2.59 | 2.54 | -0.05 | 2.35 | -0.19 | 2.30 | -0.05 | 2.23 | -0.07 | 1.83 | -0.40 | -0.76 |
| 30 | 2.60 | 2.55 | -0.05 | 2.36 | -0.19 | 2.31 | -0.05 | 2.24 | -0.07 | 1.84 | -0.40 | -0.76 |

Historical Treasury Movement

Annual Movement – August 2014 - August 2019



| Year | 8/30/2014 | 8/30/2015 | Movement | 8/30/2016 | Movement | 8/30/2017 | Movement | 8/30/2018 | Movement | 8/30/2019 | Movement |
|------|-----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|
| 1 | 0.09 | 0.38 | 0.29 | 0.61 | 0.23 | 1.23 | 0.62 | 2.47 | 1.24 | 1.76 | -0.71 |
| 2 | 0.48 | 0.72 | 0.24 | 0.80 | 0.08 | 1.33 | 0.53 | 2.64 | 1.31 | 1.50 | -1.14 |
| 3 | 0.94 | 1.04 | 0.10 | 0.92 | -0.12 | 1.44 | 0.52 | 2.72 | 1.28 | 1.42 | -1.30 |
| 5 | 1.63 | 1.52 | -0.11 | 1.18 | -0.34 | 1.72 | 0.54 | 2.75 | 1.03 | 1.39 | -1.36 |
| 7 | 2.05 | 1.92 | -0.13 | 1.44 | -0.48 | 1.97 | 0.53 | 2.82 | 0.85 | 1.45 | -1.37 |
| 10 | 2.35 | 2.19 | -0.16 | 1.57 | -0.62 | 2.15 | 0.58 | 2.86 | 0.71 | 1.50 | -1.36 |
| 20 | 2.83 | 2.61 | -0.22 | 1.91 | -0.70 | 2.49 | 0.58 | 2.93 | 0.44 | 1.78 | -1.15 |
| 30 | 3.09 | 2.92 | -0.17 | 2.23 | -0.69 | 2.75 | 0.52 | 3.00 | 0.25 | 1.96 | -1.04 |

Historical Treasury Movement

Monthly Movement – March 2019 - August 2019

| Year | 3/30/2019 | 4/30/2019 | Movement | 5/30/2019 | Movement | 6/30/2019 | Movement | 7/30/2019 | Movement | 8/30/2019 | Movement | Total Change |
|------|-----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|--------------|
| 1 | 2.40 | 2.39 | -0.01 | 2.29 | -0.10 | 1.92 | -0.37 | 1.97 | 0.05 | 1.76 | -0.21 | -0.64 |
| 2 | 2.27 | 2.27 | 0.00 | 2.06 | -0.21 | 1.75 | -0.31 | 1.85 | 0.10 | 1.50 | -0.35 | -0.77 |
| 3 | 2.21 | 2.24 | 0.03 | 2.00 | -0.24 | 1.71 | -0.29 | 1.82 | 0.11 | 1.42 | -0.40 | -0.79 |
| 5 | 2.23 | 2.28 | 0.05 | 2.03 | -0.25 | 1.76 | -0.27 | 1.84 | 0.08 | 1.39 | -0.45 | -0.84 |
| 7 | 2.31 | 2.39 | 0.08 | 2.12 | -0.27 | 1.87 | -0.25 | 1.93 | 0.06 | 1.45 | -0.48 | -0.86 |
| 10 | 2.41 | 2.51 | 0.10 | 2.22 | -0.29 | 2.00 | -0.22 | 2.06 | 0.06 | 1.50 | -0.56 | -0.91 |
| 20 | 2.63 | 2.75 | 0.12 | 2.46 | -0.29 | 2.31 | -0.15 | 2.36 | 0.05 | 1.78 | -0.58 | -0.85 |
| 30 | 2.81 | 2.93 | 0.12 | 2.65 | -0.28 | 2.52 | -0.13 | 2.58 | 0.06 | 1.96 | -0.62 | -0.85 |

Appendix B

Davenport Numbers

TABLE OF CONTENTS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

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SOURCES AND USES OF FUNDS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| | |
|---------------|------------|
| Dated Date | 11/13/2019 |
| Delivery Date | 11/13/2019 |

Sources:

| | |
|----------------|---------------------|
| Bond Proceeds: | |
| Par Amount | 6,840,000.00 |
| | <u>6,840,000.00</u> |

Uses:

| | |
|----------------------------|---------------------|
| Refunding Escrow Deposits: | |
| Cash Deposit | 0.32 |
| SLGS Purchases | <u>6,667,977.00</u> |
| | 6,667,977.32 |

| | |
|------------------------|-------------------|
| Cost of Issuance: | |
| VRA Cost of Issuance | 33,480.00 |
| Local Cost of Issuance | <u>100,000.00</u> |
| | 133,480.00 |

| | |
|-------------------------|-----------|
| Delivery Date Expenses: | |
| Underwriter's Discount | 34,200.00 |

| | |
|----------------------|---------------------|
| Other Uses of Funds: | |
| Additional Proceeds | 4,342.68 |
| | <u>6,840,000.00</u> |

BOND SUMMARY STATISTICS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| | |
|---------------------------------|--------------|
| Dated Date | 11/13/2019 |
| Delivery Date | 11/13/2019 |
| Last Maturity | 11/01/2031 |
| Arbitrage Yield | 2.104092% |
| True Interest Cost (TIC) | 2.306812% |
| Net Interest Cost (NIC) | 2.179619% |
| All-In TIC | 2.616315% |
| Average Coupon | 2.108990% |
| Average Life (years) | 7.079 |
| Duration of Issue (years) | 6.513 |
| Par Amount | 6,840,000.00 |
| Bond Proceeds | 6,840,000.00 |
| Total Interest | 1,021,215.17 |
| Net Interest | 1,055,415.17 |
| Total Debt Service | 7,861,215.17 |
| Maximum Annual Debt Service | 697,772.50 |
| Average Annual Debt Service | 656,926.06 |
| Underwriter's Fees (per \$1000) | |
| Average Takedown | |
| Other Fee | 5.000000 |
| Total Underwriter's Discount | 5.000000 |
| Bid Price | 99.500000 |

| Bond Component | Par Value | Price | Average Coupon | Average Life |
|---|--------------|---------|----------------|--------------|
| Taxable Moral Obligation Serial Bonds | 2,045,000.00 | 100.000 | 2.179% | 7.077 |
| Taxable Infrastructure Revenue Serial Bonds | 4,795,000.00 | 100.000 | 2.079% | 7.080 |
| | 6,840,000.00 | | | 7.079 |

| | TIC | All-In TIC | Arbitrage Yield |
|----------------------------|--------------|--------------|-----------------|
| Par Value | 6,840,000.00 | 6,840,000.00 | 6,840,000.00 |
| + Accrued Interest | | | |
| + Premium (Discount) | | | |
| - Underwriter's Discount | (34,200.00) | (34,200.00) | |
| - Cost of Issuance Expense | | (133,480.00) | |
| - Other Amounts | | | |
| Target Value | 6,805,800.00 | 6,672,320.00 | 6,840,000.00 |
| Target Date | 11/13/2019 | 11/13/2019 | 11/13/2019 |
| Yield | 2.306812% | 2.616315% | 2.104092% |

BOND PRICING

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Bond Component | Maturity Date | Amount | Rate | Yield | Price |
|--|---------------|-----------|--------|--------|---------|
| Taxable Infrastructure Revenue Serial Bonds: | | | | | |
| | 11/01/2020 | 70,000 | 1.750% | 1.750% | 100.000 |
| | 11/01/2021 | 390,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2022 | 390,000 | 1.800% | 1.800% | 100.000 |
| | 11/01/2023 | 405,000 | 1.750% | 1.750% | 100.000 |
| | 11/01/2024 | 410,000 | 1.800% | 1.800% | 100.000 |
| | 11/01/2025 | 420,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2026 | 435,000 | 2.000% | 2.000% | 100.000 |
| | 11/01/2027 | 435,000 | 2.050% | 2.050% | 100.000 |
| | 11/01/2028 | 445,000 | 2.100% | 2.100% | 100.000 |
| | 11/01/2029 | 455,000 | 2.150% | 2.150% | 100.000 |
| | 11/01/2030 | 460,000 | 2.250% | 2.250% | 100.000 |
| | 11/01/2031 | 480,000 | 2.300% | 2.300% | 100.000 |
| | 11/01/2032 | | 2.350% | 2.350% | 100.000 |
| | 11/01/2033 | | 2.400% | 2.400% | 100.000 |
| | 11/01/2034 | | 2.450% | 2.450% | 100.000 |
| | 11/01/2035 | | 2.500% | 2.500% | 100.000 |
| | 11/01/2036 | | 2.550% | 2.550% | 100.000 |
| | 11/01/2037 | | 2.600% | 2.600% | 100.000 |
| | 11/01/2038 | | 2.650% | 2.650% | 100.000 |
| | 11/01/2039 | | 2.700% | 2.700% | 100.000 |
| | 11/01/2040 | | 2.750% | 2.750% | 100.000 |
| | | 4,795,000 | | | |
| Taxable Moral Obligation Serial Bonds: | | | | | |
| | 11/01/2020 | 30,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2021 | 165,000 | 1.950% | 1.950% | 100.000 |
| | 11/01/2022 | 170,000 | 1.900% | 1.900% | 100.000 |
| | 11/01/2023 | 170,000 | 1.850% | 1.850% | 100.000 |
| | 11/01/2024 | 175,000 | 1.900% | 1.900% | 100.000 |
| | 11/01/2025 | 180,000 | 1.950% | 1.950% | 100.000 |
| | 11/01/2026 | 185,000 | 2.100% | 2.100% | 100.000 |
| | 11/01/2027 | 185,000 | 2.150% | 2.150% | 100.000 |
| | 11/01/2028 | 190,000 | 2.200% | 2.200% | 100.000 |
| | 11/01/2029 | 195,000 | 2.250% | 2.250% | 100.000 |
| | 11/01/2030 | 200,000 | 2.350% | 2.350% | 100.000 |
| | 11/01/2031 | 200,000 | 2.400% | 2.400% | 100.000 |
| | 11/01/2032 | | 2.450% | 2.450% | 100.000 |
| | 11/01/2033 | | 2.500% | 2.500% | 100.000 |
| | 11/01/2034 | | 2.550% | 2.550% | 100.000 |
| | 11/01/2035 | | 2.600% | 2.600% | 100.000 |
| | 11/01/2036 | | 2.650% | 2.650% | 100.000 |
| | 11/01/2037 | | 2.700% | 2.700% | 100.000 |
| | 11/01/2038 | | 2.750% | 2.750% | 100.000 |
| | 11/01/2039 | | 2.800% | 2.800% | 100.000 |
| | 11/01/2040 | | 2.850% | 2.850% | 100.000 |
| | | 2,045,000 | | | |
| | | 6,840,000 | | | |

| | | |
|-------------------------|--------------|-------------|
| Dated Date | 11/13/2019 | |
| Delivery Date | 11/13/2019 | |
| First Coupon | 05/01/2020 | |
| Par Amount | 6,840,000.00 | |
| Original Issue Discount | | |
| Production | 6,840,000.00 | 100.000000% |
| Underwriter's Discount | (34,200.00) | (0.500000%) |
| Purchase Price | 6,805,800.00 | 99.500000% |
| Accrued Interest | | |
| Net Proceeds | 6,805,800.00 | |

BOND DEBT SERVICE

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Period Ending | Principal | Coupon | Interest | Debt Service | Annual Debt Service | Bond Balance | Total Bond Value |
|------------------|-----------|--------|--------------|--------------|------------------------|-----------------|---------------------|
| 11/13/2019 | | | | | | 6,840,000 | 6,840,000 |
| 05/01/2020 | | | 64,747.67 | 64,747.67 | | 6,840,000 | 6,840,000 |
| 06/30/2020 | | | | | 64,747.67 | 6,840,000 | 6,840,000 |
| 11/01/2020 | 100,000 | ** % | 69,372.50 | 169,372.50 | | 6,740,000 | 6,740,000 |
| 05/01/2021 | | | 68,482.50 | 68,482.50 | | 6,740,000 | 6,740,000 |
| 06/30/2021 | | | | | 237,855.00 | 6,740,000 | 6,740,000 |
| 11/01/2021 | 555,000 | ** % | 68,482.50 | 623,482.50 | | 6,185,000 | 6,185,000 |
| 05/01/2022 | | | 63,266.25 | 63,266.25 | | 6,185,000 | 6,185,000 |
| 06/30/2022 | | | | | 686,748.75 | 6,185,000 | 6,185,000 |
| 11/01/2022 | 560,000 | ** % | 63,266.25 | 623,266.25 | | 5,625,000 | 5,625,000 |
| 05/01/2023 | | | 58,141.25 | 58,141.25 | | 5,625,000 | 5,625,000 |
| 06/30/2023 | | | | | 681,407.50 | 5,625,000 | 5,625,000 |
| 11/01/2023 | 575,000 | ** % | 58,141.25 | 633,141.25 | | 5,050,000 | 5,050,000 |
| 05/01/2024 | | | 53,025.00 | 53,025.00 | | 5,050,000 | 5,050,000 |
| 06/30/2024 | | | | | 686,166.25 | 5,050,000 | 5,050,000 |
| 11/01/2024 | 585,000 | ** % | 53,025.00 | 638,025.00 | | 4,465,000 | 4,465,000 |
| 05/01/2025 | | | 47,672.50 | 47,672.50 | | 4,465,000 | 4,465,000 |
| 06/30/2025 | | | | | 685,697.50 | 4,465,000 | 4,465,000 |
| 11/01/2025 | 600,000 | ** % | 47,672.50 | 647,672.50 | | 3,865,000 | 3,865,000 |
| 05/01/2026 | | | 42,032.50 | 42,032.50 | | 3,865,000 | 3,865,000 |
| 06/30/2026 | | | | | 689,705.00 | 3,865,000 | 3,865,000 |
| 11/01/2026 | 620,000 | ** % | 42,032.50 | 662,032.50 | | 3,245,000 | 3,245,000 |
| 05/01/2027 | | | 35,740.00 | 35,740.00 | | 3,245,000 | 3,245,000 |
| 06/30/2027 | | | | | 697,772.50 | 3,245,000 | 3,245,000 |
| 11/01/2027 | 620,000 | ** % | 35,740.00 | 655,740.00 | | 2,625,000 | 2,625,000 |
| 05/01/2028 | | | 29,292.50 | 29,292.50 | | 2,625,000 | 2,625,000 |
| 06/30/2028 | | | | | 685,032.50 | 2,625,000 | 2,625,000 |
| 11/01/2028 | 635,000 | ** % | 29,292.50 | 664,292.50 | | 1,990,000 | 1,990,000 |
| 05/01/2029 | | | 22,530.00 | 22,530.00 | | 1,990,000 | 1,990,000 |
| 06/30/2029 | | | | | 686,822.50 | 1,990,000 | 1,990,000 |
| 11/01/2029 | 650,000 | ** % | 22,530.00 | 672,530.00 | | 1,340,000 | 1,340,000 |
| 05/01/2030 | | | 15,445.00 | 15,445.00 | | 1,340,000 | 1,340,000 |
| 06/30/2030 | | | | | 687,975.00 | 1,340,000 | 1,340,000 |
| 11/01/2030 | 660,000 | ** % | 15,445.00 | 675,445.00 | | 680,000 | 680,000 |
| 05/01/2031 | | | 7,920.00 | 7,920.00 | | 680,000 | 680,000 |
| 06/30/2031 | | | | | 683,365.00 | 680,000 | 680,000 |
| 11/01/2031 | 680,000 | ** % | 7,920.00 | 687,920.00 | | | |
| 06/30/2032 | | | | | 687,920.00 | | |
| | 6,840,000 | | 1,021,215.17 | 7,861,215.17 | 7,861,215.17 | | |

