



COMMISSION MEETING MINUTES
August 27, 2019

<u>No.</u>	<u>Topic</u>	<u>Page</u>
1.	<u>Awards and Recognition</u>	3
2.	<u>Consent Agenda</u>	4
	a. <u>Approval of Minutes</u>	4
	b. <u>Contract Awards</u>	4
	c. <u>Task Orders</u>	4
	d. <u>Sole Source</u>	4
3.	<u>South Shore High Point Air Vent Installation Phase I Rejection of all bids</u>	5
4.	<u>Fixed-Rate Subordinate Wastewater Revenue Bonds Refunding Resolution</u>	6-8
5.	<u>Master Trust Indenture Senior Lien Closure</u>	9-10
6.	<u>Climate Change Planning Program Initial Appropriation and Contract Award</u>	11-12
7.	<u>Fleet Management Initial Appropriation</u>	13-14
8.	<u>Improved Assessment of Virus Reductions Study</u>	15
9.	<u>Nansemond Treatment Plant Influent Screen Replacement Initial Appropriation and Task Order</u>	16-17
10.	<u>Virginia Initiative Plant Nutrient Reduction Improvements Funding Transfer and Additional Appropriation</u>	18-19
11.	<u>Urbanna Treatment Plant Nutrient Credit Acquisition</u>	20-21
12.	<u>Nutrient Compliance Plan Update</u>	22-23



COMMISSION MEETING MINUTES
August 27, 2019

<u>No.</u>	<u>Topic</u>	<u>Page</u>
13.	<u>Unfinished Business</u>	24
14.	<u>New Business</u>	24
15.	<u>Commissioner Comments</u>	24
16.	<u>Public Comments Not Related to Agenda</u>	24
17.	<u>Informational Items</u>	24
	a. <u>Management Reports</u>	24
	b. <u>Strategic Planning Metrics Summary</u>	24
	c. <u>Effluent Summary</u>	24
	d. <u>Air Summary</u>	24
	e. <u>Emergency Declaration Update – Langley Magruder 30-Inch Ductile Iron Force Main Emergency Repairs (Semple Farm)</u>	24
18.	<u>Closed Session – Discussion with Staff Regarding Probable Litigation</u>	25
19.	<u>Reconvened Meeting</u>	25
Attachments (7)		



COMMISSION MEETING MINUTES
August 27, 2019

Name	Title	Present for Item Nos.
Elofson, Frederick N.	Commission Chair	1-19
Lynch, Maurice P.	Commission Vice-Chair	1-19
Glenn, Michael E.	Commissioner	1-19
Lakdawala, Vishnu K.	Commissioner	1-19
Levenston, Jr., Willie	Commissioner	1-19
Rodriguez, Stephen C.	Commissioner	1-19
Taraski, Elizabeth	Commissioner	1-19
Ward, Molly Joseph	Commissioner	1-19

1. **AWARDS AND RECOGNITION**

Action: No action required.

Brief: The SWIFT Research Center continues to receive accolades from various engineering and contracting groups. Two recently received awards were acknowledged at the meeting:

- a. The Associated Builders and Contractors, Inc. (ABC) awarded the SWIFT Research Center the 2018 National Eagle Award (first place) in the “General Contracting Category: Public Works/Environmental” category. The SWIFT Research Center had previously received an Excellence in Construction (EIC) Merit Award from the ABC Carolina Chapter, which qualified the project to compete at the national level.
- b. The Associated General Contractors of America (AGC), supported by JLT and Construction Risk Partners, awarded the SWIFT Research Center a national 2019 Build America Award in the “Utility Infrastructure – New” category.

Attachment: None

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

2. **CONSENT AGENDA**

Action: Approve the items listed in the Consent Agenda.

Moved: Maurice Lynch **Ayes:** 8
Seconded: Michael Glenn **Nays:** 0

Brief:

- a. Approval of minutes from previous meeting.
- b. Contract Awards
 - 1. [Gravity Flow Monitoring Services](#) \$1,214,500
 - 2. [Investment Management Services](#) \$567,500
 - 3. [Organizational Development Training and Consulting Services](#) \$1,158,098
 - 4. [Pump Station Generators and Standby Pump Upgrades Contract Award, HRSD Use of Existing Competitively Awarded Contract Vehicle and Task Order](#) 4,645,737
- c. Task Orders
 - 1. [SWIFT Integrated Planning](#) \$1,010,564
 - 2. [SWIFT Program Management](#) \$4,514,535
 - 3. [Washington District Pump Station Area Sanitary Sewer Improvements](#) \$323,708
 - 4. [Smart Sewer – Optimization of Chesapeake-Elizabeth and Atlantic Service Areas](#) \$229,400
- d. Sole Source
 - 1. [Flygt Submersible Pump](#)

Item(s) Removed for Discussion: None

Attachment #1: [Consent Agenda](#)

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

3. **SOUTH SHORE HIGH POINT AIR VENT INSTALLATION PHASE I
REJECTION OF ALL BIDS**

Action: Approve rejection of all bids submitted for the South Shore High Point Air Vent Installation Phase I.

Moved: Willie Levenston **Ayes:** 8
Seconded: Michael Glenn **Nays:** 0

CIP Project: GN016600

Brief: Bids were received and evaluated for this contract in June 2019. There were two bidders as shown below:

Bidder	Bid Amount
Tidewater Utility Construction, Inc.	\$470,151
TA Sheets General Contractors, Inc.	\$774,200

HRSD Estimate: \$562,500

At the June 2019 Commission meeting, staff recommended award of the contract to the low bidder, Tidewater Utility Construction, Inc. for the installation of 20 air vents at unvented high points along the south shore interceptor force main system. After receiving Commission approval but prior to making the award, staff discovered a bid error. The error was material and significant enough to increase the total cost over project budget. The second low bid also exceeded the budget and as a result staff recommends rejecting all bids.

Based on the confusion in the fixed-price bidding process, staff has repackaged this work to be accomplished under existing on-call construction contracts. Use of the on-call contracts allows the use of pre-negotiated unit prices and keeps the work within the available budget for this project.

Attachment: None

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

conditions, to generate present value savings of \$28 million or 14 percent of refunded par. The planned use of cash will bring the Days Cash on Hand closer to high-end of policy. Future capital expenditures should be funded with Virginia Clean Water Revolving Loan Funds and hopefully Water Infrastructure Finance and Innovation Act (WIFIA) loans, which both have lower interest rates than the outstanding bonds to be defeased.

Refunding efficiency is a probabilistic calculation that measures savings you realize today relative to estimated savings you might achieve in the future. When this was included in the Financial Policy, the high threshold was developed assuming there was only one opportunity (for a tax-exempt advance refunding) at an ideal time, which is not the case following the 2018 tax reform. The Financial Policy requires that refunding efficiency be “considered” with 70 percent or greater as a benchmark. Staff is recommending that the three percent net present value savings policy requirement be the primary driver for this transaction. Staff will recommend revising the refunding efficiency consideration in the next policy update.

The attached [resolution](#) authorizes HRSD to issue subordinate revenue bonds for the purpose of refunding existing senior and subordinate obligations for debt service savings. The sizing threshold was based on treasuries dropping fifty basis points from August 14, 2019.

The following bond documents are provided:

- a. [Resolution](#) authorizing the issuance and award of HRSD Wastewater Revenue Bonds, Series 2019;
- b. [Seventh Supplemental Trust Agreement](#), by and between HRSD and the Trustee, relating to the 2019 Fixed Rate Bonds;
- c. [Preliminary Official Statement of HRSD](#);
- d. [Bond Purchase Agreement](#), by and between HRSD and [Citi], as representative of the underwriters;
- e. [Continuing Disclosure Agreement](#), the form of which appears as Appendix E to the Preliminary Official Statement and a version of which will be delivered in connection with each of the 2019 Fixed Rate Bonds; and



COMMISSION MEETING MINUTES
August 27, 2019

- f. [Escrow Deposit Agreement](#), by and between the District and Bank of New York Mellon Corporate Trus], which will be delivered if the District issues any 2019 Bonds to refund the Refunding Candidates.

Certain information in these documents cannot be completed until the bonds are priced. As a result of the market conditions, HRSD plans to price the refunding bonds between August 29 and mid-September, but this may change if bond market conditions weaken. These documents have been reviewed by bond and local counsel.

Staff provided an [overview](#) of the subordinate wastewater revenue bonds and the Master Trust Indenture closure.

Discussion Summary: Staff explained the mechanics of funding the escrow with available cash, effects on the bond rating, and any potential impacts to the CIP. There are no impacts to the CIP and this refunding will improve our financial forecast due to the reduced debt service. The net present value savings included the opportunity cost of our existing cash, which is our discount rate.

Attachment #2: [Bond Documents](#)

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

5. **MASTER TRUST INDENTURE SENIOR LIEN CLOSURE**

Action: Approve the terms and conditions of the [resolution](#) authorizing the closure of the Master Trust Indenture and authorize the General Manager to execute same, substantially as presented, together with such changes, modifications and deletions as the General Manager may deem necessary.

Moved: Vishnu Lakdawala **Ayes:** 8
Seconded: Willie Levenston **Nays:** 0

Brief: In the 2016 bond transaction, HRSD amended the Subordinate Trust Agreement. One of the major changes in the Amended and Restated Subordinate Trust, the Subordinate Trust, is modifying the definition of Operating Expenses to be consistent with the Financial Policy. As part of the Regional Wet Weather Management Plan (RWWMP), HRSD will be performing work on Locality assets that it does not own. Under Generally Accepted Accounting Principles (GAAP), this requires that the expenditures on Locality assets be expensed rather than capitalized, which negatively impacts our debt service coverage ratio. In the Subordinate Trust, the definition of Operating Expenses excludes any expenses related to Locality assets as approved by the Commission, which alleviates issues with the debt service coverage calculation. Other changes included increasing the minimum legal debt service coverage to 1.2 times and making some modernization and clarification changes.

Since the Subordinate Trust was amended in 2016, as part of the Plan of Finance, HRSD has planned to issue all new debt at the subordinate level. Currently, the Ratings Agencies rate the subordinate lien bonds one notch lower than the senior lien bonds. By issuing all future debt at the subordinate lien, the outstanding debt will eventually become significantly larger than the senior debt. As a result, at some point, the subordinate rating should be upgraded to the senior rating.

When the Subordinate Trust was amended, HRSD intentionally left the senior lien legally open to additional bond issuance to allow flexibility in unforeseen circumstances. At the time, the rating agencies communicated they would not upgrade the subordinate rating to the senior rating. Given the debt issued since 2016 and the potential 2019 refunding bond issuance, all at the subordinate lien, HRSD believes it has reached a tipping point upon which the rating agencies might consider upgrading the subordinate rating.



COMMISSION MEETING MINUTES

August 27, 2019

The Virginia Resources Authority (VRA) is a large holder of HRSD's senior debt. On December 8, 2015, the Virginia Resources Authority Board approved a resolution to move the VRA senior lien debt to the Subordinate Trust once a number of conditions are met, including the closure of the senior lien to additional bonds. This will trigger a migration of approximately \$36 million in VRA loans from the senior to subordinate lien. Aside from the 2009 Build America Bonds, staff anticipates that all existing senior lien debt will be defeased or refunded by FY 2026.

The VRA senior lien debt will move to the subordinate lien once the following conditions are met:

1. There are no existing defaults under the provisions of any HRSD debt; and
2. Department of Environmental Quality provides necessary consent to amend load documents; and
3. HRSD's existing Senior Trust Agreement is legally closed to additional bonds; and
4. HRSD maintains at least a AA- or equivalent by two nationally recognized statistical ratings organizations on the subordinate lien; and
5. HRSD issues no additional senior lien debt; and
6. HRSD adheres to its currently adopted financial policy total debt service coverage minimum of 1.4 times; and
7. HRSD has substantially amortized or defeased its outstanding senior lien bonds such that the total par amount outstanding under the senior lien is less than \$150 million.
8. If Conditions 1 - 6 are met (and Condition 7 is not), VRA's Executive Director will have full authority to effectuate a pro rata migration in order to maintain the current ratio of HRSD to VRA debt at the senior lien.

Since Condition 7 will not be met, staff will ask VRA's Executive Director to approve a pro rata migration as outlined in Condition 8.

Attachment #3: [Resolution](#)

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

7. **FLEET MANAGEMENT
INITIAL APPROPRIATION (>\$200,000)**

Action: Appropriate project funding in the amount of \$1,237,000.

Moved: Willie Levenston **Ayes:** 8
Seconded: Stephen Rodriguez **Nays:** 0

CIP Project: GN017600

Project Description: This project will provide for replacement of aging fleet vehicles and the purchase of additional vehicles to meet the needs of the organization for Fiscal Year 2020.

Funding Description: The initial appropriation for the project is based on the cost estimates from vehicle manufacturers and state contracts. Funding for the additional fiscal years in the CIP will be requested each year. The amount provided in the CIP for the following three years are significantly higher due to the need to replace vactor/ sewer flusher trucks, a septage truck and other fleet replacements.

Planned replacements for FY 2020 are included in the table below. Actual replacements may change within the total appropriation based on final purchase price, delivery schedule or other emerging needs.

Vehicle Number	Dept	Vehicle Description	Vehicle Replacement Cost
2	INT SS	2004 Chevrolet Malibu Sedan	\$33,000
6	EEM SS	2001 Dodge 3500 Pickup with Enclosed Utility Body Diesel	\$64,000
27	INT SS	2007 Chevrolet Extended Cab 2500 4X4 Utility Body Pickup Truck	\$43,000
35	Auto SS	1999 Dodge 3500 Extended Cab Utility Body Pickup	\$43,000
41	INT SS	2007 Chevrolet Extended Cab 2500 4X4 Utility Body Pickup Truck	\$43,000
43	INT NS	2001 GMC 2500 HD Utility Body Pickup Diesel	\$46,000
54	INT NS	2001 GMC 2500 HD Utility Body Pickup Diesel	\$46,000
55	INT NS	2002 Chevrolet HD 4X4 Utility Body Pickup Diesel	\$46,000
92	INT NS	2007 Chevrolet 2500 4X4 Extended Cab with Utility Body	\$46,000



COMMISSION MEETING MINUTES
August 27, 2019

Vehicle Number	Dept	Vehicle Description	Vehicle Replacement Cost
101	P3 SS	2002 Chevrolet Astro Mini-Van	\$31,000
127	CC	2011 Ford Escape Hybrid SUV	\$31,000
130	INT NS	2002 Chevrolet 2500 HD 4X4 Utility Body Pickup Diesel	\$46,000
134	INT SS	2004 Chevrolet 2500 Utility Body Pickup Diesel	\$46,000
142	NS P3	2002 Chevrolet Astro Mini-Van	\$26,000
143	EEM SS	2010 Chevrolet 2500 Cargo Van	\$35,000
212	INT NS	2007 Chevrolet 2500 4X4 Extended Cab with Utility Body	\$46,000
104	EEM NS	2012 Chevrolet 3500 Cargo Van	\$35,000
242	CC	2011 Ford Escape Hybrid SUV	\$31,000
294	ICSM	2006 Chevrolet 1500 Extended Cab Pickup	\$33,000
307	EEM NS	2003 Chevrolet 2500 Pickup-Utility	\$43,000
325	CC	2011 Ford Escape Hybrid SUV	\$31,000
46	EEM SS	1998 Ford E 350 Cargo Van	\$35,000
191	YRTP	2003 Capacity Yard Tractor	\$125,000
120	JRTP	1993 Clark GPX 200 Diesel Forklift	\$53,000
	BHTP	Telehandler with Accessories	\$180,000
			\$1,237,000

Attachment: None

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

8. **IMPROVED ASSESSMENT OF VIRUS REDUCTIONS STUDY BRIEFING**

Action: No action required.

HRSD Estimate: \$75,000

Project Description: Through its microbial source tracking program, HRSD has developed a robust ability to measure dilute concentrations of specific viruses in environmental samples. These techniques developed by the microbial source tracking program have been successfully applied within the SWIFT program in order to assess the performance of various treatment steps and soil-aquifer treatment in terms of virus inactivation and removal. While HRSD's existing field sampling and laboratory virus counting methods are very appropriate for answering human health questions in that they are well-established, highly sensitive, and are a direct measurement of viruses of concern, there remains interest in a more immediate indication of virus inactivation and removal in the context of SWIFT that can be used to make real-time operational or flow-diversion decisions.

The [proposed](#) collaboration with the University of Michigan (Krista Wigginton research group) will further develop a technique that counts very small particles in a process water stream that have been shown to correlate well with relevant viruses within drinking water and advanced treatment systems such as SWIFT (referred to as virometry). The project will first demonstrate the technique at bench scale at the University of Michigan using selected virus types that are relevant to SWIFT and other water treatment systems. The approach will then be applied at the SWIFT Research Center during a multi-month study to test the suitability of virometry to provide the type of near real-time data that HRSD desires to support operational decision making that will ultimately enhance our protection of human health.

Attachment #4: [Proposed Study Summary](#)

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

9. **NANSEMOND TREATMENT PLANT INFLUENT SCREEN REPLACEMENT
INITIAL APPROPRIATION AND TASK ORDER**

Actions:

- a. **Appropriate total project funding in the amount of \$3,508,700.**
- b. **Approve a task order with Hazen and Sawyer in the amount of \$253,283.**

Moved: Vishnu Lakdawala **Ayes:** 8
Seconded: Maurice Lynch **Nays:** 0

CIP Project: NP014400

Budget	\$3,508,700
Previous Expenditures and Encumbrances	(\$0)
Available Balance	\$3,508,700

Contract Status:	Amount
Original Contract with Hazen and Sawyer	\$0
Total Value of Previous Task Orders	\$0
Requested Task Order	\$253,283
Total Value of All Task Orders	\$253,283
Revised Contract Value	\$253,283
Engineering Services as % of Construction	9.38%

Project Description: This project is to replace three aging mechanical bar screens at the Nansemond Treatment Plant. The current bar screens routinely require corrective maintenance and currently are not capable of capturing material down to 6 millimeters. The new screens will allow for greater capture of materials as HRSD looks to implement solids processing that will require a higher capture of trash and debris in the preliminary treatment process.

Task Order Description and Analysis of Cost: Hazen and Sawyer will provide design and bid phase services for the above project under this task order.



COMMISSION MEETING MINUTES
August 27, 2019

The estimated total project cost is \$3,508,700. The estimated project cost is based on a construction cost estimate of \$2,700,000 combined with an engineering services cost \$253,283 and an 18.5 percent contingency allowance of \$500,000. Engineering services for the design will be provided by Hazen. The design phase services of 9.38 percent of the construction cost compares well with other projects.

<u>Schedule:</u> Design	September 2019
Pre-Construction	March 2020
Construction	May 2020
Closeout	May 2021

Attachment: None

Public Comment: None



COMMISSION MEETING MINUTES

August 27, 2019

resulting in \$6.57 million in expenditures (including actuals, encumbrances and a small contingency to complete the work) over appropriations for the combined projects.

Project Description: The original project, VP016300, was established to provide needed plant improvements, to maintain year-round enhanced nitrogen removal, and increase the peak hydraulic capacity of the plant. VP016300 was split into two projects, Contract A (VP016310) and Contract B (VP016320), to expedite the overall construction schedule. Contract B consists of furnishing labor, materials, equipment, and temporary facilities for the construction of Preliminary Treatment Facility, Versatile Bioreactor, Supplemental Carbon Storage and Feed Facility, Secondary Clarifier No. 6, Chlorine Contact Channel, Odor Control Facilities, Electrical Upgrades and other facility upgrades.

Funding Description: The requested funding includes funds for contractually obligated expenses including operations, training and inspections. This funding, which will be combined with funds remaining from the VIP Diesel Emergency Generator Replacement project, will allow the completion and closure of the three projects. The needed funds are included as part of the budgeting for the FY-2020 CIP.

Schedule: Project Closeout December 2019

Attachment: None

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

11. **URBANNA TREATMENT PLANT NUTRIENT CREDIT ACQUISITION**

Action: No action required.

Brief: The Chesapeake Bay Total Maximum Daily Load (TMDL) is a restoration plan for the Chesapeake Bay and its tidal tributaries. The TMDL places a limit across the Bay watershed on the amount of nutrients (nitrogen and phosphorus) and sediment that can enter these waters while still allowing them to support aquatic life and habitat. These limits were divided among the jurisdictions (the watershed states and the District of Columbia) and allocations were assigned to each of the major river basins. In Virginia, these basins are the Potomac, Rappahannock, York and James Rivers as well as the Eastern Shore. Though the Bay struggles with multiple challenges, the primary drivers for the TMDL were low dissolved oxygen levels and a loss of underwater grasses within the rivers and the Chesapeake Bay.

The allocations were further subdivided among the various source sectors (point and non-point). Under the current Watershed General Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed, the allocations for wastewater facilities in several watersheds, including the Rappahannock, were assigned as technology based limits (4 mg/L Total Nitrogen and 0.3 mg/L Total Phosphorus) as opposed to limits which are intended to address a local water quality concern (water quality based limits). These limits were only applied to facilities that treated 100,000 gallons per day or more. HRSD's Urbanna Treatment Plant, located within the Rappahannock Basin, has a design flow of 100,000 gallons per day and is captured in this General Permit.

Recognizing that the costs associated with meeting these limits would negatively impact local communities, the General Assembly enacted legislation to implement a nutrient trading program that would assist communities in meeting the pollution reductions needed to comply with the loading cap as cost-effectively and as soon as possible while continuing to promote growth and economic development. Virginia's Nutrient Credit Exchange was created as a result and is recognized as a tool which allows flexibility in the implementation of necessary nutrient reduction practices. A critical and often overlooked element of this as noted in the General Permit is that the credits cannot be acquired if doing so would cause an exceedance of a local water quality based limit. This requirement, therefore, allows trading to occur at a large watershed scale while providing protection for local waters.



COMMISSION MEETING MINUTES
August 27, 2019

While HRSD is a large credit generator in both the James and York River basins, in the Rappahannock, HRSD has utilized Virginia's nutrient credit trading program to cost-effectively maintain compliance with the Urbanna facility's allocation, benefitting local ratepayers. Even with the availability of credits, HRSD operates the facility as efficiently as possible to optimize wastewater treatment performance. A phased plan to manage increasing flows within Middlesex County includes closing this facility in the future so that current and future flows can be treated at a larger facility.

Staff provided a [briefing](#) at the meeting.

Attachment #5: [Presentation](#)

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

12. **NUTRIENT COMPLIANCE PLAN**

Action: No action required.

Brief: The 2019 update for the HRSD Nutrient Exchange submission is due to the Virginia Nutrient Credit Exchange Association by September 1. The Exchange is a voluntary body of more than 100 regulated municipal wastewater treatment plants and industrial facilities discharging nitrogen and phosphorus into the Chesapeake Bay watershed. The purpose of the Exchange is to coordinate and facilitate nutrient credit trading among its members with the goal of improving water quality in the Chesapeake Bay watershed efficiently and cost-effectively.

As set forth by regulation, the Exchange must submit a five-year compliance plan schedule to the Department of Environmental Quality each February on behalf of all members of the Exchange. In order to provide time for compilation and review, the Exchange requires that all members submit their individual plans to the Exchange several months prior to the annual February deadline. The annual update adds a new fifth year (2024), for nitrogen and phosphorus, to the rolling five year compliance plan period.

The HRSD Nutrient Compliance plan for 2024 is consistent with the 2023 plan year with minor changes in flow estimates. The highlights of the plan are noted below.

- Lower James River Basin (Army Base, Boat Harbor, James River, Nansemond, VIP and Williamsburg Treatment Plants): The plan includes nutrient removal at each facility with the exception of Boat Harbor. The projected nutrient loadings from HRSD's James River Basin facilities are anticipated to meet the nutrient allocations through 2024.
- York River Basin (King William, West Point and York River Plants): Both King William and York River employ nutrient removal. The nutrient reductions at these facilities are sufficient to meet HRSD's nutrient allocations through 2024.
- Rappahannock River Basin (Urbanna Treatment Plant): The plan continues to require HRSD to purchase nutrient credits through the Exchange to meet its allocation. In 2018, the expenditure for credits was approximately \$13,000. The cost to upgrade this facility for nutrient removal far exceeds the cost of credit purchase.



COMMISSION MEETING MINUTES

August 27, 2019

The Exchange uses the information provided by the annual updates to ensure that the plans in each basin are sufficient to meet the load allocations of nitrogen and phosphorus. HRSD successfully met the nutrient allocations in the James and York River basins for 2018 and anticipates continued compliance with the nutrient allocations in these basins through 2024. Sufficient credits are expected to be available in the Rappahannock River Basin to address the nutrient obligations for the Urbanna Treatment Plant. The updated submission for 2020 – 2024 demonstrates a plan of continued compliance with HRSD James River and York River allocations.

In addition to a discussion on the Exchange submission, a presentation will be provided outlining HRSD's historical and projected compliance with each of its permitted nutrient allocations. Future projections will include an evaluation of the HRSD's capacity to assist with locality compliance with Chesapeake Bay Total Maximum Daily Load (TMDL) nutrient and sediment stormwater reduction requirements.

Staff provided a [briefing](#) at the meeting.

Attachment #6: [Presentation](#)

Public Comment: None



COMMISSION MEETING MINUTES
August 27, 2019

- 13. **UNFINISHED BUSINESS** – None
- 14. **NEW BUSINESS** – None
- 15. **COMMISSIONER COMMENTS** – None
- 16. **PUBLIC COMMENTS NOT RELATED TO AGENDA** – None
- 17. **INFORMATIONAL ITEMS**

Action: No action required.

Brief: The items listed below were presented for information.

- a. [Management Reports](#)
- b. [Strategic Planning Metrics Summary](#)
- c. [Effluent Summary](#)
- d. [Air Summary](#)
- e. [Langley Magruder 30-Inch Ductile Iron Force Main Emergency Repairs \(Semple Farm\) Emergency Declaration Update](#)

Attachment #7: [Informational Items](#)

Public Comment: None

HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #1

AGENDA ITEM 1. – CONSENT AGENDA

CONSENT AGENDA ITEM 2.b.1. – August 27, 2019

Subject: Gravity Flow Monitoring Services
Contract Award (>\$200,000)

Recommended Action: Award a blanket purchase contract for Gravity Flow Monitoring Services to McKim and Creed, Inc. in the estimated amount of \$242,900 for year one with four annual renewal options and an estimated cumulative value in the amount of \$1,214,500.

Type of Procurement: Competitive Bid

Bidder	Bid Amount
McKim and Creed, Inc.	\$242,980
RJN Group, Inc.	\$332,802
Hydromax USA LLC	\$399,160
CSL Services, Inc.	\$431,067
Hydrostructures, PA	\$471,850
ADS LLC dba ADS Environmental Services	\$562,038

HRSD Estimate: \$446,030

Contract Description: This contract is an agreement for flow monitoring services of the HRSD gravity collection system. Services include placement of 16 gravity flow meters on HRSD assets at designated locations and 10 transient gravity flow meters for flow surveys. Services also include routine meter calibrations, flow monitoring and data reporting into HRSD's Telog server.

Analysis of Cost: Costs are determined to be fair and reasonable based on the competitive solicitation results and previous contract pricing.

CONSENT AGENDA ITEM 2.b.2. – August 27, 2019

Subject: Investment Management Services
Contract Award (>\$200,000)

Recommended Action: Award a contract for Investment Management Services to PFM Asset Management LLC in the estimated amount of \$113,500 for year one with four annual renewal options and an estimated cumulative value in the amount of \$567,500.

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
PFM Asset Management LLC	87	1
Chandler Asset Management Inc.	80	2

HRSD Estimate: \$600,000

Contract Description: This contract is an estimated use contract for investment management services. The manager will act as a consultant to provide advisory, placement, and asset investment services for HRSD's Retiree Health Plan Trust Funds.

A Public Notice was issued on May 23, 2019. Two firms submitted proposals on June 21, 2019 and all firms were determined to be responsive and deemed fully qualified, responsible and suitable to the requirements in the Request for Proposals. Two firms were short listed and technically ranked. The proposal submitted by PFM Asset Management LLC was ranked by technical points to be the highest qualified.

Analysis of Cost: Rates and associated fees were compared to past contract history including estimated yearly renewal increases and cost was determined to be fair, reasonable and below previous contract pricing.

CONSENT AGENDA ITEM 2.b.3. – August 27, 2019

Subject: Organizational Development Training and Consulting Services
Contract Award (>\$200,000)

Recommended Action: Award a contract for Organizational Development Training and Consulting Services to Hicks Carter Hicks, LLC in the estimated amount of \$251,500 for year one with four annual renewal options and an estimated cumulative value in the amount of \$1,158,098.

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
Hicks Carter Hicks, LLC	87	1
Infotec, LLC	83	2

Contract Description: This contract is an agreement for organizational development training and consulting services. Services include supervisor and employee training curriculum development, instruction, coaching, organizational needs assessments and other services as required. A Public Notice was issued on February 27, 2019. Three firms submitted proposals on March 22, 2019 and two firms were determined to be responsive and deemed fully qualified, responsible and suitable to the requirements in the Request for Proposals. Two firms were short listed, interviewed and technically ranked. The proposal submitted by Hicks Carter Hicks, LLC was ranked by technical points to be the highest qualified.

Analysis of Cost: Costs were compared to industry standards, previous contract rates and results from the competitive negotiation. Rates were negotiated and determined to be fair and reasonable.

CONSENT AGENDA ITEM 2.b.4. – August 27, 2019

Subject: Pump Station Generators and Standby Pump Upgrades
Contract Award (>\$200,000), HRSD Use of Existing Competitively Awarded
Contract Vehicle (>200,000), and Task Order (>\$200,000)

Recommended Actions:

- a. Award a contract to TA Sheets General Contractors Inc. (Bridgeman Civil, Inc.) in the amount of \$3,823,000.
- b. Approve the use of the Sourcewell contract for Diesel Gas Generator Sets to Caterpillar Inc. Alternative Energy in the estimated amount of \$522,437.
- c. Approve a task order with Guernsey Tingle (GT) in the amount of \$300,300.

CIP Project: GN011700

Budget	\$7,106,000
Previous Expenditures and Encumbrances	(\$861,589)
Available Balance	\$6,244,411

Type of Procurement: Competitive Bid

Bidder	Bid Amount
Bridgeman Civil, Inc.	\$3,823,000
Clark Construction LLC	\$4,564,228
SHAW Construction Corp.	\$4,970,500

Engineer's Estimate: \$4,199,000

Contract Status:	Amount
Original Contract with GT	\$676,711
Total Value of Previous Task Orders	\$122,463
Requested Task Order	\$300,300
Total Value of All Task Orders	\$422,673
Revised Contract Value	\$1,099,474
Engineering Services as % of Construction	28.8%

Contract Description: In accordance with HRSD's competitive sealed bidding procedures, the Engineering Department advertised and solicited bids directly from potential bidders. The project was advertised July 7, 2019, and three bids were received on August 6, 2019. The design engineer, GT, evaluated the bids and recommends award to the lowest responsive and responsible bidder Bridgeman Civil, Inc., in the amount of \$3,823,000.

Project Description: This project will install emergency generators or standby pumps at thirteen North and South Shore pumping stations to provide station reliability and avoid sanitary sewer overflows (SSOs) during power outages. This project is a Rehabilitation Action Plan – Phase I program, which is part of the Federal Consent Decree to address SSOs in the region.

Contract Description: This contract is for the supply and delivery of diesel gas generators for use by all of HRSD in accordance with a cooperative contract competitively solicited by Sourcewell. Upon evaluation of the Sourcewell contract terms and conditions, as a public agency, HRSD is eligible to use the contract awarded to Caterpillar Inc. Alternative Energy.

Task Order Description and Analysis of Cost: This task order will provide construction phase services for this project. A fee of \$300,300 was negotiated with GT based on anticipated construction administration and specialty inspection hours required for this project. This cost for construction phase service is 7.9 percent of the total construction cost and is within the range of comparable projects.

<u>Schedule:</u>	Construction	October 2019
	Project Completion	April 2021

CONSENT AGENDA ITEM 2.c.1. – August 27, 2019

Subject: SWIFT Integrated Planning
Task Order (>\$200,000)

Recommended Action: Approve a task order with CH2M Hill Engineers, Inc. (Jacobs) in the amount of \$1,010,564.

CIP Project: GN016310

Budget	\$8,500,000
Previous Expenditures and Encumbrances	(\$1,858,693)
Available Balance	\$6,641,307

Contract Status:	Amount
Original Contract with Jacobs	\$1,513,248
Total Value of Previous Task Orders	\$198,053
Requested Task Order	\$1,010,564
Total Value of All Task Orders	\$2,721,865
Revised Contract Value	\$2,721,865

Project Description: The Integrated Planning of SWIFT project will provide technical guidance and concept development in support of the SWIFT Full Scale Implementation Program. The Integrated Planning project will also provide technical support to HRSD for other aspects of SWIFT that may be separate from the Full Scale Implementation Program, as SWIFT will have impacts on many facets of HRSD's business, operations, and role in the region. This project will bring in the needed resources to support HRSD staff for planning, modeling, regulatory coordination, and engagement with stakeholders.

Task Order Description: This task order will provide professional engineering services during FY 2020 for multiple tasks associated with the integrated planning of SWIFT. These services will provide support to Research Center operation, SWIFT related research, direct filtration pilot, pretreatment program, regulatory coordination, evaluation of wellfield site locations at VIP and York River, and capacity analysis for VIP SWIFT. It is expected that this scope will primarily support SWIFT integration and provide Owner's Technical Advisor services for full scale facility implementation during FY 2020. Subsequent support services will be negotiated annually or at such point when a specific need has been identified.

Analysis of Cost: The labor rates for each staff category in the proposed fee are in accordance with Jacobs Professional Services Agreement for General Engineering Services, as approved for FY 2020. The level of effort for each of the sub-tasks included is consistent with previous services provided for SWIFT and with expected levels of effort for similar studies and support tasks. An eight percent contingency was included to cover any small requests for assistance or modifications in scope by HRSD during the fiscal year. The proposed scope and associated fees are considered to be reasonable and appropriate for the negotiated tasks.

CONSENT AGENDA ITEM 2.c.2. – August 27, 2019

Subject: SWIFT Program Management
Task Order (>\$200,000)

Recommended Action: Approve a task order with AECOM in the amount of \$4,514,535

CIP Project: GN016320

Budget	\$80,000,000
Previous Expenditures and Encumbrances	(\$5,267,490)
Available Balance	\$74,732,510

Contract Status:	Amount
Original Contract with AECOM	\$5,264,440
Total Value of Previous Task Orders	\$0
Requested Task Order	\$4,514,535
Total Value of All Task Orders	\$9,778,975
Revised Contract Value	\$9,778,975

Project Description: The SWIFT Full Scale Implementation Program Management team will manage the delivery of the advanced water treatment facilities to take HRSD's already highly treated wastewater and produce SWIFT water. The Program Management team may also deliver conveyance, wastewater treatment plant improvements, and other such projects to support full scale SWIFT implementation. The Program Management team will implement the processes, procedures, and systems needed to design, procure, construct, permit, manage, and integrate the new SWIFT related assets.

Task Order Description: This task order will provide professional engineering services during FY 2020 for multiple tasks associated with the program management of the SWIFT Full Scale Implementation Program (FSIP). These services will provide program administration, training strategy development, asset integration requirements, sustainability approach, program document controls, permitting support, risk identification and tracking, funding application support, schedule and budget management, quality assurance reviews of deliverables, and additional project development to support HRSD capital improvement program planning related to the SWIFT FSIP.

Analysis of Cost: The professional engineering services task order includes the scope and fee for the second year of the program for FY 2020. It is intended that subsequent program management services scopes and fees will be negotiated annually. The proposed activities and number of hours associated with each task are considered to be a reasonable estimate of the effort required. The labor rates for each staff category in the proposed fee are in accordance with the Professional Services Agreement with AECOM, as approved for FY 2020. The program management rate schedule is comparable with the typical rate schedule of HRSD's General Engineering Services providers. The proposed scope, rate schedule, and budget fee are considered to be reasonable and appropriate for the second year of program management services. Compensation for program management services will be based on actual time and materials costs invoiced to HRSD.

CONSENT AGENDA ITEM 2.c.3. – August 27, 2019

Subject: Washington District Pump Station Area Sanitary Sewer Improvements Task Order (>\$200,000)

Recommended Action: Approve a task order with Rummel, Klepper & Kahl, LLP (RKK) in the amount of \$323,708.

CIP Project: AT013000

Budget	\$2,496,266
Previous Expenditures and Encumbrances	(\$94,850)
Available Balance	\$2,401,416

Contract Status:	Amount
Original Contract with RKK	\$94,850
Total Value of Previous Task Orders	\$0
Requested Task Order	\$323,708
Total Value of All Task Orders	\$323,708
Revised Contract Value	\$418,558
Engineering Services as % of Construction	14%

Project Description: This project will rehabilitate and/or replace 4,300 linear feet of 18-inch gravity pipeline with associated manholes. This project will also include the permanent abandonment of the inactive Washington District outfall.

Task Order Description and Analysis of Cost: This task order will provide design services and construction documents in accordance with the approved alternative from the Preliminary Engineering Report. The design will reflect capacity upgrades to the existing gravity sewer influent to discharge directly into the Washington District Pump Station wet well and abandonment and minor modifications to the former influent chambers for use as storage. A meeting was held to discuss the project and scope of services. A fee of \$323,708 was negotiated which is based on hourly rates in RKK's annual services contract for Interceptor System Projects. The design fee is 14 percent of the estimated construction cost which is reasonable when compared to other similar projects. This project is included in the Rehabilitation Action Plan Phase 2 Program, which is part of the Federal Consent Decree to address Sanitary Sewer Overflows (SSOs) in the region.

<u>Schedule:</u>	PER	December 2018
	Design	September 2019
	Bid	November 2020
	Construction	March 2021
	Project Completion	July 2022

CONSENT AGENDA ITEM 2.c.4. – August 27, 2019

Subject: Smart Sewer - Optimization of Chesapeake-Elizabeth and Atlantic Service Areas
Task Order (>\$200,000)

Recommended Action: Approve a task order with EmNet, LLC in the amount of \$229,400.

Contract Status:	Amount
Original Contract with EmNet, LLC	\$62,021
Total Value of Previous Task Orders	\$25,000
Requested Task Order	\$229,400
Total Value of All Task Orders	\$254,400
Revised Contract Value	\$316,421

Project Description: HRSD has contracted with EmNet to pilot a real-time decision support system (RT-DSS) on the North Shore. The effort is commonly referred to as the 'smart sewer pilot' and evaluates the benefits of real time control within the collection system to help meet a variety of targets over different time scales. The pilot was recently completed and there are several demonstrated opportunities for improvements to the system which show positive return on investment for treatment, capital investment, and wet weather flow management.

The most tangible benefit thus far is the use of collection system storage tanks to reduce the need for equalization at full- scale SWIFT facilities. Following the EmNet pilot, HRSD staff developed control logic at Coliseum storage tank to successfully 'flatline' the dry weather flow variability seen at the York River Treatment Plant demonstrating the potential of collection system control and optimization.

HRSD has also contracted with EmNet to provide design guidance during the SCADA system development.

Task Order Description: This task order will examine the operation of HRSD's Chesapeake-Elizabeth and Atlantic service areas to determine how an automated system could optimize hydraulic performance primarily during wet weather. The study will determine the potential impact on the system following the closure of the Chesapeake-Elizabeth Treatment Plant by maximizing wet weather capacity of the existing collection system to minimize or offset the need for additional wet weather capacity infrastructure.

Analysis of Cost: The cost for this task order is based on previously negotiated hourly rates for similar work.

CONSENT AGENDA ITEM 2.d.1 – August 27, 2019

Subject: Flygt Submersible Pump
Sole Source (>\$10,000)

Recommended Action: Approve the use of Flygt Submersible pumps, parts and maintenance services for use at HRSD.

Sole Source Justification:

- Compatibility with existing equipment or systems is required
- Support of a special program in which the product or service has unique characteristics essential to the needs of the program
- Product or service is covered by a patent or copyright
- Product or service is part of standardization program to minimize training for maintenance and operation, and parts inventory

Details: Product includes the purchase of Flygt Submersible pumps, parts and maintenance services for the Boat Harbor Treatment Plant (BHTP). This pump is used in side stream treatment (SST) at BHTP. The SST wet well has two of these pumps, one primary and one backup. The pumps move incinerator scrubber water, centrifuge centrate and dissolved air floatation (DAF) supernatant to the SST tank.

Xylem Water Solutions USA, INC is the direct manufacturer of Flygt Submersible pumps.

HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #2

AGENDA ITEM 4. – FIXED-RATE SUBORDINATE WASTEWATER REVENUE
BONDS REFUNDING RESOLUTION AND PRESENTATION



2019 Taxable Bond Refunding and Closure of the Senior Lien

August 27, 2019

Bottom-Line Up Front (BLUF)

- Estimated Net Present Value Savings = **\$32M or 14%**, subject to change
- Proposing to close the Master Trust Indenture (senior lien) to improve our bond ratings

Bond Refunding Mechanics



Since 2012, HRSD saved over \$40M net present value



Issue Lower Interest Rate Refunding Bonds or Cash



ESCROW ACCOUNT



Purchase fixed rate government securities



Pays Principal and Interest until the Call Date

Higher Interest Rate Bonds

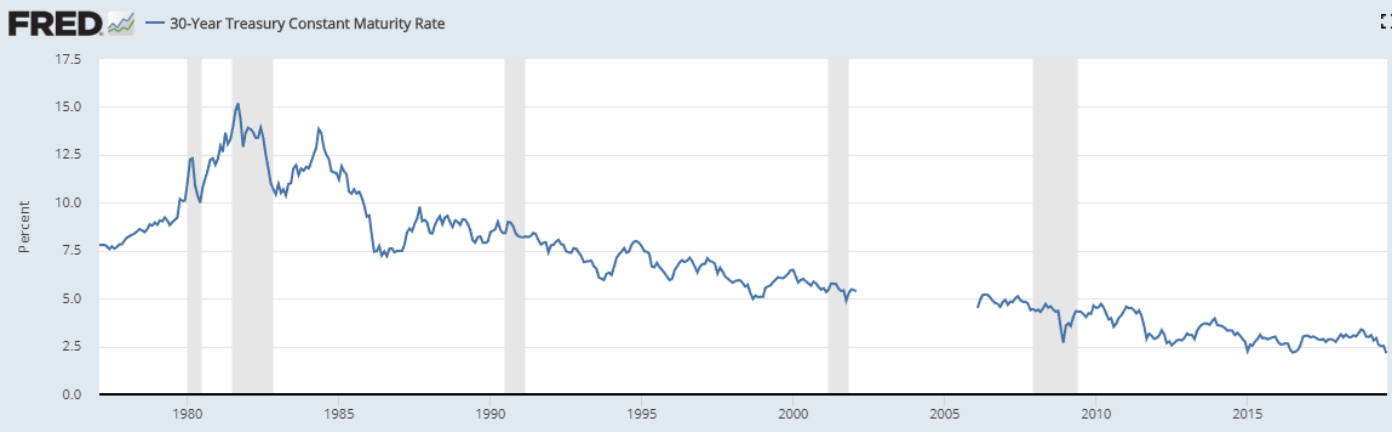
DEFEASED



- **Eliminated Tax-Exempt Advanced Refunding**
 - Ability to refund bonds greater than 90 days from the Call Date
 - Limited to one advanced refunding
- **Primary options**
 - **Taxable Refunding**, no limit to number of this type
 - **Tax-Exempt Current Refunding** – less than 90 days from the Call Date
 - Can still be done after a taxable refunding

Current Market Conditions

- Trade war and Global uncertainty
- Flight to quality
- Yield curve inversion
- 30-year Treasury hit its lowest level in history



30 YR

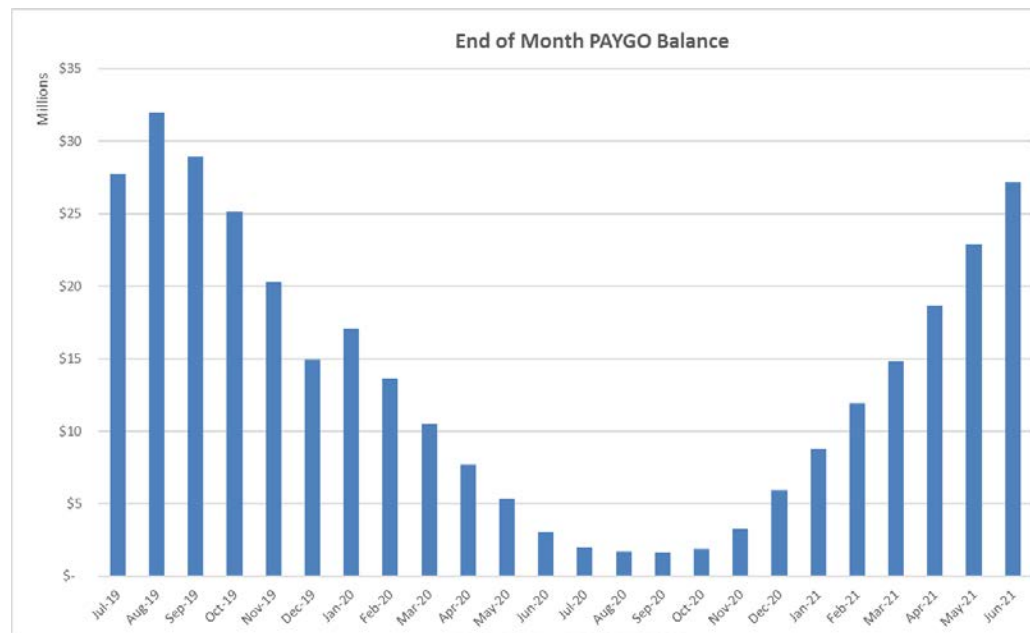
PERFORMANCE	Value
5 Day	-9.17
1 Month	-64.97
3 Month	-80.60
YTD	-107.07
1 Year	-101.57

2019 Bond Refunding Summary

- Authorization to issue up to \$360M in taxable refunding bonds and up to \$70M in cash
- Assuming Aug 23 market conditions
 - \$211M taxable refunding bonds issued
 - \$66M in cash
 - Net Present Value Savings = **\$32M or 14%**
- Moves \$40M from senior to subordinate level
 - executing on Plan of Finance
- Virginia retail-only order period first

Using Cash to Defeasure Bonds

- Estimated defeasance cash = \$66 million
- Lower interest rate opportunities on the horizon
 - Existing and Proposed \$177M Clean Water Loans (Likely \$150M)
 - \$1.7 Billion WIFIA Funds



Financial Policy - Refunding Efficiency

- “Consider” Refunding Efficiency 70% or greater
- Probabilistic calculation
- Measures savings you realize today relative to estimated savings you might achieve in the future
- Assumes that it can only be done once (Current Refunding)
- Recommend
 - 3% Net Present Value Savings
 - Revising Refunding Efficiency in the next policy update

Closing the Senior Lien

- Assuming the region's wet weather responsibility to save \$1 billion
- Requires spending \$1.1 billion on Locality assets
 - Must be expensed
- 2016 – Opportunity to amend the Subordinate (Sub) Trust agreement
 - Redefined Debt Service Coverage calculation to exclude Locality CIP expenses
- Strategy – issue all new debt at the Sub lien
- Discussed this strategy with Ratings Agencies

Example – Debt Service Coverage Ratio (DSCR) Calculation

	GAAP Basis	Adjusted Basis
Net Operating Income	\$150M	\$150M
- Locality Projects Expensed	-\$50M	\$ - <i>(adjusted)</i>
Net Operating Income	\$100M	\$150M
Debt Service <i>(Principal + Interest)</i>	\$75M	\$75M

DEBT SERVICE COVERAGE RATIO

$$\frac{\$100M}{\$75M} =$$

1.3
(GAAP)

$$\frac{\$150M}{\$75M} =$$

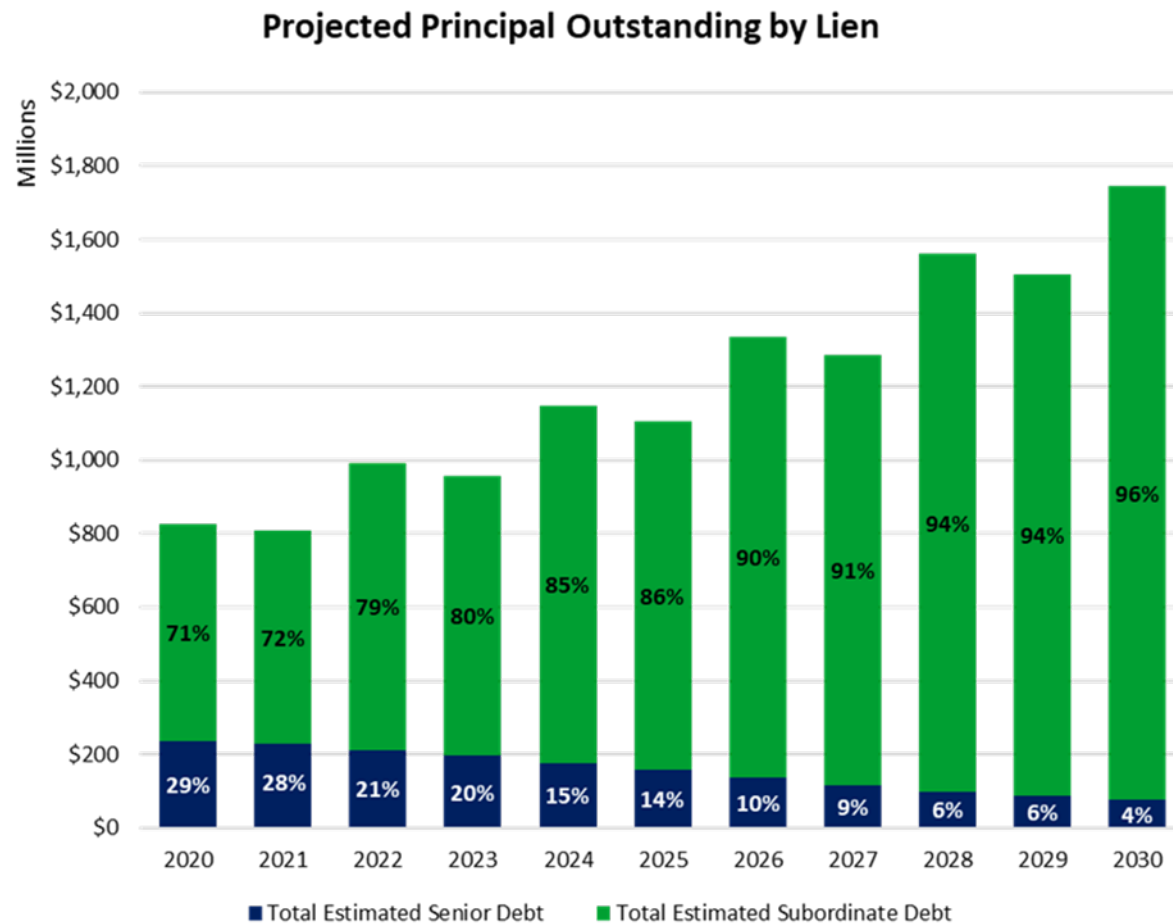
2.0
(Adjusted)

Virginia Resource Authority (VRA) Master Financing Agreement

- Senior to Sub Migration Conditions
 - Condition #3 of 8 - Close the senior lien
- \$40 million projected to migrate to the Sub level

Closing the Master Trust Indenture (Senior Lien)

- “Closed” to new issuance
- Issuing all new debt under the Subordinate (Sub) lien
- Sub lien will become our Senior Lien



HRSD's Senior and Subordinate Ratings



Senior
Sub

Questions

*Hampton Roads Sanitation District
Resolution of
August 27, 2019*

HAMPTON ROADS SANITATION DISTRICT COMMISSION

A RESOLUTION
AUTHORIZING THE ISSUANCE AND AWARD OF
ONE OR MORE SERIES OF
HAMPTON ROADS SANITATION DISTRICT
SUBORDINATE WASTEWATER REVENUE BONDS

Adopted August 27, 2019

Resolution

**RESOLUTION AUTHORIZING THE ISSUANCE AND
AWARD OF ONE OR MORE SERIES OF HAMPTON ROADS
SANITATION DISTRICT SUBORDINATE WASTEWATER
REVENUE BONDS.**

WHEREAS, the Hampton Roads Sanitation District (the “District”) was duly created under and pursuant to Chapter 407 of the Acts of Assembly of Virginia of 1940, and the Hampton Roads Sanitation District Commission (the “Commission”), created by said Chapter 407, is the governing body of the District; and

WHEREAS, by virtue of Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (the “Act”), the Commission is authorized and empowered:

(a) to construct, improve, extend, enlarge, reconstruct, maintain, equip, repair and operate a wastewater treatment system or systems, either within or without or partly within and partly without the corporate limits of the District;

(b) to issue, at one time or from time to time, revenue bonds, notes or other obligations of the District payable solely from the special funds provided under the authority of the Act and pledged for their payment, for the purpose of paying the cost of a wastewater treatment system or systems and extensions and additions thereto, and providing funds for any other authorized purpose of the Commission, and

(c) to fix, revise, charge and collect rates, fees and other charges for the use of, and for the services and facilities furnished or to be furnished by, any such wastewater treatment system; and

WHEREAS, as provided by the Act, the District is constituted a political subdivision of the Commonwealth of Virginia and established as a governmental instrumentality to provide for the public health and welfare; and

WHEREAS, the Commission has previously authorized the execution and delivery of a Master Trust Indenture, dated as of December 1, 1993, as amended and restated March 1, 2008 (as supplemented and as further amended and supplemented from time to time, the “Senior Trust Agreement”), between the District and The Bank of New York, as Trustee (The Bank of New York Mellon Trust Company, N.A., as successor in interest to The Bank of New York, the “Senior Trustee”), to secure the payment of Senior Obligations (as defined in the Senior Trust Agreement) of the District, such Senior Obligations being payable from the Net Revenues (as defined in the Senior Trust Agreement) of the District; and

WHEREAS, the Senior Trust Agreement permits the issuance of Subordinated Indebtedness (as defined in the Senior Trust Agreement), the payment on which will be, in all cases, subordinate and junior in right of payment to the prior payment in full of the Senior Obligations; and

WHEREAS, to secure the payment of and provide for the issuance of such Subordinated Indebtedness, the Commission authorized the execution and delivery of a Trust Agreement, dated as of October 1, 2011 (the “Original Trust Agreement”), as amended and restated as of March 1, 2016 (the Original Trust Agreement, as so amended and restated, the “Trust Agreement”), each by and

between the District and The Bank of New York Mellon Trust Company, N.A., as successor trustee (in such capacity, the “Trustee”), to provide for the issuance of Parity Obligations (as defined in the Trust Agreement);

WHEREAS, the Commission has determined to provide for the issuance under the Trust Agreement, of one or more series of Bonds of the District, which Bonds may be delivered at one or more times, in the aggregate principal amount of not to exceed Three Hundred and Seventy Million Dollars (\$370,000,000) (the “2019 Bonds”) for the purpose of providing funds, together with other available funds, to (i) to refund certain Senior Obligations, Bonds, VRA Subordinate Obligations and Junior Obligations (each as defined in the Trust Agreement) (collectively, the “Refunding Candidates”) and (ii) pay certain expenses incurred in connection with the issuance of the 2019 Bonds by the District;

WHEREAS, the Commission has determined that 2019 Bonds will be sold through a negotiated underwriting with one or more of the investment banking firms replying to the District’s request for proposals for investment banking services, dated April 27, 2018, to be selected by a Delegate (as defined below) in accordance with the provisions of Section 3 hereof (the investment banking firm or firms so selected, the “Underwriters”); and

WHEREAS, there have been presented at this meeting draft copies of the following documents relating to the issuance and sale of the 2019 Bonds:

- (a) a Supplemental Trust Agreement (the “Supplemental Agreement”), by and between the District and the Trustee;
- (b) a Preliminary Official Statement of the District, with such changes as may be approved in accordance with Section 10 hereof (the “Preliminary Official Statement”);
- (c) a Continuing Disclosure Agreement (the “Continuing Disclosure Agreement”), the form of which appears as Appendix E to the Preliminary Official Statement; and

Now, Therefore, the HAMPTON ROADS SANITATION DISTRICT COMMISSION DOES HEREBY RESOLVE, as follows:

Section 1. Definitions. Capitalized words and terms used in this Resolution and not defined herein shall have the same meanings in this Resolution as such words and terms are given in the Trust Agreement and the Supplemental Agreement.