SUMMARY OF REFUNDING RESULTS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| | |
|--|--------------|
| Dated Date | 11/13/2019 |
| Delivery Date | 11/13/2019 |
| Arbitrage yield | 2.104092% |
| Escrow yield | 1.745639% |
| Value of Negative Arbitrage | 22,577.83 |
| Bond Par Amount | 6,840,000.00 |
| True Interest Cost | 2.306812% |
| Net Interest Cost | 2.179619% |
| Average Coupon | 2.108990% |
| Average Life | 7.079 |
| Par amount of refunded bonds | 6,475,000.00 |
| Average coupon of refunded bonds | 4.690111% |
| Average life of refunded bonds | 7.434 |
| PV of prior debt to 11/13/2019 @ 2.104092% | 7,660,831.72 |
| Net PV Savings | 770,009.45 |
| Percentage savings of refunded bonds | 11.892038% |
| Percentage savings of refunding bonds | 11.257448% |

SAVINGS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Date | Prior Debt Service | Refunding Debt Service | Refunding Expenses | Refunding Net Cash Flow | Savings | Present Value to 11/13/2019 @ 2.1040919% |
|------------|-----------------------|---------------------------|-----------------------|----------------------------|------------|--|
| 06/30/2020 | 152,312.50 | 64,747.67 | 3,990.00 | 68,737.67 | 83,574.83 | 82,762.46 |
| 06/30/2021 | 311,100.00 | 237,855.00 | 8,487.50 | 246,342.50 | 64,757.50 | 62,648.12 |
| 06/30/2022 | 759,600.00 | 686,748.75 | 8,078.13 | 694,826.88 | 64,773.12 | 61,424.76 |
| 06/30/2023 | 755,640.00 | 681,407.50 | 7,381.26 | 688,788.76 | 66,851.24 | 62,169.29 |
| 06/30/2024 | 756,922.50 | 686,166.25 | 6,671.88 | 692,838.13 | 64,084.37 | 58,390.33 |
| 06/30/2025 | 758,330.00 | 685,697.50 | 5,946.88 | 691,644.38 | 66,685.62 | 59,582.81 |
| 06/30/2026 | 757,900.00 | 689,705.00 | 5,206.26 | 694,911.26 | 62,988.74 | 55,150.44 |
| 06/30/2027 | 765,420.00 | 697,772.50 | 4,443.76 | 702,216.26 | 63,203.74 | 54,258.65 |
| 06/30/2028 | 756,605.00 | 685,032.50 | 3,668.76 | 688,701.26 | 67,903.74 | 57,179.12 |
| 06/30/2029 | 756,620.00 | 686,822.50 | 2,884.38 | 689,706.88 | 66,913.12 | 55,241.51 |
| 06/30/2030 | 755,230.00 | 687,975.00 | 2,081.25 | 690,056.25 | 65,173.75 | 52,754.98 |
| 06/30/2031 | 752,385.00 | 683,365.00 | 1,262.50 | 684,627.50 | 67,757.50 | 53,786.50 |
| 06/30/2032 | 752,985.00 | 687,920.00 | 425.00 | 688,345.00 | 64,640.00 | 50,317.81 |
| | 8,791,050.00 | 7,861,215.17 | 60,527.56 | 7,921,742.73 | 869,307.27 | 765,666.77 |

Savings Summary

| | |
|-------------------------------|------------|
| PV of savings from cash flow | 765,666.77 |
| Plus: Refunding funds on hand | 4,342.68 |
| Net PV Savings | 770,009.45 |

SUMMARY OF BONDS REFUNDED

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Bond | Maturity Date | Interest Rate | Par Amount | Call Date | Call Price |
|---------------------------|---------------|---------------|--------------|------------|------------|
| ARWA Series 2010C, 2010C: | | | | | |
| SEN | 11/01/2021 | 5.000% | 325,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2022 | 5.000% | 340,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2023 | 5.000% | 355,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2024 | 5.000% | 370,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2025 | 5.000% | 390,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2026 | 5.000% | 415,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2027 | 5.000% | 430,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2028 | 5.000% | 445,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2029 | 5.000% | 465,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2030 | 5.000% | 490,000.00 | 11/01/2020 | 100.000 |
| SR_TM | 11/01/2031 | 5.000% | 510,000.00 | 11/01/2020 | 100.000 |
| SUB | 11/01/2021 | 5.000% | 135,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2022 | 5.000% | 140,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2023 | 3.150% | 150,000.00 | 11/01/2020 | 100.000 |
| SUB_TM | 11/01/2024 | 3.250% | 160,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2025 | 4.000% | 165,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2026 | 4.000% | 175,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2027 | 4.000% | 180,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2028 | 4.000% | 195,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2029 | 4.000% | 205,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2030 | 4.000% | 210,000.00 | 11/01/2020 | 100.000 |
| | 11/01/2031 | 4.000% | 225,000.00 | 11/01/2020 | 100.000 |
| | | | 6,475,000.00 | | |

PRIOR BOND DEBT SERVICE

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Period Ending | Principal | Coupon | Interest | Debt Service | Other Cash Flow | Total | Bond Balance | Total Bond Value |
|------------------|-----------|--------|--------------|--------------|--------------------|--------------|-----------------|---------------------|
| 06/30/2020 | | | 152,312.50 | 152,312.50 | | 152,312.50 | 6,475,000 | 6,475,000 |
| 06/30/2021 | | | 304,625.00 | 304,625.00 | 6,475 | 311,100.00 | 6,475,000 | 6,475,000 |
| 06/30/2022 | 460,000 | 5.000% | 293,125.00 | 753,125.00 | 6,475 | 759,600.00 | 6,015,000 | 6,015,000 |
| 06/30/2023 | 480,000 | 5.000% | 269,625.00 | 749,625.00 | 6,015 | 755,640.00 | 5,535,000 | 5,535,000 |
| 06/30/2024 | 505,000 | ** % | 246,387.50 | 751,387.50 | 5,535 | 756,922.50 | 5,030,000 | 5,030,000 |
| 06/30/2025 | 530,000 | ** % | 223,300.00 | 753,300.00 | 5,030 | 758,330.00 | 4,500,000 | 4,500,000 |
| 06/30/2026 | 555,000 | ** % | 198,400.00 | 753,400.00 | 4,500 | 757,900.00 | 3,945,000 | 3,945,000 |
| 06/30/2027 | 590,000 | ** % | 171,475.00 | 761,475.00 | 3,945 | 765,420.00 | 3,355,000 | 3,355,000 |
| 06/30/2028 | 610,000 | ** % | 143,250.00 | 753,250.00 | 3,355 | 756,605.00 | 2,745,000 | 2,745,000 |
| 06/30/2029 | 640,000 | ** % | 113,875.00 | 753,875.00 | 2,745 | 756,620.00 | 2,105,000 | 2,105,000 |
| 06/30/2030 | 670,000 | ** % | 83,125.00 | 753,125.00 | 2,105 | 755,230.00 | 1,435,000 | 1,435,000 |
| 06/30/2031 | 700,000 | ** % | 50,950.00 | 750,950.00 | 1,435 | 752,385.00 | 735,000 | 735,000 |
| 06/30/2032 | 735,000 | ** % | 17,250.00 | 752,250.00 | 735 | 752,985.00 | | |
| | 6,475,000 | | 2,267,700.00 | 8,742,700.00 | 48,350 | 8,791,050.00 | | |

ESCROW REQUIREMENTS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Period Ending | Interest | Principal Redeemed | Total |
|------------------|------------|-----------------------|--------------|
| 05/01/2020 | 152,312.50 | | 152,312.50 |
| 11/01/2020 | 152,312.50 | 6,475,000.00 | 6,627,312.50 |
| | 304,625.00 | 6,475,000.00 | 6,779,625.00 |

ESCROW CASH FLOW

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Date | Principal | Interest | Net Escrow Receipts | Present Value to 11/13/2019 @ 1.7456394% |
|------------|--------------|------------|------------------------|--|
| 05/01/2020 | 150,973.00 | 1,339.37 | 152,312.37 | 151,081.97 |
| 11/01/2020 | 6,517,004.00 | 110,308.31 | 6,627,312.31 | 6,516,895.03 |
| | 6,667,977.00 | 111,647.68 | 6,779,624.68 | 6,667,977.00 |

Escrow Cost Summary

| | |
|------------------------------|--------------|
| Purchase date | 11/13/2019 |
| Purchase cost of securities | 6,667,977.00 |
| Target for yield calculation | 6,667,977.00 |

ESCROW SUFFICIENCY

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Date | Escrow Requirement | Net Escrow Receipts | Excess Receipts | Excess Balance |
|------------|-----------------------|------------------------|--------------------|-------------------|
| 11/13/2019 | | 0.32 | 0.32 | 0.32 |
| 05/01/2020 | 152,312.50 | 152,312.37 | (0.13) | 0.19 |
| 11/01/2020 | 6,627,312.50 | 6,627,312.31 | (0.19) | |
| | 6,779,625.00 | 6,779,625.00 | 0.00 | |

ESCROW DESCRIPTIONS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Type of Security | Type of SLGS | Maturity Date | First Int Pmt Date | Par Amount | Rate | Max Rate |
|---------------------|-----------------|------------------|-----------------------|---------------|--------|-------------|
| Nov 13, 2019: | | | | | | |
| SLGS | Certificate | 05/01/2020 | 05/01/2020 | 150,973 | 1.910% | 1.910% |
| SLGS | Certificate | 11/01/2020 | 11/01/2020 | 6,517,004 | 1.750% | 1.750% |
| | | | | 6,667,977 | | |

SLGS Summary

| | |
|------------------------------------|--------------|
| SLGS Rates File | 27AUG19 |
| Total Certificates of Indebtedness | 6,667,977.00 |

ESCROW STATISTICS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Total Escrow Cost | Modified Duration (years) | Yield to Receipt Date | Yield to Disbursement Date | Perfect Escrow Cost | Value of Negative Arbitrage | Cost of Dead Time |
|-------------------------|---------------------------------|-----------------------------|----------------------------------|---------------------------|-----------------------------------|----------------------|
| Global Proceeds Escrow: | | | | | | |
| 6,667,977.32 | 0.947 | 1.745639% | 1.745639% | 6,645,399.49 | 22,577.83 | |
| 6,667,977.32 | | | | 6,645,399.49 | 22,577.83 | 0.00 |

Delivery date 11/13/2019
Arbitrage yield 2.104092%

ESCROW COST

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Type of Security | Maturity Date | Par Amount | Rate | Total Cost |
|------------------|---------------|------------|--------|--------------|
| SLGS | 05/01/2020 | 150,973 | 1.910% | 150,973.00 |
| SLGS | 11/01/2020 | 6,517,004 | 1.750% | 6,517,004.00 |
| | | 6,667,977 | | 6,667,977.00 |

| Purchase Date | Cost of Securities | Cash Deposit | Total Escrow Cost | Yield |
|---------------|--------------------|--------------|-------------------|-----------|
| 11/13/2019 | 6,667,977 | 0.32 | 6,667,977.32 | 1.745639% |
| | 6,667,977 | 0.32 | 6,667,977.32 | |

FORM 8038 STATISTICS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

Dated Date 11/13/2019
Delivery Date 11/13/2019

| Bond Component | Date | Principal | Coupon | Price | Issue Price | Redemption at Maturity |
|--|------------|--------------|--------|---------|--------------|---------------------------|
| Taxable Infrastructure Revenue Serial Bonds: | | | | | | |
| | 11/01/2020 | 70,000.00 | 1.750% | 100.000 | 70,000.00 | 70,000.00 |
| | 11/01/2021 | 390,000.00 | 1.850% | 100.000 | 390,000.00 | 390,000.00 |
| | 11/01/2022 | 390,000.00 | 1.800% | 100.000 | 390,000.00 | 390,000.00 |
| | 11/01/2023 | 405,000.00 | 1.750% | 100.000 | 405,000.00 | 405,000.00 |
| | 11/01/2024 | 410,000.00 | 1.800% | 100.000 | 410,000.00 | 410,000.00 |
| | 11/01/2025 | 420,000.00 | 1.850% | 100.000 | 420,000.00 | 420,000.00 |
| | 11/01/2026 | 435,000.00 | 2.000% | 100.000 | 435,000.00 | 435,000.00 |
| | 11/01/2027 | 435,000.00 | 2.050% | 100.000 | 435,000.00 | 435,000.00 |
| | 11/01/2028 | 445,000.00 | 2.100% | 100.000 | 445,000.00 | 445,000.00 |
| | 11/01/2029 | 455,000.00 | 2.150% | 100.000 | 455,000.00 | 455,000.00 |
| | 11/01/2030 | 460,000.00 | 2.250% | 100.000 | 460,000.00 | 460,000.00 |
| | 11/01/2031 | 480,000.00 | 2.300% | 100.000 | 480,000.00 | 480,000.00 |
| | 11/01/2032 | | 2.350% | 100.000 | | |
| | 11/01/2033 | | 2.400% | 100.000 | | |
| | 11/01/2034 | | 2.450% | 100.000 | | |
| | 11/01/2035 | | 2.500% | 100.000 | | |
| | 11/01/2036 | | 2.550% | 100.000 | | |
| | 11/01/2037 | | 2.600% | 100.000 | | |
| | 11/01/2038 | | 2.650% | 100.000 | | |
| | 11/01/2039 | | 2.700% | 100.000 | | |
| | 11/01/2040 | | 2.750% | 100.000 | | |
| Taxable Moral Obligation Serial Bonds: | | | | | | |
| | 11/01/2020 | 30,000.00 | 1.850% | 100.000 | 30,000.00 | 30,000.00 |
| | 11/01/2021 | 165,000.00 | 1.950% | 100.000 | 165,000.00 | 165,000.00 |
| | 11/01/2022 | 170,000.00 | 1.900% | 100.000 | 170,000.00 | 170,000.00 |
| | 11/01/2023 | 170,000.00 | 1.850% | 100.000 | 170,000.00 | 170,000.00 |
| | 11/01/2024 | 175,000.00 | 1.900% | 100.000 | 175,000.00 | 175,000.00 |
| | 11/01/2025 | 180,000.00 | 1.950% | 100.000 | 180,000.00 | 180,000.00 |
| | 11/01/2026 | 185,000.00 | 2.100% | 100.000 | 185,000.00 | 185,000.00 |
| | 11/01/2027 | 185,000.00 | 2.150% | 100.000 | 185,000.00 | 185,000.00 |
| | 11/01/2028 | 190,000.00 | 2.200% | 100.000 | 190,000.00 | 190,000.00 |
| | 11/01/2029 | 195,000.00 | 2.250% | 100.000 | 195,000.00 | 195,000.00 |
| | 11/01/2030 | 200,000.00 | 2.350% | 100.000 | 200,000.00 | 200,000.00 |
| | 11/01/2031 | 200,000.00 | 2.400% | 100.000 | 200,000.00 | 200,000.00 |
| | 11/01/2032 | | 2.450% | 100.000 | | |
| | 11/01/2033 | | 2.500% | 100.000 | | |
| | 11/01/2034 | | 2.550% | 100.000 | | |
| | 11/01/2035 | | 2.600% | 100.000 | | |
| | 11/01/2036 | | 2.650% | 100.000 | | |
| | 11/01/2037 | | 2.700% | 100.000 | | |
| | 11/01/2038 | | 2.750% | 100.000 | | |
| | 11/01/2039 | | 2.800% | 100.000 | | |
| | 11/01/2040 | | 2.850% | 100.000 | | |
| | | 6,840,000.00 | | | 6,840,000.00 | 6,840,000.00 |

| | Maturity Date | Interest Rate | Issue Price | Stated Redemption at Maturity | Weighted Average Maturity | Yield |
|----------------|------------------|------------------|----------------|-------------------------------------|---------------------------------|---------|
| Final Maturity | 11/01/2040 | 2.750% | | | | |
| Entire Issue | | | 6,840,000.00 | 6,840,000.00 | 7.0792 | 2.1041% |

FORM 8038 STATISTICS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| | |
|---|--------------|
| Proceeds used for accrued interest | 0.00 |
| Proceeds used for bond issuance costs (including underwriters' discount) | 167,680.00 |
| Proceeds used for credit enhancement | 0.00 |
| Proceeds allocated to reasonably required reserve or replacement fund | 0.00 |
| Proceeds used to currently refund prior issues | 0.00 |
| Proceeds used to advance refund prior issues | 6,667,977.32 |
| Remaining weighted average maturity of the bonds to be currently refunded | 0.0000 |
| Remaining weighted average maturity of the bonds to be advance refunded | 7.4338 |

FORM 8038 STATISTICS

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

Refunded Bonds

| Bond Component | Date | Principal | Coupon | Price | Issue Price |
|--------------------|------------|------------|--------|---------|--------------|
| ARWA Series 2010C: | | | | | |
| SEN | 11/01/2021 | 325,000.00 | 5.000% | 100.000 | 325,000.00 |
| SEN | 11/01/2022 | 340,000.00 | 5.000% | 100.000 | 340,000.00 |
| SEN | 11/01/2023 | 355,000.00 | 5.000% | 100.000 | 355,000.00 |
| SEN | 11/01/2024 | 370,000.00 | 5.000% | 100.000 | 370,000.00 |
| SEN | 11/01/2025 | 390,000.00 | 5.000% | 100.000 | 390,000.00 |
| SEN | 11/01/2026 | 415,000.00 | 5.000% | 100.000 | 415,000.00 |
| SEN | 11/01/2027 | 430,000.00 | 5.000% | 100.000 | 430,000.00 |
| SEN | 11/01/2028 | 445,000.00 | 5.000% | 100.000 | 445,000.00 |
| SEN | 11/01/2029 | 465,000.00 | 5.000% | 100.000 | 465,000.00 |
| SEN | 11/01/2030 | 490,000.00 | 5.000% | 100.000 | 490,000.00 |
| SR_TM | 11/01/2031 | 510,000.00 | 5.000% | 100.000 | 510,000.00 |
| SUB | 11/01/2021 | 135,000.00 | 5.000% | 100.000 | 135,000.00 |
| SUB | 11/01/2022 | 140,000.00 | 5.000% | 100.000 | 140,000.00 |
| SUB | 11/01/2023 | 150,000.00 | 3.150% | 100.000 | 150,000.00 |
| SUB | 11/01/2024 | 160,000.00 | 3.250% | 100.000 | 160,000.00 |
| SUB_TM | 11/01/2025 | 165,000.00 | 4.000% | 100.000 | 165,000.00 |
| SUB_TM | 11/01/2026 | 175,000.00 | 4.000% | 100.000 | 175,000.00 |
| SUB_TM | 11/01/2027 | 180,000.00 | 4.000% | 100.000 | 180,000.00 |
| SUB_TM | 11/01/2028 | 195,000.00 | 4.000% | 100.000 | 195,000.00 |
| SUB_TM | 11/01/2029 | 205,000.00 | 4.000% | 100.000 | 205,000.00 |
| SUB_TM | 11/01/2030 | 210,000.00 | 4.000% | 100.000 | 210,000.00 |
| SUB_TM | 11/01/2031 | 225,000.00 | 4.000% | 100.000 | 225,000.00 |
| 6,475,000.00 | | | | | 6,475,000.00 |

| | Last Call Date | Issue Date | Remaining Weighted Average Maturity |
|---------------------|----------------|------------|-------------------------------------|
| ARWA Series 2010C | 11/01/2020 | 11/23/2010 | 7.4338 |
| All Refunded Issues | 11/01/2020 | | 7.4338 |

PROOF OF ARBITRAGE YIELD

Appomattox River Water Authority, VA
Refunding of VRA 2010C Bonds (Taxable)

| Date | Debt Service | Present Value to 11/13/2019 @ 2.1040918566% |
|------------|--------------|---|
| 05/01/2020 | 64,747.67 | 64,118.31 |
| 11/01/2020 | 169,372.50 | 165,979.97 |
| 05/01/2021 | 68,482.50 | 66,412.11 |
| 11/01/2021 | 623,482.50 | 598,338.34 |
| 05/01/2022 | 63,266.25 | 60,082.71 |
| 11/01/2022 | 623,266.25 | 585,741.44 |
| 05/01/2023 | 58,141.25 | 54,071.90 |
| 11/01/2023 | 633,141.25 | 582,696.93 |
| 05/01/2024 | 53,025.00 | 48,292.28 |
| 11/01/2024 | 638,025.00 | 575,028.80 |
| 05/01/2025 | 47,672.50 | 42,518.18 |
| 11/01/2025 | 647,672.50 | 571,632.79 |
| 05/01/2026 | 42,032.50 | 36,711.47 |
| 11/01/2026 | 662,032.50 | 572,203.84 |
| 05/01/2027 | 35,740.00 | 30,568.98 |
| 11/01/2027 | 655,740.00 | 555,025.47 |
| 05/01/2028 | 29,292.50 | 24,535.37 |
| 11/01/2028 | 664,292.50 | 550,617.95 |
| 05/01/2029 | 22,530.00 | 18,480.22 |
| 11/01/2029 | 672,530.00 | 545,899.19 |
| 05/01/2030 | 15,445.00 | 12,406.34 |
| 11/01/2030 | 675,445.00 | 536,908.85 |
| 05/01/2031 | 7,920.00 | 6,230.04 |
| 11/01/2031 | 687,920.00 | 535,498.53 |
| | 7,861,215.17 | 6,840,000.00 |

Proceeds Summary

| | |
|------------------------------|--------------|
| Delivery date | 11/13/2019 |
| Par Value | 6,840,000.00 |
| Target for yield calculation | 6,840,000.00 |

Municipal Advisor Disclosure



The U.S. Securities and Exchange Commission (the "SEC") has clarified that a broker, dealer or municipal securities dealer engaging in municipal advisory activities outside the scope of underwriting a particular issuance of municipal securities should be subject to municipal advisor registration. Davenport & Company LLC ("Davenport") has registered as a municipal advisor with the SEC. As a registered municipal advisor Davenport may provide advice to a municipal entity or obligated person. An obligated person is an entity other than a municipal entity, such as a not for profit corporation, that has commenced an application or negotiation with an entity to issue municipal securities on its behalf and for which it will provide support. If and when an issuer engages Davenport to provide financial advisory or consultant services with respect to the issuance of municipal securities, Davenport is obligated to evidence such a financial advisory relationship with a written agreement.

When acting as a registered municipal advisor Davenport is a fiduciary required by federal law to act in the best interest of a municipal entity without regard to its own financial or other interests. Davenport is not a fiduciary when it acts as a registered investment advisor, when advising an obligated person, or when acting as an underwriter, though it is required to deal fairly with such persons.

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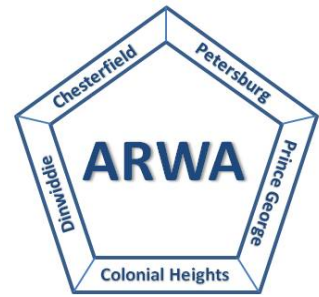
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Version 1.13.14 BD | MB | TC

Appomattox River Water Authority



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

**RESOLUTION OF THE BOARD OF THE
APPOMATTOX RIVER WATER AUTHORITY,
AUTHORIZING THE ISSUANCE AND SALE OF A WATER
REVENUE REFUNDING BOND, SERIES 2019,
IN A PRINCIPAL AMOUNT NOT TO EXCEED
\$7,250,000 AND PROVIDING FOR THE
FORM AND DETAILS THEREOF**

A. The Appomattox River Water Authority (“ARWA”) is a public body politic and corporate created in 1960 upon agreement of the governing bodies of the County of Chesterfield, Virginia, the City of Colonial Heights, Virginia, the County of Dinwiddie, Virginia, the City of Petersburg, Virginia, and the County of Prince George, Virginia (collectively, the “Participating Jurisdictions”), and in accordance with the Virginia Water and Waste Authorities Act, Virginia Code § 15.2-5100, et seq. (the “Act”), for the purpose of serving the water supply needs of the Participating Jurisdictions.

B. ARWA staff and ARWA’s bond counsel and financial advisor have recommended to the Board of ARWA (the “Board”) that ARWA undertake a refunding of all or a portion of the outstanding principal amount of ARWA's Water Revenue Refunding Bond, Series 2010 (the “Refunded Bond”), by causing ARWA to issue its Water Revenue Refunding Bond, Series 2019 (the “2019 ARWA Bond”), as an Additional Bond under the Agreement of Trust dated as of August 15, 1986, as previously amended and supplemented (the “Master Trust Agreement”), and as supplemented and amended by a Tenth Supplemental Agreement of Trust, to be dated as of a date to be determined by the parties thereto (the “Tenth Supplemental Trust Agreement”), each between ARWA and U.S. Bank National Association (as successor to Crestar Bank), as trustee (the “ARWA Trustee”).

C. The Virginia Resources Authority (“VRA”) initially purchased and currently owns the Refunded Bond and has offered to purchase the 2019 ARWA Bond with the proceeds of VRA’s fall 2019 series of Infrastructure and State Moral Obligation Revenue Bonds (Virginia Pooled Financing Program) (the “VRA Bonds”).

D. VRA has indicated that the VRA Bonds will be sold as taxable bonds and ARWA will not be required to agree to any tax-related covenants or provide any tax-related certifications.

E. The 2019 ARWA Bond will be in a principal amount not to exceed \$7,250,000 and the proceeds of the sale thereof will be used along with any funds that may be released from the Debt Service Reserve Fund or the Bond Fund established under the Master Trust Agreement to (i) refund the Refunded Bond, (ii) make the required deposit into the Debt Service Reserve Fund, if any, and (iii) pay the costs of refunding the Refunded Bond and the costs of issuance of the 2019 ARWA Bond.

F. The foregoing arrangements are to be reflected in the following documents, the most recent drafts of which have been presented to this meeting and filed with the Board's records:

(1) Tenth Supplemental Trust Agreement, to which the form of the 2019 ARWA Bond is attached as Exhibit A; and

(2) Local Bond Sale and Financing Agreement to be dated as of a date to be determined by the parties thereto (the “Financing Agreement”), between VRA and ARWA.

G. The Tenth Supplemental Trust Agreement and the Financing Agreement will be referred to collectively below as the “Documents.”

H. Unless otherwise defined, each capitalized term used in this Resolution shall have the meaning set forth in the Master Trust Agreement as supplemented by the Tenth Supplemental Trust Agreement (collectively, the “Trust Agreement”).

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF THE APPOMATTOX RIVER WATER AUTHORITY THAT:

1. Authorization of 2019 ARWA Bond. The Board hereby determines that it is advisable to cause ARWA to issue the 2019 ARWA Bond as an Additional Bond under the Trust Agreement in a principal amount of up to \$7,250,000 for the purposes described in Recital E above. The Additional Bond shall be known as the “Appomattox River Water Authority, Water Revenue Refunding Bond, Series 2019” or such other appropriate designation as may be established pursuant to paragraph 3 of this Resolution. The Board hereby finds that the issuance of the Bond for the purposes described in this Resolution will promote the health, safety, welfare, morals and prosperity of the residents of the Participating Jurisdictions served by ARWA and will promote the governmental purposes for which ARWA was formed.

2. Award and Sale to the Virginia Resources Authority. The award and sale of the 2019 ARWA Bond to VRA are authorized. The 2019 ARWA Bond shall be delivered to or at the direction of VRA upon payment of the purchase price thereof under the terms of the Documents.