Section 2. Authorization of Bonds. In order to provide funds required to refund all or a portion of the Refunding Candidates and pay certain expenses incurred in connection with the 2019 Bonds by the District and pursuant to the authority granted to it by the Act, the District hereby authorizes the issuance at one or more times and in one or more series of Hampton Roads Sanitation District Subordinate Wastewater Revenue Bonds, Refunding Series 201[_][_] [(Federally Taxable)] (the blank to be completed with the calendar year of issuance and a letter), in an aggregate principal amount not to exceed Three Hundred and Seventy Million Dollars (\$370,000,000), dated as of such date, maturing on such dates in such years not later than thirty-five (35) years from their date of issuance and in such principal amounts and bearing interest at such rates, on a federally taxable or tax-exempt basis, all as determined by the Chairman of the Commission, Vice Chairman of the Commission, the General Manager of the District and the Director of Finance of the District (each, a

“Delegate”), any of whom may act, prior to the execution of the Bond Purchase Agreement (as defined in Section 3 below) relating to such series of 2019 Bonds and evidenced in the Bond Purchase Agreement and the Supplemental Agreement relating to such series of 2019 Bonds.

The Commission hereby determines that the issuance of the 2019 Bonds will be in the best interests of the District.

The 2019 Bonds shall be issued as fully registered bonds in denominations of \$5,000 or any whole multiple thereof or in any other denominations determined by the Delegates. The 2019 Bonds shall be issuable in book-entry form as provided in the Trust Agreement. Payments of principal of, premium, if any, and interest on the 2019 Bonds shall be forwarded by the Bond Registrar to the registered owners of the 2019 Bonds in such manner as is set forth in the Trust Agreement.

Section 3. Method of Sale. The 2019 Bonds, if any, shall be sold by negotiated sale with one or more Underwriters. A Delegate, acting in consultation with PFM Financial Advisors LLC, Financial Advisor to the District (the “Financial Advisor”), is authorized to select such Underwriters, provided that each firm so selected shall have submitted a response to the District’s request for proposals for investment banking services, dated April 27, 2018, that has been deemed complete in all material respects. If any 2019 Bonds are issued, a Delegate is authorized to execute a Bond Purchase Agreement with respect to each series of the 2019 Bonds in substantially the form executed by the District in connection with the issuance of the District’s Subordinate Wastewater Revenue Bonds, Refunding Series 2017A (the “Bond Purchase Agreement”), a copy of which has been presented at the meeting of the Commission in which this Resolution was approved, with such changes, modifications and deletions as such Delegate, with the advice of counsel, may deem necessary and appropriate.

Section 4. Redemption. A Delegate is hereby authorized to determine the optional redemption provisions of each series of the 2019 Bonds, if any, as such Delegate, in consultation with the Financial Advisor, in writing, may deem advisable, and the Delegate may, with the advice of the Financial Advisor and counsel to the District, provide that such series of the 2019 Bonds shall not be subject to optional redemption before their respective maturities. A Delegate may further determine that any term 2019 Bonds shall be subject to mandatory sinking fund redemption at a redemption price of 100% and shall have such amortization requirements as determined by such Delegate. All such determinations by a Delegate shall be determined prior to the execution of the Bond Purchase Agreement relating to such series of 2019 Bonds.

Section 5. Application of Bond Proceeds. The proceeds of the 2019 Bonds shall be applied as provided in Section 3.1 of the Supplemental Agreement and the Escrow Deposit Agreement (as defined below). If any 2019 Bonds are issued, a Delegate is authorized to execute one or more Escrow Deposit Agreements, each by and between the District and a national banking association or similar bank or trust company qualified to do business in the Commonwealth, in substantially the form executed by the District in connection with the issuance of the District’s Subordinate Wastewater Revenue Bonds, Refunding Series 2017A (the “Escrow Deposit Agreement”), a copy of which has been presented at the meeting of the Commission in which this Resolution was approved, with such changes, modifications and deletions as such Delegate, with the advice of counsel, may deem necessary and appropriate.

Section 6. Authorization of Basic Documents. The forms, terms and provisions of each of the Supplemental Agreement, the Bond Purchase Agreement, the Continuing Disclosure Agreement

and the Escrow Deposit Agreement (collectively, the “Basic Documents”) are hereby approved in all respects, and the District Representatives (hereinafter defined) are hereby authorized and directed to execute and deliver the Basic Documents with respect to each series of 2019 Bonds in substantially the forms presented to this meeting, together with such changes, modifications and deletions as such District Representatives, with the advice of counsel, may deem necessary and appropriate; such execution and delivery shall be conclusive evidence of the approval and authorization thereof by the District.

Section 7. Refunding Candidates. A Delegate is authorized to determine the Refunding Candidates to be refunded with the proceeds of any series of the 2019 Bonds (such Refunding Candidates, the “Refunded Bonds”) based on the following criterion: based on a determination by the Financial Advisor, in writing, if any of the Refunding Candidates are to be refunded, the aggregate net present value debt service savings achieved as a result of refunding such Refunding Candidates with the proceeds of the Refunding Bonds shall be equal to at least three percent (3%) of the par amount of the Refunded Bonds.

Section 8. Execution of Bonds. The form of the 2019 Bonds set forth in the Supplemental Agreement is hereby approved in all respects, and the Chairman or Vice Chairman and the Secretary or any Assistant Secretary of the Commission are hereby authorized and directed to execute, by manual or facsimile signature, as provided in such forms of the 2019 Bonds, and to deliver to the Bond Registrar for authentication on behalf of the District, the 2019 Bonds in definitive form for each series of the 2019 Bonds, with such changes, modifications and deletions as they, with the advice of counsel, may deem necessary, appropriate and consistent with the Trust Agreement and the Supplemental Agreement; such execution and delivery shall be conclusive evidence of the approval and authorization thereof by the District.

Section 9. Authorization and Delivery of the Bonds. Upon their execution in the form and manner set forth in the Trust Agreement, the 2019 Bonds of each series shall be deposited with the Bond Registrar for authentication, and the Bond Registrar is hereby authorized and directed to authenticate such series of 2019 Bonds and, upon the due and valid execution of the Basic Documents, the Trustee shall cause the Bond Registrar to deliver such series of 2019 Bonds to or for the account of The Depository Trust Company, New York, New York, for the account of the Underwriters, in accordance with and subject to the provisions of Section 209 of the Trust Agreement.

Section 10. Official Statements. The form of the Preliminary Official Statement is hereby approved, and a Delegate is hereby authorized to approve the terms of and publish a Preliminary Official Statement with respect to each series of the 2019 Bonds, as updated to reflect any subsequent events if any series of 2019 Bonds is to be sold after the first series of 2019 Bonds, describing the 2019 Bonds and substantially in the same form as the Preliminary Official Statement presented to this meeting, and deem “final” such Preliminary Official Statement for purposes of Rule 15c2-12 under the Securities Exchange Act of 1934, as amended; and a Delegate is hereby authorized to execute an official statement (the “Official Statement”) with respect to each series of 2019 Bonds in substantially the form of the deemed “final” Preliminary Official Statement relating to such series of the 2019 Bonds, together with such changes, modifications and deletions as such Delegate, with the advice of counsel, may deem necessary or appropriate; and the District hereby approves and authorizes the distribution and use of copies of the Official Statement and the Basic Documents in connection with such sale.

Section 11. District Representatives. Each of the Chairman of the Commission, Vice Chairman of the Commission, General Manager and Director of Finance are hereby appointed a District Representative within the meaning of such term under the Trust Agreement, with full power to carry out the duties set forth therein. Any one or more of the District Representatives may act for and on behalf of the District.

Section 12. Securities Depository. The Depository Trust Company, New York, New York, is hereby appointed as the initial Securities Depository for the Bonds, with Cede & Co., a nominee thereof, being the initial Securities Depository Nominee and initial registered owner of each series of the 2019 Bonds.

Section 13. Further Actions. The Delegates and the District Representatives are each authorized and directed (without limitation except as may be expressly set forth herein) to take such action and to execute and deliver any such documents, certificates, undertakings, agreements or other instruments as they, with the advice of counsel, may deem necessary or appropriate to effectuate the transactions contemplated by the Basic Documents, the Trust Agreement and the Official Statement.

Section 14. Use of Available Funds. The Commission authorizes up to \$70,000,000 of available funds of the District (in addition to any proceeds of 2019 Bonds) for use in the refunding of the Refunded Bonds.

Section 15. Delegates' Certificate. Each Delegate may execute a Certificate or Certificates evidencing the determinations made or other actions carried out pursuant to the authority granted in this Resolution, and any such Certificate shall be conclusive evidence of the actions or determinations as stated therein.

Section 16. Ratification of Prior Acts. The actions heretofore taken by the District Representatives in connection with the proposed issuance of the Bonds are hereby ratified.

Section 17. Sunset Provision. No series of 2019 Bonds may be issued pursuant to the authority provided by this Resolution after June 30, 2020.


Section 18. Rate Schedule. In compliance with Section 22 of the Act, incorporated herein the same as if set forth verbatim herein is the current "Rate Schedule For all Wastewater and Associated Charges effective July 1, 2019" for the use of, and for the services and facilities furnished or to be furnished by, the wastewater disposal system or systems and the wastewater improvements, for which the 2019 Bonds are to be issued. Such schedule appears in full on the District's website, www.hrsd.com.

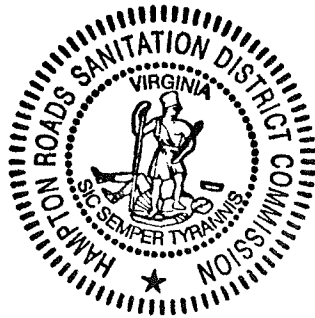
RESOLUTION AUTHORIZING THE ISSUANCE AND AWARD OF ONE OR MORE SERIES
OF HAMPTON ROADS SANITATION DISTRICT SUBORDINATE
WASTEWATER REVENUE BONDS

Section 19. Effective Date. This Resolution shall take effect immediately upon its passage.

[END OF RESOLUTION]

Adopted by the Hampton Roads Sanitation District Commission on August 27, 2019.


Frederick N. Elofson, Chair



SEVENTH SUPPLEMENTAL TRUST AGREEMENT

by and between

HAMPTON ROADS SANITATION DISTRICT

and

THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A.,
as Trustee

Dated as of _____ 1, 2019

Securing

[\$PAR]

Subordinate Wastewater Revenue Bonds
Refunding Series 2019A
(Federally Taxable)

TABLE OF CONTENTS

ARTICLE I.

DEFINITIONS

Section 1.1 Meaning of Words and Terms.....4
Section 1.2 Rules of Construction6

ARTICLE II.

DETAILS OF THE 2019A Bonds

Section 2.1 Details of 2019A Bonds.....7
Section 2.2 Optional Redemption.....7
Section 2.3 [Reserved]7
Section 2.4 Selection of 2019A Bonds to be Redeemed7
Section 2.5 Redemption Notice.....8
Section 2.6 Effect of Calling for Redemption.....8
Section 2.7 Redemption of Portion of 2019A Bonds.....9
Section 2.8 Cancellation9
Section 2.9 Use of Defeasance Obligations to Redeem 2019A Bonds9

ARTICLE III.

APPLICATION OF THE PROCEEDS OF THE 2019A Bonds

Section 3.1 Creation of Subfunds.....10
Section 3.2 Application of the Proceeds of the 2019A Bonds10

ARTICLE IV.

[RESERVED]

ARTICLE V.

DEFEASANCE

Section 5.1 Release of this Supplemental Trust Agreement.....12

ARTICLE VI.

MISCELLANEOUS

Section 6.1 Manner of Giving Notice.....14
Section 6.2 Substitute Mailing.....15
Section 6.3 Parties, Bond Registrar and Holders Alone Have Rights under Trust Agreement.....15
Section 6.4 Effect of Partial Invalidity.....15
Section 6.5 Effect of Covenants.....16
Section 6.6 No Recourse Against Members, Officers or Employees of Commission or District.....16
Section 6.7 Dealing in 2019A Bonds.....16
Section 6.8 Legal Holidays.....16
Section 6.9 Multiple Counterparts.....17
Section 6.10 Headings.....17
Section 6.11 Further Authority.....17

TESTIMONIUM.....S-1
SIGNATURES.....S-1

EXHIBIT A – REFUNDED BONDS
EXHIBIT B – FORM OF 2019A Bonds

THIS SEVENTH SUPPLEMENTAL TRUST AGREEMENT, dated for convenience of reference as of _____ 1, 2019 (“Supplemental Trust Agreement”), by and between

HAMPTON ROADS SANITATION DISTRICT,

a political subdivision of the Commonwealth of Virginia, by Hampton Roads Sanitation District Commission, the governing body of said District, and

THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A.,

a national banking association duly incorporated and validly existing under the laws of the United States of America and having a corporate trust office in Pittsburgh, Pennsylvania, which is authorized under such laws to exercise trust powers and is subject to examination by federal authority (said banking corporation and any bank or trust company becoming successor Trustee under this Supplemental Trust Agreement being hereinafter sometimes called the “Trustee”), supplements the Trust Agreement, dated as of October 1, 2011 (the “Original Trust Agreement”), as amended and restated as of March 1, 2016 (the “Amended and Restated Trust Agreement”), between the District and The Bank of New York Mellon Trust Company, N.A. (the Amended and Restated Trust Agreement, as amended and supplemented from time to time, the “Trust Agreement”),

WITNESSETH:

WHEREAS, the Hampton Roads Sanitation District (the “District”) was duly created under and pursuant to Chapter 407 of the Acts of Assembly of Virginia of 1940, and the Hampton Roads Sanitation District Commission (the “Commission”), created by said Chapter 407, is the governing body of the District; and

WHEREAS, by virtue of Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (said Chapter 66 as so amended being hereinafter sometimes called the “Enabling Act”), the Commission is authorized and empowered:

(a) to construct, improve, extend, enlarge, reconstruct, maintain, equip, repair and operate a wastewater treatment system or systems, either within or without or partly within and partly without the corporate limits of the District,

(b) to issue, at one time or from time to time, revenue bonds, notes or other obligations of the District payable solely from the special funds provided under the authority of the Enabling Act and pledged for their payment, for the purpose of refunding the outstanding bonds, including the payment of any redemption premium thereon, paying the cost of a wastewater treatment system or systems and extensions and additions thereto, and providing funds for any other authorized purpose of the Commission, and

(c) to fix, revise, charge and collect rates, fees and other charges for the use of, and for the services and facilities furnished or to be furnished by, any such wastewater treatment system; and

WHEREAS, the Commission has previously executed and delivered a Master Trust Indenture, dated as of December 1, 1993, as amended and restated March 1, 2008 (as supplemented and as further amended and supplemented from time to time, the “Senior Trust Agreement”), between the District and The Bank of New York Mellon Trust Company, N.A., as successor Trustee (in such capacity, the “Senior Trustee”) pursuant to which District may provide for issuance and incurrence of Senior Obligations (as defined in the Senior Trust Agreement); and

WHEREAS, Section 705 of the Senior Trust Agreement permits the issuance of Subordinated Indebtedness (as defined in the Senior Trust Agreement) subject to the conditions recited therein; and

WHEREAS, on October 20, 2011, the Commission executed and delivered the Original Trust Agreement to provide for the issuance of Parity Obligations payable solely from the Net Revenues Available for Debt Service derived by the District from its Wastewater System and the money attributable to proceeds of the Bonds and the income from the investment thereof and, coincident with the delivery of the Trust Agreement, determined to execute and deliver a First Supplemental Trust Agreement, dated as of October 1, 2011, to authorize and secure under the Trust Agreement revenue bonds of the District in the aggregate principal amount of Twenty-five Million Dollars (\$25,000,000) (the “2011 Bonds”) for the purpose of providing funds, together with other available funds, to (i) provide funds required to finance a portion of the costs of its 2011-2020 Capital Improvement Program and (ii) pay certain expenses incurred in connection with the issuance of the 2011 Bonds by the District; and

WHEREAS, the Commission has determined to provide for the issuance under the Trust Agreement at this time of revenue bonds of the District in the aggregate principal amount of _____ Dollars (\$[PAR]) (the “2019A Bonds”) for the purpose of providing funds, together with other available funds, to (i) refund the outstanding Senior Bonds (as defined in the Senior Trust Agreement) and Bonds issued under the Trust Agreement specified in Exhibit A and (ii) pay a portion of the expenses incurred in connection with the issuance of the 2019A Bonds by the District; and

WHEREAS, the District is entering into this Supplemental Trust Agreement for the purpose of fixing the details of the 2019A Bonds; and

WHEREAS, the Trustee has accepted the trusts created by this Supplemental Trust Agreement and in evidence thereof has joined in the execution hereof;

NOW, THEREFORE, THIS SUPPLEMENTAL TRUST AGREEMENT WITNESSETH: that in consideration of the premises, of the acceptance by the Trustee of the trusts hereby created, and of the purchase and acceptance of 2019A Bonds by the Holders (as defined in the Trust Agreement) thereof, and also for and in consideration of the sum of One Dollar in hand paid by the Trustee at or before the execution and delivery of this Supplemental Trust Agreement, and for other good and valuable consideration, the receipt whereof is hereby acknowledged, and for the purpose of fixing and declaring the terms and conditions upon which 2019A Bonds are to be issued, authenticated, delivered, secured and accepted by all persons who shall from time to time be or become Holders thereof, and to secure the payment of all 2019A

Bonds at any time issued and Outstanding under this Supplemental Trust Agreement and the interest thereon according to their tenor, purport and effect, and to secure the performance and observance of all the covenants, agreements and conditions, express or implied, therein and herein contained, the Commission has executed and delivered this Supplemental Trust Agreement in the name of and on behalf of the District, and has agreed and covenanted, and does hereby agree and covenant, with the Trustee and with the respective Holders, from time to time, of 2019A Bonds, or any part thereof, as follows:

(end of Preamble)

ARTICLE I.

DEFINITIONS

Section 1.1 Meaning of Words and Terms. In addition to words and terms defined in the Original Trust Agreement, which words and terms are used herein as therein defined, or elsewhere in this Supplemental Trust Agreement, the following words and terms as used in this Supplemental Trust Agreement shall have the following meanings, unless some other meaning is plainly intended.

“20__ Escrow Deposit Agreement” means the Escrow Deposit Agreement, dated as of [Closing], 2019, between the District and The Bank of New York Mellon Trust Company, N.A., as Escrow Agent, providing for the payment of interest on the [District’s Wastewater Revenue Bonds, Series 20__] constituting Refunded Bonds as the same comes due and payable and the principal of the Refunded Bonds at maturity or their respective maturity dates.

“20__ Escrow Fund” means the Hampton Roads Sanitation District Series 20__ Escrow Fund created under the 20__ Escrow Deposit Agreement.

“20__ Escrow Deposit Agreement” means the Escrow Deposit Agreement, dated as of [Closing], 2019, between the District and The Bank of New York Mellon Trust Company, N.A., as Escrow Agent, providing for the payment of interest on the [District’s Subordinate Wastewater Revenue Bonds, Series 20__] constituting Refunded Bonds as the same comes due and payable and the principal of the Refunded Bonds at maturity or their respective maturity dates.

“2016 Escrow Fund” means the Hampton Roads Sanitation District Series 20__ Escrow Fund created under the 20__ Escrow Deposit Agreement.

“Closing” means the date on which this Supplemental Trust Agreement becomes legally effective, the same being the date on which the 2019A Bonds are delivered against payment therefor.

“Defeasance Obligations” means noncallable (i) Government Obligations, (ii) Senior debt obligations issued or guaranteed by, or investments otherwise stripped from senior debt obligations issued by, any federal agency, instrumentality, corporation, or government-sponsored enterprise, including but not limited to: (1) Federal Home Loan Bank System, (2) Export-Import Bank of the United States, (3) Federal Financing Bank, (4) Government National Mortgage Association, (5) Federal Home Loan Mortgage Company, (6) Federal Housing Administration, (7) Private Export Funding Corp, (8) Federal National Mortgage Association, (9) Federal Farm Credit Bank, (10) Resolution Funding Corporation, including interest strips and principal strips, (11) Rural Economic Community Development Administration (formerly, Farmers Home Administration), (iii) evidences of ownership of a proportionate interest in specified Government Obligations, which Government Obligations are held by a bank or trust company organized and existing under the laws of the United States of America or any state thereof in the

capacity of custodian, (iv) obligations issued pursuant to Section 21B(d)(3) of the Federal Home Loan Bank Act, as amended by Section 511(a) of the Financial Institutions Reform, Recovery and Enforcement Act of 1989, and commonly known as “interest strips” of the Resolution Funding Corporation, (v) Defeased Municipal Obligations, (vi) United States Agency for International Development (“US AID”) guaranteed notes (including stripped securities) provided that any US AID security shall mature at least 10 business days prior to any cash flow or escrow requirement, and (vii) evidences of ownership of a proportionate interest in specified Defeased Municipal Obligations, which Defeased Municipal Obligations are held by a bank or trust company organized and existing under the laws of the United States of America or any state thereof in the capacity as custodian.

“Defeased Municipal Obligations” means obligations of state or local government municipal bond issuers which are rated the highest rating by at least two of the three Rating Agencies, meeting the following conditions:

(i) (A) such obligations cannot be redeemed prior to maturity or (B) the trustee for which has been given irrevocable instructions concerning their call for redemption, and the issuer of such obligations has covenanted not to redeem such obligations other than as set forth in such instructions;

(ii) such obligations are secured by Government Obligations that may be applied only to interest, principal, and premium payments on such obligations;

(iii) the principal of and interest on such Government Obligations (plus any cash in the escrow fund with respect to such pre-refunded obligations) are sufficient to meet the liabilities of the obligations;

(iv) the Government Obligations serving as security for the obligations are held by an escrow agent or trustee; and

(v) such Government Obligations are not available to satisfy any other claims, including those against the trustee or escrow agent.

“Electronic Means” means, e-mail, facsimile transmission, secure electronic transmission containing applicable authorization codes, passwords and/or authentication keys issued by the Trustee, or another method or system specified by the Trustee as available for use in connection with its services under this Supplemental Trust Agreement.

“Escrow Agent” means, with respect to each of the 20__ Escrow Deposit Agreement and the 20__ Escrow Deposit Agreement, The Bank of New York Mellon Trust Company, N.A., its successors and assigns.

“Interest Payment Date” means each [April 1 and October 1, commencing April 1, 2020, to and including October 1, 20__.]

“Principal Payment Date” means October 1 of each of the years set forth in the table in Section 2.1 below.

“Regular Record Date” means the fifteenth day (whether or not a business day) of the calendar month next preceding each Interest Payment Date.

“Tax Certificate” means the certificate, including the exhibits thereto, of that name delivered by the District in connection with the issuance of the 2019A Bonds.

Section 1.2 Rules of Construction. This Supplemental Trust Agreement shall have the same rules of construction as are provided for the Trust Agreement in its Section 102. Any provision of this Supplemental Trust Agreement referring to actions to be taken by the District shall be deemed to refer to the Commission to the extent that the Enabling Act authorizes the Commission to take such action instead of the District.

ARTICLE II.

DETAILS OF THE 2019A Bonds

Section 2.1 Details of 2019A Bonds. The 2019A Bonds shall be issued in accordance with and secured by the Trust Agreement, including in particular the provisions of Section 209 of the Trust Agreement, as supplemented by this Supplemental Trust Agreement, as Current Interest Bonds in the aggregate principal amount of \$[PAR] for the purposes set forth in Sections 209 of the Trust Agreement and the Preamble of this Supplemental Trust Agreement, shall be dated their date of delivery, shall be designated “Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable),” shall be numbered R-1 and upwards, shall be issued in substantially the form set forth in Exhibit B hereto, shall bear interest (based on a 360-day year consisting of twelve 30-day months) from their dated date until their payment, such interest to the maturity thereof being payable semi-annually on the Interest Payment Dates, [April 1 and October 1 in each year, commencing April 1, 20__, at the following rates, and shall be stated to mature on October 1], as the case may be, in the following years and amounts:

Due	Principal Amount	Interest Rate
_____	_____	_____

Section 2.2 Optional Redemption. From any available moneys, the District may, at its option, redeem prior to their respective maturities, in whole or in part, the 2019A Bonds stated to mature on and after [October 1, 20__, on any date beginning October 1, 20__], at a redemption price of par, together with interest accrued to the date fixed for redemption.

Section 2.3 [Make-Whole Optional Redemption].

Section 2.4 Selection of 2019A Bonds to be Redeemed. The 2019A Bonds shall be redeemed only in the minimum denomination authorized in Section 202 of the Trust Agreement

or in whole multiples of such minimum denomination. In selecting 2019A Bonds for redemption, the Trustee shall treat each 2019A Bond as representing the number of 2019A Bonds that is obtained by dividing the principal amount of such 2019A Bond by the minimum denomination authorized by this Supplemental Trust Agreement. If less than all of the 2019A Bonds of a particular maturity shall be called for redemption, the particular 2019A Bonds or portions of 2019A Bonds to be redeemed shall be selected by the Trustee by such method as the Trustee in its sole discretion shall determine.

Section 2.5 Redemption Notice. At least thirty (30), but not more than ninety (90), days before the redemption date of any 2019A Bonds, whether such redemption be in whole or in part, optional or mandatory, the Trustee shall cause a notice of such redemption, in the name of the District, to be mailed, certified mail, return receipt requested to all Holders owning 2019A Bonds to be redeemed in whole or in part, but any defect in such notice or the failure so to mail any such notice to any Holder owning any 2019A Bonds shall not affect the validity of the proceedings for the redemption of any other 2019A Bonds. Each such notice shall set forth the 2019A Bonds or portions thereof to be redeemed, the date fixed for redemption, the redemption price to be paid, and if less than all the 2019A Bonds shall be called for redemption, the maturities of the 2019A Bonds to be redeemed and, if less than all of the 2019A Bonds of any one maturity then outstanding shall be called for redemption, the distinctive numbers and letters, if any, of such 2019A Bonds to be redeemed and, in the case of 2019A Bonds to be redeemed in part only, the portion of the principal amount thereof to be redeemed. If any 2019A Bond is to be redeemed in part only, the notice of redemption shall state also that on or after the redemption date, upon surrender of such 2019A Bond, a new 2019A Bond in principal amount equal to the unredeemed portion of such 2019A Bond and of the same maturity will be issued.

Section 2.6 Effect of Calling for Redemption. On the date fixed for redemption, notice having been mailed in the manner and under the conditions hereinabove provided, the 2019A Bonds or portions thereof called for redemption shall become due and payable at the redemption price provided therefor, plus accrued interest to such date; provided, however, that the District may direct that the notice of an optional redemption, but not any mandatory redemption, may state that the call for redemption is expressly conditioned on there being on deposit with the Trustee on the redemption date sufficient moneys to effect the redemption at the applicable redemption price plus accrued interest, if any, and if such moneys shall not be so on deposit, the call for redemption shall be deemed cancelled, void and of no effect and all 2019A Bonds called for such redemption shall remain outstanding and if presented for payment, such 2019A Bonds shall be returned forthwith to their registered owners. If money or Government Obligations, or a combination of both, sufficient to pay the redemption price of the 2019A Bonds to be redeemed, plus accrued interest thereon to the date fixed for redemption, are held by the Bond Registrar in trust for the Holders of 2019A Bonds to be redeemed, interest on the 2019A Bonds called for redemption shall cease to accrue after the date fixed for redemption; such 2019A Bonds shall cease to be entitled to any benefits or security under this Supplemental Trust Agreement or to be deemed outstanding; and the Holders of such 2019A Bonds shall have no rights in respect thereof except to receive payment of the redemption price thereof, plus accrued interest to the date of redemption. 2019A Bonds and portions of 2019A Bonds for which irrevocable instructions to pay or to call for redemption on one or more specified dates have been given to the Trustee and the Bond Registrar in form satisfactory to them shall not thereafter be deemed to be outstanding under this Supplemental Trust Agreement and shall cease to be entitled

to the security of or any rights under the Trust Agreement as supplemented by this Supplemental Trust Agreement, other than rights to receive payment of the redemption price thereof and accrued interest thereon, to be given notice of redemption in the manner provided in Section 2.5, and, to the extent hereinafter provided, to receive 2019A Bonds for any unredeemed portions of 2019A Bonds if money or Defeasance Obligations, or a combination of both, sufficient to pay the redemption price of such 2019A Bonds or portions thereof, together with accrued interest thereon to the date upon which such 2019A Bonds are to be paid or redeemed, are held in separate accounts by the Trustee or the Bond Registrar in trust for the holders of such 2019A Bonds.

Section 2.7 Redemption of Portion of 2019A Bonds. If a portion of an outstanding 2019A Bond shall be selected for redemption, the Holder thereof or his attorney or legal representative shall present and surrender such 2019A Bond to the Bond Registrar for payment of the principal amount thereof so called for redemption and the redemption premium, if any, on such principal amount, and the District shall execute and the Bond Registrar shall authenticate and deliver to or upon the order of such registered owner or his legal representative, without charge therefor, for the unredeemed portion of the principal amount of the 2019A Bond so surrendered, a 2019A Bond of the same maturity and bearing interest at the same rate.

Section 2.8 Cancellation. 2019A Bonds so redeemed, presented and surrendered shall be cancelled upon the surrender thereof.

Section 2.9 Use of Defeasance Obligations to Redeem 2019A Bonds. For purposes of this Article, Defeasance Obligations shall be deemed to be sufficient to pay or redeem 2019A Bonds on a specified date if the principal of and the interest on such Defeasance Obligations, when due, will be sufficient to pay on such date the redemption price of, and the interest accruing on, such 2019A Bonds to such date.

(end of Article II)

ARTICLE III.

**APPLICATION OF THE PROCEEDS
OF THE 2019A Bonds**

Section 3.1 **Creation of Subfunds.** For purposes of convenience and to enable the District to track the proceeds from the sale of the 2019A Bonds, the Trustee shall establish the “Series 2019A Issuance Subfund” within the 2011 Trust Agreement Issuance Fund (the “Issuance Fund”).

Section 3.2 **Application of the Proceeds of the 2019A Bonds.** Simultaneously with the delivery of the 2019A Bonds, the proceeds of the 2019A Bonds, shall be applied by the Trustee as follows:

- (1) to the credit of the Issuance Subfund, the amount of \$_____,
- (2) to the credit of the “20__ Escrow Fund”, the amount of \$_____, and
- (3) the balance of the proceeds, \$_____, shall be deposited to the credit of the “20__ Escrow Fund.”

(end of Article III)

ARTICLE IV.

[Reserved.]

(end of Article IV)

ARTICLE V.

DEFEASANCE

Section 5.1 Release of this Supplemental Trust Agreement. [TBD] When (a) the 2019A Bonds secured hereby shall have become due and payable in accordance with their terms or otherwise as provided in this Supplemental Trust Agreement, the whole amount of the principal and the interest so due and payable upon all 2019A Bonds shall be paid, (b) if the 2019A Bonds shall not have become due and payable in accordance with their terms, the Trustee or the Bond Registrar shall hold, sufficient money or Defeasance Obligations, or a combination of money and Defeasance Obligations, the principal of and the interest on which, when due and payable, will provide sufficient money to pay the principal of, and the interest on, all 2019A Bonds then Outstanding to the maturity date or dates of such 2019A Bonds and (c) sufficient funds shall also have been provided or provision made for paying all other obligations payable hereunder by the District, then and in that case the right, title and interest of the Trustee in the funds and accounts mentioned in this Supplemental Trust Agreement shall thereupon cease, determine and become void and, on demand of the District and upon being furnished with an opinion, in form and substance satisfactory to the Trustee, of counsel approved by the Trustee, to the effect that all conditions precedent to the release of this Supplemental Trust Agreement and the defeasance of the 2019A Bonds have been satisfied and, if the 2019A Bonds are to be redeemed more than ninety (90) days after the date the escrow therefor is established, a verification report prepared by an independent firm of certified public accountants or other qualified financial consultants stating that the money and Defeasance Obligations, together with investment earnings thereon, delivered to or held by the Trustee or Bond Registrar, will be sufficient to pay the principal and redemption price of, and interest on the 2019A Bonds called for redemption to their maturity or redemption date, as applicable, the Trustee shall release this Supplemental Trust Agreement and shall execute such documents to evidence such release as may reasonably be required by the District and, subject to the provisions of the Trust Agreement, shall turn over to the District any surplus in, and all balances remaining in, all funds and accounts. Otherwise, this Supplemental Trust Agreement shall be, continue and remain in full force and effect; provided, that, in the event Defeasance Obligations shall be deposited with and held by the Trustee or the Bond Registrar as hereinabove provided, (a) the Trustee shall nevertheless retain such rights, powers and privileges under this Supplemental Trust Agreement as may be necessary and convenient in respect of the 2019A Bonds for the payment of the principal and interest for which such Defeasance Obligations have been deposited, and (b) the Bond Registrar shall retain such rights, powers and privileges under this Supplemental Trust Agreement as may be necessary and convenient for the registration, transfer and exchange of 2019A Bonds.

(1) All money and Defeasance Obligations held by the Trustee (or the Bond Registrar) pursuant to this Section shall be held in trust and applied to the payment, when due, of the obligations payable therewith. If the District shall pay or cause to be paid to the Owners of less than all of the Outstanding 2019A Bonds the principal of and interest on such 2019A Bonds, or such portions thereof, which is and shall thereafter become due and payable upon such 2019A Bonds, or such portions thereof, such 2019A Bonds, or such portions thereof, shall cease to be entitled to any lien, benefit or security under this Supplemental Trust Agreement.

(2) Any Outstanding 2019A Bond (or any portion thereof) shall be deemed to have been paid for the purposes of subsection (a) or (b) of this Section when (i) there shall have been deposited with the Trustee or any other Depository either money in an amount which, or Defeasance Obligations the principal of and the interest on which when due, and without any reinvestment thereof, will provide money in an amount which, together with the money, if any, deposited with or held by the Trustee or any Depository or Paying Agent and available therefor, shall be sufficient to pay when due the principal of and interest due and to become due on such 2019A Bond (or portion thereof) on or prior to the maturity date thereof, (ii) in the event such 2019A Bond is not to mature within the next succeeding sixty (60) days, the District shall have given the Trustee irrevocable instructions to give notice to the Owner of such 2019A Bond (or portion thereof) stating that money or Defeasance Obligations have been deposited with the Trustee or any other Depository as provided in this Article V and that such 2019A Bond (or portion thereof) is deemed to have been paid in accordance with this Article and stating the maturity date upon which money is to be available for the payment of the principal thereof and interest thereon and (iii) provisions satisfactory to the Trustee shall have been made for the payment of the Trustee's and the Bond Registrar's fees and expenses, and any Paying Agent's or other Depository's fees and all fees and expenses payable by the District in connection with the defeasance of such 2019A Bond.

(3) The money and Defeasance Obligations deposited with the Trustee or any other Depository pursuant to this Section and all payments of principal or interest on any such Defeasance Obligations shall not be withdrawn or used for any purpose other than, and shall be held in trust for, the payment of the principal of and interest on the 2019A Bonds (or portions thereof) deemed to have been paid in accordance with this Section.

(4) If 2019A Bonds (or portions thereof) are deemed to have been paid in accordance with the provisions of this Article by reason of the deposit with the Trustee or any other Depository of moneys or Defeasance Obligations, no amendment to the provisions of this Section which would adversely affect the Owners of such 2019A Bonds (or portions thereof) shall be made without the consent of each Owner affected thereby.

(5) All money and Defeasance Obligations held pursuant to this Article shall be held in trust and applied to the payment, when due, of the 2019A Bonds (or portions thereof) payable therewith.

(end of Article V)

ARTICLE VI.

MISCELLANEOUS

Section 6.1 Manner of Giving Notice. All notices, demands and requests to be given to or made hereunder by the District or the Trustee shall be given or made in writing and shall be deemed to be properly given or made if sent by United States registered mail, return receipt requested, postage prepaid, addressed as follows:

- (a) As to the District—

Hampton Roads Sanitation District
1434 Air Rail Avenue
Virginia Beach, Virginia 23455
Attention: General Manager

- (b) As to the Trustee—

The Bank of New York Mellon Trust Company, N.A.
500 Ross Street, 12th Floor
Pittsburgh, Pennsylvania 15262
Attention: Corporate Trust Department

- (c) As to the Bond Registrar—

The Bank of New York Mellon Trust Company, N.A.
500 Ross Street, 12th Floor
Pittsburgh, Pennsylvania 15262
Attention: Corporate Trust Department

Any such notice, demand or request may also be transmitted to the appropriate above-mentioned party by telegram, telecopy or telephone and shall be deemed to be properly given or made at the time of such transmission if, and only if, such transmission of notice shall be confirmed in writing and sent as specified above.

The Trustee agrees to accept and act upon instructions or directions, including funds transfer instructions (“Instructions”), pursuant to this Indenture or any other document reasonably relating to the Bonds sent by the District by Electronic Means, provided, however, that the District shall provide to the Trustee an incumbency certificate listing designated persons with the authority to provide such Instructions and containing specimen signatures of such designated persons, which incumbency certificate shall be amended whenever a person is to be added or deleted from the listing. If the District elects to give the Trustee Instructions by Electronic Means and the Trustee, in its discretion, elects to act upon such Instructions, the Trustee’s understanding of such Instructions shall be deemed controlling. The District understands and agrees that the Trustee cannot determine the identity of the actual sender of such Instructions and that the Trustee shall conclusively presume that directions that purport to have been sent by a designated person listed on the incumbency certificate provided to the Trustee have been sent by such designated person. The District shall be responsible for ensuring that

only designated persons transmit such Instructions to the Trustee and that the District and all designated persons are solely responsible to safeguard the use and confidentiality of applicable user and authorization codes, passwords or authentication keys upon receipt by the District. The Trustee shall not be liable for any losses, costs or expenses arising directly or indirectly from the Trustee's reliance upon and compliance with such Instructions notwithstanding such Instructions conflict or are inconsistent with a subsequent written Instruction. The District agrees (i) to assume all risks arising out of the use of such Electronic Means to submit Instructions to the Trustee, including without limitation the risk of the Trustee acting on unauthorized Instructions, and the risk of interception and misuse by third parties; (ii) that it is fully informed of the protections and risks associated with the various methods of transmitting Instructions to the Trustee and that there may be more secure methods of transmitting Instructions than the method(s) selected by the District; (iii) that the security procedures (if any) to be followed in connection with its transmission of Instructions provide to it a commercially reasonable degree of protection in light of its particular needs and circumstances; and (iv) to notify the Trustee immediately upon learning of any compromise or unauthorized use of the security procedures.

Any of such addresses may be changed at any time upon written notice of such change sent by United States registered mail, postage prepaid, to the other parties by the party effecting the change.

All documents received by the Trustee under the provisions of this Supplemental Trust Agreement, or photographic copies thereof, shall be retained in its possession until this Supplemental Trust Agreement shall be released under the provisions of Section 5.1 of this Supplemental Trust Agreement, subject at all reasonable times to the inspection of the District and any Holder and the agents and representatives thereof.

Section 6.2 Substitute Mailing. If, because of the temporary or permanent suspension of postal service, the District or the Trustee shall be unable to mail any notice required to be given by the provisions of this Supplemental Trust Agreement, the District or the Trustee shall give notice in such other manner as in the judgment of the District or the Trustee shall most effectively approximate mailing (but, if by unsecured facsimile or electronic transmission, then in compliance with and subject to the provisions of Section 6.1 above) and the giving of notice in such manner shall for all purposes of this Supplemental Trust Agreement be deemed to be in compliance with the requirement for the mailing thereof.

Section 6.3 Parties, Bond Registrar and Holders Alone Have Rights under Trust Agreement. Except as herein otherwise expressly provided, nothing in this Supplemental Trust Agreement, express or implied, is intended or shall be construed to confer upon any person, firm or corporation, other than the Trustee, the Bond Registrar, the District and the Holders, any right, remedy or claim, legal or equitable, under or by reason of this Supplemental Trust Agreement or any provision being intended to be and being for the sole and exclusive benefit of the Trustee, the District, the Bond Registrar and the Holders.

Section 6.4 Effect of Partial Invalidity. In case any one or more of the provisions of this Supplemental Trust Agreement or the 2019A Bonds shall for any reason be held to be illegal or invalid, such illegality or invalidity shall not affect any other provisions of this Supplemental Trust Agreement or the 2019A Bonds, but this Supplemental Trust Agreement and the 2019A

Bonds shall be construed and enforced as if such illegal or invalid provisions had not been contained therein. In case any covenant, stipulation, obligation or agreement contained in the 2019A Bonds or this Supplemental Trust Agreement shall for any reason be held to be in violation of law, then such covenant, stipulation, obligation or agreement shall be deemed to be the covenant, stipulation, obligation or agreement of the Commission or the District to the full extent permitted by law.

Section 6.5 Effect of Covenants. All covenants, stipulations, obligations and agreements of the District contained in this Supplemental Trust Agreement shall be deemed to be covenants, stipulations, obligations and agreements of the District to the full extent permitted by the Constitution and laws of the State. This Supplemental Trust Agreement is adopted with the intent that the laws of the State shall govern its construction.

Section 6.6 No Recourse Against Members, Officers or Employees of Commission or District. No recourse under, or upon, any statement, obligation, covenant, or agreement contained in this Supplemental Trust Agreement, or in any 2019A Bond hereby secured, or in any document or certification whatsoever, or under any judgment obtained against the Commission or the District or by the enforcement of any assessment or by any legal or equitable proceeding by virtue of any constitution or statute or otherwise or under any circumstances, shall be had against any member, officer or employee, as such, of the Commission or the District, either directly or through the Commission or the District, respectively, or otherwise, for the payment for or to, the Commission or the District or any receiver of either of them, or for, or to, any Holder or otherwise, of any sum that may be due and unpaid upon any such 2019A Bond. Any and all personal liability of every nature, whether at common law or in equity or by statute or by constitution or otherwise, of any such member, officer or employee, as such, to respond by reason of any act or omission on his or her part or otherwise, for the payment for, or to, the Commission or the District or any receiver of either of them, or for, or to, any Holder or otherwise, of any sum that may remain due and unpaid upon the 2019A Bonds hereby secured, is hereby expressly waived and released as an express condition of, and in consideration for, the execution of this Supplemental Trust Agreement and the issuance of the 2019A Bonds.

Section 6.7 Dealing in 2019A Bonds. The Trustee and the Bond Registrar and their directors, officers, employees or agents may in good faith, buy, sell, own, hold and deal in any 2019A Bonds issued under the provisions of this Supplemental Trust Agreement and may join in any action which any Holder may be entitled to take with like effects as if such Trustee were not a Trustee and such bank or trust company were not the Bond Registrar under this Supplemental Trust Agreement.

Section 6.8 Legal Holidays. In any case where the date of maturity of principal of and interest on the 2019A Bonds shall be on a day on which banking institutions at the place of payment are authorized by law to remain closed, then payment of such principal and interest need not be made on such date but may be made on the next succeeding day not a day on which banking institutions are authorized by law to remain closed with the same force and effect as if made on the date of maturity, and in the case of such payment, no interest shall accrue for the period from and after such date.

Section 6.9 Multiple Counterparts. This Supplemental Trust Agreement may be executed in multiple counterparts, each of which shall be regarded for all purposes as an original, and such counterparts shall constitute but one and the same instrument.

Section 6.10 Headings. Any heading preceding the text of the several articles hereof, and any table of contents or marginal notes appended to copies hereof, shall be solely for convenience of reference and shall not constitute a part of this Supplemental Trust Agreement, nor shall they affect its meaning, construction or effect.

Section 6.11 Further Authority. The officers of the Commission or the District, attorneys, engineers and other agents or employees of the Commission or the District are hereby authorized to do all acts and things required of them by this Supplemental Trust Agreement and the Agreement for the full, punctual and complete performance of all of the terms, covenants and agreements contained in the 2019A Bonds and this Supplemental Trust Agreement.

IN WITNESS WHEREOF, the Hampton Roads Sanitation District has caused these presents to be signed in its name and on its behalf and attested by its duly authorized officers and to evidence its acceptance of the trusts hereby created, the Trustee has caused these presents to be signed in its name and on behalf by its duly authorized officer, all as of the 1st day of _____, 2019.

HAMPTON ROADS SANITATION DISTRICT

(Seal)

By: _____

Director of Finance

Hampton Roads Sanitation District Commission

Attest:

By: _____

Secretary

Hampton Roads Sanitation District Commission

THE BANK OF NEW YORK MELLON TRUST
COMPANY, N.A., as Trustee

By: _____

Authorized Officer

(Seal)

EXHIBIT A

REFUNDED BONDS

Wastewater Revenue Bonds, Series 20__

<u>Maturity</u> <u>(January 1)</u>	<u>Principal</u> <u>Amount</u>	<u>Redemption</u> <u>Date</u>	<u>Redemption</u> <u>Price</u>	<u>CUSIPs</u>
---------------------------------------	-----------------------------------	----------------------------------	-----------------------------------	---------------

Subordinate Wastewater Revenue Bonds, Series 20__

<u>Maturity</u> <u>(August 1)</u>	<u>Principal</u> <u>Amount</u>	<u>Redemption</u> <u>Date</u>	<u>Redemption</u> <u>Price</u>	<u>CUSIPs</u>
--------------------------------------	-----------------------------------	----------------------------------	-----------------------------------	---------------

FORM OF 2019A BONDS

UNLESS THIS CERTIFICATE IS PRESENTED BY AN AUTHORIZED REPRESENTATIVE OF THE DEPOSITORY TRUST COMPANY, A NEW YORK CORPORATION (“DTC”), TO THE DISTRICT OR ITS AGENT FOR REGISTRATION OF TRANSFER, EXCHANGE, OR PAYMENT, AND ANY CERTIFICATE ISSUED IS REGISTERED IN THE NAME OF CEDE & CO. OR IN SUCH OTHER NAME AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC (AND ANY PAYMENT IS MADE TO CEDE & CO. OR TO SUCH OTHER ENTITY AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC), ANY TRANSFER, PLEDGE OR OTHER USE HEREOF FOR VALUE OR OTHERWISE BY OR TO ANY PERSON IS WRONGFUL INASMUCH AS THE REGISTERED OWNER HEREOF, CEDE & CO., HAS AN INTEREST HEREIN.