3. Details of 2019 ARWA Bond. The Chairman of this Board (the “Chairman”) and the Executive Director of ARWA (the “Executive Director”) are authorized to determine and approve all of the final terms and details of the 2019 ARWA Bond, including, without limitation, its series designation, dated date, original principal amount, interest rates, maturity dates, redemption provisions, and the principal amount amortization; provided, however, that (i) the original principal amount of the 2019 ARWA Bond shall not exceed \$7,250,000, (ii) the issuance and sale of the Refunded Bond shall result in an aggregate net present value debt service savings of not less than 3% of the principal amount of the Refunded Bond to be refunded, and (iii) the final maturity of the 2019 ARWA Bond shall not be later than December 31, 2032. The approval of the Chairman and the Executive Director of such details shall be evidenced conclusively by the execution and delivery of the 2019 ARWA Bond on ARWA’s behalf.

4. Approval of Documents. The draft Documents presented to this meeting are approved. The Chairman and the Executive Director are each authorized to execute the final Documents in substantially the form of the drafts presented to this meeting, with such completions, deletions, insertions and changes not inconsistent with this Resolution as may be approved by the Chairman or the Executive Director, whose approval shall be evidenced conclusively by the execution and delivery of the final Documents.

5. Disclosure Documents. The Chairman and the Executive Director and such officers and agents of ARWA as may be designated by either of them, are hereby authorized and directed to prepare, execute, and deliver any appropriate disclosure documents regarding ARWA as may be necessary in connection with the public offering and sale of the VRA Bonds. The distribution and use by VRA of such disclosure in connection with such public offering and sale are hereby authorized and approved. The Chairman and the Executive Director, or either of them, are authorized and directed to take whatever actions with respect to such disclosure documents as are necessary and/or appropriate to ensure compliance with Securities and Exchange Commission Rule 15c2-12.

6. Bond Counsel. The engagement of McGuireWoods LLP as authority counsel and bond counsel to ARWA in connection with the issuance of the 2019 ARWA Bond is approved. ARWA acknowledges that it is aware that McGuireWoods LLP also serves as bond counsel to VRA in connection with the issuance of the VRA Bonds and consents to this arrangement.

7. Further Actions. Such officers and agents of ARWA as may be designated by the Executive Director are authorized and directed to take such further actions as may be necessary or appropriate regarding the issuance and sale of the 2019 ARWA Bond, including without limitation any actions required under the Trust Agreement and the Service Agreements as a condition to the issuance of Additional Bonds and the execution and delivery on behalf of ARWA of such instruments, documents or certificates as the Executive Director shall deem necessary or appropriate to carry out the transactions contemplated by this Resolution. The Chairman and the Executive Director, or either of them, are authorized to designate the ARWA's Authorized Representatives for purposes of the Financing Agreement. Any authorization or direction to the Chairman or the Executive Director under this Resolution shall also be deemed to be an authorization or a direction to the Vice Chairman or the Assistant Executive Director, respectively. All actions previously taken by officers and agents of ARWA in connection with the issuance and sale of the 2019 ARWA Bond are ratified and confirmed.

8. Filing of Resolution. Counsel to ARWA is hereby authorized and directed to file a certified copy of this Resolution with a Circuit Court pursuant having jurisdiction over any of the Participating Jurisdictions to Section 15.2-5126 of the Code of Virginia of 1950, as amended.

9. Effective Date. This Resolution shall take effect immediately.

The undersigned Secretary-Treasurer of the Appomattox River Water Authority hereby certifies that the foregoing resolution was duly adopted by a recorded affirmative vote of a majority of all members of the Board of the Appomattox River Water Authority at a regular meeting duly called and held on September 12, 2019, at which meeting a quorum was present and acting throughout. The resolution has not been repealed, revoked, rescinded or amended.

Date: September __, 2019

Secretary-Treasurer
Appomattox River Water Authority

[SEAL]

- **Award of American Water Works Association Partnership of Safe Water 20 Year Directors Award for Constant Vigilance to Improve Water Quality**

- **Board Discussion on Alum Litigation Refunding**

Following is a copy of an email that was sent to Board Members and Alternates on August 14, 2019 related to the discussion of the Alum Litigation Refunding.

ARWA Board Members and Alternates

RE: ARWA Alum Litigation Settlement Refunding Options

At the July 25, 2019 ARWA Board meeting, it was requested that staff provide a summary of refunding options for funds received from the alum litigation. The two options mentioned at the meeting were to distribute the settlement funds by allocation or consumption.

The alum settlement funds are to reimburse facilities that were overcharged for alum purchases between the years of 1997 – 2016. The ARWA has received \$144,773 in settlement funds to date and the total expected refund is \$857,399. Staff has been able to find member consumption data back to FY98/99. The average percent consumption for FY98/99 through FY15/16 was used to calculate the alum settlement distribution. In 2003, the ARWA expanded the plant from 46 mgd to 96 mgd and members participated in this expansion based on their expected future needs. The result was a difference in allocations before and after 2003. To calculate the distribution of funds using plant allocation, a weighted average of plant allocations for the years 1997-2003 and 2003-2016 was used.

The table below summarizes the distribution of settlement funds using allocation and consumption for the current funds received (\$144,773) and the total expected funds to be received (\$857,399).

Appomattox River Water Authority Alum Litigation Refunding Comparison

Current Refund **\$141,773**

| | Chesterfield | Colonial Heights | Dinwiddie | Petersburg | Prince George |
|-----------------------------|--------------|------------------|------------|-------------|---------------|
| FY96 - FY16 Allocation | \$91,118.96 | \$7,864.80 | \$7,988.11 | \$31,779.09 | \$3,022.04 |
| FY99 - FY16 Consumptions | \$94,686.24 | \$10,695.91 | \$7,135.02 | \$26,120.36 | \$3,135.46 |

Total Est. Refund **\$857,399**

| | Chesterfield | Colonial Heights | Dinwiddie | Petersburg | Prince George |
|-----------------------------|--------------|------------------|-------------|--------------|---------------|
| FY96 - FY16 Allocation | \$551,059.12 | \$47,563.86 | \$48,309.63 | \$192,190.06 | \$18,276.34 |
| FY99 - FY16 Consumptions | \$572,632.94 | \$64,685.54 | \$43,150.37 | \$157,967.83 | \$18,962.31 |

Weighted allocation for 1997-2016

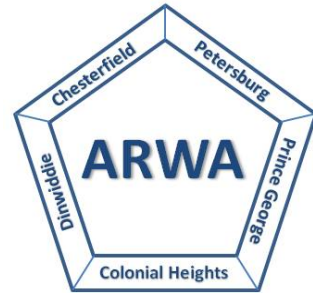
| | % |
|------------------|--------|
| Chesterfield | 64.27% |
| Colonial Heights | 5.55% |
| Dinwiddie | 5.63% |
| Petersburg | 22.42% |
| Prince George | 2.13% |

Consumption % FY99 - FY16

| | % |
|------------------|--------|
| Chesterfield | 66.79% |
| Colonial Heights | 7.54% |
| Dinwiddie | 5.03% |
| Petersburg | 18.42% |
| Prince George | 2.21% |

- **Board Discussion on Requirement for Irrigation Permit to Withdraw Water**

Following is an update of on the Irrigation Permits to withdraw water. Also included is a copy of the letter and opt-out form sent.



MEMORANDUM

TO: APPOMATTOX RIVER WATER AUTHORITY BOARD OF DIRECTORS

**REVIEWED BY: ROBERT C. WICHSER, EXECUTIVE DIRECTOR
JAMES C. GORDON, ASSISTANT EXECUTIVE DIRECTOR**

FROM: MELISSA WILKINS, BUSINESS/ACCOUNTING MANAGER

SUBJECT: STATUS UPDATE ON IRRIGATION WITHDRAWAL APPLICATIONS AND PERMITS

DATE: SEPTEMBER 12, 2019

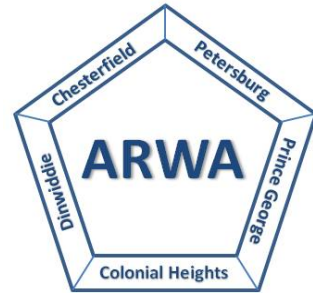
As requested by the Board of Directors during the July 25, 2019 Board of Directors Meetings, staff prepared reminder letters and opt-out forms that were reviewed and approved by both Chesterfield County Board Members and Dinwiddie County Board Members.

On Wednesday, August 28, 2019, Staff mailed out packages to the forty-five known property owners that previously had irrigation permits on file with the Authority and had not yet responded to the January 22, 2019 postcard mailing. The packages included the Reminder Letter, Opt-Out Form, an Application For Direct Irrigation Withdrawal License and a License Agreement.

To date, we have received four opt-out forms, one application and license, and one check with no paperwork.

The reminder letter and opt-out form are attached.

Appomattox River Water Authority



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

August 28, 2019

RE: Irrigation withdrawals from Lake Chesdin

Dear:

On January 16, 2019 the Board of the Appomattox River Water Authority approved an updated irrigation withdrawal policy for property owners adjacent to Lake Chesdin. This policy permits irrigation withdrawals from the lake through October 31, 2028 provided the property owner has completed an "Application for Direct Irrigation Withdrawal License", executed a License Agreement and paid the license fee. Our records indicate that you have an irrigation system but have not completed the paperwork and paid the fee to continue these withdrawals.

The purpose of this correspondence is to provide you with the necessary forms to apply for a withdrawal license under the new irrigation withdrawal policy.

If your irrigation system is no longer in use, please complete the Opt-Out Form and return it to us via email. Upon receipt of the Opt-Out Form, our staff will schedule a time to field verify that the system has been removed.

If you have any questions or need any additional information, please contact Melissa Wilkins at (804) 590-1145 or mwilkins@arwava.org.

We thank you in advance for your assistance.

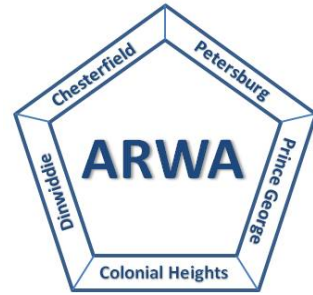
Sincerely,

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

Attachments

- Application for Direct Irrigation Withdrawal License
- License Agreement
- Opt Out Form

Appomattox
River
Water
Authority



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

Opt-Out Form

Name: _____

Address: _____

Date System taken out of service: _____

Signature: _____ Date: _____

ARWA

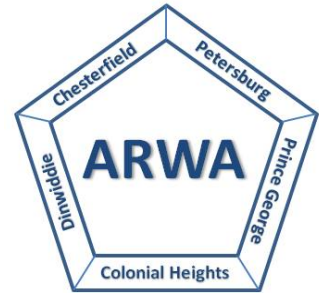
Date Inspected: _____

Inspected by: _____

- **Information Requested related to ARWA on-going “In-Plant” upgrade project**

Following is a memorandum concerning questions on the “In-Plant” upgrade project bond and pre-purchase of equipment

Appomattox River Water Authority



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

MEMORANDUM

**TO: APPOMATTOX RIVER WATER AUTHORITY
BOARD OF DIRECTORS**

**FROM: ROBERT C. WICHSER, Ph.D., P.E., BCEE, EXECUTIVE DIRECTOR
JAMES C. GORDON, ASSISTANT EXECUTIVE DIRECTOR**

**SUBJECT: CHESTERFIELD'S QUESTIONS ON "IN-PLANT"
PROJECT BOND AND PRE-PURCHASE OF EQUIPMENT**

DATE: SEPTEMBER 12, 2019

During our review of the Appomattox River Water Authority (ARWA) monthly Status Report at the July 25th Board Meeting related to the "In-Plant" capital upgrade project, ARWA Board member Dr. Joseph Casey requested information be presented at the September Board Meeting providing information related to both the "In-Plant" capital upgrade project bond purchase and the pre-purchase activity by ARWA of major project equipment.

A.) Question Related to Bond:

- Was the Bond purchased too early and at the opportune time?

McGuireWoods Response:

McGuire Woods concluded that the timing of the sale of the Bond was permissible under both Virginia and federal tax law as evidenced by the unqualified opinions McGuire Woods rendered at closing.

The timing issue under Virginia law was settled by the inclusion of the "in-plant" project in the Authority's then-current Board-approved capital improvement plan and budget.

The federal tax law issue is whether the Bond would be deemed to be a taxable "arbitrage bond" because the Bond was issued earlier than was otherwise reasonably necessary to accomplish its governmental purposes. The determination of whether tax-exempt bonds are issued too early is based on the issuer's reasonable expectations as of the issue date. The question is whether the expectations were reasonable based on the facts and circumstances known on the issue date. If the issuer meets the reasonableness standard, then the arbitrage regulations do not permit the Internal Revenue Service to play Monday-Morning Quarterback on the early issuance question. The Service gets to object only if there is a deliberate, intentional action by the issuer after the issue date

to earn arbitrage if that action, had it been expected on the issue date, would have caused the bonds to be arbitrage bonds.

For a "new money" bond issue such as the Bond, the most important factor evidencing an early issuance is the failure to qualify for the three-year temporary period during which the sale proceeds may be invested without yield restriction. To qualify for the temporary period, the issuer must certify as of the issue date that it reasonably expects its bonds will pass the following three tests:

- (A) Expenditure test. The expenditure test is met if at least 85 percent of the net sale proceeds of the issue are allocated to expenditures on the capital projects by the end of the 3-year temporary period;
- (B) Time test. The time test is met if the issuer incurs within 6 months of the issue date a substantial binding obligation to a third party to expend at least 5 percent of the net sale proceeds of the issue on the capital projects; and
- (C) Due diligence test. The due diligence test is met if completion of the capital projects and the allocation of the net sale proceeds of the issue to expenditures proceed with due diligence.

The Authority certified that it reasonably expected to meet all three tests in its tax certificate. The facts and circumstances surrounding the "in-plant" project and the manner in which the Authority proposed to procure the project elements supported the certifications, including without limitation (i) the well-documented urgency of the need to replace in-plant equipment, (ii) the Authority's ability to proceed with the project as soon as the funds were obtained (for example, all of the necessary permits had been obtained), (iii) the cost estimates provided to the Authority Board by staff and the consulting engineer, and (iv) that the equipment pre-purchasing program entailed a commitment to spend bond proceeds earlier rather than later in the project schedule. Mr. Anderson also notes that it is not in any way unusual for Virginia localities and authorities to issue bonds to finance projects for which all of the bids have not yet been obtained. There are many reasons for this, including the desire to issue bonds at a favorable time in the capital markets and the need to fund architectural and engineering costs as well as hard construction costs.

The fact that the Authority received a favorable bid for the in-plant project does not change the legal analysis that resulted in the unqualified opinions at the closing of the Bond, nor should it cause a tax problem for the Bond now. Without some evidence to the contrary, getting a favorable bid in a competitive bidding process does not constitute a deliberate, intentional action taken in order to earn arbitrage.

Davenport's Response:

The Authority's 2017 borrowing amount was sized using the Engineer's estimates for the project costs and flexibility was built into the borrowing documents that provided for alternative uses of the bond monies should actual project costs be lower than the estimates.

I believe that the borrowing coincided with the Authority's commitment and approval of the project, or at least certain project components (i.e. the purchase of certain equipment). As such, the Authority was insulated from an unforeseen funding problem/disruption while being contractually obligated to a capital expenditure.

The debt amount, rate, amortization and annual debt service payments were secured at levels consistent with planning and budget estimates.

In support of these discussion items and as a refresher for the group, I have attached two files:

A.) A Board presentation from September 2017 that discusses the project, the funding options, the then current interest-rate environment and the considerations related to the timing of the borrowing. I think we covered things in pretty good detail here laying out the considerations related to the borrowing timing (see attached).

B.) A Board presentation from November 2017 where we summarized the results from the bank RFP and provided a comparison to alternative funding options. Here again, we note various items for discussion including the options regarding the timing of the borrowing (see attached).

- Why was the contractor's bid considerably under the Engineer's estimate resulting in an overage in the bond funds?

Response:

The construction contractor gave the Authority a very attractive low bid. We note that MEB Contractors was \$869,000 below the second low bidder.

B.) Questions Related to Project's Pre-Purchased Equipment:

- How much is expected for the owner to save on the equipment pre-purchase costs versus having a contractor "Turn-Key" the entire project including 100% of the project's equipment?
- Would the scheduling issue with the pumps have occurred if a contractor "Turn-Keyed" the project versus the owner pre-purchasing the pumps?
- Would the overall "In-Plant" project schedule be any different if a contractor "Turn-Keyed" the entire project versus the Owner impact of pre-purchasing the pumps?

Response:

At the September 21, 2017 ARWA Board Meeting, Mr. Herb White, President of WW Associates (ARWA's Trust Engineer) presented to the Board of Directors a Power Point slide presentation along with an in-depth discussion and question period related to ARWA's upcoming "In-Plant" capital project and the recommendation that ARWA move forward with major project equipment "Pre-Purchase".

The major equipment items that were discussed and recommended to be pre-purchased by ARWA were the large pumps and motors along with the 3000KV emergency generator. These project related major equipment items had production and manufacturer delivery times of twelve to fourteen months. WW Associates strongly recommended that the ARWA move forward with pre-purchasing these items "as early deliverable in design process to get pumps on order" and to "minimize contractor markup". The emergency generator was to be a procurement pre-purchase through a municipal buying cooperative of which ARWA is a member (The National Joint Power Alliance), which allowed for "Purchase price generally lower than on the open market" and "ARWA purchases generator, avoiding cost of markups from the installing contractor". The Engineer's estimate on total project cost was \$13.36 million.

The Engineer presented to the ARWA Board on September 21, 2017 the following as advantages of pre-purchasing:

- 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 one year

WW Associates was provided quotes for direct pump and motor equipment purchase by ARWA from Sydnor Hydro Inc. of \$2.25 million. WW Associates then added variable frequency drives (VFDs) on seven (7) of the pumps (\$518,000). Total budget for pumps and VFDs was \$2.768 million. We note that the vendor that quoted the estimate was in fact the low bidder. Since the Authority pre-purchased nine (9) raw water and finished water pumps for a bid price of \$1.27 million, we were able avoid the Contractor's additional markup fee. By receiving the attractive bid price and avoiding contractor markup, the total cost for pumps and VFDs was \$1.498 million under the budget estimate. Actual project cost savings the Authority received by pre-purchasing the pumps was approximately \$380,000.

The direct purchase by ARWA of the new "In-Plant" emergency generator estimate was based on a regional Caterpillar representative Carter Equipment quote of \$ 1.25 million. The new emergency generator was then quoted through The National Joint Powers Alliance Purchasing Cooperative (NJPA) contract with the regional Caterpillar vendor Carter Equipment for \$958,272. This resulted in a direct savings of \$300,000 by ARWA by pre-purchasing this equipment. Should the Contractor have bid this generator, he would have received the \$1.25 million cost plus contractor markup. Total generator savings is therefore \$300,000 + \$375,000 markup = \$675,000.

In summary, total savings for pre-purchase of pumps and the generator was therefore \$1,055,000.

ARWA issued the following "In-Plant" major equipment pre-purchase orders:

| | |
|--|-------------|
| "In-Plant" project pumps ordered on May 9, 2018: | \$1,270,000 |
| "In-Plant" project emergency generator ordered on May 9, 2018: | \$958,272 |

The scheduling problem with the pump manufacturer occurred due to the pump castings being poured at the Pentair foundry not meeting Pentair's quality control engineer's tolerance standards (the pump bowl castings were out of measurement specification). Additional delays have been realized at Pentair due to vibration analysis that required revisions to the mounting systems to minimize vibration at the factory. Based on these specific technical issues, it would not have mattered if the "In-Plant" contractor or ARWA had ordered the pumps. The foundry's pump bowl castings still would have not met tolerance specification and the pump delivery schedule would have been impacted while waiting for the Pentair foundry to re-cast the pump bowls as well as performing design and manufacture of the additional mounting systems.

The Pre-Purchasing Option

Municipal utilities across the United States use the pre-purchasing option to their advantage. A few local examples are:

County of Henrico Department of Public Utilities

Contact: Utility Design Division Director

Henrico County Public Utilities has used capital project pre-purchasing of major equipment for over ten years.

Most recent capital project using equipment pre-purchase: Gambles Mill Pumping Station: pumps, motors, valves and flow meters were pre-purchased.

Reason for pre-purchasing: Reduction in overall project time due to major equipment long-lead times. Henrico Utilities expects at least a 6-10 month schedule time savings using owner pre-purchase versus normal contractor equipment purchase.

Hampton Roads Sanitation District (HRSD)

Contact: Purchasing

HRSD has used capital project pre-purchasing of major capital equipment over the years as needed.

Most recent project using equipment pre-purchase: Independence Pressure Reducing Station: Pumps were approved for pre-purchase.

Reason for pre-purchasing: Reduction in overall project time due to major equipment long-lead times. HRSD expects savings using owner pre-purchase versus normal contractor equipment purchase.

Recommendation to the ARWA Board: Based on the potential for overall reduction in project time and cost savings on capital project major long-lead equipment, we recommend that the Appomattox River Water Authority continue to investigate the benefit of using the equipment pre-purchase option on future capital projects.

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.

Credit Process



- 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



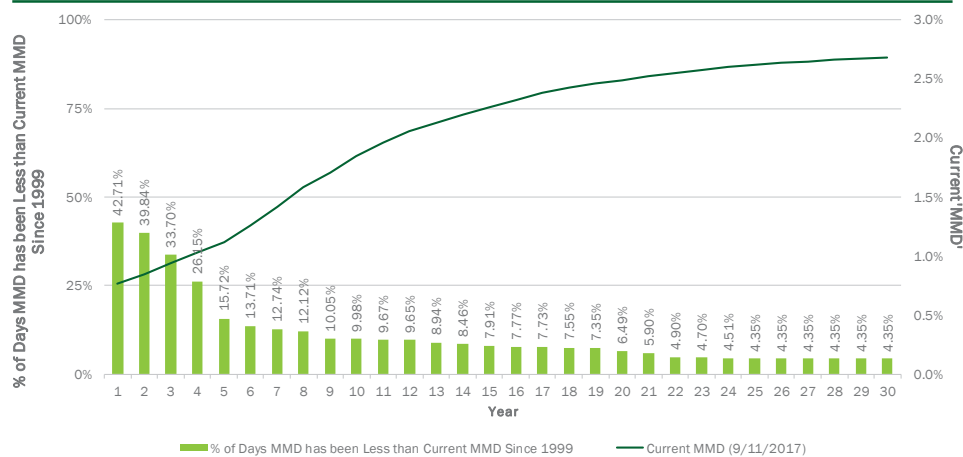
10-Year Treasury Movement – Since September 2016



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.

2017 Revenue Bond – Summary of Bids

Appomattox River Water Authority



November 16, 2017

Project Funding Estimates and Funding Sources



| | A | B |
|---|-------------------|-------------------|
| | 2017A - New Money | |
| 1 Project Fund Allowance | | |
| 2 Finished Water Improvements | \$ | 7,311,910 |
| 3 Raw Water Improvements | | 5,145,150 |
| 4 Engineering | | 940,000 |
| 5 Total Project Fund Allowance | | 13,397,060 |
| 6 Less: Cash on Hand for Engineering | | (940,000) |
| 7 Net Project Fund Allowance | \$ | 12,457,060 |
| 8 | | |
| 9 Debt Service Reserve Fund Allowance | | 750,000 |
| (Current estimated range of \$417,000 - \$622,000) | | |
| 10 Cost of Issuance Allowance | | 200,940 |
| 11 | | |
| 12 Estimated Uses of Funds | \$ | 13,408,000 |

■ The Authority has a number of funding options to consider, including:

– Direct Bank Loan

– VRA Financing Options

- 1) Participate in the VRA 2018 Spring Pool: Secured by the Net Revenues of the System and Moral Obligation Pledge Requirements
- 2) Participate in the VRA 2018 Spring Pool: Secured by the Net Revenues of the System and Additional Cash Security for Petersburg's Share
- 3) Direct Bank Loan using VRA's Virginia Helps credit enhancement (this would not be an issuance through the VRA Pool program)

Summary of Bids – 2017A New Money



| A | B | C | D | E | F |
|---------------------------------------|--------------------|--------------------|--|-------------------------------|--------------------|
| Series | Interest Rate | | Prepayment Language | Acceptance / Rate Expiration | Bank Fees |
| | 2017A | 2017A | | | |
| | New Money | New Money | | | |
| Amount | Up to \$14,750,000 | Up to \$14,750,000 | | | |
| Term | 15 Years | 20 Years | | | |
| 1 US Bank ¹ | 2.516% | - | On any payment date after 13 months at the lesser of a make-whole or 103% | Not specified / December 26th | \$0 |
| 2 Sterling National Bank ² | 2.740% | 3.200% | In whole on any date at: Years 1-5: Noncallable; Years 6-10: 101%; Thereafter: 100% | November 22nd / December 15th | \$5,000 Per Series |
| 3 Capital One ³ | 2.890% | 3.450% | In whole on any date at 100% on or after: 10/1/22 (10 Year Term); 10/1/24 (15 Year Term); 10/1/27 (20 Year Term) | November 17th / December 15th | \$0 |

¹ Interest rates are based on a monthly compound period. The terms and conditions are subject to final review and approval by USBGLF's business, legal, credit, and risk management personnel.

² Subject to formal credit approval by Purchaser and the negotiation of mutually acceptable documentation.

³ The Term Sheet has not yet received all necessary internal and committee approvals of COPF.

Estimated Debt Service Comparison

2017A – 15 Year New Money Financing



| A | B | C | D | E |
|---|----------------------|----------------------|----------------------|---|
| Lender | US Bank | Sterling National | Capital One | VRA Spring Pool - Current Market as of 11/8/17 ¹ |
| 1 | | | | |
| 2 Sources | | | | |
| 3 Par Amount* | \$ 13,250,000 | \$ 13,273,000 | \$ 13,280,000 | \$ 11,310,000 |
| 4 Premium* | - | - | - | 2,072,265 |
| 5 Total | \$ 13,250,000 | \$ 13,273,000 | \$ 13,280,000 | \$ 13,382,265 |
| 6 | | | | |
| 7 Uses | | | | |
| 8 Project Fund* | \$ 12,457,060 | \$ 12,457,060 | \$ 12,457,060 | \$ 12,457,060 |
| 9 Cost of Issuance / Bank Fees* | 200,000 | 205,000 | 200,000 | 276,550 |
| 10 Underwriter's Discount* | - | - | - | 56,550 |
| 11 Debt Service Reserve Fund* | 592,000 | 610,000 | 622,000 | 590,000 |
| 12 Additional Proceeds* | 940 | 940 | 940 | 2,105 |
| 13 Total | \$ 13,250,000 | \$ 13,273,000 | \$ 13,280,000 | \$ 13,382,265 |
| 14 | | | | |
| 15 Interest Rate / TIC* | 2.516% | 2.740% | 2.890% | 2.440% |
| 16 All-In TIC* | 2.727% | 2.958% | 3.103% | 2.742% |
| 17 | | | | |
| 18 Debt Service* | | | | |
| 19 Fiscal Year | | | | |
| 20 2018 | \$ 99,085 | \$ 108,094 | \$ 114,072 | \$ - |
| 21 2019 | 1,061,099 | 1,078,748 | 1,091,417 | 1,059,269 |
| 22 2020 | 1,060,329 | 1,079,595 | 1,091,363 | 1,062,309 |
| 23 2021 | 1,060,094 | 1,078,881 | 1,090,703 | 1,059,903 |
| 24 2022 | 1,060,369 | 1,078,605 | 1,091,406 | 1,058,794 |
| 25 2023 | 1,060,140 | 1,078,739 | 1,091,445 | 1,059,475 |
| 26 2024 | 1,060,396 | 1,079,258 | 1,090,820 | 1,058,619 |
| 27 2025 | 1,060,123 | 1,079,146 | 1,090,515 | 1,058,897 |
| 28 2026 | 1,060,309 | 1,079,390 | 1,090,502 | 1,062,253 |
| 29 2027 | 1,060,930 | 1,078,977 | 1,090,752 | 1,058,688 |
| 30 2028 | 1,060,971 | 1,078,892 | 1,091,236 | 1,063,072 |
| 31 2029 | 1,060,434 | 1,079,108 | 1,090,940 | 1,061,578 |
| 32 2030 | 1,060,305 | 1,078,613 | 1,090,849 | 1,059,359 |
| 33 2031 | 1,060,561 | 1,079,377 | 1,090,935 | 1,060,088 |
| 34 2032 | 1,060,187 | 1,079,374 | 1,091,168 | 1,058,659 |
| 35 2033 | 1,060,171 | 1,079,591 | 1,090,534 | 1,059,947 |
| 36 Total | \$ 16,005,503 | \$ 16,294,385 | \$ 16,478,655 | \$ 15,900,909 |
| 37 | | | | |
| 38 Difference to Column B | n/a | \$ 288,882 | \$ 473,152 | \$ (104,593) |
| 39 | | | | |
| 40 Breakeven VRA Rate Movement to Column B | n/a | n/a | n/a | +7bps |

* Preliminary and subject to change. Debt service shown does not include interest earned on or amounts held in the Debt Service Reserve Fund.