No. R-__ \$

HAMPTON ROADS SANITATION DISTRICT
(VIRGINIA)
SUBORDINATE WASTEWATER REVENUE BOND
REFUNDING SERIES 2019A

INTEREST RATE MATURITY DATE DATED DATE CUSIP
 October 1, 20__ ____, 2019 409327 ____

Registered Owner: Cede & Co.
Principal Amount: _____

Hampton Roads Sanitation District (the “District”), a political subdivision of the Commonwealth of Virginia, by the Hampton Roads Sanitation District Commission (the “Commission”), the Commission of the District, for value received, promises to pay, but solely from the sources and in the manner hereinafter provided, to the registered owner named above, or registered assigns, the principal amount set forth above on the Maturity Date set forth above, upon the presentation and surrender hereof, at the corporate trust office of The Bank of New York Mellon Trust Company N.A. (the “Bond Registrar”) located on the date hereof at The Bank of New York Mellon Trust Company, N.A., 500 Ross Street, 12th Floor, Pittsburgh, Pennsylvania 15262. The District also promises to pay, solely from such sources, interest on this Bond (calculated based upon a 360-day year consisting of twelve 30-day months) from the interest payment date next preceding the date on which it is authenticated, unless it is authenticated on an interest payment date, in which event it shall bear interest from such date, or unless it is authenticated prior to its dated date in which event it shall bear interest from its date, payable on [April 1, 20__ and semi-annually thereafter on April 1 and October 1 of each year], at

the rate per annum set forth above until the principal sum hereof is paid. The interest so payable and punctually paid or duly provided for, on any interest payment date, will, as provided in the Trust Agreement hereinafter referred to, be paid to the person in whose name this Bond is registered at the close of business on the Regular Record Date for such interest, which shall be the fifteenth (15th) day (whether or not a business day) of the calendar month next preceding such interest payment date. Any such interest not so punctually paid or duly provided for shall forthwith cease to be payable to the registered owner on such Regular Record Date, and may be paid to the person in whose name this Bond is registered at the close of business on a Special Record Date for the payment of such defaulted interest to be fixed by the Trustee hereinafter mentioned, notice whereof being given to the registered owners not less than ten (10) days prior to such Special Record Date, or may be paid at any time in any other lawful manner not inconsistent with the requirements of any securities exchange on which the Bonds of this series may be listed and upon such notice as may be required by such exchange, or as more fully provided in said Trust Agreement. All such payments shall be made in such coin or currency of the United States of America as at the time of payment is legal tender for payment of public and private debts.

This Bond is one of a duly authorized series of revenue bonds of the District, designated "Hampton Roads Sanitation District (Virginia) Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable)" (the "Bonds"), issued under a trust agreement, dated as of October 1, 2011 between the District and The Bank of New York Mellon Trust Company, N.A., Pittsburgh, Pennsylvania, as Trustee (said banking corporation and any bank or successor trustee under the Trust Agreement being hereinafter referred to as the "Trustee"), as amended and restated as of March 1, 2016, and as the same may be amended and supplemented from time to time (the "Trust Agreement"). The Bonds are being issued for the purpose of providing funds, together with other available funds, to (i) refund certain outstanding Senior Bonds (as defined in the Senior Trust Agreement) and a portion of the District's Subordinate Wastewater Revenue Bonds, Series 20__ and (ii) to pay a portion of the expenses incurred in connection with the issuance of the 2019A Bonds by the District.

This Bond is issued and the Trust Agreement was made and entered into under and pursuant to the Constitution and laws of the Commonwealth of Virginia, and particularly in conformity with the provisions, restrictions and limitations of Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended.

Indebtedness secured by the Trust Agreement is in all respects subordinate and inferior to the lien thereon of indebtedness ("Senior Obligations") secured by that certain trust agreement, dated as of March 1, 2008 (as the same may be amended and supplemented from time to time, the "Senior Trust Agreement"), between the District and The Bank of New York Mellon Trust Company, N.A., as trustee (in such capacity, the "Senior Trustee"), outstanding under the Senior Trust Agreement. The District may incur additional Senior Obligations, including notes, guaranties and other indebtedness secured by the Senior Trust Agreement on a pari passu basis (collectively, "Senior Obligations") for the purposes, under the terms and conditions and to the extent described therein.

The District has agreed to perform, observe and comply with certain covenants, conditions and agreements set forth in the Trust Agreement. The District may incur additional

indebtedness, including notes, guaranties and other indebtedness secured by the Trust Agreement on a pari passu basis (collectively, "Parity Obligations") for the purposes, under the terms and conditions and to the extent described therein.

This Bond is a special obligation of the District and is payable solely from Net Revenues Available for Debt Service (as defined in the Trust Agreement) derived by the District from its Wastewater System (as defined in the Trust Agreement) and the money attributable to proceeds of the Bonds and the income from the investment thereof and not from any other fund or source. This Bond shall not be deemed to constitute a debt, or a pledge of the faith and credit, of the Commonwealth of Virginia or of any county, city, town or political subdivision thereof. The issuance of this Bond shall not directly or indirectly or contingently obligate the Commonwealth of Virginia or any county, city, town or political subdivision thereof to levy or to pledge any form of taxation whatever therefor.

The Bonds are issuable as fully registered Bonds in denominations of \$5,000 or any whole multiple thereof. Bonds may be exchanged at the corporate trust office of the Bond Registrar for the delivery of Bonds, in the manner and subject to the limitations and conditions provided in the Trust Agreement, for an equal aggregate principal amount of Bonds of the same series and maturity, of other authorized denominations and bearing interest at the same rate.

The transfer of this Bond is registrable by the registered owner hereof in person or by his attorney or legal representative at the corporate trust office of the Bond Registrar for the delivery of Bonds, but only in the manner and subject to the limitations and conditions provided in the Trust Agreement and upon surrender and cancellation of this Bond. Upon any such registration of transfer, the District shall execute and the Bond Registrar shall authenticate and deliver in exchange for this Bond a new Bond or Bonds, registered in the name of the transferee, of authorized denominations, in an aggregate principal amount equal to the principal amount of this Bond, of the same series and maturity and bearing interest at the same rate.

The District may, at its option, redeem prior to their respective maturities, in whole or in part, the Bonds of the series of which this Bond is one stated to mature on and after [October 1, 20__, on any date beginning October 1, 20__], at a redemption price of par, together with interest accrued to the date fixed for redemption.

[Insert Other Applicable Redemption Provisions]

In the event of a partial optional redemption or purchase of such term Bonds, the District will credit the principal amount of such term bonds so purchased or redeemed against the Sinking Fund Requirements for the remaining term bonds outstanding in such amounts and in such years as it in its sole discretion shall determine.

The Holder of this Bond shall have no right to enforce the provisions of the Trust Agreement or to institute action to enforce the covenants therein, or to take any action with respect to any event of default under the Trust Agreement, or to institute, appear in or defend any suit or other proceeding with respect thereto, except as provided in the Trust Agreement and except that any registered owner may institute action to enforce the payment of the principal of or the interest on such owner's Bond.

Upon the occurrence of certain events, and on the conditions, in the manner and with the effect set forth in the Trust Agreement, the principal of all Bonds then Outstanding under the Trust Agreement may become or may be declared due and payable before the stated maturities thereof, together with the interest accrued thereon.

Modifications or alterations of the Trust Agreement or any trust agreement supplemental thereto or this Trust Agreement or any indenture supplemental thereto, may be made only to the extent and in the circumstances permitted by the Trust Agreement.

This Bond is issued with the intent that the laws of the Commonwealth of Virginia shall govern its construction.

All acts, conditions and things required to happen, exist and be performed precedent to and in the issuance of this Bond and the execution of the Trust Agreement have happened, exist and have been performed as so required.

Neither the members, officers or employees of the Commission or the District, nor any person executing this Bond, is liable personally hereon or subject to any personal liability or accountability by reason of issuance hereof.

This Bond shall not be valid or become obligatory for any purpose or be entitled to any benefit or security under the Trust Agreement until it shall have been authenticated by the execution by the Bond Registrar of the certificate of authentication endorsed hereon.

IN WITNESS WHEREOF, the Hampton Roads Sanitation District has caused this Bond to be executed in its name and on its behalf with the signatures of the Chair and the Secretary of the Hampton Roads Sanitation District Commission and the official seal of said Commission to be impressed hereon and this Bond to be dated the __ day of _____, 2019.

HAMPTON ROADS SANITATION DISTRICT

By

Chair
Hampton Roads Sanitation District Commission

By

Secretary
Hampton Roads Sanitation District Commission

[FORM OF ASSIGNMENT]

FOR VALUE RECEIVED the undersigned hereby sells, assigns and transfers unto

[Please Print or Typewrite Name and Address of Transferee]

the within Bond and all rights thereunder, and hereby irrevocably constitutes and appoints _____ attorney to register the transfer of the within Bond on the books kept for registration thereof, with full power of substitution in the premises.

Date: _____

Signature Guaranteed:

NOTICE: Signature(s) must be guaranteed by an institution which is a participant in the Securities Transfer Agent Medallion Program (STAMP) or similar program.

NOTICE: The signature to this assignment must correspond with the name as it appears upon the face of the within Bond in every particular, without alteration or enlargement or any change whatever.

CERTIFICATE OF AUTHENTICATION

Date of authentication:

This Bond is a Bond issued under the provisions of the within-mentioned Trust Agreement.

THE BANK OF NEW YORK MELLON TRUST
COMPANY, N.A.,
as Bond Registrar

By _____
Authorized Signatory

NEW ISSUE – BOOK-ENTRY ONLY

S&P: “___”

Fitch: “___”

(See “RATINGS” herein)

Under current law, interest on the Series 2019A Bonds will be includable in gross income of the owners thereof for federal income tax purposes. See “TAX MATTERS” herein for a description of certain provisions regarding the Code that may affect the tax treatment of interest on the Series 2019A Bonds for certain bondholders. The District’s Enabling Act provides that the Series 2019A Bonds, their transfer and the income therefrom, including any profit made on the sale thereof, shall be exempt from taxation by the Commonwealth of Virginia and by any political subdivision thereof. See “TAX MATTERS” herein for further information.



\$ _____ *

**Hampton Roads Sanitation District, Virginia
Subordinate Wastewater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)**

Dated: Date of Issue

Due: As shown on the inside cover

The Series 2019A Bonds are being issued under an Amended and Restated Trust Agreement, dated as of March 1, 2016, as amended and supplemented (the “Trust Agreement”), between the Hampton Roads Sanitation District (the “District”) and The Bank of New York Mellon Trust Company, N.A., as trustee (in such capacity, the “Trustee”). The proceeds of the Series 2019A Bonds will be used, together with other available funds of the District, (i) to refund, subject to market conditions, a portion of the District’s [outstanding Senior Bonds and certain outstanding Bonds] (each as defined herein), and (ii) to pay certain costs of issuing the Series 2019A Bonds.

The Series 2019A Bonds are issuable as registered bonds without coupons and will be initially registered only in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York (“DTC”), serving as securities depository for the Series 2019A Bonds. The Series 2019A Bonds will be available to purchasers in denominations of \$5,000 and any whole multiple thereof only under the book-entry system maintained by DTC through brokers and dealers that are, or that act through, DTC Participants.

Principal and interest will be paid by the Trustee, as bond registrar, to DTC or its nominee, which will remit the payments to the DTC Participants for subsequent disbursement. See “THE SERIES 2019A BONDS—Book-Entry Only System” herein. Interest on the Series 2019A Bonds is payable on each [February] 1 and [August] 1, commencing [February] 1, 2020.

The Series 2019A Bonds are subject to optional and mandatory redemption prior to maturity as described herein.

THE SERIES 2019A BONDS ARE SPECIAL OBLIGATIONS OF THE DISTRICT PAYABLE SOLELY FROM THE NET REVENUES AVAILABLE FOR DEBT SERVICE AND OTHER FUNDS PLEDGED TO SECURE THE SERIES 2019A BONDS UNDER THE TRUST AGREEMENT. THE SERIES 2019A BONDS SHALL NOT BE DEEMED TO CONSTITUTE A DEBT, OR A PLEDGE OF THE FAITH AND CREDIT, OF THE COMMONWEALTH OF VIRGINIA OR OF ANY COUNTY, CITY, TOWN OR POLITICAL SUBDIVISION THEREOF. THE ISSUANCE OF THE SERIES 2019A BONDS SHALL NOT DIRECTLY OR INDIRECTLY OR CONTINGENTLY OBLIGATE THE COMMONWEALTH OF VIRGINIA OR ANY COUNTY, CITY, TOWN OR POLITICAL SUBDIVISION THEREOF TO LEVY OR TO PLEDGE ANY FORM OF TAXATION WHATEVER THEREFOR.

This cover page contains certain information for quick reference only. It is not a summary of this issue. Investors must read the entire Official Statement to obtain information essential to making an informed investment decision.

The Series 2019A Bonds are offered when, as and if issued, subject to the approving opinion of Norton Rose Fulbright US LLP, Washington, D.C., Bond Counsel, and to certain other conditions. Certain legal matters will be passed upon for the District by Kellam, Pickrell, Cox & Anderson, a Professional Corporation, Norfolk, Virginia, and for the Underwriters by Kaufman & Canoles, P.C., Richmond, Virginia. The Series 2019A Bonds are expected to be available for delivery to The Depository Trust Company in New York, New York, on or about _____, 2019.

Citigroup

FTN Financial

UBS Financial Services

_____, 2019

*Preliminary, subject to change.

This Preliminary Official Statement and the information contained herein are subject to completion or amendment. Under no circumstances shall this Preliminary Official Statement constitute an offer to sell or the solicitation of an offer to buy nor shall there be any sale of these securities in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction.

\$ _____ *

**Hampton Roads Sanitation District, Virginia
Subordinate Wastewater Revenue Bonds
Refunding Series 2019A (Federally Taxable)**

MATURITIES, AMOUNTS, INTEREST RATES AND YIELDS
Base CUSIP Number: 409327[†]

<u>Due</u> <u>[August] 1*</u>	<u>Principal</u> <u>Amount</u>	<u>Interest</u> <u>Rate</u>	<u>Yield</u>	<u>CUSIP</u> <u>Suffix[†]</u>
2020	\$	%	%	
2021				
2022				
2023				
2024				
2025				
2026				
2027				
2028				
2029				
2030				
2031				
2032				
2033				
2034				
2035				
2036				
2037				
2038				
2039				
2040				
2041				
2042				
2043				

[\$ _____ % Term Bonds due August 1, 20__ – Yield ____% – CUSIP[†] Suffix ____]

[†] CUSIP® is a registered trademark of the American Bankers Association. The CUSIP number listed above is being provided solely for the convenience of bondholders only, and the District does not make any representation with respect to such number or undertake any responsibility for its accuracy. The CUSIP number is subject to being changed after the issuance of the Series 2019A Bonds as a result of various subsequent actions including, but not limited to, a change in mode or defeasance as a whole or in part of the Series 2019A Bonds.

*Preliminary, subject to change.

HAMPTON ROADS SANITATION DISTRICT

COMMISSIONERS

FREDERICK N. ELOFSON, CPA, *Chair*

MAURICE P. LYNCH, Ph.D., *Vice-Chair*

MICHAEL E. GLENN
WILLIE LEVENSTON, JR.
ELIZABETH A. TARASKI, Ph.D.

VISHNU K. LAKDAWALA, Ph.D.
STEPHEN C. RODRIGUEZ
MOLLY JOSEPH WARD

STAFF

EDWARD G. HENIFIN, P.E.
General Manager

JAY A. BERNAS, P.E.,
Director of Finance and Treasurer

CHARLES B. BOTT, Ph.D., P.E.
*Director of Water Technology and
Research*

DONALD C. CORRADO
*Director of Information
Technology*

STEVEN G. de MIK, CPA
Director of Operations

PAULA A. HOGG
Director of Talent Management

BRUCE W. HUSSELBEE, P.E.
Director of Engineering

JAMES J. PLETL, Ph.D.
Director of Water Quality

LEILA E. RICE, APR
Director of Communications

JENNIFER L. CASCIO
Secretary

COUNSEL, ADVISOR, TRUSTEE

KELLAM, PICKRELL, COX & ANDERSON, A PROFESSIONAL CORPORATION
General Counsel

JONES, BLECHMAN, WOLTZ & KELLY, P.C.
Associate Counsel

PFM FINANCIAL ADVISORS LLC
Financial Advisor

NORTON ROSE FULBRIGHT US LLP
Bond Counsel

AQUALAW, PLC
Special Counsel

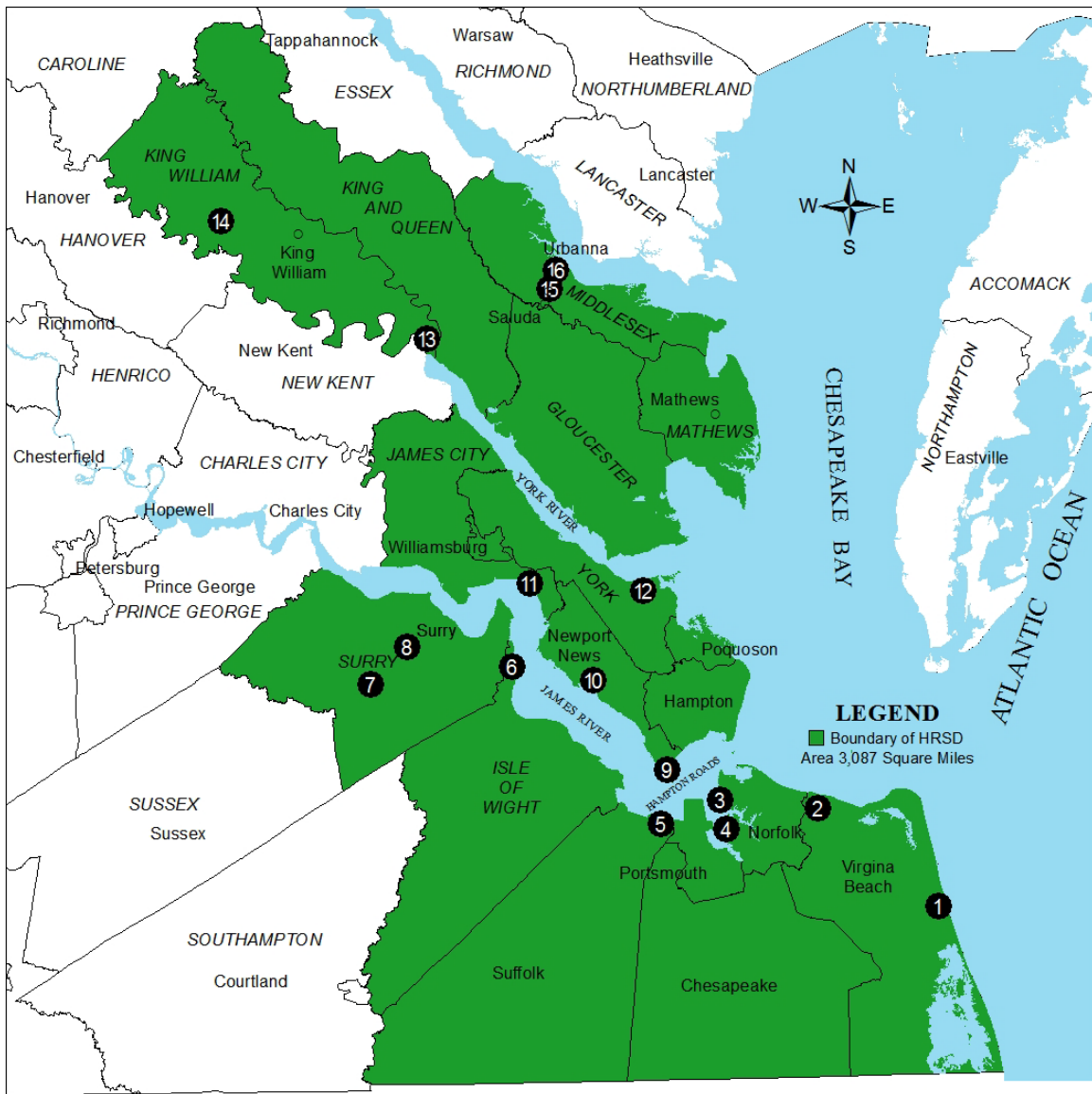
THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A.
Trustee and Bond Registrar

HRSD Service Area

Facilities include the following:

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Atlantic, Virginia Beach 2. Chesapeake-Elizabeth, Va. Beach 3. Army Base, Norfolk 4. Virginia Initiative, Norfolk 5. Nansemond, Suffolk 6. Lawnes Point, Smithfield 7. County of Surry 8. Town of Surry | <ol style="list-style-type: none"> 9. Boat Harbor, Newport News 10. James River, Newport News 11. Williamsburg, James City County 12. York River, York County 13. West Point, King William County 14. King William, King William County 15. Central Middlesex, Middlesex County 16. Urbanna, Middlesex County |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Serving the Cities of
Chesapeake, Hampton,
Newport News, Norfolk,
Poquoson, Portsmouth, Suffolk,
Virginia Beach, Williamsburg and the
Counties of Gloucester,
Isle of Wight, James City,
King and Queen, King William,
Mathews, Middlesex, Surry* and York
*Excluding the Town of Claremont



CERTAIN STATEMENTS INCLUDED IN THIS OFFICIAL STATEMENT CONSTITUTE “FORWARD-LOOKING STATEMENTS” WITHIN THE MEANING OF SECTION 27A OF THE SECURITIES ACT OF 1933, AS AMENDED, AND SECTION 21E OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED. SUCH STATEMENTS ARE GENERALLY IDENTIFIABLE BY TERMS SUCH AS “PLAN,” “PROJECT,” “EXPECT,” “ANTICIPATE,” “INTEND,” “BELIEVE,” “ESTIMATE,” “BUDGET” OR OTHER SIMILAR WORDS. THE ACHIEVEMENT OF CERTAIN RESULTS OR OTHER EXPECTATIONS CONTAINED IN SUCH FORWARD-LOOKING STATEMENTS INVOLVES KNOWN AND UNKNOWN RISKS, UNCERTAINTIES AND OTHER FACTORS THAT MAY CAUSE ACTUAL RESULTS, PERFORMANCE OR ACHIEVEMENTS DESCRIBED TO BE MATERIALLY DIFFERENT FROM ANY RESULTS, PERFORMANCES OR ACHIEVEMENTS EXPRESS OR IMPLIED BY SUCH FORWARD-LOOKING STATEMENTS. EXCEPT AS SPECIFICALLY SET FORTH HEREIN, THE DISTRICT DOES NOT PLAN TO ISSUE ANY UPDATES OR REVISIONS TO THOSE FORWARD-LOOKING STATEMENTS DUE TO CHANGES IN ITS EXPECTATIONS OR SUBSEQUENT EVENTS, CONDITIONS OR CIRCUMSTANCES ON WHICH SUCH STATEMENTS ARE BASED.

This Official Statement speaks as of its date except where specifically noted otherwise and is subject to change without notice. Neither the delivery of this Official Statement, any sale made hereunder, nor any filing of this Official Statement shall under any circumstances create an implication that there has been no change in the affairs of the District since the date of this Official Statement or imply that any information herein is accurate or complete as of any later date.

The Series 2019A Bonds are exempt from registration under the Securities Act of 1933, as amended. As obligations of a political subdivision of the Commonwealth of Virginia, the Series 2019A Bonds are also exempt from registration under the securities laws of Virginia.

No dealer, salesman or any other person has been authorized to give any information or to make any representation, other than the information and representations contained herein, in connection with the offering of the Series 2019A Bonds, and, if given or made, such information or representations must not be relied upon. This Official Statement does not constitute an offer to sell or solicitation of an offer to buy any of the Series 2019A Bonds in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

The Underwriters have provided the following sentence for inclusion in this Official Statement. The Underwriters have reviewed the information in this Official Statement in accordance with, and as part of, their responsibility to investors under the federal securities laws as applied to the facts and circumstances of the transactions contemplated by this Official Statement, but the Underwriters do not guarantee the accuracy or completeness of such information.

IN CONNECTION WITH THIS OFFERING, THE UNDERWRITERS MAY OVERALLOT OR EFFECT TRANSACTIONS THAT STABILIZE OR MAINTAIN THE MARKET PRICE OF THE SERIES 2019A BONDS AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL IN THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME.

TABLE OF CONTENTS

	Page
INTRODUCTION	1
PLAN OF REFUNDING	2
Plan of Refunding	2
Future Financings	3
SOURCES AND USES OF FUNDS	4
THE SERIES 2019A BONDS	4
Description.....	4
Book-Entry Only System.....	4
Redemption Provisions	5
Notice of Redemption	7
SECURITY AND SOURCES OF PAYMENT	8
General.....	8
Rate Covenant.....	8
Outstanding Senior Obligations.....	9
Additional Senior Obligations	9
Parity Obligations	9
Additional Parity Obligations	10
Amendments relating to VRA Obligations.....	10
DEBT SERVICE REQUIREMENTS FOR PARITY OBLIGATIONS.....	13
DEBT SERVICE REQUIREMENTS FOR SENIOR OBLIGATIONS AND PARITY OBLIGATIONS.....	14
HAMPTON ROADS SANITATION DISTRICT	15
Authorization and Purpose.....	15
History	15
The Commission.....	15
Management and Staff.....	18
Awards.....	24
THE SERVICE AREA	25
Population Growth.....	26
Wastewater Flow	27
Expansion of Service Area.....	27
THE SYSTEM.....	27
System Improvements and Innovations	28
Capital Improvement Program.....	31
Regulation and Permits	32
State Consent Agreement and EPA Consent Decree.....	33
State Consent Agreement for Town of Surry Treatment Plant.....	34
Virginia Watershed Implementation Plan.....	34
FINANCIAL MANAGEMENT	34
General.....	34
Budgeting and Accounting	38
Rates.....	38
Rate Making Process.....	39

Collection of Unpaid Wastewater Treatment Charges.....	39
LITIGATION.....	40
APPROVAL OF LEGAL PROCEEDINGS.....	40
TAX MATTERS.....	40
General.....	40
Certain U.S. Federal Income Tax Considerations.....	40
Payments of Interest.....	41
Original Issue Discount.....	41
Market Discount	42
Premium.....	43
Disposition of a Series 2019A Bond.....	44
Defeasance.....	44
Medicare Tax	44
Backup Withholding.....	44
Withholding on Payments to Nonresident Alien Individuals and Foreign Corporations	45
Foreign Account Tax Compliance Act	46
ERISA Considerations.....	46
Virginia Taxes.....	47
UNDERWRITING	47
FINANCIAL ADVISOR	47
VERIFICATION OF MATHEMATICAL COMPUTATIONS FOR THE REFUNDED BONDS.....	47
RATINGS	48
CONTINUING DISCLOSURE.....	48
MISCELLANEOUS	S-1
Appendix A – Comprehensive Annual Financial Report for the Fiscal Year ended June 30, 2018, including as a part thereof, the Basic Financial Statements and Related Auditor’s Report for the Fiscal Year ended June 30, 2018, as rendered by KPMG LLP	
Appendix B – Certain Definitions	
Appendix C – Summary of Certain Provisions of the Trust Agreement	
Appendix D – Proposed Opinion of Bond Counsel	
Appendix E – Form of Continuing Disclosure Agreement	
Appendix F – The Depository Trust Company	

Official Statement

Hampton Roads Sanitation District, Virginia

Relating to its

\$ _____*

**Subordinate Wastewater Revenue Bonds
Refunding Series 2019A (Federally Taxable)**

INTRODUCTION

This Official Statement, which includes the cover and inside cover pages hereof, the map and the appendices hereto, sets forth information concerning the Hampton Roads Sanitation District (the “District” or “HRSD”) and the District’s \$ _____* aggregate principal amount of Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable) (the “Series 2019A Bonds”).

The Series 2019A Bonds are being issued in accordance with the provisions of Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (the “Enabling Act”). On August __, 2019, the Hampton Roads Sanitation District Commission (the “Commission”), the governing body of the District, authorized by resolution the issuance of the Series 2019A Bonds. The Commission is issuing the Series 2019A Bonds for the purpose of providing funds, together with other available funds, (i) to refund, in advance of their maturity, certain outstanding [Senior Bonds and certain outstanding Bonds] (the “Refunding Candidates”) and (ii) to pay certain expenses incurred in connection with the issuance of the Series 2019A Bonds by the District. The sale and delivery of all or a portion of the Series 2019A Bonds is contingent upon the ability of the District to achieve significant aggregate present value debt service savings on the Refunding Candidates. As a result, the sale and delivery of the Series 2019A Bonds is subject to market conditions.

The Series 2019A Bonds are special obligations of the District payable solely from the Net Revenues Available for Debt Service (hereinafter defined) derived by the District from the operation of its Wastewater System (hereinafter defined) and other funds pledged to secure the Series 2019A Bonds under the Trust Agreement (hereinafter defined). See “SECURITY AND SOURCES OF PAYMENT” and “THE SYSTEM” herein. The Commission has determined to provide for the issuance of the Series 2019A Bonds under the Amended and Restated Trust Agreement, dated as of March 1, 2016 (the “Amended and Restated Trust Agreement”), as supplemented by the Seventh Supplemental Trust Agreement, dated as of _____, 2019 (the “Seventh Supplemental Trust Agreement” and the Amended and Restated Trust Agreement, as so supplemented and as the same may be amended and further supplemented, the “Trust Agreement”), each by and between the District and The Bank of New York Mellon Trust Company, N.A., as trustee (in such capacity, the “Trustee”).

This Official Statement contains a brief description of the Series 2019A Bonds and the District, including its service area, governance and information regarding its operations and finances.

Appendix A contains the District’s Comprehensive Annual Financial Report for the Fiscal Year ended June 30, 2018, and includes additional information regarding the District’s operations and financial condition. Appendix B contains the definitions of certain terms used in this Official Statement. Capitalized terms used but not defined herein shall have the meanings given to such terms in the Trust

*Preliminary, subject to change.

Agreement. Brief descriptions and summaries of certain provisions of the Series 2019A Bonds, the Trust Agreement and the Seventh Supplemental Trust Agreement are included in Appendix C.

PLAN OF REFUNDING

Plan of Refunding

[To be revised] Although the District anticipates that the refunding of the Refunding Candidates will produce debt service savings and other financial benefits for the District, the issuance of the Series 2019A Bonds and the refunding of all or any of the Refunding Candidates (the Refunding Candidates actually refunded with the proceeds of the Series 2019A Bonds, the “Refunded Bonds”) is subject to the District’s determination at the time of sale that it will achieve significant debt service savings. Consequently, the issuance of the Series 2019A Bonds and the refunding of any of the Refunding Candidates is dependent upon market conditions and other events beyond the control of the District.

The Refunding Candidates that are outstanding Senior Bonds issued under the Senior Trust Agreement identified below:

Wastewater Revenue Bonds, Series 20__*

<u>Maturity</u> <u>(____1)</u>	<u>Principal</u> <u>Amount</u>	<u>Redemption</u> <u>Date</u>	<u>Redemption</u> <u>Price</u>	<u>CUSIPs</u>
	\$		100%	
			100	
			100	
			100	
			100	
			100	

The Refunding Candidates that are outstanding Bonds issued under the Trust Agreement identified below:

Wastewater Revenue Bonds, Series 20__*

<u>Maturity</u> <u>(____1)</u>	<u>Principal</u> <u>Amount</u>	<u>Redemption</u> <u>Date</u>	<u>Redemption</u> <u>Price</u>	<u>CUSIPs</u>
	\$		100%	
			100	
			100	
			100	
			100	
			100	
			100	

The details of the Refunding Candidates that are selected to become Refunded Bonds will be set forth in the final Official Statement.

*Preliminary, subject to change.

To effect the refunding, a sufficient amount of the proceeds of the Series 2019A Bonds will be deposited in [an/___ separate] escrow account[s] ([each, an “Escrow Fund”) established by the District with The Bank of New York Mellon Trust Company, N.A. (in such capacity, the “Escrow Agent”), and will be invested in certain non-callable direct obligations or obligations the principal and interest on which are unconditionally guaranteed by the United States of America (“Defeasance Obligations”) that mature in amounts and pay interest at rates sufficient to pay, when due, the principal, applicable redemption premiums, if any, and interest on the Refunded Bonds through their respective maturity or redemption dates, as applicable. The sufficiency of each Escrow Fund, including Defeasance Obligations and the income thereon, to pay such amounts will be verified by _____.

See “VERIFICATION OF MATHEMATICAL COMPUTATIONS FOR THE REFUNDED BONDS.” The Escrow Agent will be given irrevocable instructions to call the callable Refunded Bonds for redemption on the applicable redemption dates and at the applicable redemption prices.

Future Financings

The District anticipates that it will finance a portion of its Capital Improvement Program through the issuance of Additional Bonds (as hereinafter defined), VRA Subordinate Obligations (as hereinafter defined), and other Indebtedness subordinate to Indebtedness secured by the Trust Agreement (“Junior Obligations”). See “SECURITY AND SOURCES OF PAYMENT—Outstanding Senior Obligations,” “—Additional Senior Obligations,” “—Parity Obligations,” and “—Additional Parity Obligations.” Any acceleration of the Capital Improvement Program could result in an acceleration of the date and, potentially, an increase the size of any issuance of Indebtedness by the District.

[to be updated] The District has entered into a Credit Agreement, dated as of October 30, 2015, with Bank of America, N.A. (as amended, the “Credit Agreement”), pursuant to which the bank provided a line of credit in the aggregate principal amount of up to \$90,000,000 (the “Line of Credit”). The District’s the maximum outstanding authorization on the Line of Credit is currently \$1,000,000. The District does not intend to use the Line of Credit prior to _____ 1, ___, to provide interim financing for projects included in the CIP. The Line of Credit constitutes a Junior Obligation under the Trust Agreement and is secured on a subordinate basis from the lien on Net Revenues Available for Debt Service securing Parity Obligations.

The District has no current plans to issue additional Senior Obligations under the Senior Trust Agreement and plans to use the Trust Agreement as the principal operating lien for the issuance of indebtedness to finance the District’s Capital Improvement Program. By a resolution adopted on August 27, 2019, the Commission has authorized the District to take such actions as are necessary to prohibit the future issuance of Additional Senior Obligations. Although the District anticipates that it will take such actions, by December 31, 2019, no assurance can be given as to the actual timing thereof. See “SECURITY AND SOURCES OF PAYMENT—Additional Senior Obligations” below.

[Remainder of page intentionally left blank.]

SOURCES AND USES OF FUNDS

Sources

Principal Amount of Series 2019A Bonds	\$
Net Bond [Premium/Discount]	
Other District Funds	
Total Sources of Funds *	<u>\$</u>

Uses

Deposit to Escrow Fund[s]	\$
Underwriters' Discount	
Costs of Issuance	
Total Uses of Funds *	<u>\$</u>

*Numbers may not add to totals due to rounding.

THE SERIES 2019A BONDS

Description

The Series 2019A Bonds will be dated, bear interest and mature as set forth on the cover and inside cover pages of this Official Statement. The Series 2019A Bonds are issuable as registered bonds without coupons in the denomination of \$5,000 or any whole multiple thereof, as provided in the Trust Agreement. Interest will be payable on each [February] 1 and [August] 1, commencing [February] 1, 2020, to the person in whose name such bond is registered as of the applicable Regular Record Date, which is [January] 15 for interest due on [February] 1, and [July] 15 for interest due on [August] 1.

Book-Entry Only System

The Depository Trust Company (“DTC”), New York, New York, will act as securities depository for the Series 2019A Bonds. The Series 2019A Bonds will be issued as fully-registered securities registered in the name of Cede & Co. (DTC’s partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered bond certificate will be issued for each maturity of the Series 2019A Bonds and will be deposited with DTC. Additional information respecting DTC and its book entry system is contained in Appendix F.

The information in this section and in Appendix F concerning DTC and DTC’s book-entry system has been obtained from sources that the District believes to be reliable, but the District takes no responsibility for the accuracy thereof.

DTC may discontinue providing its services as depository with respect to the Series 2019A Bonds at any time by giving reasonable notice to the District. Under such circumstances, if a successor depository is not obtained, certificates for the Series 2019A Bonds are required to be printed and delivered.

The District may decide to discontinue use of the system of book-entry transfers through DTC (or a successor securities depository). In that event, certificates for the Series 2019A Bonds will be printed and delivered.

Redemption Provisions

Optional Redemption

The District may, at its option, redeem the Series 2019A Bonds due after [August] 1, 20__*, prior to their respective maturities, as a whole or in part, on any date, beginning [August] 1, 20__*, at a redemption price equal to the principal amount thereof, together with interest accrued to the date fixed for redemption.

Mandatory Redemption

The Series 2019A Bonds due on [August] 1, 20__*, are subject to mandatory sinking fund redemption on [August] 1 in the following years in the following principal amounts (“Sinking Fund Requirements”) at a redemption price equal to the principal amount thereof, together with interest accrued to the date of redemption.

Term Bonds due [August] 1, 20__	
<u>Year</u>	<u>Sinking Fund Requirement</u>
20__	\$
20__	
20__	
20__	†

† Unamortized balance at maturity.

In the event of a partial optional redemption or purchase of such term bonds, the District will credit the principal amount of such term bonds so purchased or redeemed against the Sinking Fund Requirements for the remaining term bonds outstanding in such amounts and in such years as it in its sole discretion shall determine.

[Make-Whole Optional Redemption]

[TBD-This is a place-holder] “Make-Whole” Optional Redemption. The Series 2019A Bonds maturing on or prior to [August] 1, 20__*, are subject to redemption at the option of the District, as a whole or in part, at any time, at the Make-Whole Redemption Price (as defined herein). The “Make-Whole Redemption Price” is the greater of (i) 100% of the principal amount of the Series 2019A Bonds to be redeemed and (ii) the sum of the present value of the remaining scheduled payments of principal and interest on the Series 2019A Bonds to be redeemed, not including any portion of those payments of interest accrued and unpaid as of the date on which the Series 2019A Bonds are to be redeemed, discounted to the date on which the Series 2019A Bonds are to be redeemed on a semi-annual basis, assuming a 360-day year consisting of twelve 30-day months, at the Treasury Rate (defined below) [plus 0.15%]; plus in each case, accrued and unpaid interest on the Series 2019A Bonds to be redeemed on the redemption date.

For purpose of determining the Make-Whole Redemption Price, the following definitions apply:

“Treasury Rate” means, with respect to any redemption date for any particular Series 2019A Bond, the greater of:

*Preliminary, subject to change.

(i) the yield to maturity as of such redemption date of the United States Treasury securities with a constant maturity (as compiled and published in the most recent Federal Reserve Statistical Release H.15 (519) that has become publicly available at least two business days prior to the redemption date (excluding inflation indexed securities) (or, if such Statistical Release is no longer published, any publicly available source of similar market data)) most nearly equal to the period from the redemption date to maturity; provided, however, that if the period from the redemption date to maturity is less than one year, the weekly average yield on actually traded United States Treasury securities adjusted to a constant maturity of one year will be used; all as will be determined by an independent accounting firm, investment banking firm or financial advisor retained by the District at the District's expense and such determination shall be conclusive and binding on the owners of the Series 2019A Bonds, and

(ii) the rate per annum, expressed as a percentage of the principal amount, equal to the semiannual equivalent yield to maturity or interpolated maturity of the Comparable Treasury Issue (defined below), assuming that the Comparable Treasury Issue is purchased on the redemption date for a price equal to the Comparable Treasury Price (defined below), as calculated by the Designated Investment Banker (defined below).

“Comparable Treasury Issue” means, with respect to any redemption date for a particular Series 2019A Bond, the United States Treasury security or securities selected by the Designated Investment Banker that has an actual or interpolated maturity comparable to the remaining average life of the Series 2019A Bond to be redeemed.

“Comparable Treasury Price” means, with respect to any redemption date for a particular Series 2019A Bond, (i) if the Designated Investment Banker receives at least four Reference Treasury Dealer Quotations (defined below), the average of such quotations for such redemption date, after excluding the highest and lowest Reference Treasury Dealer Quotations, or (ii) if the Designated Investment Banker obtains fewer than four Reference Treasury Dealer Quotations, the average of all such quotations.

“Designated Investment Banker” means one of the Reference Treasury Dealers appointed by the District.

“Reference Treasury Dealer” means each of the four firms, specified by the District, from time to time, that are primary United States government securities dealers in the City of New York, New York (each a “Primary Treasury Dealer”); provided, however, that if any of them ceases to be a Primary Treasury Dealer, the District will substitute another Primary Treasury Dealer.

“Reference Treasury Dealer Quotations” means, with respect to each Reference Treasury Dealer and any redemption date for a particular Series 2019A Bond, the average, as determined by the Designated Investment Banker, of the bid and asked prices for the Comparable Treasury Issue (expressed in each case as a percentage of its principal amount) quoted in writing to the Designated Investment Banker by such Reference Treasury Dealer at 3:30 P.M., New York City time, on the third Business Day preceding such redemption date.

Any Make-Whole Redemption Price of Series 2019A Bonds to be redeemed pursuant to the provisions described under this section will be determined by an independent accounting firm, investment banking firm or financial advisor retained by the District to calculate such redemption price. The District may conclusively rely on the determination of such redemption price by such independent accounting firm, investment banking firm or financial advisor and will not be liable for such reliance.]

Selection of Series 2019A Bonds for Redemption

Series 2019A Bonds may be redeemed only in increments of \$5,000 or whole multiples thereof. If less than all the Series 2019A Bonds are called for redemption the Series 2019A Bonds or portions thereof will be redeemed in a pro-rata manner for each maturity of Series 2019A Bonds, each \$5,000 increment being counted as one Series 2019A Bond for such purpose. If a portion of a Series 2019A Bond is called for redemption, a new Series 2019A Bond in a principal amount equal to the unredeemed portion thereof will be issued to the bondholder upon the surrender thereof.

Defeasance of Series 2019A Bonds

[Persons considering the purchase of a Series 2019A Bond should be aware that a defeasance of a Series 2019A Bond by the District prior to maturity could result in the realization of gain or loss by the beneficial owner of the Series 2019A Bond for federal income tax purposes, without any corresponding receipt of money by the beneficial owner. Such gain or loss generally would be subject to recognition for the tax year in which such realization occurs, as in the case of a sale or exchange. Owners are advised to consult their own tax advisers with respect to the tax consequences resulting from such events. See “TAX MATTERS—Defeasance” herein.]

Notice of Redemption

Notice of redemption is to be given not more than 60 nor less than 30 days before the redemption date by first class mail to the registered owner or owners of the Series 2019A Bonds or portions thereof to be redeemed; provided, however, that any defect in such notice or the failure so to mail any such notice to any owners of any Series 2019A Bonds will not affect the validity of the proceedings for the redemption of any other Series 2019A Bonds. **During the period that DTC or its nominee is the registered holder of the Series 2019A Bonds, the Bond Registrar will not be responsible for mailing notices of redemption to the beneficial owners of the Series 2019A Bonds. See “—Book-Entry Only System” above and Appendix F.** Each such notice will set forth the Series 2019A Bonds or portions thereof to be redeemed, the date fixed for redemption, the redemption price to be paid, and if less than all the Series 2019A Bonds will be called for redemption, the maturities of the Series 2019A Bonds to be redeemed and shall otherwise comply with Securities Exchange Act of 1934 Release No. 34-23856, dated December 3, 1986, including the requirement that notice be given to all organizations registered with the Securities and Exchange Commission as securities depositories, and to one or more information services of national recognition that disseminate redemption information with respect to tax-exempt securities. If any Series 2019A Bond is to be redeemed in part only, the notice of redemption will state also that on or after the redemption date, upon surrender of such Series 2019A Bond, a new Series 2019A Bond in an authorized denomination and in principal amount equal to the unredeemed portion of such Series 2019A Bond will be issued.

Any notice of optional redemption of the Series 2019A Bonds may state that it is conditioned upon there being available an amount of money sufficient to pay the redemption price, consisting of par plus interest accrued and unpaid to the redemption date, and any conditional notice so given may be rescinded at any time before the payment of the redemption price if any such condition so specified is not satisfied. If a redemption does not occur after a conditional notice is given due to an insufficient amount of funds on deposit with the Trustee, the corresponding notice of redemption will be deemed to be revoked.

If the District gives an unconditional notice of redemption, then on the redemption date the Series 2019A Bonds called for redemption will become due and payable. If the District gives a conditional notice of redemption and money to pay the redemption price of the affected Series 2019A Bonds has been

set aside in escrow with the Trustee for the purpose of paying such Series 2019A Bonds, then on the redemption date such Series 2019A Bonds will become due and payable. In either case, if on the redemption date the Trustee holds money to pay the Series 2019A Bonds called for redemption, thereafter no interest will accrue on those Series 2019A Bonds, and a Bondholder's right will be to receive payment of the redemption price upon surrender of those Series 2019A Bonds.

SECURITY AND SOURCES OF PAYMENT

THE SERIES 2019A BONDS ARE SPECIAL OBLIGATIONS OF THE DISTRICT PAYABLE SOLELY FROM THE NET REVENUES AVAILABLE FOR DEBT SERVICE AND OTHER FUNDS PLEDGED TO SECURE THE SERIES 2019A BONDS UNDER THE TRUST AGREEMENT. THE SERIES 2019A BONDS SHALL NOT BE DEEMED TO CONSTITUTE A DEBT, OR A PLEDGE OF THE FAITH AND CREDIT, OF THE COMMONWEALTH OF VIRGINIA OR OF ANY COUNTY, CITY, TOWN OR POLITICAL SUBDIVISION THEREOF. THE ISSUANCE OF THE SERIES 2019A BONDS SHALL NOT DIRECTLY OR INDIRECTLY OR CONTINGENTLY OBLIGATE THE COMMONWEALTH OF VIRGINIA OR ANY COUNTY, CITY, TOWN OR POLITICAL SUBDIVISION THEREOF TO LEVY OR TO PLEDGE ANY FORM OF TAXATION WHATEVER THEREFOR.

General

Principal of and interest on the Series 2019A Bonds will be payable from "Net Revenues Available for Debt Service" of the District pledged to the payment thereof and money held in certain funds and accounts under the Trust Agreement.

"Net Revenues Available for Debt Service" means all Net Revenues less debt service on Senior Obligations.

The realization of amounts to be derived upon the enforcement of the Series 2019A Bonds will depend upon the exercise of various remedies specified in the Trust Agreement. These and other remedies may, in many respects, require judicial action of a nature that is often subject to discretion and delay. Under existing laws, the remedies specified in the Trust Agreement may not be readily available or may be limited. A court may decide not to order the specific performance of the covenants contained in the Trust Agreement. The various legal opinions to be delivered concurrently with the delivery of the Series 2019A Bonds will be qualified as to the enforceability of the various legal instruments by limitations imposed by state and federal laws, rulings and decisions affecting remedies and by bankruptcy, fraudulent conveyance, reorganization and other laws affecting the enforcement of creditors' rights generally.

Under the Trust Agreement, the District is subject to covenants relating to maintenance of a specified Long-Term Debt Service Coverage Ratio and restricting, among other things, incurrence of Indebtedness and the existence of liens on Property. See "—Limitations on Indebtedness" and "—Limitation on Creation of Liens" in Appendix C hereto.

Rate Covenant

In the Trust Agreement, the District covenants to set and revise its rates and charges for facilities, services and products such that the Net Revenues, calculated at the end of each Fiscal Year, will equal at least 120% of the sum of (a) the Principal and Interest Requirements (as defined in the Senior Trust Agreement) on Senior Obligations and (b) the Principal and Interest Requirements on Parity Obligations (the "Rate Covenant"). If, for any reason, the Net Revenues are insufficient to satisfy the foregoing

covenant, the District shall within one hundred and twenty (120) days adjust and increase its rates, fees and other charges (to the extent permitted by the Enabling Act) or reduce its current expenses so as to provide sufficient Net Revenues to satisfy the Rate Covenant.

On or before the last day of each Fiscal Year, the District will review the adequacy of its rates, fees and other charges for the next Fiscal Year, and, if such review indicates the District's rates, fees and other charges are insufficient to satisfy the Rate Covenant, the District will promptly take appropriate action to increase its rates, fees and other charges or reduce its current expenses to cure any deficiency. See "—Rate Covenant" in Appendix C hereto.

Outstanding Senior Obligations

As of August 27, 2019, the District has outstanding four series of Bonds constituting Senior Obligations under the Senior Trust Agreement, including its Wastewater Revenue Bonds, Series 2009 (the "Senior 2009 Bonds"), of which \$120,140,000 principal amount is outstanding, its Wastewater Revenue Bonds, Series 2011 (the "Senior 2011 Bonds"), of which \$1,525,000 principal amount is outstanding, its Wastewater Revenue Bonds, Series 2012 (the "Senior 2012 Bonds"), of which \$5,770,000 principal amount is outstanding, and its Wastewater Revenue Bonds, Refunding Series 2014A (the "Senior 2014 Bonds"), of which \$100,060,000 principal amount is outstanding.

Since May 2009, the District obtained seven loans from the Virginia Resources Authority Revolving Fund and issued, in evidence of its obligations to repay such loans, its bonds constituting Senior Obligations under the Senior Trust Agreement (the "VRA Senior Bonds" and, together with the Senior Bonds, "Senior Obligations"). Such VRA Senior Bonds are secured under the Senior Trust Agreement on a parity with all other Senior Obligations, including the Senior 2008 Bonds, the Senior 2009 Bonds, the Senior 2011 Bonds, the Senior 2012 Bonds and the Senior 2014 Bonds. As of August 27, 2019, \$79,914,507 of such VRA Senior Bonds were outstanding, with no remaining undrawn authorized amount. See also "—Parity Obligations" below.

Additional Senior Obligations

Under the Senior Trust Agreement, the District may issue and incur additional Senior Obligations for the District's Capital Improvement Program or to refund outstanding Senior Obligations subject to the District's demonstrating its compliance with the conditions for the incurrence thereof under the Senior Trust Agreement or the new Senior Obligations qualifying for an exception thereto.

At this time, the District does not currently intend to issue additional Senior Obligations under the Senior Trust Agreement and instead plans to use the Trust Agreement as the principal operating lien for the issuance of indebtedness to finance the District's Capital Improvement Program. In addition, as market conditions permit, the District intends to refund outstanding Senior Obligations with the proceeds of Bonds issued under the Trust Agreement and, subject to certain conditions, certain VRA Senior Bonds will become VRA Subordinate Obligations. By a resolution adopted on August 27, 2019, the Commission has authorized the District to take such actions as are necessary to prohibit the future issuance of Additional Senior Obligations. Although the District anticipates that it will take such actions, by December 31, 2019, no assurance can be given as to the actual timing thereof.