¹ Interest Rates will not be locked in until May 2018. TIC shown includes VRA's 0.125% Admin Fee.

Note: The contribution to the Debt Service Reserve Fund is calculated based on the Parity Debt Service Reserve Fund requirement.

Estimated Debt Service Comparison

2017A – 20 Year New Money Financing



| A | B | C | D |
|---|----------------------|----------------------|---|
| Lender | Sterling National | Capital One | VRA Spring Pool - Current Market as of 11/8/17 ¹ |
| 1 | | | |
| 2 Sources | | | |
| 3 Par Amount* | \$ 13,080,000 | \$ 13,095,000 | \$ 11,630,000 |
| 4 Premium* | - | - | 1,552,660 |
| 5 Total | \$ 13,080,000 | \$ 13,095,000 | \$ 13,182,660 |
| 6 | | | |
| 7 Uses | | | |
| 8 Project Fund* | \$ 12,457,060 | \$ 12,457,060 | \$ 12,457,060 |
| 9 Cost of Issuance / Bank Fees* | 205,000 | 200,000 | 278,150 |
| 10 Underwriter's Discount* | - | - | 58,150 |
| 11 Debt Service Reserve Fund* | 417,000 | 437,000 | 385,000 |
| 12 Additional Proceeds* | 940 | 940 | 4,300 |
| 13 Total | \$ 13,080,000 | \$ 13,095,000 | \$ 13,182,660 |
| 14 | | | |
| 15 Interest Rate / TIC* | 3.20% | 3.45% | 2.79% |
| 16 All-In TIC* | 3.37% | 3.62% | 3.03% |
| 17 | | | |
| 18 Debt Service* | | | |
| 19 Fiscal Year | | | |
| 20 2018 | \$ 124,405 | \$ 134,278 | \$ - |
| 21 2019 | 884,976 | 905,808 | 853,081 |
| 22 2020 | 885,552 | 906,576 | 855,103 |
| 23 2021 | 885,616 | 906,757 | 854,850 |
| 24 2022 | 885,168 | 906,352 | 857,050 |
| 25 2023 | 885,192 | 906,343 | 857,050 |
| 26 2024 | 885,656 | 906,696 | 856,025 |
| 27 2025 | 885,544 | 906,393 | 852,450 |
| 28 2026 | 885,840 | 906,417 | 852,722 |
| 29 2027 | 885,528 | 906,735 | 856,584 |
| 30 2028 | 885,592 | 906,327 | 854,038 |
| 31 2029 | 885,016 | 906,178 | 855,931 |
| 32 2030 | 885,768 | 906,253 | 857,213 |
| 33 2031 | 884,832 | 906,517 | 857,081 |
| 34 2032 | 885,192 | 905,953 | 855,488 |
| 35 2033 | 885,800 | 906,527 | 857,328 |
| 36 2034 | 885,640 | 906,203 | 856,303 |
| 37 2035 | 885,696 | 905,965 | 852,719 |
| 38 2036 | 884,952 | 905,779 | 855,825 |
| 39 2037 | 885,376 | 906,592 | 855,391 |
| 40 2038 | 884,936 | 906,370 | 853,650 |
| 41 Total | \$ 17,832,277 | \$ 18,261,017 | \$ 17,105,881 |
| 42 | | | |
| 43 Difference to Column B | n/a | \$ 428,740 | \$ (726,396) |
| 44 | | | |
| 45 Breakeven VRA Rate Movement to Column B | n/a | n/a | +50bps |

* Preliminary and subject to change. Debt service shown does not include interest earned on or amounts held in the Debt Service Reserve Fund.

¹ Interest Rates will not be locked in until May 2018. TIC shown includes VRA's 0.125% Admin Fee.

Note: The contribution to the Debt Service Reserve Fund is calculated based on the Parity Debt Service Reserve Fund requirement.

Estimated Debt Service Comparison

2017A – 25 and 30 Year New Money Financing



| A | B | C |
|---------------------------------|---|---|
| Lender | 25 Year VRA Spring Pool - Current Market as of 11/8/17 ¹ | 30 Year VRA Spring Pool - Current Market as of 11/8/17 ¹ |
| 1 | | |
| 2 Sources | | |
| 3 Par Amount* | \$ 11,735,000 | \$ 11,800,000 |
| 4 Premium* | 1,337,447 | 1,200,441 |
| 5 Total | \$ 13,072,447 | \$ 13,000,441 |
| 6 | | |
| 7 Uses | | |
| 8 Project Fund* | \$ 12,457,060 | \$ 12,457,060 |
| 9 Cost of Issuance / Bank Fees* | 278,675 | 279,000 |
| 10 Underwriter's Discount* | 58,675 | 59,000 |
| 11 Debt Service Reserve Fund* | 276,000 | 205,000 |
| 12 Additional Proceeds* | 2,037 | 381 |
| 13 Total | \$ 13,072,447 | \$ 13,000,441 |
| 14 | | |
| 15 Interest Rate / TIC* | 3.07% | 3.24% |
| 16 All-In TIC* | 3.27% | 3.42% |
| 17 | | |
| 18 Debt Service* | | |
| 19 Fiscal Year | | |
| 20 2018 | \$ - | \$ - |
| 21 2019 | 745,282 | 671,145 |
| 22 2020 | 745,381 | 673,375 |
| 23 2021 | 744,438 | 675,219 |
| 24 2022 | 746,653 | 675,650 |
| 25 2023 | 747,250 | 674,919 |
| 26 2024 | 742,206 | 673,675 |
| 27 2025 | 745,294 | 671,119 |
| 28 2026 | 742,484 | 672,922 |
| 29 2027 | 743,778 | 673,956 |
| 30 2028 | 744,047 | 674,222 |
| 31 2029 | 743,916 | 674,169 |
| 32 2030 | 743,409 | 673,822 |
| 33 2031 | 746,825 | 672,756 |
| 34 2032 | 744,138 | 675,844 |
| 35 2033 | 745,347 | 673,084 |
| 36 2034 | 743,103 | 671,556 |
| 37 2035 | 742,609 | 671,334 |
| 38 2036 | 743,341 | 672,019 |
| 39 2037 | 745,119 | 673,469 |
| 40 2038 | 745,894 | 674,169 |
| 41 2039 | 743,981 | 672,878 |
| 42 2040 | 744,347 | 674,553 |
| 43 2041 | 743,747 | 675,469 |
| 44 2042 | 747,100 | 675,603 |
| 45 2043 | 744,250 | 674,853 |
| 46 2044 | - | 673,197 |
| 47 2045 | - | 670,753 |
| 48 2046 | - | 672,438 |
| 49 2047 | - | 673,147 |
| 50 2048 | - | 672,881 |
| 51 Total | \$ 18,613,938 | \$ 20,204,196 |

* Preliminary and subject to change. Debt service shown does not include interest earned on or amounts held in the Debt Service Reserve Fund.

¹ Interest Rates will not be locked in until May 2018. TIC shown includes VRA's 0.125% Admin Fee.

Note: The contribution to the Debt Service Reserve Fund is calculated based on the Parity Debt Service Reserve Fund requirement.

VRA Financing Options



- As mentioned previously, the Authority has three funding options that it could pursue under the VRA umbrella:

- 1) VRA Financing via the VRA Spring Pool – Secured by the Net Revenues of the System, “Standard” Moral Obligation Pledge Requirements, and a “Special Petersburg Share” Moral Obligation Pledge Requirement
 - ARWA would issue a parity Water Revenue Bond to fund the full Project cost. Moral Obligation pledges from each of the Member Jurisdictions would be required to cover each Member’s share of the annual debt service and in total 100% of the annual debt service. (“Standard Moral Obligation Pledge”).
 - An additional Moral Obligation pledge would be required by some combination of the Member Jurisdictions, excluding Petersburg, that would cover Petersburg’s share of the project debt service. (“Special Petersburg Share Moral Obligation Pledge”).
- 2) VRA Financing via the VRA Spring Pool – Secured by the Net Revenues of the System, “Standard” Moral Obligation Pledge Requirements, and Additional Cash Reserve for 100% of Petersburg’s Share
 - The additional cash reserve would be cash funded and would equal the sum of Petersburg’s share of the proposed debt service. Certain provisions would be included in the loan documents that would allow the cash reserve to be released if certain performance metrics are met:
 - 1.25x Debt Service Coverage at the local Petersburg Water & Sewer System level.
 - Petersburg’s General Fund Balance deemed to be at an “adequate” level by VRA’s Local Government Financial Guidelines.
 - Petersburg’s General Obligation Bond credit rating raised into the investment grade range by either Moody’s or S&P, excluding the State Aid program.
- 3) VRA Financing via the Virginia Helps Program
 - ARWA secures a third-party financing source from a bank or other financial institution under a pledge of net revenues and a Debt Service Reserve Fund.
 - ARWA and Member Jurisdictions agree to a loan structure such that VRA has the ability to step in and intercept State aid in the event a debt service payment is not made. The State aid intercept would be assigned to the lender as additional security for the loan.
 - Each Member Jurisdiction would agree to a local obligation allowing State aid funds to be intercepted based on their allocable share of the project debt service.

Financing Timeline



| Date | Task |
|-------------------------------------|---|
| November 16 th at 2:00pm | Authority Board Meeting <ul style="list-style-type: none"> Authority Board discusses options for financing and, if the direct bank loan is approved: <ul style="list-style-type: none"> Authority Board considers selecting a winning RFP bidder and approving a Bond Resolution Authority Board considers adopting approving resolution(s) and DBL form of documents |
| TBD | Special Authority Board Meeting (if necessary) |
| By December 15 th | Close on financing |
| Early January | <ul style="list-style-type: none"> Project bids released Execute financing (if not closed in December) |
| Early / Mid-February | Project bids received (held 90 days) |
| Early / Mid-May | <ul style="list-style-type: none"> Project bids expire VRA Spring Pool Pricing |
| Mid / Late-May | VRA Spring Pool Closing |

■ Topics for Discussion / Consideration:

- Borrowing funds now vs. waiting for project bids to be in hand.
- If borrowing funds now, establishing the proper borrowing amount to cover the costs of the project with adequate contingencies to accommodate variability in the actual project bids.
- Consider the potential implications of the pending tax reform.



Appendix A

2017B Refunding Information

Summary of Bids – 2017B New Money and Combined Financing



| A | B | C | D | E | F | G |
|---------------------------------------|--------------------|---|--|--|----------------------------------|-----------------------|
| Series | 2017B Refunding | Interest Rate 2017A & B Combined New Money / Refunding | 2017A & B Combined New Money / Refunding | Prepayment Language | Acceptance / Rate Expiration | Bank Fees |
| Amount | \$2,580,000 | \$17,330,000 | \$17,330,000 | | | |
| Term | 10 Years | 10/15 Years | 10/20 Years | | | |
| 1 US Bank ¹ | 2.321% | - | - | On any payment date after 13 months at the lesser of a make-whole or 103% | Not specified / December 26th | \$0 |
| 2 Sterling National Bank ² | 2.530% | - | - | In whole on any date at: Years 1-5: Noncallable; Years 6-10: 101%; Thereafter: 100% | November 22nd / December 15th | \$5,000 Per Series |
| 3 Capital One ³ | 2.650% | 2.870% | 3.350% | In whole on any date at 100% on or after: 10/1/22 (10 Year Term); 10/1/24 (15 Year Term); 10/1/27 (20 Year Term) | November 17th / December 15th | \$0 |

¹ Interest rates are based on a monthly compound period. The terms and conditions are subject to final review and approval by USBGLF's business, legal, credit, and risk management personnel.

² Subject to formal credit approval by Purchaser and the negotiation of mutually acceptable documentation.

³ The Term Sheet has not yet received all necessary internal and committee approvals of COPF.

Estimated Debt Service Savings Comparison

2017B – Refunding of 2012 Revenue Bond



| A | B | C | D | E | F | G | H | I | J |
|---|-------------------------------|-----------------------------|------------------------|-----------------------------|------------------------|-----------------------------|------------------------|---|------------------------|
| | Existing 2012 Revenue Bond | US Bank Bid | | Sterling National Bid | | Capital One Bid | | VRA Spring Pool - Current Market as of 11/8/17 | |
| 1 Final Maturity | 10/1/2027 | 10/1/2027 | | 10/1/2027 | | 10/1/2027 | | 11/1/2027 | |
| 2 Interest Rate | 3.10% | 2.321% | | 2.53% | | 2.65% | | 1.84% | |
| 3 Rate Expiration | n/a | December 26th | | December 15th | | December 15th | | n/a | |
| 4 Cost of Issuance / Bank Fees | n/a | \$30,882 | | \$35,886 | | \$30,823 | | \$44,889 | |
| 5 Underwriter's Discount | n/a | n/a | | n/a | | n/a | | \$11,025 | |
| 6 Par Amount | \$2,597,000 | \$2,593,000 | | \$2,598,000 | | \$2,593,000 | | \$2,205,000 | |
| 7 | | | | | | | | | |
| 8 Fiscal Year | Debt Service | Debt Service ^{1,3} | Savings ^{1,3} | Debt Service ^{1,3} | Savings ^{1,3} | Debt Service ^{1,3} | Savings ^{1,3} | Debt Service ^{2,4} | Savings ^{2,4} |
| 9 2018 ^{3,4} | \$ 40,254 | \$ 17,888 | \$ (28,552) | \$ 19,536 | \$ (30,201) | \$ 20,423 | \$ (31,088) | \$ - | \$ (119,209) |
| 10 2019 | 302,020 | 290,480 | 11,540 | 293,807 | 8,212 | 294,680 | 7,339 | 279,049 | 22,971 |
| 11 2020 | 301,936 | 290,014 | 11,922 | 293,887 | 8,049 | 295,519 | 6,417 | 278,809 | 23,127 |
| 12 2021 | 301,636 | 290,420 | 11,216 | 293,815 | 7,820 | 295,186 | 6,450 | 281,247 | 20,389 |
| 13 2022 | 302,103 | 290,687 | 11,415 | 294,579 | 7,524 | 295,680 | 6,423 | 277,475 | 24,628 |
| 14 2023 | 302,322 | 290,815 | 11,507 | 294,178 | 8,144 | 295,002 | 7,320 | 277,694 | 24,628 |
| 15 2024 | 302,293 | 290,804 | 11,489 | 294,612 | 7,680 | 295,152 | 7,141 | 277,400 | 24,893 |
| 16 2025 | 302,016 | 290,653 | 11,363 | 293,883 | 8,133 | 295,116 | 6,900 | 280,741 | 21,275 |
| 17 2026 | 302,475 | 291,351 | 11,124 | 293,988 | 8,487 | 295,881 | 6,594 | 278,441 | 24,034 |
| 18 2027 | 301,671 | 289,911 | 11,760 | 293,917 | 7,754 | 294,461 | 7,210 | 280,500 | 21,171 |
| 19 2028 | 301,604 | 290,331 | 11,273 | 293,669 | 7,935 | 294,856 | 6,748 | 276,919 | 24,685 |
| 20 Total | \$ 3,060,326 | \$ 2,923,353 | \$ 86,056 | \$ 2,959,871 | \$ 49,538 | \$ 2,971,955 | \$ 37,453 | \$ 2,788,274 | \$ 112,590 |
| 21 Net Present Value Savings ^{1,2,3} | N/A | N/A | \$ 71,233 | N/A | \$ 38,218 | N/A | \$ 27,269 | N/A | \$ 96,531 |
| 22 % NPV Savings ^{1,2,3} | N/A | N/A | 2.74% | N/A | 1.47% | N/A | 1.05% | N/A | 3.72% |
| 23 | | | | | | | | | |
| 24 Breakeven VRA Rate Movement to Column D | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | +21bps |

Note: US Bank, Sterling National, Capital One, and VRA Financing Options are all subject to final credit approval by the respective lenders.

¹ Preliminary and subject to change. Assumes a closing date of December 14th. Savings shown include assumed Cost of Issuance of \$200,000 plus Bank Fees, pro-rated in conjunction with the New Money Issuance.


² Preliminary and subject to change. Assumes a closing date of May 23, 2018. Savings shown include assumed Cost of Issuance of \$291,625 and Underwriter's Discount of \$71,625, pro-rated in conjunction with the New Money Issuance.


³ Assumes the Authority makes an equity contribution of \$50,917.83 from the Debt Service Fund Principal and Interest Accounts.

⁴ Assumes the Authority makes an equity contribution of \$119,208.92 from the Debt Service Fund Principal and Interest Accounts.

Appendix B

90% Project Cost Information

| | | |
|-----------------------------|--------------------------------------|--|
| Project: | ARWA In-Plant Capital Upgrade |  ENGINEERS SURVEYORS PLANNERS ASSOCIATES <small>P. O. Box 4119 3040 Avemore Square Place Lynchburg, VA 24502 Charlottesville, VA 22911 Phone: 434.316.6080 Phone: 434.984.2700 www.wwassociates.net</small> |
| Location: | Petersburg, VA | |
| WWA Project No: | 217029.00 | |
| Date: | November 13, 2017 | |
| Estimate By: | SAR | |
| Checked By: | HFW | |
| Status: | 90% Submission | |
| Page: | 1 of 1 | |
| | | |
| Item | | Total Cost |
| Finished Water Improvements | | \$7,311,910 |
| Raw Water Improvements | | \$5,145,150 |
| Engineering | | \$940,000 |
| | | |
| | | |
| | | |
| Project Total: | | \$13,397,059 |

| Project: ARWA In-Plant Capital Upgrade - Finished Water Improvements | | | | | | |  <div>ENGINEERS SURVEYORS PLANNERS</div> <div>ASSOCIATES</div> <div><div>P.O. Box 4119 Charlottesville, VA 22902 Phone: 434.316.6080</div><div>3040 Avenue Square Place Charlottesville, VA 22911 Phone: 434.984.2700</div></div> <div>www.wassociates.net</div> | | |
|---|-------|----------|--------------------------|----------------------------|-----------------------|-------------------------|---|---------------|--|
| Location: ARWA | | | | | | | | | |
| WWA Project No: 217029.00 | | | | | | | | | |
| Date: November 13, 2017 | | | | | | | | | |
| Estimate By: SAR | | | | | | | | | |
| Checked By: HFW | | | | | | | | | |
| Status: 90% Submission | | | | | | | | | |
| Page: 1 | | | | | | | | | |
| | | | | | | | | | |
| Item | Units | Quantity | Unit Material Cost | Total Material Costs | Unit Labor Cost | Total Labor Costs | Total Unit Costs | Total Cost | |
| Mobilization | LS | 1 | \$60,000 | \$60,000 | \$60,000 | \$60,000 | \$120,000 | \$ 120,000 | |
| Demolish Ex. FWPS No. 1 Domestic Water Pumps | Ea | 3 | \$0 | \$0 | \$10,000 | \$30,000 | \$10,000 | \$ 30,000 | |
| Demolish Ex. FWPS No. 1 Backwash Pump | Ea | 1 | \$0 | \$0 | \$10,000 | \$10,000 | \$10,000 | \$ 10,000 | |
| Demolish Ex. FWPS No. 1 Finished Water Pumps Piping and Valves | Ea | 5 | \$0 | \$0 | \$10,000 | \$50,000 | \$10,000 | \$ 50,000 | |
| Demolish Ex. Hypo Piping | LS | 1 | \$0 | \$0 | \$20,000 | \$20,000 | \$20,000 | \$ 20,000 | |
| Change 16" Header Nozzle to 24" Nozzle | Ea | 1 | \$5,000 | \$5,000 | \$10,000 | \$10,000 | \$15,000 | \$ 15,000 | |
| New Domestic Water Pumps (VFD Price Included in Electrical) | Ea | 3 | \$50,000 | \$150,000 | \$10,000 | \$30,000 | \$60,000 | \$ 180,000 | |
| New P15 Pumps | Ea | 2 | \$30,000 | \$60,000 | \$2,000 | \$4,000 | \$32,000 | \$ 64,000 | |
| New Stainless Steel Pump Casing/Well Screen | Ea | 2 | \$10,000 | \$20,000 | \$5,000 | \$10,000 | \$15,000 | \$ 30,000 | |
| New P15 Pumps - Piping and Insulation (4"/6") | LF | 70 | \$200 | \$14,000 | \$100 | \$7,000 | \$300 | \$ 21,000 | |
| New 4" Check Valve | Ea | 2 | \$2,000 | \$4,000 | \$1,000 | \$2,000 | \$3,000 | \$ 6,000 | |
| New 4" Butterfly Valve | Ea | 2 | \$1,300 | \$2,600 | \$150 | \$300 | \$1,450 | \$ 2,900 | |
| New 4" Restrained Flange Adapter | Ea | 2 | \$300 | \$600 | \$100 | \$200 | \$400 | \$ 800 | |
| New Backwash Pump (VFD Price Included in Electrical) with Conc. Base | Ea | 1 | \$185,000 | \$185,000 | \$75,000 | \$75,000 | \$260,000 | \$ 260,000 | |
| New 16 MGD Finished Water Pump with Constant Speed Motor with Conc. Base | Ea | 1 | \$185,000 | \$185,000 | \$75,000 | \$75,000 | \$260,000 | \$ 260,000 | |
| New 16 MGD Finished Water Pump (VFD Price Included in Electrical) with Conc. Base | Ea | 3 | \$185,000 | \$555,000 | \$75,000 | \$225,000 | \$260,000 | \$ 780,000 | |
| New 24" Check Valve | Ea | 5 | \$25,000 | \$125,000 | \$2,500 | \$12,500 | \$27,500 | \$ 137,500 | |
| New 24" Butterfly Valve | Ea | 5 | \$10,000 | \$50,000 | \$1,000 | \$5,000 | \$11,000 | \$ 55,000 | |
| New 24" Ductile Iron Pipe | LF | 10 | \$1,500 | \$15,000 | \$100 | \$1,000 | \$1,600 | \$ 16,000 | |
| New 24" Restrained Flange Adapter | Ea | 5 | \$1,000 | \$5,000 | \$250 | \$1,250 | \$1,250 | \$ 6,250 | |
| New 6" Check Valve | Ea | 3 | \$2,500 | \$7,500 | \$250 | \$750 | \$2,750 | \$ 8,250 | |
| New 6" Butterfly Valve | Ea | 3 | \$1,500 | \$4,500 | \$250 | \$750 | \$1,750 | \$ 5,250 | |
| New 6" Restrained Flange Adapter | Ea | 3 | \$400 | \$1,200 | \$100 | \$300 | \$500 | \$ 1,500 | |
| New 6" Ductile Iron Pipe | LF | 15 | \$175 | \$2,625 | \$75 | \$1,125 | \$250 | \$ 3,750 | |
| New 14" Blind Flange | Ea | 2 | \$1,000 | \$2,000 | \$500 | \$1,000 | \$1,500 | \$ 3,000 | |
| 1" Schedule 80 PVC (Neat Hypo) | LF | 3,000 | \$5 | \$15,000 | \$8 | \$22,500 | \$13 | \$ 37,500 | |
| Hypochlorite Injector | Ea | 2 | \$500 | \$1,000 | \$100 | \$200 | \$600 | \$ 1,200 | |
| Combination Air Release Valve | Ea | 12 | \$2,000 | \$24,000 | \$1,000 | \$12,000 | \$3,000 | \$ 36,000 | |
| Remove and Replace Flow Meter 3 | LS | 1 | \$0 | \$0 | \$20,000 | \$20,000 | \$20,000 | \$ 20,000 | |
| Drain and Disinfect Clearwell | LS | 1 | \$10,000 | \$10,000 | \$20,000 | \$20,000 | \$30,000 | \$ 30,000 | |
| Electrical Room AC Unit | EA | 2 | \$12,000 | \$24,000 | \$3,500 | \$7,000 | \$15,500 | \$ 31,000 | |
| 4160-480V Step Down Transformer | EA | 2 | \$55,000 | \$110,000 | \$2,200 | \$4,400 | \$57,200 | \$ 114,400 | |
| 480V Switchgear | LS | 1 | \$350,000 | \$350,000 | \$36,000 | \$36,000 | \$386,000 | \$ 386,000 | |
| Finished Water Pump VFD w/RVSS Bypass | EA | 3 | \$74,000 | \$222,000 | \$11,000 | \$33,000 | \$85,000 | \$ 255,000 | |
| Finished Water Pump RVSS Starter | EA | 1 | \$23,000 | \$23,000 | \$8,000 | \$8,000 | \$31,000 | \$ 31,000 | |
| Backwash Pump VFD | EA | 1 | \$47,000 | \$47,000 | \$11,000 | \$11,000 | \$58,000 | \$ 58,000 | |
| Domestic Water Pump VFD | EA | 2 | \$7,500 | \$15,000 | \$8,000 | \$16,000 | \$15,500 | \$ 31,000 | |
| 400A Automatic Transfer Switch | EA | 1 | \$7,500 | \$7,500 | \$6,000 | \$6,000 | \$13,500 | \$ 13,500 | |
| 400A Power Panel | EA | 1 | \$3,500 | \$3,500 | \$7,000 | \$7,000 | \$10,500 | \$ 10,500 | |
| 150 A Lighting Panel | EA | 1 | \$2,500 | \$2,500 | \$6,000 | \$6,000 | \$8,500 | \$ 8,500 | |
| Lighting Transformer | EA | 1 | \$3,500 | \$3,500 | \$1,100 | \$1,100 | \$4,600 | \$ 4,600 | |
| 800A, 480V MCC | LS | 1 | \$63,000 | \$63,000 | \$22,000 | \$22,000 | \$85,000 | \$ 85,000 | |
| Electrical Demolition | LS | 1 | \$0 | \$0 | \$92,000 | \$92,000 | \$92,000 | \$ 92,000 | |
| Conduit and Wire | LS | 1 | \$105,000 | \$105,000 | \$78,750 | \$78,750 | \$183,750 | \$ 183,750 | |
| Misc Electrical Supports/Anchorage | LS | 1 | \$74,150 | \$74,150 | \$28,905 | \$28,905 | \$103,055 | \$ 103,055 | |
| PLC | LS | 1 | \$48,000 | \$48,000 | \$68,000 | \$68,000 | \$116,000 | \$ 116,000 | |
| 3 MW, 4160V Generator and Fuel Tank | EA | 1 | \$920,000 | \$920,000 | \$200,000 | \$200,000 | \$1,120,000 | \$ 1,120,000 | |
| Hypochlorite Flow Meters | EA | 4 | \$5,000 | \$20,000 | \$1,000 | \$4,000 | \$6,000 | \$ 24,000 | |
| FWPS-1 Upfit Work | LS | 1 | \$60,000 | \$60,000 | \$40,000 | \$40,000 | \$100,000 | \$ 100,000 | |
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|------------------------|---|--|--|--|--|--|--|
| Project: | ARWA In-Plant Capital Upgrade - Raw Water Improvements | | | | | | |
| Location: | ARWA | | | | | | |
| WWA Project No: | 217029.00 | | | | | | |
| Date: | November 13, 2017 | | | | | | |
| Estimate By: | SAR | | | | | | |
| Checked By: | HFW | | | | | | |
| Status: | 90% Submission | | | | | | |
| Page: | 1 | | | | | | |