Parity Obligations

As of August 27, 2019, the District has outstanding five series of Bonds constituting Parity Obligations under the Trust Agreement, including its Subordinate Wastewater Revenue Bonds, Refunding Series 2012 (Federally Taxable) (the "Subordinate 2012 Bonds"), of which \$600,000 principal amount is

outstanding, its Subordinate Wastewater Revenue Bonds, Series 2016A (the “Subordinate 2016A Bonds”), of which \$228,320,000 principal amount is outstanding and its variable rate Subordinate Wastewater Revenue Bonds, Series 2016B (the “Subordinate 2016B Bonds,” and together with the Subordinate 2016A Bonds, the “Subordinate 2016 Bonds”), of which \$50,000,000 principal amount is outstanding, its Subordinate Wastewater Revenue Bonds, Refunding Series 2017A (the “Subordinate 2017 Bonds”), of which \$83,485,000 principal amount is outstanding and its Subordinate Wastewater Revenue Bonds, Series 2018A (the “Subordinate 2018 Bonds”), of which \$62,715,000 principal amount is outstanding.

[to be updated] In addition to the VRA Senior Bonds described under “—Outstanding Senior Obligations” above, since 1993, the District has borrowed over \$177 million from the Virginia Resources Authority Revolving Loan Fund and issued, in evidence of its obligations to repay such loans, 16 issues of bonds that are outstanding Parity Indebtedness and recognized as such under the Trust Agreement (the “VRA Subordinate Obligations” and collectively, with the Subordinate 2012 Bonds, the Subordinate 2016 Bonds, the Subordinate 2017 Bonds, the Subordinate 2018 Bonds, the Series 2019A Bonds, when, as and if issued, and other Bonds or additional VRA Subordinate Obligations issued from time to time under the provisions of the Trust Agreement, the “Parity Obligations”). As of August 27, 2019, the outstanding drawn amount of the VRA Subordinate Obligations was [\$54.4] million and an undrawn authorized amount of [\$62.6] million. The terms of the VRA Subordinate Obligations generally state that the lien thereof on the Net Revenues of the District is in all respects subordinate and inferior to the lien thereon of Senior Obligations outstanding under the Senior Trust Agreement. Generally, after an initial period where no interest accrues on such VRA Subordinate Obligations, interest accrues on the disbursed principal of the outstanding VRA Subordinate Obligations at interest rates ranging from 1.70% to 3.75% per annum, and principal and interest are payable in installments over the 20-year terms of the VRA Subordinate Obligations. The VRA Subordinate Obligations have been issued for various improvements and upgrades at several of the District’s treatment plants. See the table “DEBT SERVICE REQUIREMENTS FOR SENIOR OBLIGATIONS AND PARITY OBLIGATIONS” and “—Limitation on Creation of Liens” in Appendix C. The Series 2019A Bonds are on parity under the Trust Agreement with the Outstanding VRA Subordinate Obligations as to their subordinate lien on the Net Revenues of the District.

Additional Parity Obligations

Under the Trust Agreement, the District may issue Additional Parity Obligations, including Additional Bonds and VRA Subordinate Obligations, for the District’s Capital Improvement Program or to refund outstanding Senior Indebtedness or Parity Obligations subject to the District’s demonstrating its compliance with the conditions for the incurrence thereof under the Trust Agreement or qualifying for an exception thereto. The District anticipates that it will finance a portion of its Capital Improvement Program with future issues of Additional Parity Obligations, which may be evidenced by additional VRA Subordinate Obligations, and Junior Obligations, which are subordinate to Parity Obligations. See “—Limitations on Indebtedness” in Appendix C.

Amendments relating to VRA Obligations

Pursuant to a Master Financing Agreement, dated as of February 1, 2016, as amended and supplemented (the “VRA Financing Agreement”), between the District and VRA relating to the VRA Senior Bonds and the VRA Subordinate Obligations (collectively, the “VRA Obligations”), VRA and the District have amended and restated all of the Financing Agreements pursuant to which the VRA Obligations were issued and have agreed that, under certain conditions set forth in the VRA Financing Agreement, some or all of the VRA Senior Bonds will become VRA Subordinate Obligations secured as Parity Obligations under the Trust Agreement and will no longer be Senior Obligations secured under the

Senior Trust Agreement (the “Migrating VRA Senior Bonds”). The Migrating VRA Senior Bonds will, from time to time, convert from Senior Obligations to VRA Subordinate Obligations, subject to the following conditions set forth in the VRA Financing Agreement:

(a) There are no existing defaults or events of default under the terms of any debt of the District;

(b) The Senior Trust Agreement is legally closed to the issuance of additional debt (See “—Additional Senior Obligations” above);

(c) The District maintains at least a “AA-” or equivalent rating by two nationally-recognized statistical rating organizations on its debt outstanding under the Trust Agreement;

(d) The District has not issued any Senior Obligations after the date of the VRA Financing Agreement;

(e) Beginning with its Fiscal Year ended June 30, 2017, the District demonstrates that it has complied with the budgetary principles of its financial policy in effect as of the dated date of the VRA Financing Agreement to budget for minimum total debt service coverage of 1.4 times, i.e., such budgetary principles providing in pertinent part that the District will adopt operating and capital budgets that it projects will enable the District to maintain net revenues at a minimum of 1.4 times total debt service requirements, and in calculating compliance with the foregoing, the District may make reasonable adjustments to net revenues as presented on a GAAP basis;

(f) Receipt by the District of various certificates and opinions, in form and substance satisfactory to VRA; and

(g) The District has amortized or defeased its Senior Obligations such that the total par amount of debt outstanding under the Senior Trust Agreement is 15% or less of the par amount of the District’s total debt outstanding (taking into account the Migrating VRA Senior Bonds).

If only conditions (a) through (f) above are met (and condition (g) is not), the Migrating VRA Senior Bonds are to migrate from time to time to the position of Parity Obligations on a pro rata basis such that the ratio of VRA to District debt with a pledge of Net Revenues senior to the Parity Bonds is maintained at approximately 16.5% per Fiscal Year. Unless VRA and the District agree otherwise in writing, the Migrating VRA Senior Bonds are to migrate to the position of VRA Subordinate Obligations in reverse order of maturity. The Migrating VRA Senior Bonds may become VRA Subordinate Obligations without meeting any of the incurrence tests set forth in the Trust Agreement. See “—Limitations on Indebtedness” in Appendix C.

Once a Migrating VRA Senior Bond has migrated to the position of a Parity Obligation, such migration will not be reversed at a later date due to the District no longer meeting conditions (a), (c), (e) or (g) set forth above.

The conditions to migration of VRA Senior Bonds to parity lien status are not covenants with VRA (or under the Senior Trust Agreement or the Trust Agreement), and any failure of the District to meet such conditions will not constitute a default under the VRA Financing Agreement, the Senior Trust Agreement or the Trust Agreement. The sole consequence of a failure to meet any such condition under

the VRA Financing Agreement would be that the VRA Senior Bonds would not convert from senior lien status to parity lien status pursuant to the VRA Financing Agreement.

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**DEBT SERVICE REQUIREMENTS
FOR PARITY OBLIGATIONS⁽¹⁾²**

Fiscal Year Ending June 30,	<u>Series 2019A Bonds</u>			Outstanding Parity Obligations Debt Service⁽³⁾	Total Parity Obligations Debt Service
	<u>Principal</u>	<u>Interest</u>	<u>Debt Service</u>		
2020	\$	\$	\$	\$22,456,919	\$22,456,919
2021				31,771,138	31,771,138
2022				34,197,984	34,197,984
2023				31,841,351	31,841,351
2024				31,631,250	31,631,250
2025				31,633,500	31,633,500
2026				32,044,475	32,044,475
2027				37,345,566	37,345,566
2028				33,904,496	33,904,496
2029				33,859,175	33,859,175
2030				33,854,425	33,854,425
2031				44,643,442	44,643,442
2032				42,647,400	42,647,400
2033				42,648,925	42,648,925
2034				42,652,575	42,652,575
2035				42,392,941	42,392,941
2036				39,414,866	39,414,866
2037				39,533,675	39,533,675
2038				39,360,497	39,360,497
2039				24,645,956	24,645,956
2040				22,111,350	22,111,350
2041				21,826,982	21,826,982
2042				21,537,809	21,537,809
2043				21,519,954	21,519,954
2044				21,457,091	21,457,091
2045				16,263,119	16,263,119
2046				16,187,777	16,187,777
2047				13,061,813	13,061,813
2048				4,620,267	4,620,267
2049	—	—	—	<u>444,446</u>	<u>444,446</u>
TOTAL	<u>\$000</u>	<u>\$000</u>	<u>\$000</u>	<u>\$871,511,165</u>	<u>\$871,511,165</u>

(1) Numbers may not add to totals due to rounding.

(2) Total Principal and Interest payments on the District's Parity Obligations as of August 27, 2019.

(3) Assumes that none of the VRA Senior Bonds become Migrating VRA Senior Bonds. The Subordinate 2016B Bonds, which constitute Variable Rate Indebtedness, are assumed to bear interest at 2.50%. No assurance can be given, however, that the rate on the Subordinate 2016B Bonds will not be higher than assumed above. Includes debt service on the Refunding Candidates. The final Official Statement will show debt service net of the Refunded Bonds.

**DEBT SERVICE REQUIREMENTS
FOR SENIOR OBLIGATIONS AND PARITY OBLIGATIONS⁽¹⁾²**

Fiscal Year Ending June 30,	Total Senior Obligations Debt Service⁽³⁾	Total Parity Obligations Debt Service⁽⁴⁾	Total Debt Service
2020	\$24,750,183	\$22,456,919	\$47,207,102
2021	31,909,422	31,771,138	63,680,559
2022	30,373,591	34,197,984	64,571,575
2023	33,556,214	31,841,351	65,397,566
2024	33,473,648	31,631,250	65,104,899
2025	33,388,822	31,633,500	65,022,323
2026	32,632,625	32,044,475	64,677,101
2027	27,162,088	37,345,566	64,507,654
2028	27,061,025	33,904,496	60,965,521
2029	26,951,999	33,859,175	60,811,174
2030	26,838,575	33,854,425	60,693,000
2031	16,466,737	44,643,442	61,110,179
2032	13,327,125	42,647,400	55,974,525
2033	11,374,335	42,648,925	54,023,260
2034	9,257,583	42,652,575	51,910,158
2035	9,121,146	42,392,941	51,514,086
2036	8,979,755	39,414,866	48,394,621
2037	8,832,825	39,533,675	48,366,500
2038	8,679,768	39,360,497	48,040,265
2039	8,519,999	24,645,956	33,165,956
2040	8,352,932	22,111,350	30,464,282
2041	-	21,826,982	21,826,982
2042	-	21,537,809	21,537,809
2043	-	21,519,954	21,519,954
2044	-	21,457,091	21,457,091
2045	-	16,263,119	16,263,119
2046	-	16,187,777	16,187,777
2047	-	13,061,813	13,061,813
2048	-	4,620,267	4,620,267
2049	-	444,446	444,446
TOTAL	<u>\$431,010,399</u>	<u>\$871,511,165</u>	<u>\$1,302,521,564</u>

(1) Numbers may not add to totals due to rounding.

(2) Total Principal and Interest payments on the District's Senior Obligations and Parity Obligations as of August 27, 2019.

(3) See "SECURITY AND SOURCES OF PAYMENT—Outstanding Senior Obligations." Includes debt service on the Refunding Candidates. The final Official Statement will show debt service net of the Refunded Bonds.

(4) Assumes that none of the VRA Senior Bonds become Migrating VRA Senior Bonds. The Subordinate 2016B Bonds, which constitute Variable Rate Indebtedness, are assumed to bear interest at 2.50%. No assurance can be given, however, that the rate on the Subordinate 2016B Bonds will not be higher than assumed above. The interest on the Series 2009B Build America Bonds does not account for expected subsidy payments. Includes debt service on the Refunding Candidates. The final Official Statement will show debt service net of the Refunded Bonds.

HAMPTON ROADS SANITATION DISTRICT

Authorization and Purpose

Creation of the District was approved in a 1940 public referendum authorized by the Virginia General Assembly. A political subdivision of the Commonwealth of Virginia (the “Commonwealth”), the District was established as a governmental instrumentality to provide for the public health and welfare. Chapter 66, Acts of the Assembly of 1960, validated and confirmed prior legislation creating the District and repealed earlier acts of the Virginia General Assembly enacted with respect to the District.

The District was created for the specific purpose of abating pollution in the Hampton Roads area of Virginia through the interception of existing wastewater outfalls, the construction of wastewater treatment facilities and the installation of interceptors throughout the service area. The District does not provide water, solid waste disposal or storm water mitigation. The cities, counties and military establishments the District serves provide those services. With the exception of the Counties of King William, King and Queen, Middlesex, Mathews and Surry, excluding the Town of Claremont, the collection system, consisting of lateral sewers and sub trunk facilities that carry wastewater from industries, homes, apartments and businesses to the District’s interceptor system, are the responsibility of the various cities, counties and military establishments within the District.

The District is a separate legal entity from the various cities, towns, counties and military establishments within the District. See “—The Commission” below.

History

The District traces its origins to 1925, when the Virginia Department of Health condemned a large oyster producing area in Hampton Roads. The closure resulted in the Virginia General Assembly creating in 1927 a “Commission to Investigate and Survey the Seafood Industry of Virginia.” Subsequent studies recommended a public body to construct and operate a sewage system in the area.

In 1934, the Virginia General Assembly created the Hampton Roads Sanitation Disposal Commission with instructions to plan the elimination of pollution in Hampton Roads. Recommendations were made to the General Assembly which resulted in the Sanitary Districts Law of 1938, along with “An Act to provide for and create the Hampton Roads Sanitation District.” In a referendum held on November 5, 1940, a majority of the voters approved the creation of the District.

The District’s first construction project, the Warwick County Trunk Sewer, began on June 26, 1946. The District commenced operations on July 1, 1946, using facilities acquired from the United States Government. The District’s first treatment plant, the Army Base Plant, commenced operations on October 14, 1947. Since that time, the facilities of the District have been expanded to provide wastewater treatment service to all major population centers within its boundaries.

The Commission

The District operates under the direction of its governing body, the Hampton Roads Sanitation District Commission (the “Commission”), comprised of eight members appointed by the Governor for staggered terms of four years. Members of the Commission may be reappointed without limitation and may be suspended or removed by the Governor at his pleasure. The Commission annually elects one of its members as Chair and another as Vice-Chair. Under the Enabling Act, the eight members of the Commission must be residents of the cities and counties of the District as follows: one member from each of the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth and Virginia Beach; one

member from the City of Suffolk, Isle of Wight County or Surry County; and one member from the City of Williamsburg or Poquoson, or Gloucester, James City, King William, King and Queen, Mathews, Middlesex, or York County or the Town of Urbanna.

The Commission is empowered, among other things, to (1) construct and to improve, extend, enlarge, reconstruct, maintain, equip, repair and operate a wastewater system or systems, either within or without or partly within and partly without the corporate limits of the District, and to construct wastewater improvements within the corporate limits of the District, (2) issue the District’s bonds, payable solely from revenues, to pay all or part of the cost of a wastewater system, (3) fix, revise, charge and collect rates, fees and charges for the use of and for the services of any system operated by the District, (4) enter into contracts with any unit, including counties, cities and other authorities, relating to the furnishing of services of the District, and (5) acquire real or personal property necessary in connection with wastewater systems or wastewater improvements.

The current members of the Commission and their biographies are set forth below.

<u>Commissioners</u>	<u>Residence</u>	<u>Occupation</u>	<u>Term Expires June 7,</u>
Frederick N. Elofson, CPA, <i>Chair</i>	Newport News	Retired Certified Public Accountant and Personal Financial Specialist, Goodman & Company, LLP	2020
Maurice P. Lynch, Ph.D., <i>Vice-Chair</i>	Williamsburg	Professor Emeritus, Virginia Institute of Marine Science, College of William and Mary	2021
Michael E. Glenn	Norfolk	President, Luna Development Services, LLC	2023
Vishnu K. Lakdawala, Ph.D.	Virginia Beach	Associate Professor, Electrical and Computer Engineering, Old Dominion University	2022
Willie Levenston, Jr.	Portsmouth	Retired Supervisor Electronic Engineer, Norfolk Naval Shipyard	2023
Stephen C. Rodriguez	Chesapeake	Owner and President, Cruco, Inc.	2020
Elizabeth A. Taraski, Ph.D.	Suffolk	President and CEO, Nansemond River Preservation Alliance	2021
Molly Joseph Ward	Hampton	Treasurer, City of Hampton, Virginia	2020

Frederick N. Elofson, CPA, Chair. Mr. Elofson, a member of the Commission since July 1, 2006, is a Certified Public Accountant and retired senior partner in Dixon Hughes Goodman LLP, in Newport News. He earned a bachelor's degree in accounting from West Virginia University and has nearly 40 years of accounting experience. A former chair of the board and treasurer of the Peninsula Chamber of Commerce, Mr. Elofson remains active in numerous professional and civic organizations. He is a past treasurer and board member of the Schooner Virginia Project, a past president of the Peninsula Estate Planning Council, treasurer and Sunday School teacher at First Baptist Church Newport News, member of the Committee on Investments for the City of Newport News Retirement Fund and has been honored as a Chamber of Commerce Volunteer of the Year. Mr. Elofson resides in the City of Newport News.

Maurice P. Lynch, Ph.D., Vice-Chair. Dr. Lynch, a member of the Commission since August 24, 2009, is professor emeritus of the College of William and Mary's Virginia Institute of Marine Science. Upon earning his bachelor's degree from Harvard College, Dr. Lynch attended Navy Officer Candidate School, was commissioned an ensign in the U.S. Navy Reserve and remained on active duty with the Underwater Demolition Team until July 1962. After filling numerous reserve billets, he retired in 1988 with the rank of Captain USNR. Dr. Lynch earned his master's and doctoral degrees from the College of William and Mary, where he has been a member of the faculty since 1972. He has been a liaison to numerous universities as well as state and federal agencies. He has served as the Virginia Sea Grant director, director of the Chesapeake Bay Research Consortium and director of the Chesapeake Bay National Estuarine Research Reserve in Virginia. He has been an officer of several professional organizations, including the Virginia Academy of Science, the Coastal Society and the National Estuarine Research Reserve Association. Dr. Lynch also has served two terms on the Chesapeake Bay Foundation ("CBF") board of trustees and been a leader of CBF's York chapter. He served on the Middle Peninsula Planning District Commission from 1997 to 2015 and has served as its chair. Dr. Lynch resides in Williamsburg.

Michael E. Glenn, Commissioner. Mr. Glenn, a member of the Commission since May 13, 2008, is president of Luna Development Services, LLC. The firm, which offers full-service general contracting and real estate development services, is a Certified Virginia Minority Business Enterprise. Before founding his firm in 2004, Mr. Glenn was Director of Operations, Real Estate Services and Contracts for Troutman Sanders, LLP. He also has served as a development executive for Armada Hoffer Development and as a Wachovia Bank vice president. Mr. Glenn received a bachelor's degree in psychology, with a minor in biology, from Old Dominion University. Mr. Glenn resides in the City of Norfolk.

Vishnu K. Lakdawala, Ph.D., Commissioner. Dr. Lakdawala, a member of the Commission since June 8, 2002, obtained his undergraduate degree in electrical engineering from Bangalore University in India in 1972 and his Master of Engineering in High Voltage Engineering from Indian Institute of Science in 1974. He worked as Research and Development Engineer in Jyoti Limited for three years in the high voltage instrument transformers division. He received his Ph.D. in electrical engineering from the University of Liverpool in 1980. After serving as senior research associate in the Department of Electrical Engineering and Electronics in the University of Liverpool for a year, he joined Oak Ridge National Laboratory, Oak Ridge, Tennessee, where he conducted research for a year. He joined the faculty of Old Dominion University in 1983 as Assistant Professor in the Department of Electrical and Computer Engineering. He is currently the Chief Departmental Advisor and Associate Professor of Electrical and Computer Engineering. Dr. Lakdawala has served as the president and chairman of the Board of Trustees of the Hindu Temple of Hampton Roads. Dr. Lakdawala resides in the City of Virginia Beach.

Willie Levenston, Jr., Commissioner. Mr. Levenston, a member of the Commission since September 9, 2014, earned his Bachelor of Science in Engineering from Southern University in Baton Rouge, Louisiana. He retired from the Norfolk Naval Shipyard in 2008 after more than 40 years of service. In his capacity as Supervisor Electronics Engineer, Mr. Levenston was responsible for Surface Ship Exterior Radio Communications, Secure/Communication Information Processing, Naval Tactical Data Systems, Search Radar, Electronics Countermeasure/Navigational Aids, and the Submarine Communication sections. Mr. Levenston resides in the City of Portsmouth.

Stephen C. Rodriguez, Commissioner. Mr. Rodriguez, a member of the Commission since October 5, 2012, is the owner and president of Cruco Inc., which provides construction services in Hampton Roads. He currently serves as chair of the board of directors of the Outer Banks Hospital. Mr. Rodriguez was named chair of the Foundation for Virginia Natural Resources and has served as president of the Deep Creek Ruritan Club. He has also been a member of the Chesapeake School Board, the Chesapeake Hospital Authority, the Chesapeake Economic Development Authority and the board of directors of Opportunity, Inc. He holds a bachelor's degree in civil engineering technology and a certificate in civic leadership from Old Dominion University. Mr. Rodriguez resides in the City of Chesapeake.

Elizabeth A. Taraski, Ph.D., Commissioner. Dr. Taraski, a member of the Commission since June 8, 2017, is the president and CEO of the Nansemond River Preservation Alliance in Suffolk, Virginia. Dr. Taraski previously served in senior fundraising management positions at Christopher Newport University, Old Dominion University and the University of Richmond. Before moving to Virginia in 1998, Dr. Taraski was Director, Administration and Industrial Relations, Multi-lifecycle Engineering Research Center, New Jersey Institute of Technology. Dr. Taraski is a member of the Suffolk Branch AAUW, the Suffolk Business Women's Club and she is also a board member of the Suffolk Rotary Club. She holds a Ph.D. from Seton Hall University; a Master of Science degree from New York University and a Master of Education degree from Rutgers University and completed her doctoral internship at the Alfred P. Sloan Foundation, NYC. Dr. Taraski resides in the City of Suffolk.

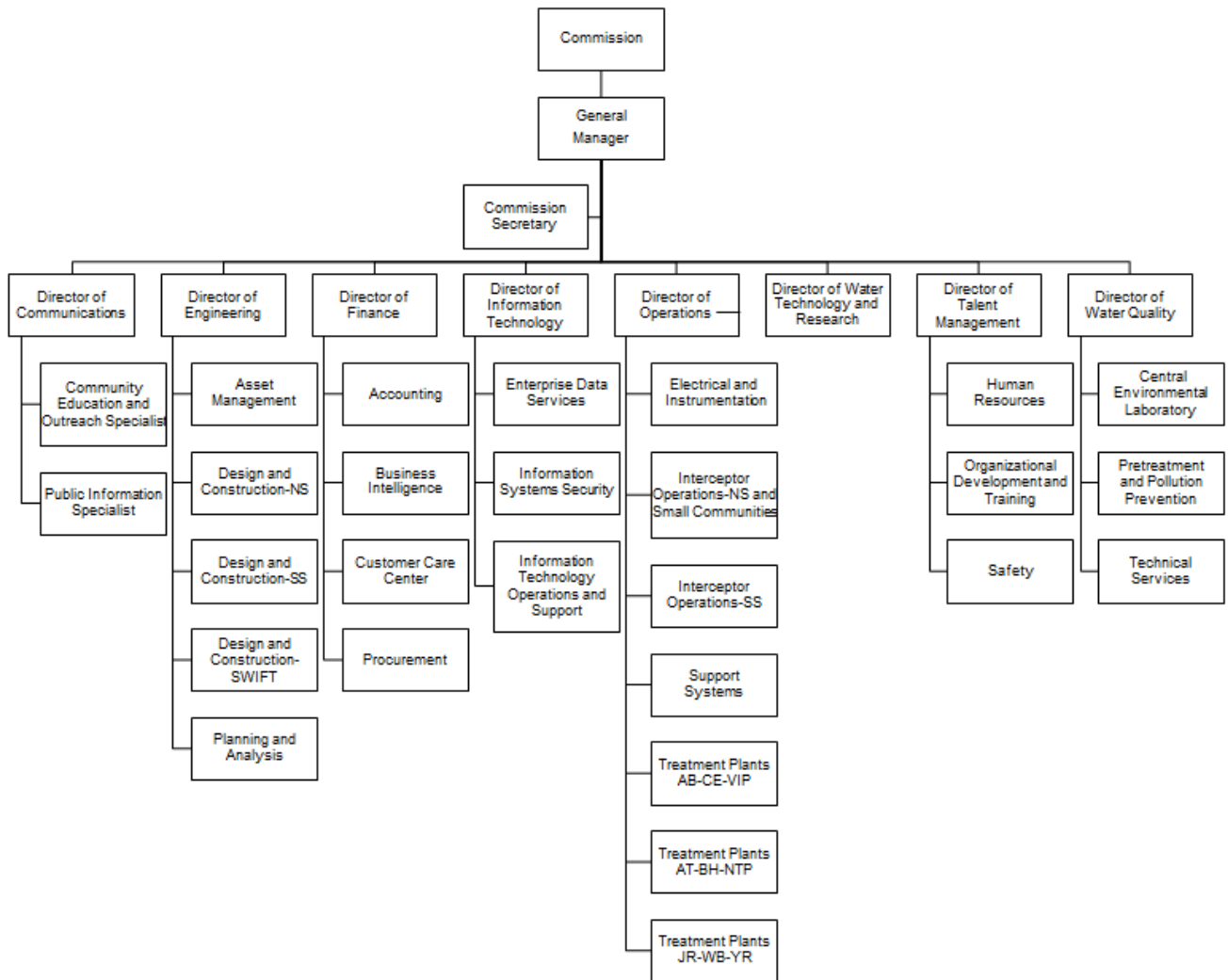
Molly Joseph Ward, Commissioner. Ms. Ward, a member of the Commission since May 24, 2019, is the Treasurer for the City of Hampton, a position she previously served in from 2002 to 2008. She also served as a member of Governor Terry McAuliffe's cabinet as the Secretary of Natural Resource, in the Obama Administration as a Special Assistant to the President and Deputy Director of Intergovernmental Affairs at the White House, and as the Mayor of the City of Hampton. Ms. Ward has served on numerous boards and commissions, including the Virginia Outdoors Foundation, the Chesapeake Bay Program Principal's Staff Committee, and the Chesapeake Bay Commission. Ms. Ward was also recently appointed to the boards of the Chesapeake Conservancy, the Virginia Living Museum and the Virginia Science Museum. Ms. Ward is a graduate of the University of Virginia and William and Mary Law School, and remains an active member of the Virginia State Bar. Ms. Ward resides in the City of Hampton.

Management and Staff

The District is managed through seven departments, which are organized into functional divisions with their principal responsibilities summarized after the District's organizational chart set out below.

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HRSD Organizational Chart



Communication

- **Community Relations:** Develops and provides community outreach and engagement around HRSD construction, infrastructure development and new initiatives.
- **Community Education:** Develops and provides educational materials, presentations, facility tours and outreach related to HRSD’s services, mission and vision.

Engineering

- Design & Construction: Manages projects to ensure that contracted work is performed according to HRSD's quality standards, fiscal policies and environmental commitment and acquires land and easements necessary to construct needed infrastructure.
- Planning & Analysis: Evaluates the service area's needs and determines the new facilities necessary to expand services. Projects future demand flows, and reviews service area expansions. Responsible for the Geographical Information System (GIS), Regional Hydraulic Model, Capital Planning, and Data Analysis.
- Asset Management: Provides systematic and risk-based analysis to manage sustainable lifecycle costs of capital assets and optimize maintenance programs. Responsible for the Computerized Maintenance Management System (CMMS).

Finance

- Accounting: Performs accounting and budget operations and treasury, debt and risk management functions.
- Procurement: Acquires goods and services.
- Customer Care Center: Responsible for billings, collections, maintenance of customer accounts and liaison with HRSD customers.

Information Technology

- Enterprise Data Services: Provides programming, configuration and support for enterprise software applications and associated databases.
- Cybersecurity: Provides an enterprise-wide information security management program to insure that organizational assets are adequately protected.
- Information Technology Operations: Provides management and support services for HRSD's networked infrastructure and mobility solutions.

Operations

- Electrical and Energy Management: Provides and/or coordinates engineering, electrical and instrumentation services to design, modify and implement electrical, instrumentation and energy management projects.

- Interceptor Operations North Shore: Operates and maintains the interceptor systems in the Cities of Hampton, Newport News, Poquoson and Williamsburg, the Counties of Gloucester, James City and York.
- Interceptor Operations South Shore: Operates and maintains the interceptor system in the Cities of Chesapeake, Norfolk, Portsmouth, Suffolk and Virginia Beach and the County of Isle of Wight.
- Small Communities: Operates and maintains the collections systems and treatment plants that serve the Counties of King William, King and Queen, Middlesex, Mathews and Surry.
- Support Systems: Coordinates preventive and major corrective maintenance programs and manages the automotive, carpentry, and machine shop operations.
- Treatment Plants: Operates and maintains the Army Base, Atlantic, Chesapeake-Elizabeth, VIP, Boat Harbor, James River, Nansemond, Williamsburg and York River treatment plants.

Talent Management

- Human Resources (HR): Responsible for recruiting, onboarding, HR policies, employee records and benefits.
- Organizational Development and Training: Provides and oversees employee training and organizational planning and manages the apprenticeship program.
- Safety: Monitors risk, develops and coordinates safety programs and provides safety training.

Water Quality

- Central Environmental Laboratory: Performs laboratory accredited analysis for various HRSD programs and coordinates testing by contract laboratories as necessary.
- Pretreatment & Pollution Prevention: Controls all non-domestic waste discharged into the HRSD system.
- Technical Services: Provides scientific/technical support of all HRSD departments and administration of all HRSD permits.

The District's administration is overseen by a General Manager, supported by eight directors and their staffs. For Fiscal Year 2018, the District has budgeted for 830 full-time employees. Current staffing is sufficient to operate all existing facilities. None of its employees is currently represented by a union.

The following individuals are responsible for the daily management and affairs of the District:

Edward G. Henifin, P.E., General Manager

Ted Henifin joined HRSD in 2006, as General Manager. HRSD has a long history of innovation in the wastewater sector and under his leadership HRSD has broadened its focus to add sustainable water management to HRSD's innovation portfolio with the SWIFT initiative. He previously served as Director of Public Works for the City of Hampton. Mr. Henifin holds a Bachelor of Science in Civil Engineering from the University of Virginia. His career has spanned more than 35 years with a focus on public works and utilities in federal, regional and local government in Hampton Roads. He is a registered professional engineer and has been active with professional associations throughout his career. He currently serves on the board of directors for the National Association of Clean Water Agencies ("NACWA"), the Virginia Association of Municipal Wastewater Agencies ("VAMWA") and Virginia Forever, is the vice chair of the US Water Alliance's One Water Council, and serves on the US EPA's Environmental Financial Advisory Board. Mr. Henifin is active in various civic and community organizations in the Hampton Roads community, currently serving as the vice chair of the board of directors for Langley Federal Credit Union and as a member of the board of directors for WHRO Public Media.

Jay A. Bernas, P.E., MBA, Director of Finance

Jay Bernas was promoted to Director of Finance in October 2015. Before his promotion to this position, Mr. Bernas served as Chief of Planning and Analysis for 10 years and was responsible for planning HRSD's Capital Improvement Program, performing business case analyses, system capacity analyses to support regional growth and managing four technical sections: Geographic Information Systems, Data Analysis, Hydraulic Modeling and Capital Planning. Prior to joining HRSD, he was a project manager with the City of Virginia Beach. Mr. Bernas graduated from Old Dominion University in 1995 with a bachelor's degree in Civil Engineering and earned his MBA from the College of William and Mary in 2013. He also has completed the Kenan-Flagler Water and Wastewater Leadership Program and was part of the 2008 class for LEAD Hampton Roads. He received the George Robert House, Jr. Award for the young public administrator of the year from the American Society for the Public Administration in 2006 and was recognized by Inside Business as a "Top Forty under 40" in 2011. Appointed by the Virginia Beach City Council to serve on the Planning Commission from 2006-2013, Mr. Bernas was its chair for the last two years of his tenure. He was elected to the Board of Trustees for the \$1.4 billion Virginia Investment Pool in 2018.

Charles B. Bott, Ph.D., P.E., Director of Water Technology and Research

Dr. Charles B. Bott joined HRSD in 2009 and is the Director of Water Technology and Research. He manages technology innovation and research and development for HRSD's wastewater treatment plants and interceptor system. Dr. Bott is also an Adjunct Professor in the Departments of Civil and Environmental Engineering at Virginia Polytechnic Institute and State University ("Virginia Tech") and Old Dominion University. He was formerly an Associate Professor in the Department of Civil and Environmental Engineering at the Virginia Military Institute and a consulting engineer with Parsons Engineering Science. Dr. Bott has a bachelor's degree in Civil Engineering from the Virginia Military Institute, a master's degree in Environmental Engineering from the Johns Hopkins University, and a Ph.D. in Civil and Environmental Engineering from Virginia Tech. He is a fellow of the Water Environment Federation ("WEF") and a member of the Science and Technology Advisory Committee to the Chesapeake Bay Program Executive Council. Dr. Bott is a professional engineer in Virginia, a board-certified Environmental Engineer, and a licensed Wastewater Treatment Plant Operator – Virginia Class I. He is a two-time winner of the WEF Harrison Prescott Eddy Medal for outstanding contribution to wastewater principles/processes research, he was a previous member of the WEF Board of Trustees, and he is the current co-chair of the WEF and Water Research Foundation Leaders Innovation Forum for Technology ("LIFT") program.

Donald C. Corrado, Director of Information Technology

Prior to his appointment in 2008, Don Corrado served as HRSD's Chief of Information Technology for nine years. In that capacity, he was responsible for the implementation of a scalable, fully-licensed, standards-based wide area network capable of supporting the various enterprise-class applications required to meet HRSD's business needs. Mr. Corrado's career includes public and private sector experience as an IT manager, enterprise solutions architect, information systems security officer, project leader and contract specialist. He earned a bachelor's degree from Old Dominion University and is a Master Certified NetWare Engineer, Microsoft Certified Systems Engineer and is ITIL Certified. He is a member of the Gartner Executive Panel, American Water Works Association ("AWWA") and WEF and has completed the Kenan-Flagler Water and Wastewater Leadership Program.

Steven G. de Mik, MBA, CPA, Director of Operations

Steve de Mik, who was named Director of Operations in 2015, joined HRSD in 2008. As Director of Operations, he leads a staff of over 500 who are responsible for the operation of HRSD's treatment plants and interceptor systems as well as various support services such as fleet management, carpentry and a machine shop. In his previous position as Director of Finance and Chief Financial Officer, Mr. de Mik was responsible for HRSD's general financial and business functions, including financial reporting, investment portfolio, debt and risk management, and customer billing. A certified public accountant, he holds an MBA from the College of William and Mary and has completed the Kenan-Flagler Water and Wastewater Leadership Program and the Virginia Natural Resources Leadership Program. Before joining HRSD, Mr. de Mik served for seven years as the Director of Finance and Business Services for the City of Norfolk. His duties in that post included managing the financial operations of the city including a pension system and a debt portfolio of approximately \$1 billion using three different credit structures. In addition, he was responsible for the city's parking, facilities maintenance and fleet operations. Mr. de Mik's years of public and private sector experience also include positions with Knox County, Tennessee; Knoxville, Tennessee; Chipman and McMurray, CPA of Hendersonville, Tennessee; and the Comptroller of the Treasury, Division of State Audit, Nashville, Tennessee. He received a bachelor's degree in accounting and business administration from Southwest Baptist University in Bolivar, Missouri. Mr. de Mik also serves as the treasurer for Heart for Orphans, a nonprofit organization based in the City of Williamsburg, Virginia.

Paula A. Hogg, Director of Talent Management

Paula Hogg became Director of Talent Management when the position was established in 2014. A graduate of Virginia Tech and the Kenan-Flagler Water and Wastewater Leadership Program, Ms. Hogg began her HRSD career in 1983. Her progressively responsible positions led to her selection as the Chief of Laboratory in 2005. In that capacity, she oversaw the effective operation of HRSD's state-of-the-art Central Environmental Laboratory and ensured proper internal analysis and regulatory control. Ms. Hogg played a key role in the effort to bring HRSD's laboratory into full compliance with Virginia's Laboratory Accreditation regulation. She has also served on the Advocacy Committee for the National Environmental Laboratory Accreditation Conference Institute. She also has led various inter-departmental teams, was instrumental in the development of HRSD's quality program and served as one of the first facilitators. Ms. Hogg is an active member of the WEF and the Virginia Water Environment Association, where she served as chair of the National Laboratory Practices Committee, as a member of the committee Leadership Council and currently supports Utility Management Committee activities related to Human Resources and Organizational Development. Ms. Hogg is a member of the International Public Management Association and the Society of Human Resources Management.

Bruce W. Husselbee, P.E., DBIA, Director of Engineering

Bruce Husselbee became Director of Engineering in July 2005. Before his promotion to this senior leadership position, he was a Project Manager in the HRSD Design and Construction Division for nine years. Mr. Husselbee previously worked in the consulting engineering field for 12 years prior to joining HRSD. He holds a bachelor's degree in Civil Engineering and a master's degree in Environmental Engineering from George Washington University. He also has completed the Kenan-Flagler Water and Wastewater Leadership Program. He is currently pursuing a doctorate in coastal engineering at Old Dominion University. He is active in a number of professional organizations including the Old Dominion University Civil and Environmental Engineering Visiting Council, the Design-Build Institute of America and the WEF Utility Management Committee.

James J. Pletl, Ph.D., Director of Water Quality

Jim Pletl was promoted to Director of Water Quality in December 2011. Previously, he was the Chief of Technical Services for five years. In that capacity, he managed HRSD's environmental monitoring and permitting program. He also served as an Environmental Scientist for 17 years, providing technical reviews and conducting planning for water quality studies. Dr. Pletl holds a bachelor's degree in Biology from Alfred University and a Ph.D. in Biological Oceanography from Old Dominion University. He also is a graduate of the Kenan-Flagler Water and Wastewater Leadership Program. Dr. Pletl is the chair of the NACWA Water Quality Committee and a member of the Water Research Foundation's (WRF) Research Advisory Committee. He has served on several federal advisory committees and several advisory groups to the Virginia Department of Environmental Quality. Dr. Pletl has also served on numerous WRF (previously Water Environment and Reuse Foundation) project oversight committees which define the goals and guide the work of WRF research relevant to wastewater utility issues. Dr. Pletl also serves on the Virginia Nutrient Credit Exchange Association Board of Governors.

Leila E. Rice, APR, Director of Communications

Leila Rice, who joined HRSD in March 2017, directs and guides overall strategic communication initiatives, internal and external communications, media relations, crisis communications, branding, social media, and community relations and community education programs. She previously served as Public Affairs Manager for Elizabeth River Crossings, where she managed internal and external communications, media relations and community outreach for the Elizabeth River Tunnels Project. Her experience also includes serving as Community and Media Relations Manager for Norfolk-based non-profit agency, ForKids, Inc., and more than 20 years of radio and television media experience. Ms. Rice holds a bachelor's degree in Communication Arts from James Madison University and received her Accreditation in Public Relations in 2017. She is a member of the Public Relations Society of America and the Water Environment Foundation (WEF). She serves on the NACWA Communications and Public Affairs Committee and the Hampton Roads Chamber of Commerce Regional Communication Committee. Ms. Rice also volunteers as an ESL teacher and serves on the Foodbank of Southeast Virginia Advisory Task Force.

Awards

HRSD has received numerous awards for excellence in plant operations and maintenance, environmental engineering and design, and financial reporting. To date, its treatment plants have earned 345 awards for outstanding compliance with National Pollutant Discharge Elimination System ("NPDES") permits since 1986, when the recognition program was established.

Awards and honors received in 2018 include NACWA National Achievement Awards for Workforce Development (for the HRSD Apprenticeship Program) and for Operations and Environmental Performance (for Pump Station Architectural Guidelines); American Council of Engineering Companies (ACEC) 2018 Engineering Excellence Award National Recognition for the HRSD Norchester Pump Station and the Engineering News Record Mid-Atlantic Region best project in the Water/Environment category for the SWIFT Research Center. Honors and Awards received in 2019 to date include NACWA National Achievement Awards in the following categories: Public Information and Education: E-Media; Operations and Environmental Performance for the SWIFT Research Center; Workforce Development for HRSD’s Partnership with Hampton Roads Public Works Academy and Research and Technology for Williamsburg Aeration Tank Modifications. HRSD has also received the ACEC National Grand Award for design of the Bridge Street Pump Station. The SWIFT Research Center earned the 2019 Governor’s Environmental Excellence Award, Gold Medal winner in the environmental project category; the Design-Build Excellence Award for “Best Water Project” from the Design-Build Institute of America (DBIA) Southeast Region and the Merit Award in the General Contracting category from the Associated Builders and Contractors, Inc. (ABC) Carolinas Chapter.

HRSD employees and leader honored and recognized for their work and service include General Manager Ted Henifin, receiving the 2018 Government Civil Engineer of the Year Award from the American Society of Civil Engineers; Dr. Charles Bott, awarded the Frederick George Pohland Medal; Commissioner Vishnu Lakdawala, receiving the NACWA 2019 Public Service Award, and Dr. Jim Pletl, receiving the NACWA Distinguished Service Award.

THE SERVICE AREA

The District provides service to 3,087 square miles of land area within the boundaries of its service area. The geographical limits are shown on the map behind the inside front cover and include the following localities:

City of Chesapeake	Gloucester County
City of Hampton	Isle of Wight County
City of Newport News	James City County
City of Norfolk	King and Queen County
City of Poquoson	King William County
City of Portsmouth	Mathews County
City of Suffolk	Middlesex County
City of Virginia Beach	Surry County (excluding Town of Claremont)
City of Williamsburg	York County

The District and the Commission are independent of the localities served by the District. See “HAMPTON ROADS SANITATION DISTRICT—Authorization and Purpose” and “—The Commission.”

The District’s Enabling Act includes provisions for adding territory to the District. From time to time, adjacent Counties have requested to have their jurisdictional area added to the territory within the District. Recently, the Counties of Northampton and Accomack on Virginia’s Eastern Shore have expressed interest in being included within the District. Discussions with such Counties are in an early stage, and no assurance can be given as to the outcome of such discussions.

Population Growth

The area within the District has experienced substantial urban and suburban development and consequent population growth. The historical population within the District is presented below. Presently, the District contains approximately 21% of the population of the Commonwealth of Virginia.

Historical Population Growth in the District

<u>Year</u>	<u>Population</u> ⁽¹⁾	<u>Population Increase (%)</u> ⁽²⁾
1960	660,338	--
1970	973,247	47
1980	1,085,332	12
1990	1,431,000	32
2000	1,551,000	8
2010	1,674,917	8

(1) Source – United States Bureau of the Census.

(2) Increase in population includes both increases in population within the District’s original service area, as well as the expansion of the District’s service area.

The District’s top ten ratepayers represented 9.5% of the District’s total rate base, as measured by wastewater treatment charges, in Fiscal Year 2018. The following table compares the top ten ratepayers in Fiscal Year 2018 with the top ten ratepayers in Fiscal Year 2009.

Wastewater Treatment Charges Ten Largest Customers

<u>Customer</u>	<u>Type</u>	<u>Fiscal Year 2018</u>		<u>Fiscal Year 2009</u>	
		<u>Amount</u> ⁽¹⁾	<u>% of Total</u>	<u>Amount</u> ⁽¹⁾	<u>% of Total</u>
U.S. Navy - Norfolk Naval Base	Military Facility	\$5,971	2.20	\$2,519	1.60
Smithfield Foods	Meat Processor	4,799	1.70	2,349	1.50
Anheuser - Busch, Inc.	Brewery	2,832	1.00	5,530	3.50
Norfolk Redevelopment & Housing Authority	Housing Authority	2,200	0.80	966	0.60
Norfolk Naval Shipyard	Military Ship Repair	2,102	0.80	-	-
City of Norfolk	Municipality	1,948	0.70	1,448	0.90
Huntington Ingalls Industries ⁽²⁾	Shipbuilding	1,732	0.60	1,069	0.70
Oceana Naval Air Station / Dam Neck	Military Facility				
Joint Expeditionary Base Little Creek – Fort Story ⁽³⁾	Military Facility				
City of Virginia Beach	Municipality	1,622	0.60	-	-
Fort Eustis	Military Facility	1,609	0.60	617	0.40
U.S. Air Force - Langley	Military Facility	1,455	0.50	580	0.40
U.S. Navy - Norfolk Naval Base	Military Facility	-	-	790	0.50
Totals⁽⁴⁾		<u>\$26,270</u>	<u>9.50%</u>	<u>\$16,645</u>	<u>10.60%</u>

(1) Dollar amounts in thousands.

(2) Formerly Northrop Grumman Newport News/Newport News Shipbuilding and Dry Dock Co.

(3) Formerly U.S. Navy – Little Creek Amphibious Base.

(4) Totals may not add due to rounding.

Wastewater Flow

During the past five years, there has been population growth in the service area, while the number of service connections has remained relatively stable. Billed water consumption has declined modestly during such period because of conservation efforts on the part of utility customers fostered by increasing water rates, improved construction materials and the installation of low flow plumbing fixtures.

Wastewater Flows and Service Connections

<u>Fiscal Year</u> <u>Ended June 30,</u>	<u>Average Daily</u> <u>Wastewater Flow</u> ⁽¹⁾	<u>Total Billed</u> <u>Wastewater Flow</u> ^(1,2)	<u>Service Connections</u> ⁽³⁾
2014	154	113	462
2015	152	112	465
2016	155	111	467
2017	153	111	470
2018	145	110	473

(1) Millions of Gallons per Day.

(2) Water meters are read for billing purposes by the participating jurisdictions.

(3) Number of service connections in thousands.

Expansion of Service Area

In most instances, the routine expansion of the service area results from the extension of the interceptor system performed at the request of a local government. The general policy is that HRSD will extend an interceptor sewer when the local government extends a public water system. The interceptor sewer is intended to serve an area within two miles of the interceptor pipeline.

THE SYSTEM

The Wastewater System consists of nine major treatment plants (248.5 million gallons per day (MGD) capacity), seven smaller plants and its interceptor system consisting of 130 pump and pressure reducing stations and approximately 651 miles of interceptors and collection sewer ranging in diameter from 6 to 66 inches. The interceptors, which are gravity and force mains, convey wastewater from the point of delivery by municipalities, industry and other users of the Wastewater System to the District's treatment plants.

The following table identifies the location of the District's major treatment plants, their design capacities and, for the Fiscal Year ended June 30, 2018, their average daily flows.

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**Hampton Roads Sanitation District
Treatment System Capacity & Flows
(Millions of Gallons per Day)**

<u>Major Treatment Facilities</u>	<u>Average Design Capacity</u>	<u>FY 2018 Annual Average Daily Flow</u>
Army Base Norfolk	18.0	10.0
Atlantic Virginia Beach	54.0	26.1
Boat Harbor Newport News	25.0	14.2
Chesapeake-Elizabeth Virginia Beach	24.0	17.6
James River Newport News	20.0	13.0
Nansemond Suffolk	30.0	17.5
Virginia Initiative Norfolk	40.0	26.7
Williamsburg James City County	22.5	7.7
York River York County	<u>15.0</u>	<u>12.6</u>
TOTALS	<u>248.5</u>	<u>145.4</u>

In addition to the major facilities described above, the District operates seven additional small wastewater treatment plants: two in Middlesex County with a combined capacity of 0.125 MGD, one in West Point (King William County) with a capacity of 0.60 MGD, one in King William (King William County) with a capacity of 0.10 MGD, two in Surry County with a combined capacity of 0.125 MGD and one in Isle of Wight County with a capacity of 0.05 MGD. The interceptor system for these localities includes 41 pumping stations. In the Counties of King William, King and Queen, Middlesex, Mathews and Surry, HRSD is responsible for the collection, conveyance and treatment of wastewater.

System Improvements and Innovations

HRSD completed significant renewals and improvements to its treatment plants, pump stations, interceptor sewers, operational and administrative facilities in recent years. Electrical equipment upgrades throughout all HRSD facilities were made to replace aging system components as well as meet new arc flash safety requirements. The on-going infrastructure renewal program has replaced a number of major interceptor pipelines and pump stations in the southern portion of the District's service area. Improvements included the Holland Road 24-inch interceptor force main in Suffolk, the Shipps Corner Pressure Reducing Station in Virginia Beach, and Rodman Avenue Pump Station wet well rehabilitation in Portsmouth as well as air vent rehabilitation projects throughout the district. In the Peninsula portion of the service area major interceptor pipelines and pump station improvements include: the completion of the North Trunk force main Part B in Williamsburg, the Williamsburg Interceptor Force Main Contract

'A' in James City County, the Hampton Trunk Sewer Division 'B' in Hampton, the Westminster Drive Force Main replacement in Hampton, and the Semple Farm Emergency Repairs in Hampton, the 58th Street Connecting Sewer Rehabilitation in Newport News, the Ferguson Park Interceptor Force Main Bridge Span Relocation in Newport News, and the Hampton Trunk Sewer Division 'E' Kecoughtan in Hampton. Also, completion and commissioning of the new Bridge Street Pump Station occurred.

HRSD owns 122 pump stations and pressure reducing stations that use various control scenarios using programmable controls to maintain various set points throughout the interceptor system. To provide a more reliable and robust control and monitoring system new control panels will be placed at every station and system control points. The Supervisory Control and Data Acquisition (SCADA) system, currently under development, will allow for future capacity optimization control regimes, including Real Time Control and predictive measures to get the most out of the interceptor system.

A comprehensive metering network installed throughout the Wastewater System aids in optimizing system operations and provides flow data to HRSD's dynamic hydraulic model for calibration and validation purposes. The hydraulic model is one of the most sophisticated sewer modeling efforts in the country and is used to guide placement and sizing of future system improvements to cost effectively address wet weather peak flows. In addition, HRSD uses the hydraulic model to evaluate new connections to the system to ensure capacity, size new pipelines and pump stations, develop contingency scenarios and improve system operational efficiency. The hydraulic model was instrumental in HRSD's decision to take the Chesapeake-Elizabeth Treatment Plant offline and divert the flow to use available capacity at the Atlantic Treatment Plant. To divert the flow and provide reliable service in the future, approximately \$100 million will be spent before December 2021 on various interceptor projects including replacing 7,500 linear feet of force main originally installed in 1965 with larger diameter pipe, wet weather storage, construction of the new Elbow Road Pressure Reducing Station and reliability upgrades at six additional pressure reducing stations. HRSD estimates that the 30-year net present value of savings realized from this decision will be between \$133 million to \$205 million.