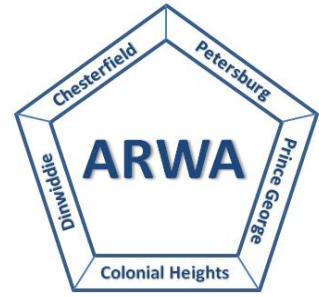
| Item | Units | Quantity | Unit Material Cost | Total Material Costs | Unit Labor Cost | Total Labor Costs | Total Unit Costs | Total Cost |
|--|-------|----------|--------------------|----------------------|-----------------|--|------------------|---------------------|
| Mobilization | LS | 1 | \$60,000 | \$60,000 | \$60,000 | \$60,000 | \$120,000 | \$ 120,000 |
| Demolish Ex. Raw Water Pumps and Piping | Ea | 5 | \$0 | \$0 | \$15,000 | \$75,000 | \$15,000 | \$ 75,000 |
| Demolish Ex. Access Hatch | Ea | 1 | \$0 | \$0 | \$1,500 | \$1,500 | \$1,500 | \$ 1,500 |
| New Raw Water Pump with Constant Speed Motor with Concrete Base | Ea | 1 | \$190,000 | \$190,000 | \$75,000 | \$75,000 | \$265,000 | \$ 265,000 |
| New Raw Water Pump (VFD included in electrical) with Concrete Base | Ea | 3 | \$190,000 | \$570,000 | \$75,000 | \$225,000 | \$265,000 | \$ 795,000 |
| New 24" Check Valve | Ea | 4 | \$25,000 | \$100,000 | \$2,500 | \$10,000 | \$27,500 | \$ 110,000 |
| New 24" Butterfly Valve | Ea | 4 | \$10,000 | \$40,000 | \$1,000 | \$4,000 | \$11,000 | \$ 44,000 |
| New 10" Surge Relief Valve | Ea | 2 | \$15,000 | \$30,000 | \$2,500 | \$5,000 | \$17,500 | \$ 35,000 |
| New 12" Gate Valve | Ea | 1 | \$4,500 | \$4,500 | \$1,000 | \$1,000 | \$5,500 | \$ 5,500 |
| New 10" Gate Valve | Ea | 2 | \$4,000 | \$8,000 | \$1,000 | \$2,000 | \$5,000 | \$ 10,000 |
| New 4" Gate Valve | Ea | 1 | \$1,000 | \$1,000 | \$500 | \$500 | \$1,500 | \$ 1,500 |
| New 24" Blind Flange | Ea | 1 | \$1,000 | \$1,000 | \$500 | \$500 | \$1,500 | \$ 1,500 |
| Combination Air Release Valve | Ea | 4 | \$2,000 | \$8,000 | \$1,000 | \$4,000 | \$3,000 | \$ 12,000 |
| New 24" Ductile Iron Pipe | LF | 12 | \$1,500 | \$18,000 | \$100 | \$1,200 | \$1,600 | \$ 19,200 |
| New 24" Restrained Flange Adapters | Ea | 4 | \$1,000 | \$4,000 | \$250 | \$1,000 | \$1,250 | \$ 5,000 |
| Pipe Supports | LS | 1 | \$3,000 | \$3,000 | \$1,000 | \$1,000 | \$4,000 | \$ 4,000 |
| New Access Hatch | LS | 1 | \$3,000 | \$3,000 | \$1,000 | \$1,000 | \$4,000 | \$ 4,000 |
| Grading | LS | 1 | \$10,000 | \$10,000 | \$5,000 | \$5,000 | \$15,000 | \$ 15,000 |
| Gravel Parking | SF | 300 | \$2 | \$600 | \$4 | \$1,200 | \$6 | \$ 1,800 |
| Concrete Apron | SF | 144 | \$4 | \$576 | \$6 | \$864 | \$10 | \$ 1,440 |
| Erosion and Sediment Control | LS | 1 | \$2,500 | \$2,500 | \$2,500 | \$2,500 | \$5,000 | \$ 5,000 |
| Restoration/RPA Requirements | LS | 1 | \$5,000 | \$5,000 | \$5,000 | \$5,000 | \$10,000 | \$ 10,000 |
| Cast-in-Place Foundation | CY | 20 | \$200 | \$4,000 | \$800 | \$16,000 | \$1,000 | \$ 20,000 |
| Cast-in-Place Floor Slab | CY | 25 | \$200 | \$5,000 | \$900 | \$22,500 | \$1,100 | \$ 27,500 |
| New Precast Building | LS | 1 | \$90,000 | \$90,000 | \$45,000 | \$45,000 | \$135,000 | \$ 135,000 |
| Lighting | LS | 1 | \$5,000 | \$5,000 | \$5,000 | \$5,000 | \$10,000 | \$ 10,000 |
| HVAC | LS | 1 | \$25,000 | \$25,000 | \$10,000 | \$10,000 | \$35,000 | \$ 35,000 |
| 4160-480V Step Down Transformer | EA | 2 | \$45,000 | \$90,000 | \$2,200 | \$4,400 | \$47,200 | \$ 94,400 |
| 480V Switchgear | LS | 1 | \$258,000 | \$258,000 | \$31,000 | \$31,000 | \$289,000 | \$ 289,000 |
| Raw Water Pump VFD w/RVSS Bypass | EA | 3 | \$85,500 | \$256,500 | \$11,000 | \$33,000 | \$96,500 | \$ 289,500 |
| Raw Water Pump RVSS Starter | EA | 1 | \$32,000 | \$32,000 | \$8,000 | \$8,000 | \$40,000 | \$ 40,000 |
| 400A Automatic Transfer Switch | EA | 1 | \$7,500 | \$7,500 | \$6,000 | \$6,000 | \$13,500 | \$ 13,500 |
| 400A Power Panel | EA | 2 | \$3,500 | \$7,000 | \$7,000 | \$14,000 | \$10,500 | \$ 21,000 |
| 150 A Lighting Panel | EA | 2 | \$2,500 | \$5,000 | \$6,000 | \$12,000 | \$8,500 | \$ 17,000 |
| Lighting Transformer | EA | 2 | \$3,500 | \$7,000 | \$1,100 | \$2,200 | \$4,600 | \$ 9,200 |
| Combination Motor Starter | EA | 2 | \$2,500 | \$5,000 | \$1,100 | \$2,200 | \$3,600 | \$ 7,200 |
| 5kV Cable Connection RWPS to FWPS (2100' in Exist Conduit) | LF | 12,600 | \$15 | \$189,000 | \$6 | \$75,600 | \$21 | \$ 264,600 |
| Electrical Demolition | LS | 1 | \$0 | \$0 | \$45,000 | \$45,000 | \$45,000 | \$ 45,000 |
| Conduit and Wire | LS | 1 | \$125,000 | \$125,000 | \$93,750 | \$93,750 | \$218,750 | \$ 218,750 |
| Misc Electrical Supports/Anchorage | LS | 1 | \$56,502 | \$56,502 | \$21,216 | \$21,216 | \$77,718 | \$ 77,718 |
| Fiber Optic Cable Replacement (3500' in mostly existing conduit) | LF | 3,500 | \$1 | \$4,375 | \$3 | \$10,500 | \$4 | \$ 14,875 |
| PLC | LS | 1 | \$30,000 | \$30,000 | \$56,000 | \$56,000 | \$86,000 | \$ 86,000 |
| Sedimentation Basin Sluice Gates | LS | 1 | \$200,000 | \$200,000 | \$50,000 | \$50,000 | \$250,000 | \$ 250,000 |
| SUBTOTALS: | | | | \$2,461,053 | | \$1,045,630 | | \$ 3,506,683 |
| 5% Sales Tax on Materials | | | | | | | | \$ 123,053 |
| | | | | | | SUBTOTAL | | \$ 3,629,735 |
| | | | | | | CONSTRUCTION MARKUP @ 35% | | \$ 1,270,407 |
| | | | | | | CONTINGENCY @ 5% | | \$ 245,007 |
| | | | | | | TOTAL AFTER CONSTRUCTION MARKUP | | \$ 5,145,150 |



- **Status Report: Ongoing Projects / Operations / Financials**

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

Appomattox River Water Authority



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

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 12, 2019

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

In-Plant Capital Projects:

Phase I

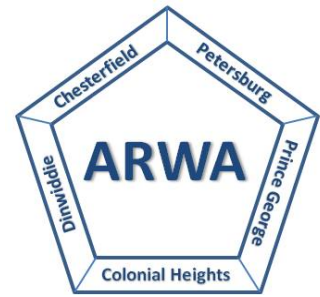
- The old eductors used for the hypochlorite feed have been removed and temporary neat hypochlorite feed lines are being used. The new hypochlorite feed lines are being installed.
- Finished Water Pumps 7 and 9 (with associated variable frequency drive) have been installed, tested, and are currently in operation. Domestic pumps P15A and P15B (both with associated variable frequency drives) are also operational.
- Finished Water Pump 8 is being removed and replaced starting the week of September 3rd.
- Raw Water pumps are scheduled for delivery the week of September 9th.
- MEB is working on a project schedule and outage plan based on these dates. We anticipate 2 raw water pumps to be installed in September, 2019.
- We anticipate the new generator startup in October, 2019.

Phase II

- The Phase 2 project preconstruction meeting was held on September 5, 2019, and a bid opening date of September 25, 2019.
- This project includes replacing electrical motor control centers and lighting panels dating back to the 1980's. Project also includes a roof on the chlorine dioxide tank farm and a new hypochlorite tank for post disinfection.

Annual Maintenance Inspection

- WW Associates has been contracted to perform the annual inspection. Work is scheduled to begin in September 2019.



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 12, 2019

Operating Status Report

General:

- The next scheduled normal Board of Directors Meeting is **Thursday November 14, 2019** at the South Central Wastewater Authority at 2:00 pm.
- Robinson, Farmer, Cox were onsite in August to perform field work for the annual audit.
- Whitman, Requerdt, and Associates has begun work related to the American Water Infrastructure Act.
- Authority staff continues to work with DEQ to finalize our Groundwater Monitoring Plan.
- Staff will be meeting with Kruger Energy on September 24th to review the Emergency Action Plan for the Dam as required by FERC every 5 years. There is no public involvement required for this review.
- Field work for the Hydrilla Management Plan was completed in August

Operations:

- Finished water met all permit requirements for August 2019. Copies of the VDH monitoring reports are available if anyone would like to see them.
- Working with the In-Plant contractors to perform testing on the newly installed pumps.

Maintenance:

- Maintenance has installed the new polymer feed pumps
- Work continues on repair flocculator 2.
- The fiber path between Finished Water Pump Station 1 to the Lab has been bored and Authority staff are working to run the lines into the buildings.
- Staff has updated the cone valve controls as required for the In-Plant project.

Instrumentation/IT:

- Working on controls and communications for the new polymer feed systems.
- Working with Authority integrators to improve remote site communications

Laboratory:

- Whole Effluent Toxicity samples from the lagoon outfalls show no toxicity.
- Recent lake study algae sample show low algae numbers.

Financial Status Report:

Following is the Income Statement through August 31, 2019.

Appomattox River Water Authority
YTD Income Statement for the period ending August 31, 2019

Water Rate Center

Revenues and Expenses Summary

| <i>Budget</i> | <i>Budget</i> | <i>Actual</i> | <i>YTD Budget</i> | <i>Variance</i> |
|-----------------|---------------------|---------------------|-------------------|-------------------|
| <i>FY 19/20</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 | \$ 10,542,625 | \$ - | \$ - | \$ - | #DIV/0! |
| Misc. Revenue | \$ 30,000 | \$ - | \$ 9,162 | \$ 9,162 | #DIV/0! |
| Total Operating Revenues | \$ 10,572,625 | \$ - | \$ 9,162 | \$ 9,162 | #DIV/0! |

Expenses

| | | | | | |
|---|---------------------|-----------------------|-----------------------|--------------------|---------------|
| Personnel Cost | \$ 2,447,600 | \$ 407,933 | \$ 391,314 | \$ (16,620) | -4.07% |
| Contractual/Professional Services | \$ 1,204,500 | \$ 210,250 | \$ 132,114 | \$ (78,136) | -37.16% |
| Utilities | \$ 850,000 | \$ 141,667 | \$ 141,713 | \$ 47 | 0.03% |
| Communication/Postal/Freight | \$ 47,200 | \$ 7,867 | \$ 7,539 | \$ (328) | -4.17% |
| Office/Lab/Purification Supplies | \$ 98,000 | \$ 16,333 | \$ 11,189 | \$ (5,145) | -31.50% |
| Insurance | \$ 90,000 | \$ 90,000 | \$ 93,573 | \$ 3,573 | 3.97% |
| Lease/Rental Equipment | \$ 20,000 | \$ 3,333 | \$ 8,026 | \$ 4,693 | 140.79% |
| Travel/Training/Dues | \$ 48,400 | \$ 8,067 | \$ 4,284 | \$ (3,783) | -46.90% |
| Safety/Uniforms | \$ 26,000 | \$ 4,333 | \$ 7,944 | \$ 3,611 | 83.33% |
| Chemicals | \$ 2,300,000 | \$ 383,333 | \$ 393,320 | \$ 9,987 | 2.61% |
| Repair/Maintenance Parts & Supplies | \$ 343,000 | \$ 57,167 | \$ 66,537 | \$ 9,370 | 16.39% |
| Total Operating Expenses | \$ 7,474,700 | \$ 1,330,283 | \$ 1,257,553 | \$ (72,730) | -5.47% |
| Operating Results Suplus/(Deficit) | \$ 3,097,925 | \$ (1,330,283) | \$ (1,248,391) | \$ 81,892 | -6.16% |

Replacement Outlay Budget vs. Actual

| | | | | | |
|------------------------------|-------------------|-------------------|------------------|--------------------|----------------|
| Machinery & Motors | \$ 175,000 | \$ 29,167 | \$ 36,782 | \$ 7,616 | 26.11% |
| Instrumentation | \$ 52,000 | \$ 8,667 | \$ - | \$ (8,667) | -100.00% |
| SCADA | \$ - | \$ - | \$ - | \$ - | #DIV/0! |
| Computer Equipment | \$ 10,000 | \$ 1,667 | \$ - | \$ (1,667) | -100.00% |
| Furniture/Fixtures | \$ 6,000 | \$ 1,000 | \$ - | \$ (1,000) | -100.00% |
| Motor Vehicles | \$ 235,000 | \$ 39,167 | \$ - | \$ (39,167) | -100.00% |
| Special Studies | \$ - | \$ - | \$ 820 | \$ 820 | #DIV/0! |
| Valve Replacement | \$ 100,000 | \$ 16,667 | \$ - | \$ (16,667) | -100.00% |
| Concrete | \$ 25,000 | \$ 4,167 | \$ - | \$ (4,167) | -100.00% |
| PG Vault Meter | \$ 30,000 | \$ 5,000 | \$ - | \$ (5,000) | -100.00% |
| Bollards and Security Fences | \$ 10,000 | \$ 1,667 | \$ - | \$ (1,667) | -100.00% |
| Matoaca Meter/Meter Box | \$ 125,000 | \$ 20,833 | \$ - | \$ (20,833) | -100.00% |
| Total Capital Outlay | \$ 768,000 | \$ 128,000 | \$ 37,602 | \$ (90,398) | -70.62% |

Construction Outlay Budget vs. Actual

| | | | | | |
|--------------------------|------|------|------------|------------|---------|
| In-Plant Capital Upgrade | \$ - | \$ - | \$ 484,302 | \$ 484,302 | #DIV/0! |
|--------------------------|------|------|------------|------------|---------|

Debt Service Budget vs. Actual

| | | | | | |
|---------------------------------|--------------|------|-----------|-----------|---------|
| Interest Income | \$ - | \$ - | \$ 67,799 | \$ 67,799 | #DIV/0! |
| Interest Jurisdictions (Income) | \$ - | \$ - | \$ - | \$ - | #DIV/0! |
| Interest Expense | \$ - | \$ - | \$ - | \$ - | #DIV/0! |
| Principal Payments | \$ 2,141,175 | \$ - | \$ - | \$ - | #DIV/0! |

Other Income

| | | | | | |
|--------------------------|------|------|------|------|---------|
| Alum Litigation Proceeds | \$ - | \$ - | \$ - | \$ - | #DIV/0! |
|--------------------------|------|------|------|------|---------|

5. Items from Counsel

6. Closed Session Personnel/Executive Directors Annual Review

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

8. Adjourn