HRSD directed significant effort to meet mass discharge limits on nitrogen and phosphorus as a result of the six-state efforts to restore the Chesapeake Bay. As a result of the capital projects at the York River, Nansemond, Army Base James River and the Virginia Initiative Plant (VIP) Treatment Plants, HRSD continues to meet its stringent nutrient limits. Through the use of creative design and phased construction, HRSD deploys cost-effective adaptive technologies to take advantage of the existing facilities and the diversity of treatment processes at each plant. In June 2019, the Virginia State Water Control Board adopted new protective criteria for Chlorophyll in the James River. The new criteria were the result of a seven-year study designed to identify the causes and consequences of algal blooms and develop models to estimate their occurrence by linking Chlorophyll to nutrients and other environmental factors. HRSD's wasteload allocations defined by the current nutrient general permit are in compliance with the new criteria. Virginia anticipates EPA approval of the criteria as adopted.

The District continues to evaluate potential renewable energy projects, such as the Atlantic Treatment Plant Digester Gas Combined Heat and Power (CHP) project completed in 2013. This project feeds internal combustion engines with treated digester gas to meet up to 40% of the 2.5 megawatt demand of the treatment plant and provide heating to the administration buildings and digesters. The digester gas treatment system uses a biological hydrogen sulfide gas scrubber, which was the first municipal installation in North America. A project is currently under way at Atlantic that will increase biogas generation by receiving and processing restaurant-derived fats, oils, and grease containing water and converting it to additional digester gas. In 2008, HRSD worked with the Navy to use the Atlantic Treatment Plant's effluent to act as a heat sink for a large Navy facility located adjacent to the plant. This system, similar in function to a geothermal system, saves the Navy \$3 million per year and won a Federal Facility Presidential Award in 2009. The District has installed its first photovoltaic array at the

SWIFTRC, a 60 kW system that supplies approximately one-quarter of the SWIFTRC's operating power demand. Finally, the District is continuing to actively pursue implementation of additional energy recovery projects (including compressed natural gas and brown-grease derived biofuel) that will further reduce its operations carbon footprint and potentially generate revenue associated with the sale of commodity energy products and associated environmental attributes.

HRSD owns and operates the second Ostara nutrient recovery facility in the United States. The patented Ostara process recovers phosphorus and nitrogen from the wastewater treatment process, rather than releasing it into the Chesapeake Bay, and converts it to a slow-release, high-phosphorus content, commercial fertilizer. The Ostara nutrient recovery facility will undergo modifications beginning in 2020 that will increase fertilizer production by approximately 1,000 pounds per day, resulting in a corresponding reduction in unrecovered phosphorus in treated effluent and biosolids.

At the Atlantic Treatment Plant, HRSD is nearing completion of the construction of a new thermal hydrolysis process for biosolids handling. The process hydrolyzes and disintegrates sludge using pressure and temperature. As a result, biosolids should be designated as Class "A," which means they are pathogen free and have far fewer land application restrictions; additional biogas is produced for the Combined Heat and Power system, and the process allows significant additional capacity to be gained from the existing anaerobic digesters. In addition to the Class "A" designation, the thermal hydrolysis process will significantly reduce the volume of biosolids produced at the plant. HRSD is currently performing a market assessment of commercial products derived from Class "A" biosolids within Coastal Virginia and North Carolina in order to provide secure channels for safe, environmentally beneficial, and cost-effective biosolids end use.

The District is a leading agency in wastewater research and development. In collaboration with an international group of researchers and other third parties, the District played a major role in patenting a process using mainstream external selectors to improve biomass settleability and stabilize biological phosphorus removal. This technology was installed at the James River Treatment Plant in 2015 and in one train at the Urbanna Treatment Plant in 2016. In addition, the District is collaborating with an international group of agencies and academic institutions to study a revolutionary wastewater process using a relatively new bacterium called anammox. The District started operating the first two full-scale sidestream treatment processes using anammox in the Western Hemisphere at York River Treatment Plant and James River Treatment Plant. HRSD developed and patented (pending) a new control system for one of those processes known as the AnitaMox process. HRSD is also currently operating the first documented full-scale mainstream nutrient removal process using anammox reducing the methanol consumption at the York River Treatment Plant. The implementation of this process was completed internally by HRSD staff for minimal capital investment. HRSD, in collaboration with others, patented a suite of technologies associated with the treatment of nitrogen using low energy, low carbon, and intensified (smaller tanks) processes and based on mainstream nitrite shunt and deammonification (anammox). This technology suite is known as "AVN" and has been commercialized through a competitive process with World Water Works, Inc. HRSD installed this control system at the Boat Harbor Treatment Plant with significant improvements in nitrogen removal performance at very low cost.

The District is also investigating other innovative projects to reduce energy usage and limit the discharge of contaminants to the environment. The District is using ammonia-based aeration control at two plants to improve nutrient removal while reducing energy, alkalinity, hypochlorite and supplemental carbon demand. Only a few plants in the United States use this control strategy.

The District has developed an innovative program called the Sustainable Water Initiative for Tomorrow ("SWIFT") to address the challenges of declining aquifer levels, land subsidence and saltwater intrusion and provide additional benefits to the region, including nutrient credits for urban stormwater and

other needs. SWIFT will add advanced water treatment (“AWT”) to up to seven of District’s existing treatment plants to produce more than 100 MGD of water that meets drinking water standards and is compatible with the receiving aquifer. Water meeting drinking water standards (“SWIFT Water”) will be injected into the Potomac Aquifer System as part of a groundwater replenishment program to counter the aquifer challenges described above.

In support of the SWIFT program the District completed the construction and is operating of a 1 MGD demonstration facility, known as the SWIFT Research Center (“SWIFTRC”), that demonstrates, on a meaningful scale, that AWT produces SWIFT Water that meets primary drinking water standards and is compatible with the receiving aquifer.

Capital Improvement Program

The District’s Capital Improvement Program is designed to meet regulatory requirements, including both nutrient reduction and sanitary sewer overflow reduction, aging infrastructure renewals and replacements, biosolids management and increased capacity. The District uses a ten-year planning horizon for the CIP. The CIP is updated each year and modified as circumstances dictate. The Commission approves the overall program and the first year of the plan and appropriates funds on an individual project basis. The District also uses a CIP project prioritization program using a decision-analysis based process. This process allows each proposed project to be considered objectively against the merits of other proposed projects to ensure the right project is completed at the right time. Individual projects are scored using performance measures based on ten criteria and ranked. After the CIP review team considers each project score for consistency, the CIP leadership team makes final decisions on project acceptability and develops a prioritized project schedule based on projected capital funding availability.

The 2020-2029 CIP includes approximately \$2.79 billion in interceptor system, treatment plant, water reuse, and other facility improvements. Of that total, \$424 million is identified for the rehabilitation and upgrade of wastewater treatment plants. A number of interceptor sewer projects, totaling approximately \$307 million are in the planning, design or construction phase. These planned projects are proposed to address aging infrastructure issues within the extensive District interceptor sewer piping system. Upgrades to aging sewer pump stations and new pump stations to serve Hampton Roads are an important part of the CIP with over \$143 million of such improvements planned in the next ten years. The CIP includes \$45 million in anticipated biosolids management improvements.

The District has proposed an Integrated Plan that will use innovative approaches to removing nutrients from the Chesapeake Bay and assist with other regional issues such as aquifer recharge and land subsidence. The SWIFT (Sustainable Water Initiative for Tomorrow) program will further treat plant effluent to drinking water standards and use it to recharge the Potomac aquifer. The 2020-2029 CIP includes \$1.7 billion for the SWIFT program. The Integrated Plan also addresses sanitary sewer overflows (SSO) and has allocated \$200 million for projects that will have the largest impact towards reducing SSO’s during wet weather events.

The District remains committed to the protection of its data and cyber infrastructure. In 2018, the District engaged a third-party contractor to help develop an IT governance plan and technology roadmap. As a result, the District is planning to spend \$15.5 million over the next five years to develop a framework for secure computing and data management. In addition, the District created a new Cybersecurity Division to monitor the global cybersecurity landscape for emerging threats, conduct vulnerability assessments, provide incident response, and deliver end-user security awareness training, while developing, maintaining, and supporting appropriate policies and guidelines.

The following table sets forth the District’s anticipated sources of funds for its Capital Improvement Plan in Fiscal Years 2020 through 2024.

CIP, Fiscal Years 2018 to 2022
(Dollar amounts in thousands)
(As of Fiscal Years ended June 30)⁽¹⁾

	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>Total (2020-24)</u>
Beginning Capital Reserves ⁽²⁾	\$76,631	\$648	-	-	-	\$77,279
Debt Funded ⁽³⁾	30,246	68,660	\$88,954	\$143,301	\$143,926	475,087
Cash	108,341	118,451	137,046	156,699	156,074	676,611
Grants and Other Reimbursements	430	5,241	4,000	-	-	9,671
Total Sources	\$215,648	\$193,000	\$230,000	\$300,000	\$300,000	\$1,238,648
Capital Expenditures	\$215,000	\$193,000	\$230,000	\$300,000	\$300,000	\$1,238,000
Ending Capital Reserves	\$648	-	-	-	-	

(1) Totals may not add due to rounding.

(2) Represents initial balance and unexpended Bond proceeds.

(3) Includes approved Clean Water Revolving Loan Funds.

The District plans to fund the Capital Improvement Program through a combination of cash and debt financing as shown in the above table. The CIP also includes \$1.55 billion in funding in Fiscal Years 2025 through 2029, of which \$804 million is planned to be funded with debt proceeds and \$746 million with operating cash.

In addition to its ten-year planning horizon, the District undertakes preliminary planning for its CIP through 2039. While subject to change, the District estimates additional capital expenditures of \$2.73 billion for years 2030-2039, with approximately 31% to be financed with new debt. Capital expenditures include estimated costs associated with the RWWMP discussed under “—State Consent Agreement and EPA Consent Decree” below.

The proposed new debt conservatively assumes a combination of interim financing and a new revenue bond issued in alternating years with a rate of 5%. HRSD continues to seek the lowest cost of capital and recently applied to two low-interest loan programs. HRSD submitted a \$1.7 billion Letter of Interest for EPA’s 2019 round of Water Infrastructure Finance and Innovation Act (WIFIA) loans. The projects that are invited to apply will be announced in the fall of 2019. In addition, HRSD applied for approximately \$177 million in Virginia Clean Water Revolving Loan Funds (VCWRLF) in July 2019. The VCWRLF decision is expected in the fall of 2019.

Regulation and Permits

The Virginia State Water Control Law (Chapter 3.1, Title 62.1, Code of Virginia, 1950, as amended) provides that the plans and specifications for wastewater facilities to be constructed be approved by the Virginia Department of Health and the Virginia Department of Environmental Quality. The District operates all of its plants and interceptor systems under permits issued by the Virginia Department of Environmental Quality.

In addition to the regulatory issues described under “--State Consent Agreement and EPA Consent Decree,” the Commonwealth is currently developing the Chesapeake Bay Total Maximum Daily

Load (TMDL) Watershed Implementation Plan, Phase 3 for submission to US EPA. This plan has the potential to require the District to reprioritize planned Capital Improvement Projects within the existing financial plan targets. Beyond the potential for the WIP Phase 3 to require re-prioritization, the District is not aware of any pending federal or commonwealth regulatory requirements proposed in the Federal Register or the Virginia Register that, in themselves, would require significant expenditures for additional capital improvements; however, the District cannot predict the scope or effect of future federal or Commonwealth regulatory actions that could require significant expenditures for capital improvements.

State Consent Agreement and EPA Consent Decree

On December 19, 2014, the Commonwealth of Virginia entered into a long-term State Consent Agreement (the “2014 Consent Agreement”) with 14 of the localities that HRSD serves. The 2014 Consent Agreement requires the localities to perform long-term management, operations and maintenance of their sewer systems in support of HRSD’s efforts to provide long-term regional wet weather wastewater capacity. HRSD is not a party to the 2014 Consent Agreement. Instead, HRSD’s obligation to provide regional wet weather sewer capacity is now solely imposed through its federal consent decree (the “Consent Decree”). HRSD entered into the Consent Decree with the Commonwealth and the United States Environmental Protection Agency (“EPA”).

The Consent Decree was entered by the federal district court for the Eastern District of Virginia (the “District Court”) on February 23, 2010. The Consent Decree has been amended four times, most recently on February 21, 2017 (the “Amended Consent Decree”).

The Amended Consent Decree has two major operative requirements. First, it requires HRSD to develop a Regional Wet Weather Management Plan (“RWWMP”) to control capacity-related sewer overflows within the 14 localities. However, through the third and fourth amendments, HRSD has now assumed responsibility for planning (in consultation with the 14 affected localities), designing, funding, and implementing the controls in both the Localities’ systems and the HRSD system that will be contained in the approved RWWMP. Through this approach, HRSD estimates the regional ratepayers will achieve significantly reduced program costs than if each locality sought to address peak wet weather wastewater flows on its own. To facilitate these regional cost savings, the Amended Consent Decree extended the RWWMP submission deadline to October 1, 2017. To further facilitate this approach, the 14 affected localities entered into a Memorandum of Agreement with HRSD in 2014 in which they agreed to (1) cooperate with HRSD, (2) facilitate the construction of and accept ownership of any improvements which HRSD may need to construct in the localities’ systems, and (3) maintain the integrity of their systems to industry standards.

The Amended Consent Decree also requires HRSD to implement a total of 45 projects from its ten-year CIP. These 45 projects total approximately \$306 million. Accordingly, HRSD has timely and fully satisfied the requirement of the Amended Consent Decree to implement these 45 early action projects.

The Amended Consent Decree authorizes HRSD to submit the RWWMP as part of an Integrated Management Plan (“IMP”). HRSD intends to use the IMP approach to facilitate the timing and financing of both its RWWMP and its SWIFT Program. The SWIFT Program will assist the Commonwealth to meet its Chesapeake Bay nutrient reduction commitments and save HRSD’s 14 localities approximately \$1 to \$2 billion in avoided Chesapeake Bay-related storm water control costs.

On September 29, 2017, HRSD submitted the IMP to EPA and the Commonwealth for approval. HRSD, EPA and the Commonwealth have been discussing HRSD’s program since that time. As of Summer, 2019, HRSD and the agencies are considering an IMP that calls for investing approximately

\$200 million in additional wet weather capacity-related sewer overflow controls between now and 2030, along with approximately \$1.1 billion to implement the SWIFT program. After 2030, the IMP would commit HRSD to invest another \$200 million through 2040 on wet weather controls and then submit a Final Remediation Plan, which may call for (1) full implementation of the RWWMP, (2) a subset of priority projects from the scenario with the greatest environmental benefits, (3) investments in emerging environmental issues including sea level rise adaptation, or (4) some combination of these or other regional environmental priorities. While cost projections in this time frame are inherently speculative, this subset of projects could cost \$1 billion or more over a 20 to 25-year period (through 2055 or later).

State Consent Agreement for Town of Surry Treatment Plant

Effective October 1, 2017, HRSD assumed ownership and operation of the Town of Surry sewage treatment plant (the “Surry Treatment Plant”). The Surry Treatment Plant is a small facility with a design capacity of 0.06 million gallons per day. HRSD took over Surry Treatment Plan on a voluntary basis to benefit water quality in the region and assist in resolving the facility’s longstanding noncompliance with its Virginia Pollutant Discharge Elimination System discharge permit. HRSD’s effort has been conducted in coordination with the Virginia State Water Control Board and the Virginia Department of Environmental Quality. Because the Surry Treatment Plant was known to be in noncompliance at the time of HRSD’s acquisition, HRSD and the Virginia Department of Environmental Quality have negotiated, and HRSD entered into, a penalty-free consent order establishing a favorable framework for corrective action at the Surry Treatment Plant. Under the consent order, the Virginia Department of Environmental Quality has established achievable interim effluent limitations that are in effect until November 1, 2020, by which time HRSD plans to have redirected the Surry Treatment Plant flow to Surry County’s Regional Wastewater Treatment Facility. The cost of this project is included within HRSD’s CIP.

Virginia Watershed Implementation Plan

[To come]

FINANCIAL MANAGEMENT

General

Through its annual budget process, management seeks to ensure that operating revenues are sufficient to meet operating expenditures and sufficient reserves are available in the event actual billings do not meet budget estimates. The construction of new plants and extension of the interceptor system are financed by a combination of operating revenues and debt financing. The following table sets out the District’s operating results and debt service coverage for the Fiscal Years ended June 30, 2014, through June 30, 2018.

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Summary of Operating Expenses and Debt Service Coverage
(Dollar Amounts in Thousands)
(As of Fiscal Years ended June 30)⁽¹⁾

	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>
Operating Revenues					
Wastewater Treatment Charges	\$275,539	\$254,961	\$234,020	\$221,626	\$211,538
Miscellaneous	<u>3,504</u>	<u>3,669</u>	<u>3,861</u>	<u>3,935</u>	<u>3,643</u>
Total Operating Revenues	<u>\$279,043</u>	<u>\$258,630</u>	<u>\$237,881</u>	<u>\$225,561</u>	<u>\$215,181</u>
Non-Operating Revenues (Expenses), excluding capital grants received					
Wastewater Facility Charges	\$6,673	\$7,511	\$6,699	\$7,428	\$6,640
Investment Earnings	3,654	2,287	1,563	1,695	1,872
Bond Interest Subsidy ⁽²⁾	2,330	2,275	2,399	2,444	2,364
Disposal of Capital Assets	-	-	-	-	-
Bond Issue Costs	(1,061)	(42)	(1,713)	(768)	-
Change in Fair Value of Investments	<u>(1,382)</u>	<u>(1,119)</u>	<u>750</u>	<u>(286)</u>	<u>(422)</u>
Total Non-Operating Revenues	<u>10,214</u>	<u>10,912</u>	<u>9,698</u>	<u>\$10,513</u>	<u>\$10,454</u>
Total Revenues	<u>\$289,257</u>	<u>\$269,542</u>	<u>\$247,579</u>	<u>\$236,074</u>	<u>\$225,635</u>
Less Operating Expenses, Excluding Depreciation	<u>(157,462)</u>	<u>(153,387)</u>	<u>(146,601)</u>	<u>(152,815)⁽⁴⁾</u>	<u>(142,161)</u>
Net Revenues	<u>\$131,795</u>	<u>\$116,155</u>	<u>\$100,978</u>	<u>\$83,259</u>	<u>\$83,474</u>
Total Senior Obligations Debt Service Coverage on Senior Obligations ⁽³⁾	\$36,488 3.61	\$35,279 3.29	\$43,419 2.33	\$44,937 1.85	\$47,220 1.77
Total Senior Obligations and Parity Obligations Debt Service Coverage on Senior Obligations and Parity Obligations ⁽³⁾	\$57,171 2.30	\$57,988 2.00	\$54,643 1.85	\$57,465 1.45	\$59,739 1.40

(1) Revenues and Operating Expenses are presented in accordance with generally accepted accounting principles. Debt Service presented on a cash basis (i.e., debt service actually due during the related Fiscal Year).

(2) Actual Build America Bonds subsidy received from the federal government relating to interest on the Series 2009B Bonds.

(3) Calculated based on actual debt service payable on a current year basis.

(4) Effective July 1, 2015, HRSD adopted GASB Statement No. 68, Accounting and Financial Reporting for Pensions and GASB Statement No. 71, Pension Transition for Contributions Made Subsequent to the Measurement Date.

For purposes of the Senior Trust Agreement, the Liquidity Ratio is the resulting dividend of unrestricted cash divided by the Maximum Annual Debt Service on Senior Obligations. Unrestricted cash includes "... cash, cash equivalents and marketable securities that do not constitute Restricted Funds held by the District for its various purposes, but not including cash, cash equivalents and securities which constitute proceeds of Indebtedness issued to finance capital improvements or funds held in the Bond Fund for Senior Obligations (or any similar sinking fund held by a trustee for the payment of Indebtedness) or the Debt Service Reserve Fund." The Senior Trust Agreement requires that the District maintain a minimum Liquidity Ratio of 1.35 or fund the Debt Service Reserve Fund at the Debt Service Reserve Fund Requirement. The following table reflects the Liquidity Ratio for Fiscal Years 2014 to 2018. Amounts held in the Debt Service Reserve Fund for the Senior Obligations are not security for the Subordinate Obligations.

Historical Liquidity Ratio
(Dollar amounts in thousands)
(As of Fiscal Years ended June 30)

	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>
Cash and Cash Equivalents	\$66,078	\$92,076	\$68,314	\$7,825	\$37,924
Investments – Current	17,871	14,260	18,544	19,926	-
Investments - Non-Current	<u>106,219</u>	<u>109,489</u>	<u>105,009</u>	<u>101,649</u>	<u>111,861</u>
Total Cash, Cash Equivalents and Investments – Unrestricted	\$190,168	\$215,763	\$191,867	\$129,400	\$149,785
 Cash and Cash Equivalents – Restricted	 95,077	 22,701	 91,559	 86,451	 139,257
Investments – Current - Restricted	 -	 -	 -	 -	 8,600
 Total Cash, Cash Equivalents and Investments*	 <u>\$285,245</u>	 <u>\$238,464</u>	 <u>\$283,426</u>	 <u>\$215,851</u>	 <u>\$297,642</u>
 Maximum Annual Debt Service†	 \$64,613	 \$60,206	 \$57,949	 \$57,807	 \$59,776
 Liquidity Ratio	 2.94	 3.58	 3.31	 2.24	 2.51
Required Liquidity Ratio†	1.35	1.35	1.35	1.35	1.35

* Includes amounts set aside pursuant to the Senior Trust Agreement and Trust Agreement for debt service.

† Ratio to be maintained without triggering requirement under the Senior Trust Agreement to fund the Debt Service Reserve Fund for Senior Bonds. Debt service is calculated in accordance with the Senior Trust Agreement calculation of the Liquidity Ratio, which includes adjustments for Balloon Long-Term Indebtedness and Variable Rate Long-Term Indebtedness.

Pension Fund and Other Post-Retirement Benefits. For a description of the District's participation in the Virginia Retirement System, a defined benefit plan offered by the Commonwealth of Virginia, and of the post-retirement health benefits for qualifying employees of the District, see the District's Comprehensive Annual Financial Report attached as Appendix A hereto.

Debt Management. The Commission has adopted a comprehensive financial policy designed to promote sound financial management. The policy addresses, but is not limited to the following areas: reserves, budgetary principles and controls, debt affordability, debt management, risk management, derivatives and investments. The Commission has the right to change the financial policy from time to time.

The policy requires minimum debt service coverage requirements in excess of its obligations under the Trust Agreement. It also requires cash contributions to its capital program of not less than 15% of each year's capital improvement program. Additionally, the policy establishes parameters for the investment of idle funds.

Projected Operating Results. The following table shows projected Revenues and Current Expenses for the Fiscal Years ending June 30, 2020, through June 30, 2024, inclusive.

**Summary of Projected Revenues and Current Expenses
(Dollar Amounts in Thousands)
(As of Fiscal Years ended June 30)⁽¹⁾**

	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
Operating Revenues	\$324,650	\$349,347	\$376,115	\$404,884	\$427,953
Non-Operating Revenues	13,155	13,422	13,518	13,699	13,714
Operating Expenses Excluding Depreciation	<u>(165,309)</u>	<u>(171,903)</u>	<u>(174,157)</u>	<u>(181,154)</u>	<u>(195,380)</u>
Net Revenues	<u>\$172,496</u>	<u>\$190,866</u>	<u>\$215,476</u>	<u>\$237,429</u>	<u>\$246,287</u>
Expenses on Assets not Owned by HRSD	<u>(1,640)</u>	<u>(2,523)</u>	<u>(13,909)</u>	<u>(10,000)</u>	<u>(7,048)</u>
Net revenues Less Expenses on Assets not Owned by HRSD	\$174,136	\$193,389	\$229,385	\$247,429	\$253,335
Senior Obligation Debt Service	\$33,531	\$31,909	\$30,374	\$33,556	\$33,474
Total Debt Service ⁽²⁾	63,895	64,316	66,690	75,386	77,231
Total Debt Service Coverage Ratio ⁽²⁾	—	—	—	—	—
Key Assumptions⁽³⁾					
Rate Increases	9.1%	9.0%	9.1%	9.0%	7.0%
Decline in Consumption	1.0%	1.0%	1.0%	1.0%	1.0%
Key Inflation Trends					
Average Inflation	3.0%	3.0%	3.0%	3.0%	3.0%
Personal Expenses	3.9%	3.9%	3.9%	3.9%	3.9%
Healthcare Rates	5.4%	5.3%	5.2%	5.2%	5.2%
Contractual Services	5.0%	5.0%	5.0%	5.0%	5.0%
Costs of Issuance	350	-	755	-	1,358

(1) Totals may not add due to rounding.

(2) Assumes debt service on variable rate Subordinate 2016B Bonds of 2.5% per annum. No assurance can be given, however, that the rate on the Subordinate 2016B Bonds will not be higher than assumed above.

(3) While the District believes the assumptions set forth above are reasonable, actual results may vary.

Budgeting and Accounting

Budgetary Controls. The District adopts an annual operating budget and a 10-year Capital Improvement Plan. The budget is approved on or before June 30 of each year. The District maintains budgetary controls on a departmental basis. With the exception of capital projects, unencumbered funds lapse at year end. As part of the budget process, the District adopts a long-range financial forecast.

Financial Statements. In accordance with accounting principles generally accepted in the United States, the District's audited general purpose financial statements are prepared on an accrual basis of accounting. The District's audited basic financial statements and the report thereon by KPMG LLP, for the Fiscal Year ended June 30, 2018, are included in Appendix A. The District's independent auditor, KPMG LLP, has not been engaged to perform and has not performed, since the date of its report included in Appendix A, any procedures on the financial statements addressed in that report. KPMG LLP also has not performed any procedures relating to this Official Statement.

[to be updated] The Government Finance Officers Association of the United States and Canada has awarded a Certificate of Achievement for excellence in Financial Reporting to the District for its comprehensive annual financial reports for 36 consecutive Fiscal Years. In order to be awarded a Certificate of Excellence, a governmental unit must publish an easily readable and efficiently organized comprehensive annual financial report, whose contents conform to program standards. Such reports must satisfy both generally accepted accounting principles and applicable legal requirements.

Rates

The District periodically reviews its rate structure and revises its charges as necessary to generate the revenues required to meet its current financial obligations. The most recent general increase in rates became effective July 1, 2019. The District's full rate schedule appears on the District's website, www.hrsd.com.

The District's typical residential customer pays less than \$33 per month for sewage interception and treatment services provided by the District. The District's sewage interception and treatment charge generally is one of the smallest public service utility bills its customers receive. Generally, the District bills and collects directly from its customers on a monthly, bimonthly, or quarterly basis depending upon the community. The jurisdictions provide the meter readings, which are the basis of the District's billing operation.

The District charges surcharge rates to recover costs in direct proportion to volume and pollutant concentrations in excess of typical residential wastewater. Industrial users are typically permitted facilities requiring periodic effluent sampling. Effective July 1, 2019, the District implemented a new surcharge program for non-permitted commercial facilities, such as restaurants, to ensure an efficient and uniform application of rates. In this program, surcharge categories and average values were developed using sampling data for groups of businesses that produce similar goods or services using NAICS industry groupings. This eliminates the need for staff to sample every non-permitted commercial facility that may require a surcharge fee.

The District provides billing and cashing services to several of the jurisdictions it serves, including Chesapeake, James City County, Norfolk, Smithfield, Suffolk, King William, Urbanna and Surry County, excluding the Town of Claremont. The combined bill can include jurisdictional charges for water, solid waste disposal, sewage collection, storm water mitigation and District charges for sewage interception and treatment. To date these services have been provided at minimum cost to assist the

jurisdictions and customers the District serves to minimize the number of bills the customers receive and number of payments they need to make.

Rate Making Process

The Enabling Act provides that the Commission is to fix and revise rates, fees and charges to provide funds that, with other funds available for such purposes, will be sufficient at all times (a) to pay the cost of maintaining, repairing and operating the Wastewater System and all improvements thereto, including reserves for such purpose and for renewals and replacements and necessary extensions and additions to the Wastewater System, (b) to pay the principal of and the interest on such revenue bonds as the same shall become due and to provide reserves therefor, and (c) to provide a margin of safety for making such payments.

The Enabling Act provides that before any revision of rates, fees and charges shall become effective the Commission shall publish a copy thereof for four consecutive weeks in a newspaper of general circulation within the District. If, on or before the last publication, the governing body of any city or county constituting a part of the District or five hundred or more qualified voters residing within the District file a petition with the Virginia State Corporation Commission complaining of the proposed revision, the State Corporation Commission may by order suspend the placing in effect of such revision for a period not exceeding sixty days from the filing of any such petition during which time it shall investigate whether such revision is just and equitable and in accordance with the provisions of the Enabling Act. If the State Corporation Commission does not enter an order suspending, approving or disapproving such revision within sixty days from the filing of any such petition, such revision will be deemed to be in effect. The District or the party or parties filing a petition may appeal to the Supreme Court of Virginia from any such order as may be entered by the State Corporation Commission.

Collection of Unpaid Wastewater Treatment Charges

The Enabling Act provides that if any bill for wastewater treatment charges is not paid in full when the same becomes due, the owner, tenant or occupant of such lot or parcel of land shall, until wastewater treatment charges are paid, cease to dispose of wastewater or industrial wastes originating from or on such property by discharge thereof directly or indirectly into the Wastewater System, and if such owner, tenant or occupant does not cease such discharge within 60 days after the delinquent fees and charges are due, it shall be the duty of each public or private agency supplying water to such property, within 10 days after receipt of notice of such facts from the District, to cease supplying water to such property. If the water supply is not stopped, the District has the power to enter into any public or private property to shut off the property's water supply.

The District participates in the Virginia Set-Off Debt Collection Program administered by the Virginia Department of Taxation. This program provides a means for government units and courts to collect delinquent debts by attaching individual income tax refunds and certain state lottery winnings. Jurisdictions participating in the Hampton Roads Utility Billing Service (which is managed by the District) may have the District submit their balances along with the District's. This benefits the jurisdictions since, under the Debt Set-Off Collection Program, the District has a higher payoff priority than counties and cities. The following table shows the District's treatment charge collection rate for the last ten Fiscal Years.

**Hampton Roads Sanitation District
Collection Rate**

Fiscal Year Ended June 30,	Percentage of Wastewater Treatment Charges Collected
2009	96.5%
2010	99.2
2011	98.8
2012	99.1
2013	99.3
2014	99.3
2015	99.1
2016	99.1
2017	99.1
2018	99.3

LITIGATION

There is no litigation pending in any court (either state or federal) or, to the knowledge of the District, threatened against the District that in any way questions or affects the validity of or the security for the Series 2019A Bonds or that would have a material adverse effect on the District's condition, financial or otherwise.

APPROVAL OF LEGAL PROCEEDINGS

The Series 2019A Bonds are offered subject to the approving opinion of Norton Rose Fulbright US LLP, Washington, D.C., Bond Counsel. Certain legal matters will be passed upon for the District by its General Counsel, Kellam, Pickrell, Cox & Anderson, A Professional Corporation, Norfolk, Virginia, and for the Underwriters by Kaufman & Canoles, P.C., Richmond, Virginia.

TAX MATTERS

General

Interest on the Series 2019A Bonds will be includable in the gross income of the owners thereof for purposes of federal income taxation. See “—Certain U.S. Federal Income Tax Considerations” below.

Certain U.S. Federal Income Tax Considerations

The following summary of certain United States federal income tax consequences of the purchase, ownership and disposition of the Series 2019A Bonds is based upon laws, regulations, rulings and decisions now in effect, all of which are subject to change (including changes in effective dates), which change may be retroactive, or possible differing interpretations. No assurance can be given that future changes in the law will not alter the consequences described herein. It deals only with the Series 2019A Bonds held as capital assets and does not purport to deal with persons in special tax situations, including but not limited to financial institutions, insurance companies, regulated investment companies, dealers in securities or currencies, persons holding the Series 2019A Bonds as a hedge against currency risks or as a position in a “straddle” for tax purposes, or persons whose functional currency is not the U.S.

dollar. It also does not deal with holders other than investors who purchase Series 2019A Bonds in the initial offering at the first price at which a substantial amount of such substantially identical bonds are sold to the general public (except where otherwise specifically noted). Persons considering the purchase of the Series 2019A Bonds should consult their own tax advisors concerning the application of U.S. federal income tax laws to their particular situations as well as any consequences of the purchase, ownership and disposition of the Series 2019A Bonds arising under the laws of any other taxing jurisdiction.

As used herein, the term “U.S. Holder” means a beneficial owner of a Series 2019A Bond that is for U.S. federal income tax purposes (i) a citizen or resident of the United States, (ii) a corporation (including an entity treated as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia, (iii) an estate, the income of which is subject to U.S. federal income taxation regardless of its source, or (iv) a trust if (a) a court within the United States is able to exercise primary supervision over the administration of the trust and one or more United States persons have the authority to control all substantial decisions of the trust, or (b) the trust was in existence on August 20, 1996, and properly elected to continue to be treated as a United States person. Moreover, as used herein, the term “U.S. Holder” includes any holder of a Series 2019A Bond whose income or gain in respect of its investment in a Series 2019A Bond is effectively connected with the U.S. trade or business. As used herein, the term “Non-U.S. Holder” means a beneficial Owner of a Series 2019A Bond (other than an entity that is classified as a partnership) that is not a U.S. Holder.

If a partnership (including for this purpose any entity treated as a partnership for United States federal income tax purposes) is the beneficial owner of any Series 2019A Bond, the treatment of a partner in that partnership will generally depend upon the status of such partner and the activities of such partnership. A partnership and any partner in a partnership holding Series 2019A Bonds should consult its own tax advisor.

Payments of Interest

Payments of interest on a Series 2019A Bond generally will be taxable to a U.S. Holder as ordinary interest income at the time such payments are accrued or are received (in accordance with the U.S. Holder’s regular method of tax accounting), provided such interest is “qualified stated interest,” as defined below.

Original Issue Discount

The following summary is a general discussion of the U.S. federal income tax consequences to U.S. Holders of the purchase, ownership and disposition of Series 2019A Bonds issued with original issue discount (“OID Bonds”), if any. The following summary is based upon final Treasury regulations (the “OID Regulations”) released by the Internal Revenue Service (“IRS”) under the original issue discount provisions of the Code.

For U.S. federal income tax purposes, original issue discount is the excess of the stated redemption price at maturity of a bond over its issue price, if such excess equals or exceeds a de minimis amount (generally 1/4 of 1% of the bond’s stated redemption price at maturity multiplied by the number of complete years to its maturity from its issue date or, in the case of a bond providing for the payment of any amount other than qualified stated interest (as defined below) prior to maturity, multiplied by the weighted average maturity of such bond). The issue price of each maturity of substantially identical Series 2019A Bonds equals the first price at which a substantial amount of such maturity of Series 2019A Bonds has been sold (ignoring sales to bond houses, brokers or similar persons or organizations acting in

the capacity of underwriters, placement agents or wholesalers), which may not be the same as the prices shown on the inside cover of this official statement. The stated redemption price at maturity of a Series 2019A Bond is the sum of all payments provided by the Series 2019A Bond other than “qualified stated interest” payments. The term “qualified stated interest” generally means stated interest that is unconditionally payable in cash or property (other than debt instruments of the issuer) at least annually at a single fixed rate. Payments of qualified stated interest on a Series 2019A Bond are generally taxable to a U.S. Holder as ordinary interest income at the time such payments are accrued or are received (in accordance with the U.S. Holder’s regular method of tax accounting).

A U.S. Holder of an OID Bond must include original issue discount in income as ordinary interest income for U.S. federal income tax purposes as it accrues under a constant yield method in advance of receipt of the cash payments attributable to such income, regardless of such U.S. Holder’s regular method of tax accounting. In general, the amount of original issue discount included in income by the initial U.S. Holder of an OID Bond is the sum of the daily portions of original issue discount with respect to such OID Bond for each day during the taxable year (or portion of the taxable year) on which such U.S. Holder held such OID Bond. The “daily portion” of original issue discount on any OID Bond is determined by allocating to each day in any accrual period a ratable portion of the original issue discount allocable to that accrual period. An “accrual period” may be of any length and the accrual periods may vary in length over the term of the OID Bond, provided that each accrual period is no longer than one year and each scheduled payment of principal or interest occurs either on the final day of an accrual period or on the first day of an accrual period. The amount of original issue discount allocable to each accrual period is generally equal to the difference between (i) the product of the OID Bond’s adjusted issue price at the beginning of such accrual period and its yield to maturity (determined on the basis of compounding at the close of each accrual period and appropriately adjusted to take into account the length of the particular accrual period) and (ii) the amount of any qualified stated interest payments allocable to such accrual period. The “adjusted issue price” of an OID Bond at the beginning of any accrual period is the sum of the issue price of the OID Bond plus the amount of original issue discount allocable to all prior accrual periods minus the amount of any prior payments on the OID Bond that were not qualified stated interest payments. Under these rules, U.S. Holders generally will have to include in income increasingly greater amounts of original issue discount in successive accrual periods.

A U.S. Holder who purchases an OID Bond for an amount that is greater than its adjusted issue price as of the purchase date and less than or equal to the sum of all amounts payable on the OID Bond after the purchase date, other than payments of qualified stated interest, will be considered to have purchased the OID Bond at an “acquisition premium.” Under the acquisition premium rules, the amount of original issue discount which such U.S. Holder must include in its gross income with respect to such OID Bond for any taxable year (or portion thereof in which the U.S. Holder holds the OID Bond) will be reduced (but not below zero) by the portion of the acquisition premium properly allocable to the period.

U.S. Holders may generally, upon election, include in income all interest (including stated interest, acquisition discount, original issue discount, de minimis original issue discount, market discount, de minimis market discount, and unstated interest, as adjusted by any amortizable bond premium or acquisition premium) that accrues on a debt instrument by using the constant yield method applicable to original issue discount, subject to certain limitations and exceptions. This election will generally apply only to the debt instrument with respect to which it is made and may be revoked only with the consent of the IRS.

Market Discount

If a U.S. Holder purchases a Series 2019A Bond, other than an OID Bond, for an amount that is less than its issue price (or, in the case of a subsequent purchaser, its stated redemption price at maturity)

or, in the case of an OID Bond, for an amount that is less than its adjusted issue price as of the purchase date, such U.S. Holder will be treated as having purchased such Series 2019A Bond at a “market discount,” unless the amount of such market discount is less than a specified de minimis amount.

Under the market discount rules, a U.S. Holder will be required to treat any partial principal payment (or, in the case of an OID Bond, any payment that does not constitute qualified stated interest) on, or any gain realized on the sale, exchange, retirement or other disposition of, a Series 2019A Bond as ordinary income to the extent of the lesser of (i) the amount of such payment or realized gain or (ii) the market discount which has not previously been included in gross income and is treated as having accrued on such Series 2019A Bonds at the time of such payment or disposition. Market discount will be considered to accrue ratably during the period from the date of acquisition to the maturity date of the Series 2019A Bonds, unless the U.S. Holder elects to accrue market discount on the basis of semiannual compounding.

A U.S. Holder may be required to defer the deduction of all or a portion of the interest paid or accrued on any indebtedness incurred or maintained to purchase or carry a Series 2019A Bond with market discount until the maturity of such Series 2019A Bond or certain earlier dispositions, because a current deduction is only allowed to the extent the interest expense exceeds an allocable portion of market discount. A U.S. Holder may elect to include market discount in income currently as it accrues (on either a ratable or semiannual compounding basis), in which case the rules described above regarding the treatment as ordinary income or gain upon the disposition of the Series 2019A Bond and upon the receipt of certain cash payments and regarding the deferral of interest deductions will not apply. Generally, such currently included market discount is treated as ordinary interest for U.S. federal income tax purposes. Such an election will apply to all debt instruments acquired by the U.S. Holder on or after the first day of the first taxable year to which such election applies and may be revoked only with the consent of the IRS.

Premium

If a U.S. Holder purchases a Series 2019A Bond for an amount that is greater than the sum of all amounts payable on the Series 2019A Bond after the purchase date, other than payments of qualified stated interest, such U.S. Holder will be considered to have purchased the Series 2019A Bond with “amortizable bond premium” equal in amount to such excess. A U.S. Holder may elect to amortize such premium using a constant yield method over the remaining term of the Series 2019A Bond and may offset interest otherwise required to be included in respect of the Series 2019A Bond during any taxable year by the amortized amount of such excess for the taxable year. Bond premium on a Series 2019A Bond held by a U.S. Holder that does not make such an election will decrease the amount of gain or increase the amount of loss otherwise recognized on the sale, exchange, redemption or retirement of a Series 2019A Bond. However, if the Series 2019A Bond may be optionally redeemed after the U.S. Holder acquires it at a price in excess of its stated redemption price at maturity, special rules would apply which could result in a deferral of the amortization of some bond premium until later in the term of the Series 2019A Bond (as discussed in more detail below). Any election to amortize bond premium applies to all taxable debt instruments held by the U.S. Holder on or after the first day of the first taxable year to which such election applies and may be revoked only with the consent of the IRS.

The following rules apply to any Series 2019A Bond that may be optionally redeemed after the U.S. Holder acquires it at a price in excess of its stated redemption price at maturity. The amount of amortizable bond premium attributable to such Series 2019A Bond is equal to the lesser of (1) the difference between (A) such U.S. Holder’s tax basis in the Series 2019A Bond and (B) the sum of all amounts payable on such Series 2019A Bond after the purchase date, other than payments of qualified stated interest and (2) the difference between (X) such U.S. Holder’s tax basis in such Series 2019A Bond and (Y) the sum of all amounts payable on such Series 2019A Bond after the purchase date due on or

before the early call date, other than payments of qualified stated interest. If a Series 2019A Bond may be redeemed on more than one date prior to maturity, the early call date and amount payable on the early call date that produces the lowest amount of amortizable bond premium, is the early call date and amount payable that is initially used for purposes of calculating the amount pursuant to clause (2) of the previous sentence. If an early call date is not taken into account in computing premium amortization and the early call is in fact exercised, a U.S. Holder will be allowed a deduction for the excess of the U.S. Holder's tax basis in the Series 2019A Bond over the amount realized pursuant to the redemption. If an early call date is taken into account in computing premium amortization and the early call is not exercised, the Series 2019A Bond will be treated as "reissued" on such early call date for the call price. Following the deemed reissuance, the amount of amortizable bond premium is recalculated pursuant to the rules of this section "Premium." The rules relating to Series 2019A Bonds that may be optionally redeemed are complex and, accordingly, prospective purchasers are urged to consult their own tax advisors regarding the application of the amortizable bond premium rules to their particular situation.

Disposition of a Series 2019A Bond

Except as discussed above, upon the sale, exchange or retirement of a Series 2019A Bond, a U.S. Holder generally will recognize taxable gain or loss equal to the difference between the amount realized on the sale, exchange or retirement (other than amounts representing accrued and unpaid interest) and such U.S. Holder's adjusted tax basis in the Series 2019A Bond. A U.S. Holder's adjusted tax basis in a Series 2019A Bond generally will equal such U.S. Holder's initial investment in the Series 2019A Bond increased by any original issue discount included in income (and accrued market discount, if any, if the U.S. Holder has included such market discount in income) and decreased by the amount of any payments, other than qualified stated interest payments, received and amortizable bond premium taken with respect to such Series 2019A Bond. Such gain or loss generally will be long-term capital gain or loss if the Series 2019A Bond has been held by the U.S. Holder at the time of disposition for more than one year. If the U.S. Holder is an individual, long-term capital gain will be subject to reduced rates of taxation. The deductibility of capital losses is subject to certain limitations.

Defeasance

Persons considering the purchase of a Series 2019A Bond should be aware that a defeasance of a Series 2019A Bond by the Authority prior to maturity could result in the realization of gain or loss by the beneficial owner of the Series 2019A Bond for federal income tax purposes, without any corresponding receipts of money by the beneficial owner. Such gain or loss generally would be subject to recognition for the tax year in which such realization occurs, as in the case of a sale or exchange. Owners are advised to consult their own tax advisers with respect to the tax consequences resulting from such events. See "THE SERIES 2019A BONDS - Redemption Provisions - Defeasance of Series 2019A Bonds" herein.

Medicare Tax

For taxable years beginning after December 31, 2012, an additional 3.8% tax has been imposed on the net investment income (which includes interest, original issue discount and net gains from a disposition of a Series 2019A Bond) of certain individuals, trust and estates. Prospective investors in the Series 2019A Bonds should consult their tax advisors regarding the possible applicability of this tax to an investment in the Series 2019A Bonds.

Backup Withholding

A beneficial owner of the Series 2019A Bonds who is a U.S. Holder may, under certain circumstances, be subject to "backup withholding" (currently at a rate of 24%) on current or accrued

interest on the Series 2019A Bonds or with respect to proceeds received from a disposition of the Series 2019A Bonds. This withholding applies if such beneficial owner of Series 2019A Bonds: (i) fails to furnish to the payor such beneficial owner's social security number or other taxpayer identification number ("TIN"); (ii) furnishes the payor an incorrect TIN; (iii) fails to report interest properly; or (iv) under certain circumstances, fails to provide the payor or such beneficial owner's broker with a certified statement, signed under penalty of perjury, that the TIN provided to the payor or broker is correct and that such beneficial owner is not subject to backup withholding. To establish status as an exempt person, a beneficial owner will generally be required to provide certification on IRS Form W-9 (or substitute form).

Backup withholding will not apply, however, if the beneficial owner is a corporation or falls within certain tax-exempt categories and, when required, demonstrates such fact. **BENEFICIAL OWNERS OF THE SERIES 2019A BONDS SHOULD CONSULT THEIR TAX ADVISORS REGARDING THEIR QUALIFICATION FOR EXEMPTION FROM BACKUP WITHHOLDING AND THE PROCEDURE FOR OBTAINING SUCH EXEMPTION, IF APPLICABLE.** The backup withholding tax is not an additional tax and taxpayers may use amounts withheld as a credit against their federal income tax liability or may claim a refund as long as they timely provide certain information to the IRS.

Withholding on Payments to Nonresident Alien Individuals and Foreign Corporations

Nonresident alien individuals and foreign corporations are generally subject to withholding of U.S. federal income tax by the payor at the rate of 30% on periodic income items arising from sources within the United States, provided such income is not effectively connected with the conduct of a United States trade or business. Assuming the interest income of such a beneficial owner of the Series 2019A Bonds is not treated as effectively connected income within the meaning of Section 864 of the Code, such interest will be subject to 30% withholding, or any lower rate specified in an income tax treaty, unless such income is treated as "portfolio interest." Interest will be treated as portfolio interest if (i) the beneficial owner provides a statement to the payor certifying, under penalties of perjury, that such beneficial owner is a Non-U.S. Holder and providing the name and address of such beneficial owner, (ii) such interest is treated as not effectively connected with the beneficial owner's United States trade or business, (iii) interest payments are not made to a person within a foreign country which the IRS has included on a list of countries having provisions inadequate to prevent United States tax evasion, (iv) interest payable with respect to the Series 2019A Bonds is not deemed contingent interest within the meaning of the portfolio debt provision, (v) such beneficial owner is not a controlled foreign corporation within the meaning of Section 957 of the Code and (vi) such beneficial owner is not a bank receiving interest on the Series 2019A Bonds pursuant to a loan agreement entered into in the ordinary course of the bank's trade or business.

Assuming payments on the Series 2019A Bonds are treated as portfolio interest within the meaning of Sections 871 and 881 of the Code, then no withholding under Section 1441 and 1442 of the Code, and no backup withholding under Section 3406 of the Code is required with respect to beneficial owners or intermediaries who have furnished Form W-8 BEN, Form W-8 BEN-E, Form W-8 EXP, or Form W-8 IMY, as applicable, provided the payor has no actual knowledge or reason to know that such person is a U.S. Holder.

A non-U.S. Holder whose income with respect to its investment in a Series 2019A Bond is effectively connected with the conduct of a U.S. trade or business would generally be taxed as if the holder was a U.S. person provided the holder provides to the Withholding Agent an IRS Form W-8ECI.

Generally, a non-U.S. Holder will not be subject to United States federal income taxes on any amount which constitutes capital gain upon retirement or disposition of a Series 2019A Bond, unless such

non-U.S. Holder is an individual who is present in the United States for 183 days or more in the taxable year of the disposition and such gain is derived from sources within the United States. Certain other exceptions may be applicable, and a non-U.S. Holder should consult its tax advisor in this regard.

The Series 2019A Bonds will not be includable in the estate of a non-U.S. Holder unless, at the time of such individual's death, payments in respect of the Series 2019A Bonds would have been effectively connected with the conduct by such individual of a trade or business in the United States.

Foreign Account Tax Compliance Act

Sections 1471 through 1474 of the Code impose a 30% withholding tax on certain types of payments made to a foreign financial institution, unless the foreign financial institution enters into an agreement with the U.S. Treasury to, among other things, undertake to identify accounts held by certain U.S. persons or U.S.-owned entities, annually report certain information about such accounts, and withhold 30% on payments to account holders whose actions prevent it from complying with these and other reporting requirements, or unless the foreign financial institution is otherwise exempt from those requirements. In addition, the Foreign Account Tax Compliance Act ("FATCA") imposes a 30% withholding tax on the same types of payments to a non-financial foreign entity unless the entity certifies that it does not have any substantial U.S. owners or the entity furnishes identifying information regarding each substantial U.S. owner. Failure to comply with the additional certification, information reporting and other specified requirements imposed under FATCA could result in the 30% withholding tax being imposed on payments of interest and principal under the Series 2019A Bonds and sales proceeds of Series 2019A Bonds held by or through a foreign entity. In general, withholding under FATCA currently applies to payments of U.S. source interest (including original issue discount) and will apply to (i) gross proceeds from the sale, exchange or retirement of debt obligations paid after December 31, 2018, and (ii) certain "pass-thru" payments but no earlier than two years after the date of publication of final regulations defining the term "foreign pass-thru payment." Prospective investors should consult their own tax advisors regarding FATCA and its effect on them.

ERISA Considerations

The Employee Retirement Income Security Act of 1974, as amended ("ERISA"), and section 4975 of the Code generally prohibit certain transactions between employee benefit plans under ERISA or tax qualified retirement plans and individual retirement accounts under the Code (collectively, the "Plans") and persons who, with respect to a Plan, are fiduciaries or other "parties in interest" within the meaning of ERISA or "disqualified persons" within the meaning of the Code. In addition, each fiduciary of a Plan ("Plan Fiduciary") must give appropriate consideration to the facts and circumstances that are relevant to an investment in the Series 2019A Bonds, including the role that such an investment in the Series 2019A Bonds would play in the Plan's overall investment portfolio. Each Plan Fiduciary, before deciding to invest in the Series 2019A Bonds, must be satisfied that such investment in the Series 2019A Bonds is a prudent investment for the Plan, that the investments of the Plan, including the investment in the Series 2019A Bonds, are diversified so as to minimize the risk of large losses and that an investment in the Series 2019A Bonds complies with the documents of the Plan and related trust, to the extent that such documents are consistent with ERISA. All Plan Fiduciaries, in consultation with their advisors, should carefully consider the impact of ERISA and the Code on an investment in any Series 2019A Bonds.

Virginia Taxes

The Enabling Act provides that the Series 2019A Bonds, their transfer and the income therefrom, including any profit made on the sale thereof, shall be free and exempt from taxation by the Commonwealth of Virginia and by any political subdivision thereof.

UNDERWRITING

Pursuant and subject to the terms and conditions set forth in a Bond Purchase Agreement (the “Purchase Agreement”) dated _____, 2019, between the District and Citigroup Global Markets Inc., FTN Financial Capital Markets and UBS Financial Services Inc. (the “Underwriters”), for whom Citigroup Global Market Inc. is acting as representative, and the District, the Underwriters will agree to purchase from the District, and the District will agree to sell to the Underwriters, all, but not less than all, of the Series 2019A Bonds at a purchase price that results in an Underwriters’ discount of \$_____ from the initial reoffering prices derived from the yields shown on the inside cover page. The Underwriters have supplied the information as to the prices or yields shown on the inside cover page.

The Underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. Under certain circumstances, the Underwriters and their affiliates may have certain creditor or other rights against the District and its affiliates in connection with such activities. In the course of their various business activities, the Underwriters and their respective affiliates, officers, directors and employees may purchase, sell or hold a broad array of investments and actively trade securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments for their own account and for the accounts of their customers, and such investment and trading activities may involve or relate to assets, securities or instruments of the District (directly, as collateral securing other obligations or otherwise) or persons and entities with relationships with the District. The Underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long or short positions in such assets, securities and instruments.

FINANCIAL ADVISOR

The District has retained PFM Financial Advisors LLC, Arlington, Virginia, as financial advisor (the “Financial Advisor”) in connection with the issuance of the Series 2019A Bonds. Although the Financial Advisor assisted in the review of this Official Statement, the Financial Advisor is not obligated to undertake, and has not undertaken to make, an independent verification or to assume responsibility for the accuracy, completeness, or fairness of the information contained in this Official Statement. The Financial Advisor is a financial advisory, investment management and consulting organization and is not engaged in the business of underwriting municipal securities.

VERIFICATION OF MATHEMATICAL COMPUTATIONS FOR THE REFUNDED BONDS

The accuracy of the arithmetical and mathematical computations (a) of the adequacy of the maturity principal amounts of the Defeasance Obligations in the Escrow Fund[s] together with the interest income thereon and uninvested cash, if any, to pay, when due, the principal of, redemption premium, if any, and interest on the Refunded Bonds, and (b) relating to the determination of compliance with certain regulations and rulings promulgated under the Code will be verified by _____. Such

verification of arithmetical accuracy and computations shall be based upon information and assumptions supplied by the District and on interpretations of the Code provided by Bond Counsel.

RATINGS

The Series 2019A Bonds have been assigned ratings of “___” and “___” by Standard & Poor’s Global Ratings, a division of Standard & Poor’s Financial Services LLC, and Fitch Ratings, respectively. Such ratings reflect only the view of such organizations and a fuller explanation of the significance of such ratings may be obtained from the rating agencies. A rating is not a recommendation to buy, sell or hold the Series 2019A Bonds. The District furnished to such rating agencies certain information regarding its policies, practices and finances, including information that is not included in this Official Statement. There is no assurance that such policies, practices and finances or such ratings will continue for any given period of time or that such ratings will not be revised downward or withdrawn entirely by such rating agencies. Any such downward revision or withdrawal could have an adverse effect on the market price of the Series 2019A Bonds.

CONTINUING DISCLOSURE

The Securities and Exchange Commission has adopted Rule 15c2-12 under the Securities Exchange Act of 1934, as amended (the “Rule”). In general, the Rule prohibits an underwriter from purchasing or selling municipal securities, such as the Series 2019A Bonds, unless it has determined that the issuer of such securities and other persons deemed to be material “obligated persons” have committed to provide to The Electronic Municipal Market Access (“EMMA”) system administered by the Municipal Securities Rulemaking Board (i) on an annual basis, certain financial information and operating data (“Annual Reports”), and audited financial statements, if available, or such unaudited financial statements as may be required by the Rule, and (ii) notice of various events described in the Rule (“Event Notices”).

The District will covenant in the Continuing Disclosure Agreement (the form of which appears in Appendix E) for the benefit of the holders of the Series 2019A Bonds to provide to EMMA annually, not later than December 31 of each year, commencing December 31, 2019, Annual Reports with respect to itself, as issuer. Similarly, the District will promptly provide Event Notices with respect to the Series 2019A Bonds to EMMA. In the five years preceding the date of this Official Statement, the District has materially complied with its other undertakings under the Rule. The District notes, however, that in connection with the District’s determination that it had entered a Reserve Funding Period on December 31, 2010, the District filed notice thereof with EMMA on October 14, 2014.

The Continuing Disclosure Agreement requires the District to provide only that information that is subject to the terms of the Continuing Disclosure Agreement and only at specific times. The District may, from time to time, provide certain information and data in addition to that required by the Continuing Disclosure Agreement. If the District chooses to provide such information and data, it has no obligation to update such information or data or to include it in a future disclosure.

The sole remedy for a default under the Continuing Disclosure Agreement is to bring an action for specific performance of the District’s covenants hereunder, and no assurance can be provided as to the outcome of any such proceeding.

MISCELLANEOUS

All of the foregoing summaries or descriptions of the provisions of the Enabling Act, the Series 2019A Bonds and the Trust Agreement are made subject to all of the detailed provisions thereof to which reference is made for further information. The foregoing summaries do not purport to be complete statements of any or all of the provisions thereof. Copies of the Trust Agreement are available upon request to the District at the following address: 1434 Air Rail Avenue, Virginia Beach, Virginia 23455, Phone (757) 460-2261.

Any statement in this Official Statement involving matters of opinion whether or not expressly so stated is intended as such and not as a representations of fact. The execution and delivery of this Official Statement have been duly authorized by the Commission.

Chair
Hampton Roads Sanitation District Commission

General Manager
Hampton Roads Sanitation District

Director of Finance
Hampton Roads Sanitation District

APPENDIX A

Basic Financial Statements and Related Auditor's Report for the Fiscal Year ended June 30, 2018, as rendered by KPMG LLP⁽¹⁾

(1) This Appendix comprises the District's Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2018. In order to preserve cross-references within such pages, this Appendix has not been repaginated and, accordingly, retains the original pagination.

APPENDIX B

CERTAIN DEFINITIONS

The following is a brief summary of certain definitions of certain terms contained in the Trust Agreement and the Seventh Supplemental Trust Agreement and used in this Official Statement. This summary does not purport to be complete or definitive and qualified in its entirety by reference to the Trust Agreement and the Seventh Supplemental Trust Agreement, copies of which are available for examination at the offices of the Trustee.

“Additional Bonds” means Bonds, if any, issued by the District, subsequent to the issuance of the Subordinate 2011 Bonds, pursuant to the Trust Agreement, including Additional Bonds issued in exchange for other such Additional Bonds or in replacement for mutilated, destroyed, stolen or lost Additional Bonds.

“Audited Financial Statements” means the annual financial statements of the District as audited and reported on by a firm of independent public accountants, for a twelve-month period constituting a Fiscal Year or other period indicated, prepared in accordance with generally accepted accounting principles.

“Balloon Long-Term Indebtedness” means Long-Term Indebtedness 25% or more of the principal payments of which is due in a single year, which portion of the principal is not required by the documents pursuant to which such Indebtedness is issued to be amortized by redemption prior to such date.

“Bond Registrar” means the Bond Registrar at the time serving as such under the Trust Agreement whether the original or a successor bond registrar.

“Bonds” means, the Subordinate 2012 Bonds, the Subordinate 2016 Bonds, the Subordinate 2017 Bonds, the Subordinate 2018 Bonds, the Series 2019A Bonds, and any Additional Bonds under the Trust Agreement, including such Bonds issued in exchange for other such Bonds and Bonds issued in replacement for and upon the cancellation of mutilated Bonds or in lieu of and in substitution for destroyed, stolen or lost Bonds.

“Capital Appreciation Bonds” means Bonds the interest on which is compounded at the rates and on the dates set forth in the Series Agreement authorizing the issuance of such Bonds and is payable upon redemption or on the maturity date of such Bonds. Nothing in the Trust Agreement prohibits the District from designating in such Series Agreement any such Bonds by a name other than Capital Appreciation Bonds.

“Coincidental Maximum Annual Debt Service” means the highest amount of debt service due and payable on the Senior Obligations and Parity Obligations in the then-current or any succeeding Fiscal Year. For purposes of this definition, debt service due and payable on the Senior Obligations for any Fiscal Year is to be determined by reference to the Principal and Interest Requirements (as defined in the Senior Trust Agreement) and debt service due and payable on Parity Obligations for any Fiscal Year is to be determined by reference to the Principal and Interest Requirements (as defined in the Trust Agreement).

“Commission” means the Hampton Roads Sanitation District Commission, which is the governing body of the District.

“Contracted Services” means services rendered or facilities provided to the District for the performance for or on behalf of the District of functions similar to those performed by the District from a specific project, projects or systems, pursuant to a contract, whether a financing lease, a service agreement or another arrangement.

“Credit Facility” means a line of credit, letter of credit, standby bond purchase agreement or similar credit enhancement or liquidity facility, including self-liquidity provided by the District, established to provide credit or liquidity support for Indebtedness.

“Cross-over Date” means, with respect to Cross-over Refunding Indebtedness, the date on which the principal portion of the related Cross-over Refunded Indebtedness is to be paid or redeemed from the proceeds of such Cross-over Refunding Indebtedness.

“Cross-over Refunded Indebtedness” means Indebtedness refunded by Cross-over Refunding Indebtedness.

“Cross-over Refunding Indebtedness” means Indebtedness issued for the purpose of refunding other Indebtedness if the proceeds of such refunding Indebtedness are irrevocably deposited in escrow to secure the payment on the applicable redemption date or maturity date of the refunded Indebtedness, and the earnings on such escrow deposit (i) are required to be applied to pay interest on such Refunding Indebtedness until the Cross-over Date and (ii) are not to be used directly or indirectly to pay interest on the Refunded Indebtedness.

“Current Interest Bonds” means Bonds the interest on which is payable on the Interest Payment Dates provided therefor in the Series Agreement authorizing the issuance of such Bonds.

“Debt Service Component of Contracted Services” means that part of the payment for Contracted Services for which the District is obligated to pay that the chief financial officer of the District shall have determined in writing in an Officer’s Certificate at the time the District commits to receive such Contracted Services to be for the purpose of paying a fixed charge or the principal of and interest on obligations, directly or indirectly associated with rendering the Contracted Services, of the person providing the Contracted Services.

“Debt Service Reserve Fund” means the Hampton Roads Sanitation District (Virginia) Subordinate Wastewater Revenue Bonds 2011 Trust Agreement Debt Service Reserve Fund created and so designated by the Trust Agreement.

“Debt Service Reserve Fund Requirement” means (i) on the date of issuance of the Series 2019A Bonds, zero (0) and (ii) if, and to the extent, the District in its sole discretion determines to fund the Debt Service Reserve Fund, the Debt Service Reserve Fund Requirement specified in a Series Agreement.

“Defaulted Interest” means any interest on any Bond which is payable, but is not punctually paid or duly provided for, on any Interest Payment Date.

“Defeasance Obligations” means, except as otherwise provided in a Series Agreement, noncallable (i) Government Obligations, (ii) Obligations issued or guaranteed by any of the following: (1) Federal Home Loan Bank System, (2) Export-Import Bank of the United States, (3) Federal Financing Bank, (4) Government National Mortgage Association, (5) Federal Home Loan Mortgage Company, (6) Federal Housing Administration, (7) Private Export Funding Corp., (8) Federal National Mortgage Association, (9) Federal Farm Credit Bank, (10) Resolution Funding Corporation, and (11) Rural

Economic Community Development Administration (formerly, Farmers Home Administration), (iii) evidences of ownership of a proportionate interest in specified Government Obligations, which Government Obligations are held by a bank or trust company organized and existing under the laws of the United States of America or any state thereof in the capacity of custodian, (iv) obligations issued pursuant to Section 21B(d)(3) of the Federal Home Loan Bank Act, as amended by Section 511(a) of the Financial Institutions Reform, Recovery and Enforcement Act of 1989, and commonly known as “interest strips” of the Resolution Funding Corporation, (v) Defeased Municipal Obligations, and (vi) evidences of ownership of a proportionate interest in specified Defeased Municipal Obligations, which Defeased Municipal Obligations are held by a bank or trust company organized and existing under the laws of the United States of America or any state thereof in the capacity as custodian.

“**Defeased Municipal Obligations**” means, except as otherwise provided in a Series Agreement, obligations of state or local government municipal bond issuers which are rated at the time of acquisition the highest rating by at least two of the three Rating Agencies, meeting the following conditions:

(i) (A) such obligations are not to be redeemed prior to maturity or the Trustee has been given irrevocable instructions concerning their call for redemption, and (B) the issuer of such obligations has covenanted not to redeem such obligations other than as set forth in such instructions;

(ii) such obligations are secured by Government Obligations that may be applied only to interest, principal, and premium payments on such obligations;

(iii) the principal of and interest on such Government Obligations (plus any cash in the escrow fund with respect to such pre-refunded obligations) are sufficient to meet the liabilities of the obligations;

(iv) the Government Obligations serving as security for the obligations are held by an escrow agent or trustee; and

(v) such Government Obligations are not available to satisfy any other claims, including those against the trustee or escrow agent.

“**Derivative Agreement**” means, without limitation, (i) any contract known as or referred to or which performs the function of an interest rate swap agreement, forward payment conversion agreement or futures contract; (ii) any contract providing for payments based on levels of, or changes or differences in, interest rates or other indices; (iii) any contract to exchange cash flows or payments or series of payments; (iv) any type of contract called, or designed to perform the function of, interest rate floors or caps, options, puts or calls, to hedge or minimize any type of financial risk, including, without limitation, payment, rate or other financial risk; and (v) any other type of contract or arrangement that the District determines is to be used, or is intended to be used, to manage or reduce the cost of Indebtedness, to convert any element of Indebtedness from one form to another or to protect against any type of financial risk or uncertainty.

“**Derivative Agreement Counterparty**” means, with respect to a Derivative Agreement, the person that is identified in such agreement as the counterparty to, or contracting party with, the District.

“**Derivative Indebtedness**” means all or any portion of Indebtedness of the District, which bears interest at

(a) a variable rate for any period of time meeting the following requirements: (i) the District has issued or entered into a Derivative Agreement in respect of all or such portion of such Indebtedness, and (ii) such Derivative Agreement provides that, during the period that such Indebtedness bears interest at a variable rate, the District will pay a fixed rate and the provider of the Derivative Agreement will pay a variable rate, then in such case such Indebtedness, taken together with the Derivative Agreement, is to be deemed to result in a net fixed rate payable by the District for such period of time (the “Hedged Fixed Rate”), for so long as the District and the party with whom the District has entered into the Derivative Agreement makes all payments required to be made by the terms of the Derivative Agreement, or

(b) a fixed rate for any period of time meeting the following requirements: (i) the District has issued or entered into a Derivative Agreement in respect of all or such portion of such Indebtedness, and (ii) such Derivative Agreement provides that during the period that such Indebtedness bears interest at a fixed rate the District will pay a variable rate and the provider of the Derivative Agreement will pay a fixed rate, then such Indebtedness, taken together with the Derivative Agreement, is to be deemed to result in a net variable rate payable by the District for such period of time (the “Hedged Variable Rate”), assuming the District and the party with whom the District has entered into the Derivative Agreement make all payments required to be made by the terms of the Derivative Agreement.

“**Designated Office**” of the Trustee means the designated office of the Trustee, which office at the date of acceptance by the Trustee of the duties and obligations imposed on the Trustee by the Seventh Supplemental Trust Agreement is located at [500 Ross Street, 12th Floor, Pittsburgh, Pennsylvania 15262.]

“**District**” means the Hampton Roads Sanitation District, a political subdivision of the Commonwealth of Virginia.

“**District Representative**” means each of the persons at the time designated to act on behalf of the District in a written certificate furnished to the Trustee, which certificate is to contain the specimen signature(s) of such person(s) and is to signed on behalf of the Commission by its Chairman or Vice Chairman or the General Manager of the District.

“**Financial Statements**” means the unaudited financial statements of the District for the Fiscal Year or other period indicated, pro forma or otherwise, and containing the same financial information as the Audited Financial Statements.

“**Fiscal Year**” means the twelve-month period beginning on July 1 of one calendar year and ending on June 30 of the following calendar year or such other twelve-month period designated by the Commission.

“**Government Obligations**” means direct obligations of, or obligations the payment of principal of and interest on which are fully and unconditionally guaranteed by, the United States of America.

“**Hedged Fixed Rate**” means Hedged Fixed Rate as defined in the definition of Derivative Indebtedness.

“**Hedged Variable Rate**” means Hedged Variable Rate as defined in the definition of Derivative Indebtedness.

“**Holder**” means an owner of any Obligation issued in other than bearer form.

“Indebtedness” means (i) all indebtedness of the District for borrowed money, (ii) all installment sales, conditional sales and capital lease obligations incurred or assumed by the District, and (iii) the Debt Service Component of Contracted Services.

“Independent Consultant” means a firm or firms which are not, and no member, stockholder, director, officer, trustee or employee of which is, an officer, director, trustee or employee of the District, and which is a professional management or engineering consultant of national repute for having the skill and experience necessary to render the particular report required by the provision of the Trust Agreement in which such requirement appears.

“Independent Insurance Consultant” means a firm or person selected by the District, who is not an officer, director, trustee or employee of the District, and which or who is qualified to survey risks and to recommend insurance coverage for wastewater treatment systems and organizations engaged in such operations and is selected by the District.

“Interest Payment Date” means each date described as such in a Series Agreement, and, for the Series 2019A Bonds, means each [February] 1 or [August] 1, as the case may be, beginning _____, 20__.

“Interest Requirements” for any Fiscal Year means the amount that is required to pay interest on all Outstanding Parity Obligations.

“Investment Obligations” means any and all investment obligations authorized by (A) the Investment of Public Funds Act, being Section 2.2-4500 *et seq.*, Code of Virginia, 1950, as amended, (B) the Government Non-Arbitrage Investment Act, being Section 2.2-4700 *et seq.*, Code of Virginia, 1950, as amended, and (C) successor statutes to those described in (A) and (B) above, as the same may be from time to time amended.

“Issuance Costs” means all issuance costs incurred in connection with the Bonds. Examples of such issuance costs include, but are not limited to, the following, if any: (a) counsel fees; (b) financial advisor fees incurred in connection with the issuance of the Bonds; (c) Rating Agency fees; (d) depository fees incurred in connection with the issuance of the Bonds; (e) trustee, paying agent and certifying and authenticating agent fees related to the issuance of the Bonds; (f) accountant fees related to the issuance of the Bonds; (g) printing costs; (h) costs incurred in connection with the required public approval process; and (i) costs of engineering and feasibility studies necessary to the issuance of the Bonds.

“Junior Obligations” means Indebtedness of the District the terms of which shall provide that it will be subordinate and junior in right of payment to the prior payment in full of the Senior Obligations and the Parity Obligations to the extent and in the manner set forth below:

In the event (a) of any insolvency or bankruptcy proceedings, and any receivership, liquidation, reorganization, arrangement or other similar proceedings in connection therewith, relative to the District or to its Property, or in the event of any proceedings for voluntary liquidation, dissolution or other winding-up of the District whether or not involving insolvency or bankruptcy, (b) any Junior Obligation is declared or otherwise becomes due and payable before its expressed maturity because of the occurrence of an event of default occurring under the documents pursuant to which such Junior Obligation is issued; and such declaration has not been rescinded and annulled, or (c) any “Event of Default” (as defined in the Senior Trust Agreement) under the Senior Trust Agreement shall occur and be continuing with respect to any Senior Obligation or any Event of Default under the Trust Agreement shall occur and be continuing with respect to any Parity Obligation and (1) written notice of such default shall have been given to the District and (2) judicial proceedings shall be commenced in respect of such Event of Default within 180

days in the case of a default in payment of principal or interest on Senior Obligations or Parity Obligations and within 90 days in the case of any other default after the giving of such notice, then, first, the Holders of Senior Obligations shall be entitled to receive payment in full of all principal, premium and interest on all Senior Obligations before the Holders of the Parity Obligation are entitled to receive any payment on account of principal or interest upon the Parity Obligations and, second, the Holders of Parity Obligations shall be entitled to receive payment in full of all principal, premium and interest on all Parity Obligations before the Holders of the Junior Obligations are entitled to receive any payment on account of principal, premium or interest upon the Junior Obligations.

“**Lien**” means any mortgage, deed of trust or pledge of, security interest in or encumbrance on any Property of the District which secures any Indebtedness or any other obligation of the District.

“**Long-Term Debt Service Coverage Ratio**” means, for any period of time, the ratio determined by dividing the Net Revenues by Coincidental Maximum Annual Debt Service.

“**Long-Term Debt Service Requirement**” means, for any period of 12 consecutive calendar months for which such determination is made, the aggregate of the payments to be made in respect of principal and interest (whether or not separately stated) on Outstanding Long-Term Indebtedness during such period, also taking into account:

(i) with respect to Balloon Long-Term Indebtedness that is not amortized by the terms thereof (a) the amount of principal that would be payable in such period if such principal were amortized from the date of incurrence thereof over a period of the lesser of 30 years and the number of years until the final maturity of such Indebtedness on a level debt service basis, at an interest rate equal to the market rate for a fixed rate obligation set forth in an opinion, delivered to the District and the Trustee, of a banking institution, an investment banking institution or an independent registered municipal advisor, selected by the District and knowledgeable in municipal finance, as the interest rate at which the District could reasonably expect to borrow the same by incurring Indebtedness with the same term as the period assumed above; provided, however, that if the date of calculation is within 12 calendar months of the actual final maturity of such Indebtedness, the full amount of principal payable at maturity is to be included in such calculation or (b) principal payments or deposits with respect to Indebtedness secured by an irrevocable letter of credit issued by, or an irrevocable line of credit with, a bank or other financial institution, provided such credit arrangement is rated in one of the three highest rating categories by at least two of the Rating Agencies or rated in the highest short-term rating category by at least two of the Rating Agencies, nominally due in the last Fiscal Year in which such Indebtedness matures may, at the option of the District, be treated as if such principal payments or deposits were due as specified in any credit agreement issued in connection with such letter of credit, line of credit or insurance policy or pursuant to the repayment provisions of such letter of credit, line of credit or insurance policy, and interest on such Indebtedness after such Fiscal Year is to be assumed to be payable pursuant to the terms of such credit agreement or repayment provisions;

(ii) with respect to Long-Term Indebtedness which is Variable Rate (but not Hedged Fixed Rate) Indebtedness, the interest on such Indebtedness is to be calculated at 120% of the rate which is equal to the average of the actual interest rates which were in effect (weighted according to the length of the period during which each such interest rate was in effect) for the most recent twelve-month period immediately preceding the date of calculation for which such information is available (or shorter period if such information is not available for a twelve-month period), except that with respect to new Variable Rate Indebtedness the interest rate for such Indebtedness for the

initial interest rate period is 120% of the average of the SIFMA Swap Index for last 12 whole months for which such Index is available and thereafter will be calculated as set forth above;

(iii) with respect to any Credit Facility, (a) to the extent that such Credit Facility has not been used or drawn upon, the principal and interest relating to such Credit Facility will not be included in the Long-Term Debt Service Requirement and (b) to the extent such Credit Facility has been drawn upon, the payment provisions of such Credit Facility with respect to repayment of principal and interest thereon will be included in the Long-Term Debt Service Requirement;

(iv) with respect to Derivative Indebtedness, (i) for any historical computation, the interest on such Indebtedness is to be calculated by adding (A) the amount of interest payable by the District on such Derivative Indebtedness pursuant to its terms and (B) the amount of regularly scheduled payments made by the District pursuant to the Derivative Agreement and subtracting (C) the amount of regularly scheduled payments made by the Derivative Agreement Counterparty pursuant to the Derivative Agreement; (ii) for any historical pro forma or forecasted computation, if the Derivative Agreement Counterparty has a long-term credit rating of at least “A” (without regard to any rating refinement or gradation by numerical modifier or otherwise) assigned to it by at least one Rating Agency then rating the Indebtedness and does not have a long-term rating of less than “A” (without regard to any rating refinement or gradation by numerical modifier or otherwise) from any Rating Agency then rating the Indebtedness and has not defaulted on its payment obligations thereunder as of the date of computation, the interest on such Derivative Indebtedness is to be calculated at the Hedged Fixed Rate or the Hedged Variable Rate, as the case may be; and (iii) in all other instances, the amount of interest payable by the District on such Derivative Indebtedness is to be calculated as if such Derivative Agreement had not been executed; and

(v) in the case of Indebtedness having the benefit of a Credit Facility that provides for a term loan facility that requires the payment of the principal in one year or more, the Indebtedness is to be considered Balloon Long-Term Indebtedness and is to be assumed to have the maturity schedule described in paragraph (i)(a) of this definition;

provided, however, that (i) interest is to be excluded from the determination of Long-Term Debt Service Requirement to the extent the same is provided from the proceeds of the Long-Term Indebtedness, (ii) the aggregate of the payments to be made with respect to principal and interest on Outstanding Long-Term Indebtedness will not include principal and interest payable from Qualified Escrow Funds, and (iii) principal is to be excluded from the determination of Long-Term Debt Service Requirement on Short-Term Indebtedness described in paragraph (c) under the caption “—Limitations on Indebtedness in Appendix C.

“Long-Term Indebtedness” means all obligations having a maturity of a term longer than one year for borrowed money incurred or assumed by the District, including (a) Short-Term Indebtedness if secured by a Credit Facility containing a commitment to provide financing to retire such Short-Term Indebtedness and such commitment provides for the repayment of principal on terms which would, if such commitment were implemented, constitute Long-Term Indebtedness, and (b) the current portion of Long-Term Indebtedness, for any of the following:

(1) money borrowed for an original term, or renewable at the option of the borrower for a period from the date originally incurred, longer than one year;

(2) leases which are required to be capitalized in accordance with generally accepted accounting principles having an original term, or renewable at the option of the lessee for a period from the date originally incurred, longer than one year;

(3) installment sale or conditional sale contracts having an original term in excess of one year; and

(4) the Debt Service Component of Contracted Services in connection with Contracted Services rendered or provided pursuant to a contract having an original term of more than one year.

“Maximum Annual Debt Service” means, at any given time of determination, the greatest Long-Term Debt Service Requirement for the then current or any succeeding Fiscal Year.

“Maximum Annual Debt Service on the Parity Obligations” means, at any given time of determination, the maximum coincidental Principal and Interest Requirements for the Parity Obligations for the then-current or any succeeding Fiscal Year.

“Maximum Interest Rate” means, for all Series 2019A Bonds, the lesser of (i) 12% per annum and (ii) the maximum rate permitted by law.

“Net Book Value” when used in connection with Property, Plant and Equipment or other Property, means the value of such property, net of accumulated depreciation, as recognized by the District in conformity with generally accepted accounting principles.

“Net Revenues” means all revenues received by the District from its Wastewater System less Operating Expenses, provided that Net Revenues will not include any Transition charge.

“Net Revenues Available for Debt Service” means all Net Revenues less debt service on Senior Obligations.

“Officer’s Certificate” means a certificate signed by a District Representative. Each Officer’s Certificate presented pursuant to the Trust Agreement is to state that it is being delivered pursuant to (and is to identify the section or subsection of), and incorporate by reference and use in all appropriate instances all terms defined in, the Trust Agreement. Each Officer’s Certificate is to state (i) that the terms thereof are in compliance with the requirements of the section or subsection pursuant to which such Officer’s Certificate is delivered or to state in reasonable detail the nature of any non-compliance and the steps being taken to remedy such non-compliance and (ii) that it is being delivered together with any opinions, schedules, statements or other documents required in connection therewith.

“Operating Expenses” means those current expenses paid by the District that may be required to pay the cost of maintaining, repairing and operating the Wastewater System, including, but not limited to, reasonable and necessary usual expenses of administration, operation, maintenance and repair, costs for billing and collecting the rates, fees and other charges for the use of or the services furnished by the Wastewater System, insurance premiums, credit enhancement and liquidity support fees, legal, engineering, auditing and financial advisory expenses, expenses and compensation of the Trustee, and deposits into a self-insurance program. Operating Expenses excludes allowance for depreciation and amortization and expenditures for extraordinary maintenance or repair or improvements. Operating Expenses also excludes expenses for improvements that will not be owned by the District but that will, in the reasonable determination of the Commission, as evidenced by a resolution thereof, maintain or improve the integrity of the Wastewater System.

“Opinion of Bond Counsel” means an opinion in writing signed by an attorney or firm of attorneys acceptable to the Trustee and experienced in the field of municipal bonds whose opinions are generally accepted by purchasers of municipal bonds.

“Opinion of Counsel” means an opinion in writing signed by an attorney or firm of attorneys who may be counsel for the District or other counsel selected by the District.

“Outstanding,” when used with reference to Bonds or other Parity Obligations, means, as of a particular date, all Bonds and Parity Obligations theretofore issued under the Trust Agreement, except:

(1) Bonds and Parity Obligations theretofore cancelled by the Bond Registrar or delivered to the Bond Registrar for cancellation;

(2) Bonds and Parity Obligations for the payment of which money, Defeasance Obligations, or a combination of both, sufficient to pay, on the date when such Bonds are to be paid, the principal amount of, and the interest accruing to such date on, the Bonds to be paid, has been deposited with the Trustee or the Bond Registrar in trust for the Holders of such Bonds; Defeasance Obligations shall be deemed to be sufficient to pay Bonds on a specified date if the principal of and the interest on such Defeasance Obligations, when due, will be sufficient to pay on such date the principal of, and the interest accruing on, such Bonds to such date;

(3) Bonds and Parity Obligations in exchange for or in lieu of which other Bonds or Parity Obligations have been issued; and

(4) Bonds and Parity Obligations deemed to have been paid in accordance with the provisions for defeasance contained in such Bonds or Parity Obligations (See “Defeasance” in Appendix C);

provided, however, that Bonds and Parity Obligations owned or held by or for the account of the District or any affiliate or any subsidiary or controlled affiliate of the District shall not be deemed Outstanding Bonds or Outstanding Parity Obligations for the purpose of any consent or other action or any calculation of Outstanding Bonds or Outstanding Parity Obligations provided for in the articles of the Trust Agreement relating to default and remedies, Supplemental Agreements and release of the Trust Agreement, and neither the District nor any affiliate, subsidiary or controlled affiliate of the District as registered owners of such Bonds or Parity Obligations shall be entitled to consent or take any other action provided for in default and remedies, Supplemental Agreements and release of the Trust Agreement. Notwithstanding the foregoing, Bonds or Parity Obligations owned or held for the account of the District or an or any affiliate or any subsidiary or controlled affiliate of the District shall not be deemed to be paid unless the District delivers, or causes such Bonds or Parity Obligations to be delivered, to the Trustee with the express written instructions of a District Representative directing the Trustee to cancel such Bonds in accordance with the procedures set forth in the Trust Agreement.

“Parity Obligations” means Bonds and VRA Subordinate Obligations.

“Principal and Interest Requirements” for any Fiscal Year means the sum of the Principal Requirements and Interest Requirements for such Fiscal Year.

“Principal Payment Date” means each date described as such in a Series Agreement.

“Principal Requirements” for any Fiscal Year means the amount required to pay the principal of all Parity Obligations coming due in such Fiscal Year.

“Property” means any and all rights, titles and interests in and to any and all property whether real or personal, tangible or intangible and wherever situated.

“Property, Plant and Equipment” means all Property of the District which is property, plant and equipment under generally accepted accounting principles.

“Qualified Escrow Funds” means amounts deposited in a segregated escrow fund, or other similar fund or account, in connection with the issuance of Indebtedness which fund is required by the documents establishing such fund to be applied toward the District’s payment obligations with respect to principal or interest on (a) the Indebtedness secured thereby which is issued under the documents establishing such fund or (b) Indebtedness secured thereby which was issued prior to the establishment of such fund.

“Qualified Reserve Fund Substitute” means (i) an irrevocable letter of credit, naming the Trustee as beneficiary, issued by any domestic or foreign bank, or any branch or agency thereof, whose long-term debt obligations are rated in one of the two highest rating categories by at least two of the Rating Agencies that will rate such obligations, or (ii) a policy of reserve fund insurance naming the Trustee as beneficiary, issued by an insurance company or financial institution whose claims paying ability is rated in one of the two highest rating categories by at least two of the Rating Agencies that rate such obligations, in either case (A) in an amount not less than the Debt Service Reserve Fund Requirement, (B) the terms of which allow the Trustee to make the draws required to fund the Debt Service Reserve Fund if and as required (See “Debt Service Reserve Fund; Qualified Reserve Fund Substitute” in Appendix C) and (C) that provides that the issuer of which has not been given a lien on any portion of the property of the District unless such lien also secures the Bonds on a parity basis.

“Rate Covenant” means the rate covenant of the District set out in the Trust Agreement and described under the caption “—Rate Covenant” in Appendix C hereto.

“Rating Agency” or **“Rating Agencies”** means one or more of Fitch, Moody’s or Standard & Poor’s for so long as it is a nationally recognized statistical rating organization and any new nationally recognized statistical rating organization.

“Senior Bonds” has the meaning given the term “Bonds” by the Senior Trust Agreement.

“Senior Debt Service Reserve Fund” means the Hampton Roads Sanitation District (Virginia) Wastewater Revenue Bonds Debt Service Reserve Fund created and so designated by the Senior Trust Agreement.

“Senior Indebtedness” means Indebtedness secured on a parity with the Senior Bonds under the terms of the Senior Trust Agreement.

“Senior Obligations” means, collectively, Senior Bonds and Senior Indebtedness, and, if the District is required to fund the Senior Debt Service Reserve Fund pursuant to the terms of the Senior Trust Agreement, the District’s funding obligations thereunder.

“Senior Trust Agreement” means that certain trust agreement, dated as of March 1, 2008, as the same may be supplemented and amended from time to time, between the District and The Bank of New York Mellon Trust Company, N.A., as successor Trustee (in such capacity, the **“Senior Trustee”**).

“Series Agreement” means a supplemental trust agreement entered into or the resolution adopted by the Commission providing for the issuance of Bonds or Parity Obligations pursuant to the Trust

Agreement. A Series Agreement will include any Officer's Certificate delivered by a District Representative or Representatives to whom authority has been delegated by the terms of the Series Agreement to provide the details of such Bonds and, for purposes of additional VRA Subordinate Obligations, a Series Agreement will include such resolutions adopted by the Commission or financing agreements authorized thereby specifying the details of such additional VRA Subordinate Obligations.

“Short-Term Indebtedness” means all obligations for borrowed money, other than the current portion of Long-Term Indebtedness, incurred or assumed by the District for any of the following:

- (1) money borrowed for an original term, or renewable at the option of the borrower for a period from the date originally incurred, of one year or less;
- (2) leases which are capitalized in accordance with generally accepted accounting principles having an original term, or renewable at the option of the lessee for a period from the date originally incurred, of one year or less; and
- (3) installment purchase or conditional sale contracts having an original term of one year or less.

“SIFMA Swap Index” means The Securities Industry and Financial Market Association Municipal Swap Index as of the most recent date for which such index was published or such other weekly, high-grade index comprised of seven-day, Tax-Exempt variable rate demand notes published by Bloomberg, or its successor, or otherwise designated by The Securities Industry and Financial Market Association; provided, however, that, if such index is no longer available or its successor, the “SIFMA Swap Index” will mean such other reasonably comparable index selected by the remarketing agent appointed by the District in connection with Variable Rate Indebtedness.

“Supplement” means an agreement, including a Series Agreement, supplemental to, and authorized and executed pursuant to the terms of, the Trust Agreement.

“Tax-Exempt” with reference to Bonds or other Parity Obligations means any Bonds or Parity Obligations so designated in the related Series Agreement.

“Tax Certificate” means a certificate or comparable instrument of the District that contains undertakings of the District with reference to Tax-Exempt Parity Obligations.

“Total Operating Revenues” means, with respect to the District, as to any period of time, as total operating revenues as determined in accordance with generally accepted accounting principles.

“Transition Charge” means any rates, fees, charges or surcharges relating to the Wastewater System or the customers thereof established by irrevocable rate order or other action or instrument, and applicable to or by the District, in conjunction with the issuance of debt or other securities under a separate resolution, indenture or similar instrument (other than the Senior Trust Agreement, the Trust Agreement or other instrument securing Indebtedness secured by revenues of the Wastewater System) to the extent such rates, fees, charges or surcharges are pledged or otherwise encumbered or conveyed as security for such debt or other securities.

“Trust Agreement” means the trust agreement entered into by and between Hampton Roads Sanitation District and The Bank of New York Mellon Trust Company, N.A., as Trustee, dated as of October 1, 2011, as amended and restated as of March 1, 2016, including any Series Agreement and any other trust agreement amendatory thereto or supplemental thereto.

“Variable Rate Indebtedness” means any portion of Indebtedness the interest rate on which is not established at the time of incurrence at a fixed or constant rate until maturity.

“VRA Subordinate Obligations” means the District’s VRA Subordinate Obligations or other evidences of indebtedness heretofore issued, and such additional Parity Obligations issued to VRA payable on a parity with Parity Obligations issued pursuant to the Trust Agreement.

“Wastewater System” means the wastewater treatment system of the District as it may exist at any time and includes all improvements and expansions thereof and additions thereto except as may otherwise be provided by resolution of the Commission.

APPENDIX C

SUMMARY OF CERTAIN PROVISIONS OF THE TRUST AGREEMENT

The following is a brief summary of certain provisions of the Trust Agreement. This summary does not purport to be complete or definitive and qualified in its entirety by reference to the Trust Agreement, a copy of which is available for examination at the offices of the Trustee.

Establishment of Funds

The Trust Agreement provides for an Issuance Fund, a Construction Fund, a Bond Fund, and a Debt Service Reserve Fund. It requires that the money and securities in each Fund be held in trust by the Trustee and applied as provided in the Trust Agreement, and pending such application be subject to a lien and charge in favor of the Holders and for the further security of the Holders until paid or transferred pursuant to the Trust Agreement.

Issuance Fund and Construction Fund

The Trust Agreement also requires that money in the Issuance Fund be applied to the payment of Issuance Costs incurred in connection with the issuance of the Bonds, to be financed from Bonds proceeds. Money in the Construction Fund will be applied to Capital Improvement Program Costs. Unexpended fund balances in the Issuance Fund and the Construction Fund will be applied as provided in the applicable Series Agreement. The Series Agreement for the Series 2019A Bonds provides any such unexpended fund balances are to be applied as directed by the District.

The District may, in any Series Agreement, create Subfunds within the Issuance Fund and the Construction Fund.

Bond Fund

The District will make payments directly to the Trustee for deposit in the Bond Fund in amounts sufficient to pay in full, when due, all Bonds issued under the Trust Agreement, together with the interest thereon. In the event the balance in the Bond Fund is insufficient for such purposes, upon notification by the Trustee, the District is to deliver to the Trustee an amount sufficient to cure the same. If such amount is insufficient, the Trustee is required to transfer to the Bond Fund the amount necessary to remedy the deficiency from the Debt Service Reserve Fund. Each such payment shall be made only in the event and to the extent that, as of the date of such payment, the District shall have paid to the Senior Trustee for the account of the Senior Bond Fund all amounts attributable to the principal of and interest on any outstanding Senior Obligations due and owing thereon, plus any amounts required to be deposited to the credit of the Senior Debt Service Reserve Fund in accordance with the terms of the Senior Trust Agreement, as of such date.

Debt Service Reserve Fund; Qualified Reserve Fund Substitute

No funds will be deposited to the credit of the Debt Service Reserve Fund upon the delivery of the Series 2019A Bonds. If the District elects to fund the Debt Service Reserve Fund, then an amount equal to the Debt Service Reserve Fund Requirement, as the same shall be specified in a Supplemental Agreement, shall be deposited to the Debt Service Reserve Fund Requirement.

The Trustee will use amounts in the Debt Service Reserve Fund to make transfers to the Bond Fund to the extent necessary to pay interest on and principal of the Bonds, whenever and to the extent that

the money on deposit in the Bond Fund is insufficient for such purposes and the District has failed to cure such deficiency.

The District may, at any time, deliver to the Trustee a Qualified Reserve Fund Substitute. In such event, if the District also delivers to the Trustee a written statement setting forth the use of the cash and Investment Obligations then on deposit to the credit of the Debt Service Reserve Fund, accompanied by an Opinion of Bond Counsel to the District, addressed to the Trustee, to the effect that such proposed use will not cause the interest on the Tax-Exempt Bonds to be includable in the gross income of the owners thereof for purposes of federal income taxation, the Trustee is to transfer to the District all amounts on deposit to the credit of the Debt Service Reserve Fund. If any Qualified Reserve Fund Substitute is in effect, the Trustee is to give such notices and execute such documents as required to assure that funds (i) are available in such amounts and at such times to assure timely payment of principal of and interest on the Bonds and (ii) are drawn to fund the Debt Service Reserve Fund in an amount equal to the Debt Service Reserve Fund Requirement at least six months prior to the expiration date of the Qualified Reserve Fund Substitute unless (a) the Trustee has received a substitute Qualified Reserve Fund Substitute to replace such expiring Qualified Reserve Fund Substitute or (b) the expiration date of the expiring Qualified Reserve Fund Substitute is no earlier than the final stated maturity date of the Bonds.

Payment of Principal and Interest

The District will cause to be paid, when due, the principal of (whether at maturity, by acceleration or otherwise) and interest on the Bonds at the places, on the dates and in the manner provided in the Trust Agreement and in said Bonds; provided that it is understood that the Bonds are not general obligations of the District but are special obligations and are payable solely from Net Revenues Available for Debt Service derived by the District from its Wastewater System and the money attributable to proceeds of Bonds and the income from the investment thereof and not from any other fund or source. To secure the prompt payment of the principal of, redemption premium, if any, and the interest on the Senior Obligations and the performance by the District of its other obligations under the Trust Agreement, the District grants to the Trustee a security interest in its Net Revenues Available for Debt Service.

Investment of Money

Money held for the credit of all funds and accounts created under the Trust Agreement is to be continuously invested and reinvested by the Trustee in Investment Obligations, to the extent practicable in accordance with the instructions of a District Representative, subject to the yield restrictions set forth in the Tax Certificate. The Trust Agreement requires that any Investment Obligations mature not later than the respective dates when the money held for the credit of such funds or accounts will be required for the purposes intended; provided, however, that Investment Obligations deposited in the Debt Service Reserve Fund mature no later than the final maturity date of the Bonds secured by the Debt Service Reserve Fund.

Unless a Qualified Reserve Fund Substitute is in effect, the District is to reimburse the Debt Service Reserve Fund for any loss resulting from a decline in the value of Investment Obligations in which money held for the credit of the Debt Service Reserve Fund is invested if on any date of valuation the amount on deposit in the Debt Service Reserve Fund is less than the Debt Service Reserve Fund Requirement.

Investment Obligations acquired with money and credited to any fund or account established under the Trust Agreement are required to be held by or under the control of the Trustee and will be deemed at all times to be part of such fund or account in which such money was originally held. Interest accruing on such Investment Obligation and any profit or loss realized upon the disposition or maturity of such investment will be credited to or charged against such fund or account. The Trustee is required to

sell at the best price attainable or reduce to cash a sufficient amount of such Investment Obligations whenever it is necessary to provide money to make any payment or transfer of money from any such fund or account. The Trustee will not be liable or responsible for any loss resulting from any such investment.

Valuation

For the purpose of determining the amount on deposit in any fund or account, Investment Obligations in which money in such fund or account is invested are to be valued (a) if such Investment Obligations mature, or are subject to redemption at the option of the holder thereof, within five years or less from the date of valuation thereof, such Investment Obligations are to be valued at amortized cost, and (b) if such Investment Obligations mature, or are subject to redemption at the option of the holder thereof, more than five years from the date of valuation thereof, such Investment Obligations are to be valued at the market value or the amortized cost thereof, whichever is lower.

The Trustee will value the Investment Obligations in the funds and accounts five Business Days prior to each Interest Payment Date. In addition, subject to prior notice, the Investment Obligations will be valued by the Trustee at any time requested by the District Representative, but not more than once in any calendar month other than as provided in the Trust Agreement.

Limitations on Indebtedness

The District may issue Additional Bonds or incur other Parity Obligations, provided that, after giving effect to all other Indebtedness incurred by the District, such Additional Bonds or other Parity Obligations are incurred only in the manner and pursuant to the terms set forth below provided, however, that VRA Senior Obligations may become VRA Subordinate Obligations without limitation:

(a) Long-Term Indebtedness may be incurred if, prior to incurrence of the Long-Term Indebtedness, there is delivered to the Trustee:

(i) an Officer's Certificate of a District Representative certifying that the Long-Term Debt Service Coverage Ratio for the most recent period of twelve (12) full consecutive calendar months preceding the date of delivery of the certificate of the District Representative for which there are Financial Statements available, adjusted for revenues and expenses resulting from anticipated new customers and any planned program of rate increases that has been approved by the Commission, taking all Long-Term Indebtedness incurred after such period and the proposed Long-Term Indebtedness into account as if such Long-Term Indebtedness had been incurred at the beginning of such period, is not less than 120%;

(ii) an Officer's Certificate of a District Representative certifying that the District is expected to comply with the Rate Covenant set forth in the Trust Agreement for the five Fiscal Years following the date of issuance of the proposed Long-Term Indebtedness. Such certificate is to be accompanied by a statement of the relevant assumptions upon which such pro forma Financial Statements for the District are based, including but not limited to, adjustments to revenues and expenses resulting from anticipated new customers and any planned program of rate increases that has been approved by the Commission;

(iii) if the Long-Term Indebtedness is authorized for any purpose other than the refunding of the outstanding Senior Obligations or Outstanding Parity Obligations, an Officer's Certificate of a District Representative to the effect, and to the extent applicable, that in his or her opinion (a) the improvements or property to which the proceeds from the issuance of the Long-Term Indebtedness are to be applied will be a part of the Wastewater System, (b) the proceeds of

the Long-Term Indebtedness and other specified sources will be sufficient to pay the estimated cost of such improvements or property, (c) the period of time that will be required to complete such improvements or acquire such property, and (d)(1) the proceeds of the Long-Term Indebtedness are necessary to complete the project to be financed thereby, (2) the failure to make such improvements or acquire or construct such property will result in an interruption or reduction of Net Revenues, or (3) during the first two Fiscal Years following the completion of the improvements or the acquisition of the property, the projected Net Revenues will satisfy the Rate Covenant described below. In providing this certificate, the District Representative may take into consideration future Wastewater System rate increases, provided that such rate increases have been duly approved by the Commission and any other person and entity required to give approval for the rate increase to become effective. In addition, he or she may take into consideration additional future revenues of the Wastewater System to be derived under then existing contractual agreements entered into by the District and from reasonable estimates of growth in the customer base of the District; or

(iv) an Officer's Certificate of a District Representative certifying compliance with the Rate Covenant set forth in the Trust Agreement for the most recent period of 12 full consecutive calendar months for which there are Financial Statements available preceding the date of delivery of the certificate.

(b) Long-Term Indebtedness may be incurred for the purpose of refunding Outstanding Long-Term Indebtedness if, either (i) a certificate of an independent financial advisor to the effect that, the Long-Term Indebtedness issued to refund outstanding Senior Obligations or Outstanding Parity Obligations will have, in the aggregate, a lower Long-Term Debt Service Requirement than the Long-Term Debt Service Requirement on the Senior Obligations or Outstanding Parity Obligations to be refunded with the proceeds thereof, or (ii) an Officer's Certificate of a District Representative to the effect that during the first two complete Fiscal Years following the issuance of the refunding Long-Term Indebtedness, the projected Net Revenues will satisfy the Rate Covenant described under the heading "—Rate Covenant" below. In providing the certificate described in clause (b), the Officer's Certificate may take into account the factors described in the last two sentences of subsection (a)(iii) of this Section. In addition, the Trustee shall receive an Opinion of Counsel stating that upon the incurrence of such proposed Long-Term Indebtedness and application of the proceeds thereof (on the Cross-over Date, in the case of Cross-over Refunding Indebtedness), the Outstanding Long-Term Indebtedness to be refunded thereby will no longer be Outstanding.

(c) Short-Term Indebtedness may be incurred as a Parity Obligation subject to the same tests that apply to the incurrence of Parity Obligations generally; provided, however, that notwithstanding such limitation, the District may incur as a Parity Obligation from time to time and have outstanding at any one time Short-Term Indebtedness in an amount up to 10% of its Total Operating Revenues as reflected in the Financial Statements of the District for the most recent period of twelve consecutive months for which Financial Statements are available, and provided, further, that the District may incur Short-Term Indebtedness secured by a Credit Facility without limitation. Short-Term Indebtedness may be incurred as Junior Obligations without compliance with the tests that apply to the incurrence of Parity Obligations.

(d) Additional VRA Subordinate Obligations may be incurred by the District subject to the delivery of an Officer's Certificate of a District Representative demonstrating compliance with the incurrence test for the issuance of Long-Term Indebtedness described above in paragraphs (a) or (b) above and the Rate Covenant described below, *provided, however*, anything in the Trust Agreement notwithstanding, the District may make such additional covenants in a supplemental resolution, financing agreement or other agreement authorizing and securing a VRA Subordinate Obligations as may be required by VRA as a condition of selling such VRA Subordinate Obligations.

(e) Junior Obligations may be incurred without limitation.

(f) For purposes of demonstrating compliance with the incurrence test for the issuance of Long-Term Indebtedness described above in paragraph (a), the District may (but is not required to) elect in the applicable Series Agreement to treat all or any Parity Obligations authorized in a Credit Facility (including, for example and without limitation, a self-liquidity arrangement provided by the District, a line of credit or a liquidity facility supporting a commercial paper program), but not immediately issued or incurred under such Credit Facility, as subject to such incurrence test as of a single date, notwithstanding that none, or less than all, of the authorized principal amount of such Parity Obligations have been issued or incurred as of such date.

(g) Notwithstanding the foregoing provisions regarding limitations on Indebtedness described above, nothing contained in the Trust Agreement will preclude the District from incurring any obligation under a Credit Facility.

Rate Covenant

(a) The District has covenanted and agreed in the Trust Agreement that it will fix and collect rates, fees and other charges for the use of and for services furnished or to be furnished by the Wastewater System, and will from time to time revise such rates, fees and other charges so that in each Fiscal Year the Net Revenues will equal at least 120% of the sum of (a) the Principal and Interest Requirements (as defined in the Senior Trust Agreement on Senior Obligations and (b) the Principal and Interest Requirements. If, for any reason, the Net Revenues are insufficient to satisfy the foregoing covenant, the District shall within one hundred twenty (120) days adjust and increase its rates, fees and other charges (to the extent permitted by the Enabling Act), or reduce its operating and maintenance expenses so as to provide sufficient Net Revenues to satisfy such requirement.

(b) If at any time the District fails to comply with its Rate Covenant described in paragraph (a) above, the District is to immediately notify the Trustee, such notice also containing an Officer's Certificate of a District Representative as to (i) the amount of the deficiency in Net Revenues which existed for the applicable period and the rates, fees and other charges which must be established by the District to cure such deficiency, and (ii) during the Fiscal Year in which the certificate is delivered, the projected Net Revenues will satisfy the Rate Covenant made by the District and described in paragraph (a) above, or, if not, the rates, fees and other charges the District must establish to satisfy such rate covenant. In addition, the District agrees, to the extent permitted by law, to take appropriate action to increase its rates, fees and other charges or reduce its operating and maintenance expenses to cure any deficiency.

(c) On or before the last day of each Fiscal Year, the District will review the adequacy of its rates, fees and other charges for the next Fiscal Year, and, if such review indicates the District's rates, fees and other charges are insufficient to satisfy the Rate Covenant described in paragraph (a) above, the District is to promptly take appropriate action to increase its rates, fees and other charges or reduce its operating and maintenance expenses to cure any deficiency.

Limitation on Creation of Liens

The District agrees that it will not create or permit the existence of any Lien on its Property or upon its Net Revenues other than Permitted Liens.

“Permitted Liens” consist of the following:

(a) Liens arising by reason of good faith deposits with the District in connection with leases of real estate, bids or contracts (other than contracts for the payment of money), deposits by the District to secure public or statutory obligations, or to secure, or in lieu of, surety, stay or appeal bonds, and deposits as security for the payment of taxes or assessments or other similar charges;

(b) Any Lien arising by reason of deposits with, or the giving of any form of security to, any governmental agency or any body created or approved by law or governmental regulation as a condition to the transaction of any business or the exercise of any privilege or license, or to enable the District to maintain self-insurance or to participate in any funds established to cover any insurance risks or in connection with any workers' compensation, unemployment insurance, pension or profit sharing plans or other social security, or to share in the privileges or benefits required for companies participating in such arrangements;

(c) Any judgment lien against the District so long as such judgment is being contested in good faith and execution thereon is stayed;

(d) (i) Rights reserved to or vested in any municipality or public authority by the terms of any right, power, franchise, grant, license, permit or provision of law, affecting any Property; (ii) any liens on any Property for taxes, assessments, levies, fees, water and sewer rents, and other governmental and similar charges and any liens of mechanics, materialmen, laborers, suppliers or vendors for work or services performed or materials furnished in connection with such Property, which are not due and payable or which are not delinquent or which, or the amount or validity of which, are being contested and execution thereon is stayed or, with respect to liens of mechanics, materialmen, laborers, suppliers or vendors, have been due for less than 90 days; (iii) easements, rights-of-way, servitudes, restrictions, oil, gas or other mineral reservations and other minor defects, encumbrances, and irregularities in the title to any Property which do not materially impair the use of such Property or materially and adversely affect the value thereof; (iv) to the extent that it affects title to any Property, the Trust Agreement; and (v) landlord's liens;

(e) Any Lien that was existing on the date of authentication and delivery of the Series 2011 Bonds issued under the Trust Agreement; provided that no such Lien may be increased, extended, renewed or modified to apply to any Property of the District not subject to such Lien on such date or to secure Indebtedness not Outstanding on the date of issuance of the Series 2011 Bonds, unless such Lien as so extended, renewed or modified otherwise qualifies as a Permitted Lien under the Trust Agreement;

(f) Any lien on pledges, gifts or grants to be received in the future, including any income derived from the investment thereof;

(g) The Lien of the Senior Trust Agreement;

(h) Any Lien securing Parity Obligations on a parity basis;

(i) Any Liens on Property received by the District through gifts, grants or bequests, such liens being due to restrictions on such gifts, grants or bequests of Property or the income thereon;

(j) Any Lien on moveable equipment securing Indebtedness incurred to purchase such moveable equipment, provided that the total of such Indebtedness does not exceed 15% of

the Net Book Value of the Property, Plant and Equipment of the District as shown on the Financial Statements for the prior Fiscal Year; and

(k) Any Lien on Net Revenues securing Junior Indebtedness; provided that such lien is expressly subordinate and junior to the Lien on Net Revenues Available for Debt Service granted to the Trustee for the payment of principal of, redemption premium, if any, and the interest on the Parity Obligations and to secure the prompt payment of the and the performance by the District of its other obligations under the Trust Agreement.

Designation of Funds

No later than the last Business Day of each month, the District will specifically earmark cash, cash equivalents or marketable securities or any combination thereof in an amount equal to the interest on and the principal of Bonds that will accrue in the next month, taking into account any scheduled maturities of interest or principal scheduled to become due and payable in such month and the funds theretofore earmarked for such purpose. The District may assume that both interest and principal accrue daily from the prior payment date or date of issuance but not more than 12 months prior to a payment date.

Maintenance of Properties

The District covenants in the Trust Agreement:

(a) to cause its Property to be maintained, preserved and kept in good repair, working order and condition and all needed and proper repairs, renewals and replacements thereof to be made; provided, however, that nothing described in this paragraph (a) will be construed to (i) prevent it from ceasing to operate any portion of its Property, if in its judgment (supported, in the case of such a cessation other than in the ordinary course of business by an opinion or certificate of an Independent Consultant) it is advisable not to operate the same, or if it intends to sell or otherwise dispose of the same and within a reasonable time endeavors to effect such sale or other disposition, or (ii) obligate it to retain, preserve, repair, renew or replace any Property, leases, rights, privileges or licenses no longer used or, in the judgment of the Commission, useful in the conduct of its business;

(b) To do all things reasonably necessary to conduct its affairs and carry on its business and operations in such manner as to comply with any and all applicable laws of the United States and the Commonwealth of Virginia and duly observe and conform to all valid orders, regulations or requirements of any governmental authority relative to the conduct of its business and the ownership of its Properties; provided, nevertheless, that nothing contained in the Trust Agreement requires it to comply with, observe and conform to any such law, order, regulation or requirement of any governmental authority so long as the validity thereof or the applicability thereof to it is contested in good faith;

(c) To pay promptly all lawful taxes, governmental charges and assessments at any time levied or assessed upon or against it or its Property; provided, however, that it will have the right to contest in good faith any such taxes, charges or assessments or the collection of any such sums and pending such contest may delay or defer payment thereof;

(d) To pay promptly or otherwise satisfy and discharge all of its Indebtedness and all demands and claims against it as and when the same become due and payable, other than any

thereof (exclusive of the Indebtedness created and Outstanding under the Trust Agreement) whose validity, amount or collectability is being contested in good faith;

(e) At all times to comply with all terms, covenants and provisions of any Liens at such time existing upon its Property or any part thereof or securing any of its Indebtedness; and

(f) To procure and maintain all necessary licenses and permits for the operation of its Wastewater System;

provided, however, that it need not comply with the covenants described in this section if and to the extent that the Commission determines in good faith, evidenced by a resolution of the Commission, that such compliance is not in its best interests and that lack of such compliance would not materially impair its ability to pay its Indebtedness when due.

Insurance

(a) The District agrees that it will maintain, or cause to be maintained, the following types of insurance, subject to the provisions described in subsection (b) below, in such amounts as, in its judgment, are adequate to protect it and its Property and operations from material financial loss: (i) comprehensive general liability insurance, and (ii) property coverage on an “all risk” basis.

(b) If the District is self-insured (excluding deductibles) for any coverage described in (a) above, the District is to provide the Trustee a report of an Independent Insurance Consultant selected by the District not less than every three years, which report is to state whether the anticipated funding of any self-insurance fund is sufficient, and if not, the required funding to obtain such result, and any such self-insurance coverage will be reviewed by the Independent Insurance Consultant not less frequently than annually. If the Independent Insurance Consultant determines in any such report that the anticipated funding of any self-insurance fund is not sufficient, the District covenants that it will undertake to fund such self-insurance fund in the manner recommended by the Independent Insurance Consultant.

Insurance and Condemnation Proceeds

(a) Amounts that do not exceed 20% of the Net Book Value of the Property, Plant and Equipment of the District received by the District as insurance proceeds with respect to any casualty loss or as condemnation awards may be used in such manner as the District may determine, including, without limitation, applying such money to the partial payment or prepayment of any Indebtedness in accordance with the terms thereof and of any pertinent Supplement.

(b) Amounts that exceed 20% of the Net Book Value of the Property, Plant and Equipment received by the District as insurance proceeds with respect to any casualty loss or as condemnation awards will be applied in such manner as the District may determine; provided, however, that the District is to notify the Trustee and within 12 months after the casualty loss or taking, deliver to the Trustee a report of an Independent Consultant stating the Independent Consultant’s recommendations, including recommendations as to the use of such proceeds or awards, to cause the Long-Term Debt Service Coverage Ratio for each of the two periods of 12 full consecutive calendar months following the date on which such proceeds or awards are expected to have been fully applied to be not less than 120%, or, if in the opinion of the Independent Consultant the attainment of such level is impracticable, at the highest practicable level.

Annual Budget

The District covenants that on or before the first day of the last month preceding the beginning of each Fiscal Year the Commission will adopt a budget of operating and non-operating revenues and expenses for the ensuing Fiscal Year.

Senior Trust Agreement

The District covenants to observe the covenants of the Commission contained in the Senior Trust Agreement, which are expressly incorporated by reference by the Trust Agreement until there shall be no outstanding Senior Obligations. To the extent the covenants in the Trust Agreement and the covenants contained in the Senior Trust Agreement conflict, for so long as there shall be any outstanding Senior Obligations, the provisions of the covenants contained in the Senior Trust Agreement shall control.

Events of Default

Events of Default under the Trust Agreement are as follows: (a) payment of the purchase price of any Bond shall not be made by the District when the same shall become due and payable; or (b) payment of any installment of interest on any Bond is not made by the District when the same becomes due and payable; or (c) payment of the principal of any Bond is not made by the District when the same becomes due and payable, whether at maturity or by acceleration or otherwise; or (d) default in the due and punctual performance of any other of the covenants, conditions, agreements and provisions contained in the Trust Agreement or any Supplement to the Trust Agreement, including any covenant, condition, agreement or provision in the Trust Agreement applicable to the District and incorporated by reference in the Trust Agreement, and such default continues for 30 days after receipt by the District of a written notice from the Trustee specifying such default and requiring the same to be remedied; provided, however, if prior to the expiration of such 30 day period the District institutes action reasonably designed to cure such default, no Event of Default is to be deemed to have occurred upon the expiration of such 30-day period for so long as the District pursues such curative action with reasonable diligence and provided that such curative action can be completed within a reasonable time.

Remedies for Default

Upon the happening and continuance of an Event of Default, the Trustee may take whatever action at law or in equity is necessary or desirable (i) in the case of an Event of Default specified in (a), (b) or (c) in the immediately preceding paragraph, to collect the payments of interest installments or principal then due under the Trust Agreement or the Bonds, or (ii) in the case of an Event of Default specified in (d) in the immediately preceding paragraph, to enforce performance, observance or compliance by the District with any covenant, condition, agreement or provision under the Trust Agreement.

Upon the happening and continuance of an Event of Default, the Trustee may, and upon the written request of the Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding is required to, by notice in writing to the District, declare the principal of all Bonds then Outstanding (if not then due and payable) to be due and payable immediately.

However, if at any time after the principal of Bonds has been declared to be due and payable, and before the entry of final judgment or decree in any suit, action or proceeding instituted on account of such default, or before the completion of the enforcement of any other remedy under the Trust Agreement, (i) money has accumulated in or has been paid into the Bond Fund sufficient to pay the principal of all matured Bonds and all arrears of interest, if any, upon all Bonds then Outstanding (except the principal of

any Bond not then due and payable by its terms and the interest accrued on such Bond since the last Interest Payment Date), and the charges, compensations, expenses, disbursements, advances and liabilities of the Trustee and (ii) all amounts then payable by the District under the Trust Agreement have been paid or a sum sufficient to pay the same has been deposited with the Trustee, and (iii) every other default known to the Trustee in the observance or performance of any covenant, condition or agreement contained in the Bonds or in the Trust Agreement (other than a default in the payment of the principal of such Bonds then due only because of a declaration of acceleration of maturities) has been remedied to the satisfaction of the Trustee, then the Trustee may, and upon the written request of the Holders of not less than a majority in aggregate principal amount of Bonds not then due and payable by their terms (Bonds then due and payable only because of a declaration of acceleration will not be deemed to be due and payable by their terms) and then Outstanding is required to, by written notice to the District, rescind and annul such declaration and its consequences, but no such rescission or annulment will extend to or affect any subsequent Event of Default or impair any right consequent thereon.

Upon the happening and continuance of an Event of Default, the Trustee may, and upon the written request of the Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding, and upon satisfactory indemnification, is required to, proceed either at equity or at law, or by proceedings in the office of any board or officer having jurisdiction to protect and enforce its rights and the rights of the Holders under the laws of the Commonwealth of Virginia or under the Trust Agreement as the Trustee, being advised by counsel chosen by the Trustee, deems most effectual to protect and enforce such rights. The Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding, upon indemnification satisfactory to the Trustee, have the right to direct the method and place of all remedial proceedings to be taken by the Trustee, provided that such direction is in accordance with law and the provisions of the Trust Agreement.

Restrictions upon Actions by Individual Holders

Except for the right of any Holder to enforce the payment of the principal of and interest on such Holder's Bond, no Holder will have any right to institute any suit, action or proceeding in equity or at law on any Bond or for the execution of any trust under the Trust Agreement or for any other remedy under the Trust Agreement unless (a) such Holder previously has given to the Trustee written notice of the particular Event of Default, (b) also the Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding have made a request of the Trustee after the right to exercise such powers or right of action has accrued, and such Holder has afforded the Trustee a reasonable opportunity either to proceed to exercise the powers granted in the Trust Agreement or to institute such action, suit or proceedings in its or their name, and (c) there has been offered to the Trustee reasonable security and indemnity against the costs, expenses and liabilities (including attorney's fees, costs and expenses to be incurred therein or thereby, and the Trustee has refused or neglected to comply with such request within a reasonable time. Notwithstanding the foregoing provisions and without complying therewith, the Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding may institute any such suit, action or proceeding in their own names for the benefits of all Holders of the Bonds.

Notice of Default to Holders

The Trustee is required to give written notice to all Holders of the occurrence of any Event of Default within 30 days after the Trustee has actual notice thereof, provided, however, except upon the occurrence of an Event of Default due to failure by the District to make payments of any installment of interest on or principal or purchase price of any Bond when the same become due and payable within 30 days after the Trustee received notice of the same, the Trustee may withhold such notice to the Holders if in its opinion such withholding is in the interest of the Holders.

Pro-Rata Application of Funds

Notwithstanding anything in the Trust Agreement to the contrary, if at any time the money in the Bond Fund is not sufficient to pay the interest on or the principal of Bonds as the same become due and payable (either by their terms or by acceleration of maturities under the provisions of the Trust Agreement), such money, together with any money then available or thereafter becoming available for such purpose, is to be applied, subject to the compensation and indemnification to the Trustee and Bond Registrar, as follows:

(a) if the principal of all Bonds has not become or has not been declared due and payable, all such money in the Bond Fund is to be applied:

first: to the payment to the persons entitled thereto of all installments of interest on Bonds then due and payable in the order in which such installments became due and payable and, if the amount available is not sufficient to pay in full any particular installment, then to the payment, ratably according to the amounts due on such installment, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in such Bonds;

second: to the payment to the persons entitled thereto of the unpaid principal of any Bonds that have become due and payable (other than Bonds called for redemption for the payment of which money is held pursuant to the provisions of the Trust Agreement), in the order of their due dates, and, if the amount available is not sufficient to pay in full the principal of Bonds due and payable on any particular date, then to the payment ratably according to the amount of such principal due on such date, to the persons entitled thereto without any discrimination or preference; and

third: to the payment of the interest on and the principal of Bonds, to the purchase and retirement of Bonds due to the redemption of Bonds in accordance with the Trust Agreement and the applicable Series Agreement.

(b) If the principal of all Bonds has become or has been declared due and payable, all such money is to be applied to the payment of principal and interest then due upon the Bonds without preference to the persons entitled thereto, without preference or priority of principal over interest or interest over principal, or of any installment of interest over any other installment of interest or any Bond over any other Bond ratably, according to the amounts due respectively for principal and interest, to the persons entitled thereto, without any discrimination or preference.

(c) If the principal of all Bonds has been declared due and payable and if such declaration is thereafter rescinded and annulled due to the remediation of an Event of Default, then, subject to the provisions described in paragraph (b) of this section, in the event that the principal of all Bonds later becomes due and payable or is declared due and payable, the money then remaining in and thereafter accruing to the Bond Fund is to be applied in accordance with the provisions described in paragraph (a) above.

Subordination

Notwithstanding any other provision of the Trust Agreement to the contrary:

(a) In the event of any insolvency or bankruptcy proceedings, and any receivership, liquidation, reorganization or other similar proceedings in connection therewith, relative to the

District, as such, or to its property, and in the event of any proceedings for voluntary liquidation, dissolution or other winding up of the District, whether or not involving insolvency or bankruptcy, the holders of all Senior Obligations then outstanding shall be entitled to receive payment in full of all principal and interest due on all such Senior Obligations in accordance with the provisions of Senior Trust Agreement and the resolutions or other instruments authorizing their issuance before the Trustee and the Holders of the Parity Obligations are entitled to receive any payment from the Net Revenues Available for Debt Service or other money pledged to the Parity Obligations on account of principal (and premium, if any) or interest upon the Parity Obligations.

(b) In the event that the Parity Obligations are declared due and payable before their stated maturity because of the occurrence of an Event of Default (under circumstances when the provisions described in paragraph (a) above are not applicable), the holders of all Senior Obligations outstanding at the time the Parity Obligations become due and payable because of such occurrence of such an Event of Default shall be entitled to receive payment in full of all principal and interest on all such Senior Obligations before the Holders of the Parity Obligations are entitled to receive any accelerated payment from the Net Revenues Available for Debt Service and other money pledged to the Parity Obligations of principal (and premium, if any) or interest upon the Parity Obligations.

(c) If any event of default with respect to the Senior Obligations shall have occurred and be continuing (under circumstances when the provisions described in paragraph (a) above are not applicable), the holders of all such Senior Obligations then outstanding shall be entitled to receive payment in full of all principal and interest on all such Senior Obligations as the same become due and payable before the Holders of the Parity Obligations are entitled to receive, subject to the provisions of paragraph (e) below, any payment from the Net Revenues Available for Debt Service and other money pledged to the Parity Obligations under the Trust Agreement of principal (and premium, if any) or interest upon the Parity Obligations.

(d) No holder of Senior Obligations shall be prejudiced in his right to enforce subordination of the Parity Obligations by any act or failure to act on the part of the District.

(e) The provisions described in paragraphs (a), (b), (c) and (d) above are solely for the purpose of defining the relative rights of the holders of the Senior Obligations on the one hand, and the Holders of Parity Obligations on the other hand, and nothing in the Trust Agreement is to impair, as between the District and the Holders of the Parity Obligations, the obligation of the District, which shall be unconditional and absolute, to pay to the Holders of the Parity Obligations the principal thereof and premium, if any, and interest on the Parity Obligations, respectively, in accordance with their terms, nor shall anything in the Trust Agreement prevent the Holders of the Parity Obligations from exercising all remedies otherwise permitted by applicable law or thereunder upon default thereunder, subject to the rights described in paragraphs (a), (b), (c) and (d) above of the holders of the Senior Obligations to receive cash, property or securities from the Net Revenues and other money pledged to such Senior Obligations otherwise payable or deliverable to the Holders of the Parity Obligations; and insofar as the Bond Registrar, Depository or Trustee is concerned, the foregoing provisions shall not prevent the application of any money deposited with the Bond Registrar, Depository or Trustee for the purpose of the payment of or on account of the principal (and premium, if any) and interest on the Parity Obligations if it did not have written notice or actual knowledge at the time of such application that such payment was prohibited by the foregoing provisions.

Supplemental Trust Agreements without Consent of Holders

The District and the Trustee may without the consent of or notice to any of the Holders, enter into agreements supplemental to the Trust Agreement as are substantially consistent with the terms and provisions of the Trust Agreement:

- (a) to cure any ambiguity or formal defect or omission, to correct or supplement any provision of the Trust Agreement that may be inconsistent with any other provision of the Trust Agreement, to make any other provisions with respect to matters or questions arising under the Trust Agreement, or to modify, alter, amend, add to or rescind, in any particular, any of the terms or provisions contained in the Trust Agreement, or
- (b) to grant to or confer upon the Trustee for the benefit of the Holders any additional rights, remedies, powers, authority or security that may lawfully be granted to or conferred upon the Holders or the Trustee, or
- (c) to add to the provisions of the Trust Agreement other conditions, limitations and restrictions thereafter to be observed, or
- (d) to add to the covenants and agreements of the District in the Trust Agreement other covenants and agreements thereafter to be observed by the District or to surrender any right or power reserved in the Trust Agreement to or conferred upon the District, or
- (e) to permit the qualification of the Trust Agreement under any federal statute now or hereafter in effect or under any state Blue Sky law, and, in connection therewith, if the District so determines, to add to the Trust Agreement or any supplemental trust agreement such other terms, conditions and provisions as may be permitted or required by such federal statute or Blue Sky law, or
- (f) to provide for the issuance of Bonds under a book-entry system, or
- (g) to make any other change in the Trust Agreement that, in the judgment of the District, expressed in a resolution of the Commission, and the Trustee, each of which may rely upon a written Opinion of Counsel, will not materially and adversely affect the Holders of the Bonds of each series that will be affected by such supplement.

Modification of Trust Agreement with Consent of Holders

The Holders of not less than a majority of the aggregate principal amount of Bonds then Outstanding will have the right to consent to and approve the execution and delivery by the District and the acceptance by the Trustee of such trust agreement or trust agreements supplemental to the Trust Agreement as deemed necessary or desirable by the District for the purpose of modifying, altering, amending, adding to or rescinding, in any particular, the Trust Agreement; provided, however, that nothing contained in the Trust Agreement will permit, or be construed as permitting (a) an extension of the maturity of the principal of or the interest on any Bonds issued under the Trust Agreement without the consent of the Holders of such Bonds, or (b) a reduction in the principal amount of any Bonds or the rate of interest thereon without the consent of the Holders of such Bonds, or (c) the creation of a pledge of receipts and revenues superior to the pledge created by the Trust Agreement without the consent of the Holders of all Bonds Outstanding, or (d) a preference or priority of any Bond over any other Bond without the consent of the Holders of all Bonds Outstanding, or (e) a reduction in the aggregate principal

amount of Bonds required for consent to such supplemental trust agreement without the consent of the Holders of all Bonds Outstanding.

If the District requests the Trustee to enter into any supplemental trust agreement described in the immediately preceding paragraph, the Trustee will cause notice of the proposed supplemental trust agreement to be mailed to all Holders. If the Holders of not less than a majority in aggregate principal amount of Bonds Outstanding at the time of the execution of such supplemental trust agreement have consented to and approved the execution, no Holder will have any right to object to the adoption of such supplemental trust agreement.

Defeasance

(a) When the Bonds become due and payable and the whole amount of the principal and the interest so due and payable upon all Bonds is required to be paid, and (b) if the Bonds have not become due and payable, the Trustee or the Bond Registrar holds, sufficient money or Defeasance Obligations, or a combination of money and Defeasance Obligations, the principal of and the interest on which, when due and payable, will provide sufficient money to pay the principal of, and the interest on, all Bonds then Outstanding to the maturity date or dates of such Bonds and (c) sufficient funds also have been provided or provision has been made for paying all other obligations payable under the Trust Agreement by the District, then and in that case the right, title and interest of the Trustee in the funds and accounts mentioned in the Trust Agreement will thereupon cease, determine and become void and, on demand of the District and upon being furnished with an opinion, satisfactory to the Trustee, of counsel approved by the Trustee, to the effect that all conditions precedent to the release of the Trust Agreement have been satisfied, the Trustee will release the Trust Agreement and will execute such documents to evidence such release as may reasonably be required by the District and will turn over to the District any surplus in, and all balances remaining in, all funds and accounts.

Otherwise, the Trust Agreement will continue to be and remain in full force and effect; provided, that, in the event Defeasance Obligations are deposited with and held by the Trustee or the Bond Registrar as provided for above, (i) the Trustee will nevertheless retain such rights, powers and privileges under the Trust Agreement as may be necessary and convenient in respect of the Bonds for the payment of the principal and interest for which such Defeasance Obligations have been deposited, and (ii) the Bond Registrar will retain such rights, powers and privileges under the Trust Agreement as may be necessary and convenient for the registration, transfer and exchange of Bonds.

Release of Seventh Supplemental Trust Agreement

When (a) the Series 2019A Bonds have become due and payable in accordance with their terms or otherwise as provided in the Seventh Supplemental Trust Agreement, the whole amount of the principal and the interest so due and payable upon all Series 2019A Bonds is paid, (b) if the Series 2019A Bonds have not become due and payable in accordance with their terms, the Trustee or the Bond Registrar holds, sufficient money or Defeasance Obligations, or a combination of money and Defeasance Obligations, the principal of and the interest on which, when due and payable, will provide sufficient money to pay the principal of, and the interest on, all Series 2019A Bonds then Outstanding to the maturity date or dates of such Series 2019A Bonds and (c) sufficient funds also have been provided or provision made for paying all other obligations payable under the Seventh Supplemental Trust Agreement by the District, then and in that case the right, title and interest of the Trustee in the funds and accounts mentioned in the Seventh Supplemental Trust Agreement will thereupon cease, determine and become void and, on demand of the District and upon being furnished with an opinion, in form and substance satisfactory to the Trustee, of Bond Counsel, to the effect that all conditions precedent to the release of the Seventh Supplemental Trust Agreement and the defeasance of the Series 2019A Bonds have been

satisfied, the Trustee is to release the Seventh Supplemental Trust Agreement and is to execute such documents to evidence such release as may reasonably be required by the District and, subject to the provisions of the Trust Agreement, is to turn over to the District any surplus in, and all balances remaining in, all funds and accounts.

Removal of Trustee

The Trustee may be removed at any time by an instrument or concurrent instruments in writing, (i) executed by the Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding and filed with the District, or (ii) so long as no Event of Default has occurred and is continuing, an instrument executed by the District, not less than 60 days before such removal is to take effect as stated in said instrument or instruments. The Trustee may also be removed at any time for acting or proceeding in violation of, or for failing to act or proceed in accordance with, any provisions of the Trust Agreement with respect to the duties and obligations of the Trustee by any court of competent jurisdiction upon the application of the District or the Holders of not less than a majority in aggregate principal amount of Bonds then Outstanding.

APPENDIX D

PROPOSED OPINION OF BOND COUNSEL

_____, 2019

Hampton Roads Sanitation District Commission
Virginia Beach, Virginia

We have examined Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (the “Act”), and certified copies of the proceedings of the Hampton Roads Sanitation District Commission (the “Commission”), the governing body of Hampton Roads Sanitation District (a political subdivision of the Commonwealth of Virginia and herein sometimes called the “District”), authorizing the execution and delivery of a Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, and as supplemented (the “Trust Agreement”), including as supplemented by the Seventh Supplemental Trust Agreement, dated as of _____, 2019, each by and between the District and The Bank of New York Mellon Trust Company, N.A., as trustee (the “Trustee”), and the issuance of

§ _____

HAMPTON ROADS SANITATION DISTRICT

**Subordinate Wastewater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)**

Dated, maturing, subject to redemption, and bearing interest,
all as provided in the Trust Agreement.

Pursuant to the Trust Agreement, as security for the payment of the amounts due on the above-captioned bonds (the “Bonds”), the District has pledged its Net Revenues Available for Debt Service to the Trustee. The District’s Net Revenues Available for Debt Service consist of all revenues derived by the District from the Wastewater System (as defined in the Trust Agreement) except such part of such revenues as may be required to pay (i) the cost of maintaining, repairing and operating such Wastewater System and (ii) Senior Obligations.

For purposes of the opinions in paragraphs 1, 2 and 3 below, we have relied upon the opinion of Kellam, Pickrell, Cox & Anderson, A Professional Corporation, to the effect that the resolutions of the Commission authorizing the Bonds and approving the Trust Agreement were duly adopted.

We have also examined one of the Bonds, as executed and authenticated.

Based upon such examination, we are of the opinion that:

1. The Bonds have been duly authorized, executed and issued for the purpose of providing funds, together with other available funds, to refund certain of the District’s outstanding bonds and to pay certain costs of issuing the Bonds.

2. The Trust Agreement has been duly authorized and executed by the District and, assuming due authorization and execution by the Trustee, is a valid, binding and enforceable obligation of the District in accordance with its terms.

3. The Bonds are valid and binding special obligations of the District payable solely from the Net Revenues Available for Debt Service and other funds pledged as security therefor under the Trust Agreement.

4. The Bonds do not constitute a debt of the Commonwealth of Virginia or of any county, city, town or political subdivision thereof, or a pledge of the faith and credit of the Commonwealth of Virginia or of any county, city, town or political subdivision thereof. The issuance of the Bonds does not directly or indirectly or contingently obligate the Commonwealth of Virginia or any county, city, town or political subdivision thereof to levy or to pledge any form of taxation whatever therefor.

5. As provided by the Act, the Bonds, their transfer and the income therefrom, including any profit made on the sale thereof, shall be free and exempt from taxation by the Commonwealth of Virginia and any political subdivision thereof.

The enforceability of the Trust Agreement and the obligations of the District with respect to such documents described above are subject to bankruptcy, insolvency, fraudulent conveyance, reorganization and other laws affecting creditors' rights generally. To the extent that the remedies under the Trust Agreement require enforcement by a court of equity, the enforceability thereof may be limited by such principles of equity as the court having jurisdiction may impose.

Respectfully submitted,

APPENDIX E

FORM OF CONTINUING DISCLOSURE AGREEMENT

This Continuing Disclosure Agreement (this “Disclosure Agreement”), dated as of _____, 2019, is executed and delivered by Hampton Roads Sanitation District (the “District”) in connection with the issuance by the District of its Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable) (the “Bonds”), pursuant to the provisions of an Amended and Restated Trust Agreement, dated as of March 1, 2016, as supplemented (the “Trust Agreement”), by and between the District and The Bank of New York Mellon Trust Company, N.A., as trustee. The proceeds of the Bonds are being used by the District to provide funds to refund certain senior indebtedness of the District. The District hereby covenants and agrees as follows:

SECTION 1. Purpose of the Disclosure Agreement. This Disclosure Agreement is being executed and delivered by the District for the benefit of the holders of the Bonds and in order to assist the Participating Underwriters (defined below) in complying with the Rule (defined below). The District acknowledges that it is undertaking primary responsibility for any reports, notices or disclosures that may be required under this Disclosure Agreement.

SECTION 2. Definitions. In addition to the definitions set forth in the Trust Agreement, which apply to any capitalized term used in this Disclosure Agreement unless otherwise defined in this Section, the following capitalized terms shall have the following meanings:

“Annual Report” shall mean any Annual Report provided by the District pursuant to, and as described in, Sections 3 and 4 of this Disclosure Agreement.

“Dissemination Agent” shall mean the District, acting in its capacity as Dissemination Agent hereunder, or any successor Dissemination Agent designated in writing by the District and which has filed with the District a written acceptance of such designation.

“Filing Date” shall have the meaning given to such term in Section 3(A) hereof.

“Financial Obligation” means a (a) debt obligation; (b) derivative instrument entered into in connection with, or pledged as security or a source of payment for, an existing or planned debt obligation; or (c) guarantee of a debt obligation or any such derivative instrument; provided that “financial obligation” shall not include municipal securities (as defined in the Securities Exchange Act of 1934, as amended) as to which a final official statement (as defined in the Rule) has been provided to the MSRB consistent with the Rule.

“Fiscal Year” shall mean the twelve-month period at the end of which financial position and results of operations are determined. Currently, the District’s Fiscal Year begins July 1 and continues through June 30 of the next calendar year.

“Holder” or “holder” shall mean, for purposes of this Disclosure Agreement, any person who is a record owner or beneficial owner of a Bond.

“Listed Events” shall mean any of the events listed in subsection (b)(5)(i)(C) of the Rule, which are as follows:

- (i) principal and interest payment delinquencies;

- (ii) non-payment related defaults, if material;
- (iii) unscheduled draws on debt service reserves reflecting financial difficulties;
- (iv) unscheduled draws on credit enhancements reflecting financial difficulties;
- (v) substitution of credit or liquidity providers, or their failure to perform;
- (vi) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB) or other material notices or determinations with respect to the tax status of the Bonds, or other material events affecting the tax status of the Bonds;
- (vii) modifications to rights of security holders, if material;
- (viii) bond calls, if material, and tender offers;
- (ix) defeasances;
- (x) release, substitution, or sale of property securing repayment of the Bonds, if material;
- (xi) rating changes;
- (xii) bankruptcy, insolvency, receivership or similar event of the District;
- (xiii) the consummation of a merger, consolidation, or acquisition involving the District or the sale of all or substantially all of the assets of the District, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material; and appointment of a successor or additional paying agent or the change of name of a paying agent, if material;
- (xiv) appointment of a successor or additional paying agent or the change of name of a paying agent, if material;
- (xv) incurrence of a Financial Obligation of the District, if material, or agreement to covenants, events of default, remedies, priority rights, or other similar terms of a Financial Obligation of the District, any of which affect security holders, if material; and
- (xvi) default, event of acceleration, termination event, modification of terms, or other similar events under the terms of a Financial Obligation of the District, any of which reflect financial difficulties.

For these purposes, (a) any event described in the immediately preceding paragraph (xii) is considered to occur when any of the following occur: the appointment of a receiver, fiscal agent, or similar officer for the District in a proceeding under the United States Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the District or if such jurisdiction has been assumed by

leaving the existing governing body and officials or officers of the District in possession but subject to the supervision and orders of a court or governmental authority, or the entry of an order confirming a plan of reorganization, arrangement, or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the District, and (b) the District intends the words used in the immediately preceding paragraphs (xv) and (xvi) and the definition of Financial Obligation in this Section 2 to have the same meanings as when they are used in the Rule, as evidenced by SEC Release No. 34-83885, dated August 20, 2018.

“MSRB” means the Municipal Securities Rulemaking Board.

“Participating Underwriters” shall mean any of the original underwriters of the Bonds required to comply with the Rule in connection with the offering of such Bonds.

“Repository” shall mean The Electronic Municipal Market Access (“EMMA”) system administered by the Municipal Securities Rulemaking Board. EMMA is recognized as a National Repository for purposes of the Rule.

“Rule” shall mean Rule 15c2-12 adopted by the Securities and Exchange Commission under the Securities Exchange Act of 1934, as the same may be amended from time to time.

SECTION 3. Provision of Annual Reports.

A. The District shall, or shall cause the Dissemination Agent to, provide to the Repository an Annual Report which is consistent with the requirements of Section 4 of this Disclosure Agreement. Such Annual Report shall be filed on a date (the “Filing Date”) that is not later than December 31 after the end of any Fiscal Year (commencing with its Fiscal Year ending June 30, 2019). Not later than ten (10) days prior to the Filing Date, the District shall provide the Annual Report to the Dissemination Agent (if applicable). In such case, the Annual Report (i) may be submitted as a single document or as separate documents comprising a package, (ii) may cross-reference other information as provided in Section 4 of this Disclosure Agreement and (iii) shall include the District’s audited financial statements or, if audited financial statements are not available, such unaudited financial statements as may be required by the Rule. In any event, audited financial statements of the District must be submitted, if and when available, together with or separately from the Annual Report.

B. The annual financial statements of the District shall be prepared on the basis of generally accepted accounting principles and will be audited. Copies of the audited annual financial statements, which may be filed separately from the Annual Report, will be filed with the Repository when they become publicly available.

C. If the District fails to provide an Annual Report to the Repository by the date required in subsection A hereto or to file its audited annual financial statements with the Repository when they become publicly available, the District shall send a notice to the Repository in substantially the form attached hereto as Exhibit B.

SECTION 4. Content of Annual Reports. Except as otherwise agreed, any Annual Report required to be filed hereunder shall contain or incorporate by reference, at a minimum, annual financial information relating to the District, including operating data, updating such information relating to the District as described in Exhibit A, all with a view toward assisting the Participating Underwriters in complying with the Rule.

Any or all of such information may be incorporated by reference from other documents, including official statements of securities issues with respect to which the District is an “obligated person” (within the meaning of the Rule), which have been filed with the Repository or the Securities and Exchange Commission. If the document incorporated by reference is a final official statement, it must be available from the Repository. The District shall clearly identify each such other document so incorporated by reference.

SECTION 5. Reporting of Listed Events. The District will provide within ten business days to the Repository, notice of any of the Listed Events.

SECTION 6. Termination of Reporting Obligation. The District’s obligations under this Disclosure Agreement shall terminate upon the earlier to occur of the legal defeasance and final retirement of all the Bonds.

SECTION 7. Dissemination Agent. The District may, from time to time, appoint or engage a Dissemination Agent to assist it in carrying out its obligations under this Disclosure Agreement and may discharge any such Dissemination Agent, with or without appointing a successor Dissemination Agent. If at any time there is not any other designated Dissemination Agent, the District shall be the Dissemination Agent.

SECTION 8. Amendment. Notwithstanding any other provision of this Disclosure Agreement, the District may amend this Disclosure Agreement, if such amendment is supported by an opinion of independent counsel with expertise in federal securities laws, to the effect that such amendment is permitted or required by the Rule.

SECTION 9. Additional Information. Nothing in this Disclosure Agreement shall be deemed to prevent the District from disseminating any other information, using the means of dissemination set forth in this Disclosure Agreement or any other means of communication, or including any other information in any Annual Report or notice of occurrence of a Listed Event, in addition to that which is required by this Disclosure Agreement. If the District chooses to include any information in any Annual Report or notice of occurrence of a Listed Event, in addition to that which is specifically required by this Disclosure Agreement, the District shall have no obligation under this Disclosure Agreement to update such information or include it in any future Annual Report or notice of occurrence of a Listed Event.

SECTION 10. Default. Any person referred to in Section 12 (other than the District) may take such action as may be necessary and appropriate, including seeking mandate or specific performance by court order, to cause the District to file its Annual Report or to give notice of a Listed Event. The holders of not less than a majority in aggregate principal amount of Bonds Outstanding may take such actions as may be necessary and appropriate, including seeking mandate or specific performance by court order, to challenge the adequacy of any information provided pursuant to this Disclosure Agreement, or to enforce any other obligation of the District hereunder. A default under this Disclosure Agreement shall not be deemed an event of default under the Trust Agreement or the Bonds, and the sole remedy under this Disclosure Agreement in the event of any failure of the District to comply herewith shall be an action to compel performance. Nothing in this provision shall be deemed to restrict the rights or remedies of any holder pursuant to the Securities Exchange Act of 1934, the rules and regulations promulgated thereunder, or other applicable laws.

SECTION 11. Format of Filings. Unless otherwise required by the Repository, all notice, documents and information provided to the Repository pursuant to this Disclosure Agreement shall be provided to EMMA, the current Internet address of which is www.emma.msrb.org. All notices, documents and information provided to the EMMA shall be provided in an electronic format prescribed

by the Repository (currently, portable document format (pdf) which must be word-searchable except for non-textual elements) and shall be accompanied by identifying information as prescribed by the Repository.

SECTION 12. Beneficiaries. This Disclosure Agreement shall inure solely to the benefit of the District, the Participating Underwriters and the holders from time to time of the Bonds, and shall create no rights in any other person or entity.

HAMPTON ROADS SANITATION DISTRICT

By: _____
Director of Finance

**CONTENT OF ANNUAL REPORT
HAMPTON ROADS SANITATION DISTRICT**

(a) **Financial Information.** Updated information including summary financial results, treatment charge collection rate, revenue collections from the District's largest customers, and a five-year comparison of revenues, expenses, debt service and debt service coverage ratios.

(b) **Debt Information.** Updated information including the debt service requirements of long-term indebtedness.

(c) **Operating Data.** Updated operating data including wastewater flows to the Wastewater System and its major treatment plants, the treatment capacities of its major treatment plants, total billed wastewater flows, and changes in rates and charges.

In general, the foregoing will include information as of the end of the most recent fiscal year or as of the most recent practicable date. Where information for the fiscal year just ended is provided, it may be preliminary and unaudited. Where information has historically been provided for more than a single period, comparable information will in general be provided for the same number of periods where valid and available. Where comparative demographic or economic information for the District and the United States as a whole is contemporaneously available and, in the judgment of the District, informative, such information may be included. Where, in the judgment of the District, an accompanying narrative is required to make data presented not misleading, such narrative will be provided.

**NOTICE OF FAILURE TO FILE ANNUAL REPORT
[AUDITED ANNUAL FINANCIAL STATEMENTS]**

**Re: HAMPTON ROADS SANITATION DISTRICT
SUBORDINATE WASTEWATER REVENUE BONDS,
REFUNDING SERIES 2019A (FEDERALLY TAXABLE)**

CUSIP NO.: 409327

Dated: _____

NOTICE IS HEREBY GIVEN that Hampton Roads Sanitation District has not provided an Annual Report [Audited Annual Financial Statements] as required by Section 3 of the Continuing Disclosure Agreement, which was entered into in connection with the above-named bonds, the proceeds of which were used to refund, in advance of their maturity, certain outstanding Senior Bonds and certain outstanding Bonds. [The District anticipates that the Annual Report [Audited Annual Financial Statements] will be filed by _____.]

Dated: _____

HAMPTON ROADS SANITATION DISTRICT

By _____

APPENDIX F

THE DEPOSITORY TRUST COMPANY

The Depository Trust Company (DTC), the world's largest depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provision of Section 17A of the Securities Exchange Act of 1934. DTC holds and provides asset servicing for over 2.2 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments from over 100 countries that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC, in turn, is owned by a number of Direct Participants of DTC and Members of the National Securities Clearing Corporation, Fixed Income Clearing Corporation, and Emerging Markets Clearing Corporation, (NSCC, FICC, and EMCC, also subsidiaries of DTCC), as well as by the New York Stock Exchange, Inc., the American Stock Exchange LLC, and the National Association of Securities Dealers, Inc. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com.

Purchases of Series 2019A Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Series 2019A Bonds on DTC's records. The ownership interest of each actual purchaser of each Series 2019A Bond (the "Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Series 2019A Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in the Series 2019A Bonds, except if use of the book-entry system for the Series 2019A Bonds is discontinued.

To facilitate subsequent transfers, all Series 2019A Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of Series 2019A Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the Series 2019A Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such Series 2019A Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial

Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time.

Redemption notices shall be sent to DTC. If less than all of the Series 2019A Bonds within a maturity are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such maturity to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to the Series 2019A Bonds unless authorized by a Direct Participant in accordance with DTC's procedures. Under its usual procedures, DTC mails an Omnibus Proxy to the District as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Series 2019A Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal, premium, if any, and interest payments on the Series 2019A Bonds will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from the District on the payable date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participant and not of DTC nor its nominee, or the District, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal, premium, if any, and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the District, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

\$ _____
Hampton Roads Sanitation District
Subordinate Wastewater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)

BOND PURCHASE AGREEMENT

_____, 2019

Hampton Roads Sanitation District
1434 Air Rail Avenue
Virginia Beach, Virginia 23455
Attn: Jay A. Bernas, PE, Director of Finance

Ladies and Gentlemen:

The undersigned, Citigroup Global Markets Inc. (the “Representative”) offers to enter into this Bond Purchase Agreement (this “Purchase Agreement”) between the Hampton Roads Sanitation District, a political subdivision of the Commonwealth of Virginia (the “District”), and the Representative, acting on behalf of itself, FTN Financial Capital Markets, and UBS Financial Services Inc., as the Underwriters (collectively, the “Underwriters”), for the purchase by the Underwriters and the sale by the District of the District’s \$_____ Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable) (the “Bonds”). This offer is made subject to acceptance, which will be evidenced by the District’s execution and delivery to the Underwriters of this Agreement at or before 11:00 a.m., Virginia Beach, Virginia, time, on _____, 2019, and, if not so accepted, will be subject to withdrawal by the Representative upon notice delivered to the District at any time thereafter.

The District has heretofore delivered to the Representative the Official Statement of the District with respect to the Bonds in preliminary form dated _____, 2019 (the “Preliminary Official Statement”), and will deliver an Official Statement in final form, dated _____, 2019 (the “Official Statement”), as provided herein. Capitalized terms used herein and not otherwise defined herein shall have the meanings given such terms in the Official Statement.

1. Agreement to Purchase and Sell; Good Faith Deposit. Upon the terms and conditions, and based upon the representations, warranties and agreements set forth herein, the Underwriters hereby agree to purchase from the District for offering to the public and the District hereby agrees to sell and deliver to the Underwriters, all (but not less than all) of the Bonds.

The Bonds shall be dated the date of delivery thereof and shall mature in the principal amounts, bear interest at the rates, and be subject to the redemption provisions, all as described in the Official Statement and in Schedule A attached hereto. The aggregate purchase price of the Bonds shall be \$_____ (representing the sum of the \$_____ par amount of the Bonds, plus net original issue premium of \$_____, less an underwriting discount of \$_____ on such Bonds).

The Representative has delivered to the District, and the District acknowledges receipt of, a wire transfer in the aggregate amount of \$_____, representing the good faith deposit of the Underwriters. At the Closing (as defined in Section 7 below), the good faith deposit, exclusive of any interest earned on such amount, which shall accrue to the benefit of the District, will be deducted from the amount payable by the Underwriters with respect to the aggregate purchase price of the Bonds (and applied by the District as proceeds of the Bonds), and the Underwriters will pay \$_____ (representing the \$_____ purchase price, less the \$_____ good faith deposit). If the District fails to deliver the Bonds at the Closing, or if the District is unable on or before the Closing to satisfy the conditions to the Underwriters' obligations contained in this Agreement, or if the obligations of the Underwriters are terminated for any reason permitted by this Agreement, the good faith deposit (with no credit for interest thereon) will be returned to the Representative. If the Underwriters fail (other than for a reason permitted in this Agreement) to accept and pay for the Bonds upon their tender by the District as provided in this Agreement, the good faith deposit will be retained by the District as full liquidated damages for such failure and for any and all defaults on the part of the Underwriters, and the delivery of the good faith deposit will constitute satisfaction, and will result in full release and discharge of the Underwriters and their affiliates from all claims and damages for such failure and for any and all defaults.

2. Description of the Bonds; Public Offering. The following is provided for informational purposes only and shall not affect or control the actual terms and conditions of the Bonds.

(a) The Bonds are authorized to be issued pursuant to the provisions of Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (the "Enabling Act"), a resolution adopted on August 27, 2019 (the "Bond Resolution"), by the Hampton Roads Sanitation District Commission (the "Commission"), the governing body of the District, and the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, by and between the District and The Bank of New York Mellon Trust Company, N.A., as further supplemented by the Seventh Supplemental Trust Agreement, dated as of _____ 1, 2019 (collectively, the "Trust Agreement").

(b) The proceeds of the Bonds are being used to (a) refund a portion of the District's outstanding [Senior Bonds and Bonds] (as defined in the Official Statement) and (b) pay the Underwriters' discount and costs of issuance of the Bonds.

To assist the Underwriters in complying with Rule 15c2-12 under the Securities Exchange Act of 1934, as amended (the "Rule"), the District will execute a Continuing Disclosure Agreement, dated as of the Closing Date (as defined in Section 7 below), for the benefit of the holders of the Bonds (the "Continuing Disclosure Agreement"). The District will agree in the Continuing Disclosure Agreement to provide annual financial information and operating data and notices of the occurrence of specified events. A description of the Continuing Disclosure Agreement is set forth in, and a form of such agreement is attached as an appendix to, the Preliminary Official Statement and the Official Statement. In addition, the District will enter into [two separate] Escrow Deposit Agreement[s], each dated as of the Closing Date (each, an "Escrow Agreement" and, collectively, the "Escrow Agreement[s]"), one with respect to the Wastewater Revenue Bonds, Series 20__A and one with respect to the Subordinate Wastewater

Revenue Bonds, Series 20__A, both constituting Refunded Bonds and each with The Bank of New York Mellon Trust Company, N.A. (in such capacity, the “Escrow Agents”), to provide for the payment of the Refunded Bonds (as defined in the Official Statement). This Agreement, the Trust Agreement, the Continuing Disclosure Agreement and the Escrow Agreement[s] are hereinafter collectively referred to as the “District Documents.”

3. Concurrent Delivery of Official Statement. Upon the acceptance, execution and delivery of this Agreement by the District, the District will deliver to the Representative a sufficient number of copies of the final version of the Official Statement, which shall be signed by the Chair or the Vice Chair, the General Manager and the Director of Finance of the District, to enable the Underwriters to comply with the Rule. The Underwriters’ approval of the Official Statement will be conclusively evidenced by the Representative’s execution and delivery of this Agreement.

4. Representations Warranties and Covenants of the District. The District represents and warrants to, and agrees with, the Underwriters as follows:

(a) The District is a political subdivision of the Commonwealth duly created and validly existing under the laws of the Commonwealth;

(b) The District has complied with all applicable provisions of the Constitution and laws of the Commonwealth, including the Enabling Act, with respect to the consummation of, and has full power and authority to consummate, all transactions contemplated by this Purchase Agreement, the Trust Agreement, and the Continuing Disclosure Agreement, executed by the District pursuant to the provisions of the Trust Agreement, and any other agreements relating thereto the District Documents;

(c) The District is authorized under the provisions of the Enabling Act to issue the Bonds for the purposes described in the Trust Agreement and the Official Statement;

(d) The Bond Resolution has been duly adopted by the Commission at a meeting duly called and held and duly and validly authorizes the issuance, sale and delivery of the Bonds pursuant to the Trust Agreement and the execution and delivery of the District Documents, and the Bond Resolution and the Trust Agreement, as of the date hereof, have not been amended, modified or repealed, in any material respect (other than as contemplated herein or by the Official Statement);

(e) The Commission has duly and validly authorized all necessary action to be taken by it or the District for (i) the issuance, sale, and delivery of the Bonds upon the terms set forth herein, (ii) the execution, delivery, and performance of the District Documents, including the Trust Agreement which provides for the issuance and delivery of and security for the Bonds, (iii) the carrying out, giving effect to, and consummation of the transactions contemplated hereby, and (iv) the consent to the distribution by the Underwriters of the Official Statement;

(f) The District Documents, when executed by the other parties thereto, if any, will have been duly and validly executed and delivered by the District and will be in full force and effect as to the District, and such District Documents constitute legal, valid and binding obligations of the District, enforceable in accordance with their respective terms, subject to

bankruptcy, insolvency, reorganization, moratorium and other similar laws and principles of equity relating to or affecting the enforcement of creditors' rights; and the Bonds, when issued, authenticated and delivered to the Underwriters in accordance with the Bond Resolution will constitute legal, valid and binding obligations of the District enforceable in accordance with their terms, subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws and principles of equity relating to or affecting the enforcement of creditors' rights;

(g) Except as described in the Official Statement, there is no action, suit, proceeding, inquiry or investigation, at law or in equity before or by any court, governmental agency or public board or body, pending or, to the best knowledge of the District, threatened against the District that (i) may affect the existence of the District or the titles or rights of its officers to their respective offices, (ii) may affect or that seeks to prohibit, restrain or enjoin (A) the sale, issuance or delivery of the Bonds or (B) the collection or payment of the Net Revenues or the pledge and assignment thereof by the District to make payments on the Bonds, (iii) in any way contests or affects the validity or enforceability of the District Documents, (iv) contests in any way the completeness or accuracy of the Official Statement, or (v) contests the powers of the District or, to the best knowledge of the District, any authority or proceedings for the issuance, sale or delivery of the Bonds, the District Documents or any of them or the transactions contemplated thereby, nor, to the best knowledge of the District, is there any basis therefor wherein an unfavorable decision, ruling or finding would materially adversely affect the validity or enforceability of the Bonds, the Bond Resolution or any of the other District Documents;

(h) The District is not in any material respect in breach of or default under any applicable constitutional provision, law or administrative regulation of the Commonwealth of Virginia or the United States or any applicable judgment or decree or any loan agreement, indenture, bond, note, ordinance, resolution, agreement or other instrument to which the District is a party or to which the District or any of the property or assets of the District are otherwise subject; no event has occurred and is continuing that constitutes or with the passage of time or the giving of notice, or both, would constitute a default or event of default by the District under any such instrument; and the execution and delivery of this Purchase Agreement and the other District Documents, and the compliance with the provisions thereof, will not conflict with or constitute on the part of the District a violation of, breach of, or default under (i) the Enabling Act, (ii) in any material respect, any indenture, mortgage, lease or note agreement or any other material agreement or instrument to which the District is a party or by which the District is bound, or (iii) any constitutional provision or statute or any order, rule or regulation of any court or governmental agency or body having jurisdiction over the District or any of its activities or properties;

(i) All consents, approvals, authorizations and orders of governmental or regulatory authorities that are required to be obtained by the District in connection with the execution and delivery of this Purchase Agreement and the other District Documents and the consummation of the transactions contemplated thereby to be consummated on or before the Closing Date have been or will be, at Closing, duly obtained and in full force and effect; provided, that no representation or warranty is expressed as to any action required under applicable federal or state securities laws or Blue Sky laws of any jurisdiction in connection with the issuance and sale of the Bonds.

(j) At the time of the District's acceptance hereof and (unless an event occurs of the nature described in Section 5(b)) at all times subsequent hereto during the period up to and including twenty-five (25) days subsequent to the end of the underwriting period, as hereinafter defined, the Official Statement was and will be true and correct in all material respects and did not and will not contain any untrue or misleading statement of a material fact or omit to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided, however, no representation or warranty is made as to any of the information described in the proviso of Section 4(o) below;

(k) If the Official Statement is supplemented or amended pursuant to Section 5(b), at the time of each supplement or amendment thereto and (unless subsequently again supplemented or amended pursuant to such paragraph) at all times subsequent thereto during the period up to and including twenty-five (25) days subsequent to the end of the underwriting period, the Official Statement as so supplemented or amended will be true and correct in all material respects and will not contain any untrue or misleading statement of a material fact or omit to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided, however, no representation or warranty is made as to any of the information described in the proviso of Section 4(o) below;

(l) The District will execute and deliver the Disclosure Agreement, at or prior to the Closing, in substantially the form attached to the Official Statement as "APPENDIX E—FORM OF CONTINUING DISCLOSURE AGREEMENT;"

(m) During the 5-year period ending on the date hereof, except as set forth in the Official Statement, the District has not failed in any material respect to comply with all previous undertakings made by it of the type specified in paragraph (b)(5)(i) of the Rule;

(n) During the 5-year period ending on the date hereof, except as set forth in the Official Statement, no notice of the type specified in paragraph (b)(5)(i)(D) of the Rule has been filed by or on behalf of the District;

(o) (i) Other than the hereinafter defined Excluded Information, the information concerning the District and the System contained in the Preliminary Official Statement is, and as of the Closing Date will be, true and correct in all material respects and does not and will not, as applicable, contain any untrue statement of a material fact or omit to state a material fact that is necessary to make the statements contained therein, in the light of the circumstances under which they were made, not misleading, and (ii) notwithstanding the foregoing, the District has not provided the information in and does not provide any assurance that the information relating to "Price or Yield" of the Bonds and CUSIP numbers on the inside cover, or the first paragraph of page (iv) thereof, or contained in the sections or appendices, as the case may be, captioned "TAX MATTERS," "UNDERWRITING," "APPENDIX D—PROPOSED OPINION OF BOND COUNSEL," and "APPENDIX F—THE DEPOSITORY TRUST COMPANY" (the "Excluded Information") in the Official Statement is true and correct in all material respects;

(p) The financial statements of, and other financial information regarding the District in the Official Statement and Appendix A thereof, fairly present the financial position and results of the operations of the District as of the dates and for the periods therein set forth; and the

audited financial statements have been prepared in accordance with U.S. generally accepted accounting principles consistently applied;

(q) The District will cause the Trustee to authenticate and deliver the Bonds when ready for delivery;

(r) To the best of the District's knowledge, neither the Securities and Exchange Commission ("SEC") nor any of the securities commission of any jurisdiction has issued or threatened to issue any order preventing or suspending the use of the Official Statement;

(s) No person, whether generally or through an enterprise, fund, or account of such person, other than the District, is committed by contract or other arrangement structured to support payment of all, or part, of the obligations on the Bonds for purposes of and within the meaning of the Rule;

(t) Any certificate signed by any of the District's authorized officers and delivered to the Underwriters shall be deemed a representation and warranty by it to the Underwriters as to the statements made therein; and

(u) The District acknowledges and agrees that (i) the primary role of the Underwriters, as underwriters, is to purchase securities, for resale to investors, in an arm's length commercial transaction between the District and the Underwriters, and the Underwriters have financial and other interests that differ from those of the District; (ii) the Underwriters are acting solely as principals and are not acting as municipal advisors, financial advisors or fiduciaries to the District and have not assumed any advisory or fiduciary responsibility to the District with respect to the transaction contemplated hereby and the discussions, undertakings and procedures leading thereto (irrespective of whether the Underwriters have provided other services or are currently providing other services to the District on other matters); (iii) the only obligations the Underwriters have to the District with respect to the transaction contemplated hereby expressly are set forth in this Purchase Agreement; and (iv) the District has consulted its own financial, municipal, legal, accounting, tax and other advisors, as applicable, to the extent it has deemed appropriate.

All representations, warranties and agreements of the District shall remain operative and in full force and effect, regardless of any investigations made by any Underwriter or on the Underwriters' behalf, and shall survive the delivery of the Bonds.

5. Compliance with the Rule; Other Covenants.

(a) The Preliminary Official Statement has been deemed final by the District in accordance with the Rule and remains as such on the date hereof. The District agrees to supply, at the District's expense, within the earlier of seven (7) business days from the date hereof and in any event not later than two (2) business days before the Closing, sufficient quantities of the Official Statement to enable the Representative to send copies of the Official Statement to any potential customer upon request in compliance with paragraph (b)(4) of the Rule and the rules and regulations of the Municipal Securities Rulemaking Board ("MSRB"). The Official Statement shall be in substantially the same form as the Preliminary Official Statement and, other than information permitted to have been omitted by the Rule, the District shall only make

such other additions, deletions and revisions in the Official Statement that are approved by the Representative. The District agrees to deliver to the Representative an electronic copy of the Official Statement in a form that permits the Representative to satisfy its obligations under the rules and regulations of the MSRB and the SEC. The Representative agrees to file the Official Statement with the MSRB in compliance with MSRB Rule G-32.

(b) The District covenants and agrees to notify the Representative if, during the period commencing on the date hereof through the date twenty-five (25) days after the “end of the underwriting period,” as hereinafter defined, any event shall occur including, but not limited to, any material adverse change in the financial position, results of operations or condition, financial or otherwise, of the District, and of which the District has knowledge, that would cause the Official Statement to contain any untrue or incorrect statement of a material fact or to omit to state a material fact that should be included therein for the purpose for which the Official Statement is to be used or that is necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, and, if in the reasonable opinion of the Representative such event requires any amendment or supplement to the Official Statement, the District will at the District’s expense promptly amend or supplement the Official Statement in a form and manner jointly approved by the District and the Representative. Anything in this Section 5(b) to the contrary notwithstanding, in no event shall the District be under any obligation to perform any continuing due diligence or monitoring to determine if any event described in this Section 5(b) has occurred subsequent to the end of the underwriting period. The “end of the underwriting period” means the Closing Date unless the Representative advises in writing on such Closing Date that as of such date there remains an unsold balance of the Bonds, in which case the “end of the underwriting period” means the date as of which the Representative notifies the District that the Underwriters no longer retain an unsold balance of the Bonds for sale to the public; however, in no event shall the “end of the underwriting period” extend beyond the date that is thirty-five (35) days from the Closing Date.

(c) Subject to Section 9, the District shall furnish such information, execute such instruments and take such other action in cooperation with the Representative as the Representative may reasonably request to qualify the Bonds for offering and sale under the securities or “blue sky” laws of such states and other jurisdictions of the United States as the Representative may designate; provided, however, the District shall not be obligated to accept, or consent to accept, service of process, or to appoint an agent to accept service of process, outside the Commonwealth of Virginia.

(d) The Underwriters agree to make a bona fide offering to the public (excluding bond houses, brokers or similar persons or organizations acting in the capacity of underwriters or wholesalers) of all of the Bonds at prices not in excess of the initial public offering price or prices (or yields below the initial public offering yield or yields) set forth on the inside cover page of the Final Official Statement and in Schedule A hereto. After such bona fide public offering, the Underwriters may change such prices or yields as they may deem necessary or desirable in connection with the offering and sale of the Bonds and to sell the Bonds to dealers (including dealer banks and dealers depositing the Bonds into investment trusts) and others at prices lower than the initial offering prices or yields greater than the yields indicated on the front portion of the Official Statement.

(e) The Representative agrees on behalf of the Underwriters that the Bonds will only be offered pursuant to the Official Statement and only in jurisdictions where such offer is legal and that a copy of the final version of the Official Statement will be delivered to each purchaser of the Bonds.

6. Conditions to Underwriters' Obligations. The Underwriters' obligation to purchase and pay for the Bonds shall be subject to the performance by the District of its obligations to be performed hereunder and in the documents delivered at the Closing, and the accuracy in all material respects of the representations and warranties contained hereunder and shall also be subject to the satisfaction of each of the following conditions, both as of the date hereof and the Closing Date:

(a) The Representative will not have discovered any material error, misstatement or omission in the representations and warranties made by the District in this Agreement, which representations and warranties will be deemed to have been made again at and as of the time of the Closing and will then be true, accurate and complete in all material respects;

(b) The Bond Resolution, the Enabling Act and the District Documents will be in full force and effect and will not have been amended, modified or supplemented, and the Official Statement will not have been supplemented or amended, except as may have been agreed or consented to by the Representative;

(c) At the time of the Closing, all official action of the District relating to this Agreement, the Bonds and the other District Documents will be in full force and effect and will not have been amended, modified or supplemented except as otherwise agreed to by the Representative;

(d) At the time of the Closing, there will have been no material adverse change in the condition, financial or otherwise, of the District from that set forth in the Official Statement that in the reasonable judgment of the Representative makes it impracticable to market the Bonds on the terms and in the manner contemplated in the Official Statement;

(e) The Representative will have received the Official Statement, and each supplement or amendment, if any, to it, executed on behalf of the District by its General Manager and its Director of Finance and a fully-executed copy of each of the District Documents;

(f) The Representative will have received from Norton Rose Fulbright US LLP, Bond Counsel for the District ("Bond Counsel"), an approving opinion with respect to the Bonds, dated the Closing Date and addressed to the District, in substantially the form set forth in Appendix D to the Official Statement;

(g) The Representative will have received from Bond Counsel a supplemental opinion or opinions with respect to the Bonds, dated the Closing Date and addressed to the Underwriters, in substantially the form set forth as Exhibit 1 hereto;

(h) The Representative will have received from the Counsel to the District opinions dated the Closing Date and addressed to the Underwriters, in substantially the forms set forth as Exhibit 2 hereto;

(i) The Representative will have received from _____, as counsel to the Underwriters, an opinion dated the Closing Date and addressed to the Underwriters, in substantially the form set forth as Exhibit 3 hereto;

(j) The Representative will have received a certificate of the General Manager and the Director of Finance of the District setting forth facts, estimates and circumstances (including covenants of the District) in existence on the Closing Date sufficient to support the conclusion that it is not expected that the proceeds of the Bonds will be used in a manner that would cause the Bonds to be “arbitrage bonds” within the meaning of Section 148 of the Internal Revenue Code of 1986, as amended, and applicable rules and regulations;

(k) The Representative will have received a certificate of the District as to the receipt of payment for the Bonds;

(l) A certificate, dated the Closing Date, signed by the General Manager of the District to the effect that (a) the representations and agreements of the District contained herein are true and correct in all material respects as of the date of the Closing; (b) except as described in the Official Statement, no litigation is pending or, to his knowledge, threatened (i) seeking to restrain or enjoin the execution or delivery of any of the District Documents, (ii) in any way contesting or affecting any authority for the Bond Resolution or any District Document, (iii) in any way contesting the creation, existence or powers of the District or the application of the proceeds of the Bonds, or (iv) which, if adversely determined, could materially adversely affect the District’s financial position or operating condition of the District or the transactions contemplated by the Official Statement or any District Document; and (c) the Official Statement is true and correct in all material respects and does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, except no review has been made of information described in the proviso of Section 4(o) above;

(m) A certificate, dated the Closing Date, signed by the General Manager of the District, in form and substance satisfactory to the Representative, to the effect that (i) the financial statements of the District as of June 30, 2018, fairly represent the receipts, expenditures, assets, liabilities and cash balances of such amounts and, insofar as presented, other funds of the District as of the dates and for the periods therein set forth and (ii) except as disclosed in the Official Statement, since June 30, 2018, no materially adverse change has occurred, or any development involving a prospective material change, in the financial position or results of operations of the District, and the District has not incurred since June 30, 2018, any material liabilities other than in the ordinary course of business or as set forth in or contemplated by the Official Statement;

(n) The verification report (the “Verification Report”) of [_____] (A) verifying the accuracy of (i) the mathematical computations of the adequacy of the maturing principal of, premium, if any, and interest earned on the obligations to be held pursuant to the

Escrow Agreement[s] together with cash deposited thereunder, if any, to provide for the payment of the principal of and interest on the Refunded Bonds when due, and (ii) the mathematical computations of the yield for federal tax purposes on the escrow funds established under the Escrow Agreement[s] and on the Bonds and (B) consenting to the reference to them and to their Verification Report under the caption of the Official Statement “VERIFICATION OF MATHEMATICAL COMPUTATIONS FOR THE REFUNDED BONDS;”

(o) The Representative will have received confirmations of long-term ratings from Standard & Poor’s Ratings Services (“S&P”) and Fitch Ratings (“Fitch”) indicating that the Bonds have been rated “AA” and “AA,” respectively, which ratings will remain in effect on the Closing Date; and

(p) The Representative will have received a certified copy of the Bond Resolution and fully executed copies of the District Documents.

If the District shall be unable to satisfy or cause to be satisfied any material (in the sole judgment of the Representative) condition to the obligations of the Underwriters contained in this Agreement, or if the obligations of the Underwriters shall be terminated for any reason permitted by this Agreement, this Agreement shall terminate, and neither the Underwriters nor the District shall be under any further obligations or liabilities hereunder, except for the return or retention of the good faith deposit as provided in Section 1 hereof and the respective obligations of the District and the Underwriters for the payment of expenses as provided in Section 9 hereof, which obligations shall continue in full force and effect.

7. Closing. By 11:00 a.m. Virginia Beach, Virginia time, on _____, 2019, or such other time or date as shall otherwise be mutually agreed upon by the District and the Representative (such date is herein sometimes called the “Closing Date”), the District will deliver or cause to be delivered to the Underwriters either at the New York City office of The Depository Trust Company (“DTC”), or at such other location as shall have been mutually agreed upon by the District and the Representative, the Bonds and, subject to the terms and conditions hereof, the Underwriters will accept such delivery and pay to the District the purchase price of the Bonds as set forth in Section 1 hereof, such purchase price to be payable in same day Federal Funds. Such delivery and such acceptance and payment are herein sometimes called the “Closing.” Delivery of the other documents as aforesaid shall be made at the offices of Bond Counsel in Washington, D.C. The Bonds shall be made available to the Underwriters, or delivered at their direction to such place and at such time as shall be mutually agreed upon, prior to the Closing. At the direction of the Underwriters, the District will deliver the Bonds in definitive form for registration through a book-entry only system of registration as described in the Official Statement, registered in the name of Cede & Co., as nominee for DTC. It is anticipated that the CUSIP identification numbers will be printed on the Bonds, but neither the failure to print such numbers nor any error with respect thereto shall constitute a cause for failure or refusal by the Underwriters to accept delivery of the Bonds in accordance with the terms of this Agreement.

8. Termination. The Representative may terminate the obligation of the Underwriters to purchase the Bonds by notification to the District in writing, if between the date hereof and the Closing:

(1) legislation shall have been introduced in or enacted by or a bill shall be favorably reported out of committee of either house of Congress or recommended for passage by the President of the United States, or a decision by a court of the United States shall be rendered, or a ruling, regulation, proposed regulation or statement by or on behalf of the Commission or any other agency of the federal government having jurisdiction of the subject matter shall be made, to the effect that the Bonds are not exempt from the registration requirements of the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended; or

(2) legislation shall have been enacted by the Congress of the United States to become effective on or prior to the Closing, or a decision of a court of the United States shall be rendered, or a stop order, ruling, regulation or proposed regulation by or on behalf of the Securities and Exchange Commission or other agency having jurisdiction over the subject matter shall be issued or made, to the effect that the issuance, sale and delivery of the Bonds or the District is in violation of the Securities Act of 1933, as amended, or with the purpose or effect of otherwise prohibiting the offering, issuance, sale or delivery of the Bonds as contemplated hereby or by the Official Statement or of obligations of the general character of the Bonds; or

(3) an event shall have occurred that (A) makes untrue or incorrect in any material respect, as of the time of such event, any statement or information contained in the Preliminary Official Statement or the Official Statement or which is not reflected in the Preliminary Official Statement or the Official Statement but should be reflected therein in order to make the statements and information contained therein not misleading in any material respect and (B) in the judgment of the Representative, materially adversely affects the market for the Bonds or the sale, at the contemplated offering prices, by the Underwriters of the Bonds; or

(4) there shall have occurred (whether or not foreseeable) any engagement in, or escalation of hostilities or other national or international calamity or crisis, or any material adverse change in the financial or economic conditions affecting the United States, the effect of such engagement, escalation, calamity, crisis or change on the financial markets of the United States being such as, in the Representative's reasonable judgment, would have a material adverse impact on the market price of the Bonds; or

(5) there shall have occurred a major financial crisis, a material disruption in commercial banking or securities settlement or clearance services, or a material disruption or deterioration in the fixed income or municipal securities market or there shall be in force a general suspension of trading on any national securities exchange or minimum or maximum prices for trading shall have been fixed and be in force, or maximum ranges for prices for securities shall have been required and be in force on any national securities exchange whether by virtue of a determination by that exchange or by order of the Securities and Exchange Commission, or any other governmental authority having jurisdiction that, in the Representative's reasonable judgment, would have a material adverse impact on the market price of the Bonds; or

(6) a general banking moratorium shall have been declared by federal, Commonwealth of Virginia or State of New York authorities; or

(7) any legislation, ordinance, rule or regulation shall be introduced in, or be enacted by, any governmental body, department or agency in the Commonwealth of Virginia, or a decision by any court of competent jurisdiction within the Commonwealth of Virginia shall be rendered that, in the Representative's reasonable judgment, would render interest received on obligations of the general character of the Bonds taxable for Commonwealth of Virginia income tax purposes or otherwise have a material adverse effect on the market price of the Bonds; or

(8) there shall have been (i) any downgrading, suspension or withdrawal of any rating assigned to the Bonds by S&P or Fitch, as applicable, or (ii) any placement of the District on credit watch negative or the equivalent by S&P or Fitch that, in the reasonable judgment of the Representative, would have a material adverse impact on the market price of the Bonds; or

(9) any litigation shall be instituted or be pending on the Closing Date to restrain or enjoin the issuance, sale or delivery of the Bonds, or in any way contesting or affecting any authority for or the validity of the proceedings authorizing and approving the Enabling Act, the Bond Resolution, the District Documents or the existence or powers of the District.

9. Expenses. Except as set forth herein, the Underwriters shall not be under any obligation to pay, and the District agrees to pay, any expenses incident to the performance of the District's obligations hereunder, including but not limited to: (i) the cost of preparation of the Bond Resolution; (ii) the costs of the preparation and printing of the definitive Bonds; (iii) the fees and disbursements of Bond Counsel; (iv) the fees and disbursements of the accountants, advisors and consultants retained by the District; (v) the cost of publication of all required notices; (vi) the disbursements of District officials and employees and any expenses incurred by the Underwriters on behalf of the District's employees and representatives which are incidental to implementing this Agreement, including without limitation meals, transportation, lodging and entertainment of such employees and representatives; (vii) fees for ratings on the Bonds; and (viii) the cost of the preparation and printing of a reasonable number of copies of the Official Statement and any amendments or supplements thereto and a reasonable number of copies required for distribution in connection with the public offering of the Bonds.

The Underwriters shall pay the fees and disbursements of Underwriters' counsel, the cost of preparation and printing of this Agreement, all advertising expenses in connection with the public offering of the Bonds and all other expenses incurred by them in connection with the public offering and distribution of the Bonds, including the cost of printing any Preliminary and Final Blue Sky Memoranda, and all other underwriting documents (which may be included as an expense component of the Underwriters' discount). The District shall not be under any obligation to pay any such expenses incident to the performance of the obligations of the Underwriters hereunder.

10. Notices. Any notice or other communication to be given under this Agreement may be given by delivering the same in writing (a) to the District at the District's address set forth above, with a copy to PFM Financial Advisors LLC, 4350 N. Fairfax Drive, Suite 580, Arlington, Virginia 22203, Attention: Sarah Frey, Director, and (b) to the Representative at Citigroup Global Markets Inc., _____, Attention: _____.

11. Successors and Assigns. This Agreement is made solely for the benefit of the District and the Underwriters (including the successors or assigns of the Underwriters), and no other person shall acquire or have any right hereunder or by virtue hereof. All of the representations, warranties and agreements of the District contained in this Agreement shall remain operative and in full force and effect, and shall survive the delivery of the Bonds, regardless of any investigations made by or on behalf of the Underwriters.

12. Counterparts. This Agreement may be executed in one or more counterparts, each of which will be regarded as an original and all of which will constitute one and the same document.

13. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, without regard to its choice of laws principles.

14. Effective Date. This Agreement shall become effective upon the execution of the acceptance hereof by the District and shall be valid and enforceable as of the time of such acceptance and approval.

Very truly yours,

CITIGROUP GLOBAL MARKETS INC.,
FTN FINANCIAL CAPITAL MARKETS
UBS FINANCIAL SERVICES INC.

BY: CITIGROUP GLOBAL MARKETS INC.,
as Representative

By: _____

Name: _____

Title: Director

By our acceptance of this Bond Purchase Agreement, given this ____ day of _____, 2019, at _____ a.m., we agree to be bound by the provisions of this Bond Purchase Agreement.

HAMPTON ROADS SANITATION DISTRICT

By: _____

Name: Jay A. Bernas, PE

Title: Director of Finance

[Mandatory Redemption. The Series 2019A Bonds due on October 1, 20__*, are subject to mandatory sinking fund redemption on October 1 in the following years in the following principal amounts (“Sinking Fund Requirements”) at a redemption price equal to the principal amount thereof, together with interest accrued to the date of redemption.

Term Bonds due October 1, 20__

<u>Year</u>	<u>Sinking Fund Requirement</u>
20__	\$
20__	
20__	
20__	†

† Unamortized balance at maturity.

In the event of a partial optional redemption or purchase of such term bonds, the District will credit the principal amount of such term bonds so purchased or redeemed against the Sinking Fund Requirements for the remaining term bonds outstanding in such amounts and in such years as it in its sole discretion shall determine.]

[“Make-Whole” Optional Redemption. The Series 2019A Bonds maturing on or prior to October 1, 20__*, are subject to redemption at the option of the District, as a whole or in part, at any time, at the Make-Whole Redemption Price (as defined herein). The “Make-Whole Redemption Price” is the greater of (i) 100% of the principal amount of the Series 2019A Bonds to be redeemed and (ii) the sum of the present value of the remaining scheduled payments of principal and interest on the Series 2019A Bonds to be redeemed, not including any portion of those payments of interest accrued and unpaid as of the date on which the Series 2019A Bonds are to be redeemed, discounted to the date on which the Series 2019A Bonds are to be redeemed on a semi-annual basis, assuming a 360-day year consisting of twelve 30-day months, at the Treasury Rate (defined below) [plus 0.15%]; plus in each case, accrued and unpaid interest on the Series 2019A Bonds to be redeemed on the redemption date.

For purpose of determining the Make-Whole Redemption Price, the following definitions apply:

“Treasury Rate” means, with respect to any redemption date for any particular Series 2019A Bond, the greater of:

(i) the yield to maturity as of such redemption date of the United States Treasury securities with a constant maturity (as compiled and published in the most recent Federal Reserve Statistical Release H.15 (519) that has become publicly available at least two business days prior to the redemption date (excluding inflation indexed securities) (or, if such Statistical Release is no longer published, any publicly available source of similar market data)) most nearly equal to the period from the redemption date to maturity; provided, however, that if the period from the redemption date to maturity is less than one year, the weekly average yield on actually traded United States Treasury securities adjusted to a constant maturity of one year will be used; all as will be determined by an independent accounting firm, investment banking firm or

financial advisor retained by the District at the District's expense and such determination shall be conclusive and binding on the owners of the Series 2019A Bonds, and

(ii) the rate per annum, expressed as a percentage of the principal amount, equal to the semiannual equivalent yield to maturity or interpolated maturity of the Comparable Treasury Issue (defined below), assuming that the Comparable Treasury Issue is purchased on the redemption date for a price equal to the Comparable Treasury Price (defined below), as calculated by the Designated Investment Banker (defined below).

“Comparable Treasury Issue” means, with respect to any redemption date for a particular Series 2019A Bond, the United States Treasury security or securities selected by the Designated Investment Banker that has an actual or interpolated maturity comparable to the remaining average life of the Series 2019A Bond to be redeemed.

“Comparable Treasury Price” means, with respect to any redemption date for a particular Series 2019A Bond, (i) if the Designated Investment Banker receives at least four Reference Treasury Dealer Quotations (defined below), the average of such quotations for such redemption date, after excluding the highest and lowest Reference Treasury Dealer Quotations, or (ii) if the Designated Investment Banker obtains fewer than four Reference Treasury Dealer Quotations, the average of all such quotations.

“Designated Investment Banker” means one of the Reference Treasury Dealers appointed by the District.

“Reference Treasury Dealer” means each of the four firms, specified by the District, from time to time, that are primary United States government securities dealers in the City of New York, New York (each a “Primary Treasury Dealer”); provided, however, that if any of them ceases to be a Primary Treasury Dealer, the District will substitute another Primary Treasury Dealer.

“Reference Treasury Dealer Quotations” means, with respect to each Reference Treasury Dealer and any redemption date for a particular Series 2019A Bond, the average, as determined by the Designated Investment Banker, of the bid and asked prices for the Comparable Treasury Issue (expressed in each case as a percentage of its principal amount) quoted in writing to the Designated Investment Banker by such Reference Treasury Dealer at 3:30 P.M., New York City time, on the third Business Day preceding such redemption date.

Any Make-Whole Redemption Price of Series 2019A Bonds to be redeemed pursuant to the provisions described under this section will be determined by an independent accounting firm, investment banking firm or financial advisor retained by the District to calculate such redemption price. The District may conclusively rely on the determination of such redemption price by such independent accounting firm, investment banking firm or financial advisor and will not be liable for such reliance.]

SUPPLEMENTAL OPINION OF BOND COUNSEL

_____, 2019

Citigroup Global Markets Inc.
Philadelphia, Pennsylvania

FTN Financial Capital Markets
Austin, Texas

USB Financial Services Inc.
Hunt Valley, Maryland

\$ _____
Hampton Roads Sanitation District
Subordinate Wasterwater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)

Ladies and Gentlemen:

We have delivered to you copies of our approving opinion as Bond Counsel, dated this date, rendered in connection with the issuance by the Hampton Roads Sanitation District, a political subdivision of the Commonwealth of Virginia (the “District”), for the purchase by the Underwriters and the sale by the District of the District’s \$ _____ Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable) (the “Bonds”). The Bonds are issued pursuant to the provisions of Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (the “Enabling Act”), a resolution adopted on August 22, 2019 (the “Bond Resolution”), by the Hampton Roads Sanitation District Commission (the “Commission”), the governing body of the District, and the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, as as further supplemented by the Seventh Supplemental Trust Agreement, dated as of _____ 1, 2019 (collectively, the “Trust Agreement”).

You may rely upon our approving opinions as if each was addressed to you.

At your request, we have reviewed, in addition to the proceedings and other papers described in our approving opinions, the following:

- (a) The Bond Purchase Agreement, dated _____, 2019 (the “Purchase Agreement”);

(b) The Preliminary Official Statement, dated _____, 2019, with respect to the Bonds, together with the final version of the Official Statement, dated _____, 2019, with respect to the Bonds (the “Official Statement”); and

(c) The Continuing Disclosure Agreement, dated the date of its execution and delivery, for your benefit and the benefit of the holders of the Bonds (the “Continuing Disclosure Agreement”).

Based on the foregoing and upon such other information and papers as we consider necessary for the purposes of rendering this opinion, we are of the opinion that:

1. The Purchase Agreement and the Continuing Disclosure Agreement have been duly authorized, executed and delivered by the District and, assuming their due authorization, execution and delivery by the other parties thereto, constitute valid and legally binding agreements of the District, enforceable against the District in accordance with their terms. The enforceability of the Purchase Agreement and the Continuing Disclosure Agreement may be limited by the provisions of bankruptcy, insolvency, reorganization, moratorium, or similar laws, now or hereafter in effect, and by equitable principles which may limit the specific enforcement of certain remedies.

2. The offering, sale and delivery of the Bonds do not require their registration under the Securities Act of 1933, as amended. No opinion is expressed with respect to the necessity of the registration of the Bonds under the “Blue Sky” or securities laws of any state, federal district, territory or possession of the United States.

In our capacity as Bond Counsel, we have participated in the preparation and have reviewed those portions of the Official Statement contained under the captions “PLAN OF REFUNDING,” “THE SERIES 2019A BONDS,” “SECURITY AND SOURCES OF PAYMENT,” “TAX MATTERS,” and “CONTINUING DISCLOSURE” (other than information under such caption with respect to the District’s compliance with previous undertakings under Rule 15c2-12, as to which no opinion is expressed) and in Appendices B, C, and D. In our opinion, the statements relating to the Bonds and the summaries of documents, statutes and opinions contained in the sections of the Official Statement referred to above fairly summarize the material provisions of the Bonds and the documents, statutes and opinions referred to therein. We offer no other opinion or view as to the information contained in the Official Statement.

This letter is furnished by us in our capacity as Bond Counsel to the District. No attorney-client relationship has existed or exists between our firm and the addressees hereof in connection with the Bonds, the Official Statement or by virtue of this opinion. This opinion is delivered to, and is solely for the benefit of, the addressees hereof and is not to be used, circulated, quoted or otherwise referred to or relied upon by any person other than you. This opinion is not intended to be relied upon by the Trustee (as described in the Bond Purchase Agreement) or the holders or the beneficial owners of the Bonds.

Very truly yours,

**OPINIONS OF KELLAM, PICKRELL, COX & ANDERSON, P.C.
COUNSEL FOR THE DISTRICT**

_____, 2019

Citigroup Global Markets Inc.
Philadelphia, Pennsylvania

FTN Financial Capital Markets
Austin, Texas

USB Financial Services Inc.
Hunt Valley, Maryland

\$ _____
Hampton Roads Sanitation District
Subordinate Wasterwater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)

Ladies and Gentlemen:

We have acted as counsel to the Hampton Roads Sanitation District (the “District”) in connection with the issuance and sale of the above-referenced bonds (the “Bonds”). The Bonds are being issued under the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, between the District and The Bank of New York Mellon Trust Company, N.A., as trustee (in such capacity, the “Trustee”). The Bonds will be secured by such Trust Agreement, as further supplemented by the Seventh Supplemental Trust Agreement, dated as of _____ 1, 2019, between the District and the Trustee (collectively, the “Trust Agreement”). Unless otherwise defined, the capitalized terms used in this opinion have the meanings set forth in the Bond Purchase Agreement (as hereinafter defined).

In connection with our opinion, we have examined the following:

- (1) Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended (the “Enabling Act”);
- (2) the resolution adopted by the District on August 27, 2019 (the “Resolution”);
- (3) the Trust Agreement;
- (4) the Bonds;

- (5) the Bond Purchase Agreement, dated _____, 2019 (the “Bond Purchase Agreement”), between you and the District;
- (6) the Escrow Deposit Agreement[s], each dated _____, 2019 (the “Escrow Agreement[s]”), each between the District and The Bank of New York Mellon Trust Company, N.A., as Escrow Agent (in such capacity, the “Escrow Agent”);
- (7) the Official Statement, dated _____, 2019 (the “Official Statement”), prepared in connection with the offering of the Bonds; and
- (8) the Continuing Disclosure Agreement, dated as of _____, 2019 (the “Continuing Disclosure Agreement”), delivered by the District for the benefit of the Underwriters and the holders of the Bonds.

The Trust Agreement, the Continuing Disclosure Agreement, the Escrow Agreement[s] and the Bond Purchase Agreement are referred to collectively as the “District Documents.”

As to questions of fact material to this opinion, we have relied upon representations of, and the compliance as of the date hereof with the covenants by, the District contained in the District Documents, certifications of public officials furnished to us, and certifications and representations contained in certificates of the District and others delivered at Closing; provided that nothing has come to our attention that would lead us to believe that reliance upon such representations and certifications is unreasonable. We have assumed that all signatures on documents, certificates, and instruments examined by us are genuine, all documents, certificates, and instruments submitted to us as originals are authentic, and all documents, certificates, and instruments submitted to us as copies conform to the originals. In addition, we have assumed that all documents, certificates, and instruments relating to this financing have been duly authorized, executed, and delivered by all parties to them.

Based upon the foregoing, we are of the opinion that:

1. The District is a political subdivision of the Commonwealth of Virginia duly created and validly existing under the Enabling Act and has full power and authority under the Enabling Act to (i) execute and deliver the District Documents and the Bonds, (ii) issue, sell and deliver the Bonds pursuant to the Trust Agreement, and (iii) consummate the transactions contemplated by, and perform its obligations under, the District Documents. The directors and officers of the District identified in the District’s general certificate delivered the date hereof have been duly appointed and are qualified to serve as such.

2. The Resolution has been duly adopted, complies with the Enabling Act and is in full force and effect on this date. The Bonds and the District Documents have been duly authorized and executed by the District.

3. The District has duly approved the Official Statement and its use in connection with the public offering of the Bonds.

4. The authorization, execution and delivery of the District Documents and the Bonds and the performance by the District of its obligations thereunder will not conflict with or

constitute a violation or breach of or default under (i) any federal or Virginia constitutional provision or any other provision of Virginia law, (ii) any material agreement or other material instrument to which the District is a party or by which the District is bound, or (iii) to the best of our knowledge, any order, rule or regulation of any court or governmental agency or body having jurisdiction over the District or any of its properties.

5. There is no litigation at law or in equity or any proceeding before any governmental agency pending against the District, nor, to the best of our knowledge, threatened with respect to (i) the organization or existence of the District, (ii) the District's authority to execute and deliver the District Documents and the Bonds, (iii) the validity or enforceability of any of the District Documents and the Bonds against the District or the transactions contemplated by them, (iv) the title of the officers of the District who executed the District Documents and the Bonds to their offices, or (v) any authority or proceedings of the District relating to the execution and delivery of any of the District Documents and the Bonds by the District. The District has expressly disclosed that the District and the United States Environmental Protection Agency ("EPA") have modified the consent agreement with the Commonwealth of Virginia and the Order from EPA into a federal consent decree lodged with the federal district court for the eastern district of Virginia. Such consent decree could impose penalties and other relief, as set forth in the Official Statement under "THE SYSTEM—State Consent Agreement and EPA Consent Decree." A separate opinion will be issued by AquaLaw as to these matters, and we express no opinion as to these matters.

We express no view as to any part of the Official Statement as to financial statements and other financial and statistical data included in the Official Statement or elsewhere.

6. No further consent, approval, authorization or order of any governmental or regulatory authority is required to be obtained by the District as a condition precedent to the issuance of the Bonds, the execution and delivery of the Bonds or the District Documents, or the performance by the District thereunder (provided no opinion is expressed as to any action required under federal or state securities or Blue Sky laws in connection with the purchase or distribution of the Bonds by the Underwriters).

Our services as counsel to the District have been limited to rendering the foregoing opinions based upon our review of such legal proceedings as we have deemed necessary. We express no opinion as to the accuracy or completeness of any information that may have been relied upon by the purchasers of the Bonds.

This letter is furnished by us in our capacity as counsel for the District. No attorney-client relationship has existed or exists between our firm and the addressees hereof in connection with the Bonds, the Official Statement or by virtue of this opinion. This opinion is delivered to, and is solely for the benefit of, the addressees hereof and is not to be used, circulated, quoted or otherwise referred to or relied upon by any person other than you. This opinion may not be relied upon by the Trustee or the holders of the Bonds.

To the best of our knowledge, the information contained in the Official Statement is true and correct and does not contain any untrue statement of a material fact and does not omit to state any material fact necessary to make the statements therein, in the light of the circumstances

under which they were made, not misleading. We do not express any opinion or belief, to any financial statements or any other financial or statistical information contained in the Official Statement, and we express no opinion as to the tax-exempt status of the interest on the Bonds or the necessity for the registration of the Bonds or the qualification of the Trust Agreement under applicable law, including the Securities Act of 1933, as amended, and the Trust Indenture Act of 1939, as amended.

KELLAM, PICKRELL, COX & ANDERSON,
P.C.

By _____
William A. Cox, III, President

_____, 2019

The Bank of New York Mellon Trust Company, N.A.,
as Trustee
Pittsburgh, Pennsylvania

\$ _____
Hampton Roads Sanitation District
Subordinate Wastewater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)

Ladies and Gentlemen:

We have served as general counsel to the Hampton Roads Sanitation District (the “District”) in connection with the issuance and sale of the above-captioned bonds (the “Bonds”). The Bonds are being issued under the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, between the District and The Bank of New York Mellon Trust Company, N.A., as trustee (the “Trustee”). The Bonds are secured by such Trust Agreement, as further supplemented by the Seventh Supplemental Trust Agreement, dated as of _____ 1, 2019, between the District and the Trustee (collectively, the “Trust Agreement”). Unless otherwise defined, the capitalized terms used in this opinion have the meanings set forth in the Trust Agreement.

In connection with our opinion, we have examined the following:

- (1) Chapter 66 of the Acts of Assembly of Virginia of 1960, as amended;
- (2) the resolution adopted by the Hampton Roads Sanitation District Commission on August 27, 2019 (the “Resolution”);
- (3) the Trust Agreement; and
- (4) the Bonds.

As to questions of fact material to this opinion, we have relied upon representations of, and the compliance as of the date hereof with the covenants by, the District contained in the Trust Agreement, certifications of public officials furnished to us, and certifications and representations contained in certificates of the District and others delivered in connection with the issuance of the Bonds; provided that nothing has come to our attention that would lead us to believe that reliance upon such representations and certifications is unreasonable. We have assumed that all signatures on documents, certificates, and instruments examined by us are genuine, all documents, certificates, and instruments submitted to us as originals are authentic, and all documents, certificates, and instruments submitted to us as copies conform to the originals. In addition, we have assumed that all documents, certificates, and instruments relating to the Bonds have been duly authorized, executed, and delivered by all parties to them other than the District.

Based upon the foregoing and upon such other information and documents as we consider necessary, we are of the opinion that:

(1) the District has the power and authority to execute and deliver the Trust Agreement and the Bonds and to consummate the transactions contemplated by such instruments;

(2) the Trust Agreement and the Bonds have been duly authorized, executed and delivered by the District;

(3) the District has received, and there are currently in full force and effect with respect to the District, all consents, approvals, authorizations and orders of governmental or regulatory authorities, if any, necessary to conduct its business as it is currently being conducted; and

(4) the execution and delivery of the Trust Agreement and the Bonds by the District and its compliance with the terms of such instruments, under the circumstances contemplated by such instruments, do not and will not in any material respect conflict with, or constitute on the part of the District a breach of or default under, any indenture, mortgage, deed of trust, agreement or other instrument to which the District is a party or by which the District or any of its property is bound or conflict with, violate or result in a breach of any law, public administrative rule or regulation, judgment, court order or consent decree to which the District or any of its property is subject.

We express no opinion as to the tax status of the interest on the Bonds or the necessity for the registration of the Bonds or the qualification of the Trust Agreement under applicable law, including the Securities Act of 1933, as amended, and the Trust Indenture Act of 1939, as amended.

KELLAM, PICKRELL, COX & ANDERSON,
P.C.

By: _____
William A. Cox, III, President

**FORM OF OPINION OF AQUALAW PLC,
SPECIAL COUNSEL FOR THE DISTRICT**

_____, 2019

Hampton Roads Sanitation District
Virginia Beach, Virginia

Citigroup Global Markets Inc.
Philadelphia, Pennsylvania

FTN Financial Capital Markets
Austin, Texas

USB Financial Services Inc.
Hunt Valley, Maryland

\$ _____
Hampton Roads Sanitation District
Subordinate Wastewater Revenue Bonds,
Refunding Series 2019A (Federally Taxable)

Ladies and Gentlemen:

We are writing as outside environmental counsel to the Hampton Roads Sanitation District (“HRSD”) regarding statements made in the Official Statement, dated _____, 2019, of HRSD (the “Official Statement”) concerning federal and State enforcement initiatives for HRSD’s sewage collection system. These initiatives relate to the portion of HRSD’s system which serves localities in the Hampton Roads, Virginia, region.

Specifically, I am writing to confirm that the statements contained in the Official Statement under the captions “THE SYSTEM—State Consent Agreement and EPA Consent Decree” and “—State Consent Agreement for Town of Surrey Treatment Plant” present a fair and accurate summary of the matters purported to be summarized therein. These statements do not contain an untrue statement of a material fact. Nor do they omit to state any material fact necessary in order to make such statements, in the light of the circumstances under which they were made, not misleading as of the date of the Official Statement and as of the date hereof.

Sincerely,

AquaLaw, PLC

EXHIBIT 3

_____, 2019

Citigroup Global Markets Inc.
Philadelphia, Pennsylvania

FTN Financial Capital Markets
Austin, Texas

USB Financial Services, Inc.
Hunt Valley, Maryland

[Underwriters' Counsel's Opinion to come]

HAMPTON ROADS SANITATION DISTRICT

and

THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A.,

as ESCROW AGENT

**Escrow Deposit Agreement relating to
Subordinate Wastewater Revenue Bonds, Series 20__A**

Dated as of _____, 2019

ESCROW DEPOSIT AGREEMENT

This ESCROW DEPOSIT AGREEMENT, dated as of _____, 2019, by and among Hampton Roads Sanitation District (the “District”) and The Bank of New York Mellon Trust Company, N.A., as trustee under the Amended and Restated Trust Agreement dated as of March 1, 2016, as supplemented (the “Trust Agreement”), and its successor or successors and any other corporation which may be substituted in its place pursuant to the Trust Agreement and as Paying Agent for the Refunded Bonds (as hereinafter defined) (the “Trustee”) and as escrow agent hereunder (hereinafter referred to, in either or both capacities, as the “Escrow Agent”).

WHEREAS, the District, under and pursuant to the provisions of that certain Trust Agreement, dated as of March 1, 2016, as supplemented, authorized and issued multiple series of Subordinate Bonds under the Trust Agreement; and

WHEREAS, the District wishes to refund all or a portion of its outstanding Subordinate Wastewater Revenue Bonds, Series 20__A, such Subordinate Obligations being more particularly identified in **Exhibit A** (the “Refunded Bonds”); and

WHEREAS, the District has determined to issue its Subordinate Wastewater Revenue Bonds, Refunding Series 2019A (Federally Taxable) (the “Series 2019A Bonds”) under the Trust Agreement; and

WHEREAS, pursuant to the Trust Agreement, a portion of the proceeds of the Series 2019A Bonds will be provided to the Trustee, along with certain other moneys, to enable the Trustee to purchase securities in order to pay the Refunded Bonds and discharge and satisfy the covenants, agreements and other obligations of the District to the holders of the Refunded Bonds under the Trust Agreement; and

WHEREAS, the purchase and deposit of Escrow Securities (as defined below) and the deposit of the Cash Amount (as defined below) with the Trustee will accomplish the discharge and satisfaction of the covenants, agreements and other obligations of the District to the holders of the Refunded Bonds under the Trust Agreement;

NOW THEREFORE, in consideration of the foregoing and of the mutual covenants hereinafter set forth, the parties hereto agree as follows:

1. All capitalized terms used herein and not otherwise defined herein shall have the same meanings in this Escrow Deposit Agreement as such terms are given in the Trust Agreement. Reference herein to or citation herein of any provisions of the Trust Agreement shall be deemed to incorporate the same as a part hereof in the same manner and with the same effect as if the same were fully set forth herein.

2. The Bank of New York Mellon Trust Company, N.A. is hereby appointed as Escrow Agent by the District and, by its execution and delivery hereof, The Bank of New York Mellon Trust Company, N.A. accepts appointment as Escrow Agent hereunder.

3. There is hereby created and established with the Escrow Agent a special and irrevocable fund designated the “Hampton Roads Sanitation District 20__A Refunding Escrow Deposit Fund” (the “Escrow Fund”) to be held by the Escrow Agent separate and apart from all other funds of the District or the Escrow Agent.

On _____, 2019, the District shall cause to be transferred Series 2019A Bond proceeds in the amount of \$_____ (the “Bond Proceeds Escrow Deposit”) and \$_____ of District funds (the “District Contribution” and, together with the Bond Proceeds Escrow Deposit, the “Escrow Deposit”) to the Escrow Agent, and the Escrow Agent shall acknowledge receipt of the Escrow Deposit.

The District directs the Escrow Agent, and the Escrow Agent agrees to deposit the Escrow Deposit in the Escrow Fund and to apply amounts credited to the Escrow Fund to the purchase of the Defeasance Obligations listed in **Exhibit B** (such Defeasance Obligations together with any Defeasance Obligations substituted therefor and any Defeasance Obligations purchased pursuant to paragraphs (4) or (5) hereof are collectively referred to herein as the “Escrow Securities”), which, as provided in paragraph (6) hereof, are intended to mature at times and in amounts sufficient (excluding reinvestment earnings) to pay principal or redemption price of and interest when due on the Refunded Bonds, respectively. Except as otherwise provided below under subparagraph (b) of paragraph (4) with respect to the Escrow Securities, the Escrow Agent shall have no power or duty to invest any moneys held hereunder or to make substitutions of the Escrow Securities held hereunder or to sell, transfer, or otherwise dispose of the Escrow Securities or moneys acquired hereunder except in accordance with written instructions of the District. Any amounts derived from Escrow Securities not required to be applied to the payment of the principal or redemption price of and interest when due on the Refunded Bonds shall, to the extent practicable, be reinvested at the written direction of the District.

4. (a) Other than as hereinafter provided in this paragraph (4), or in paragraph (5) below, with respect to any amounts received from principal or interest payments on such Escrow Securities (as defined above) remaining in the Escrow Fund, and principal or redemption price of and interest due or to become due on the Refunded Bonds, the Escrow Agent shall leave such amounts received from the maturing principal of and interest on the Escrow Securities to the extent not then used to pay the principal or redemption price of or interest on the Refunded Bonds uninvested in the Escrow Fund.

(b) The District hereby directs the Escrow Agent to enter into this Escrow Deposit Agreement, and to invest and reinvest the amount held in the Escrow Fund pursuant to the terms hereof. The Escrow Agent hereby agrees that it will take all of the actions required to be taken by it in its capacity as Trustee under the Trust Agreement and as Escrow Agent hereunder in order to effectuate this Escrow Deposit Agreement. The liability of the Escrow Agent for the payment of the Refunded Bonds, pursuant to this paragraph and the Trust Agreement shall be limited to the application thereto of the Escrow Securities and the interest earnings thereon available for such purposes in the Escrow Fund. The Escrow Agent shall have no responsibility for any investment losses resulting from the investment, reinvestment, liquidation or substitution of Escrow Securities in accordance with the written direction of the District. The Escrow Agent shall invest amounts held in the Escrow Fund in accordance with the terms of this Escrow Deposit Agreement. The Escrow Agent, at the written direction of the District and upon receipt

of the opinions and certificates described below, shall invest and reinvest in Defeasance Obligations any moneys remaining from time to time in the Escrow Fund until such time that they are needed to provide for the payment of the principal or redemption price of and interest on the Refunded Bonds, except as provided by paragraph (5) below. [Such moneys shall be reinvested at the direction of the District in Defeasance Obligations maturing no later than when required to meet an interest or principal payment on the Refunded Bonds, and at such interest rates or yields and for such periods that the District shall direct, provided that the Escrow Agent shall have received (i) a written opinion of a lawyer or a firm of lawyers nationally recognized in the field of municipal finance and satisfactory to the Escrow Agent (an “Opinion of Counsel”) to the effect that such reinvestment of such moneys and the interest rates or yields on such moneys and substitute Defeasance Obligations will not adversely affect the exclusion of interest on the Series 2019A Bonds or the Refunded Bonds from gross income for Federal income tax purposes and] (ii) a certification from a nationally recognized verification agent that, immediately following such transaction, the principal of and interest on the Defeasance Obligations in the Escrow Fund when due and paid will, without reinvestment, together with any other moneys or securities held in the Escrow Fund for such purpose, be sufficient to pay the principal of, redemption premium, if any, and interest on the Refunded Bonds when due.

5. The District may withdraw from the Escrow Fund at any time moneys or Defeasance Obligations not then or thereafter needed to pay the principal or redemption price of and interest due or to become due on the Refunded Bonds resulting from any activity described in paragraphs (3) or (4) above or any other action of the District permitted by the Trust Agreement (including that certain of the Refunded Bonds have ceased to be Outstanding by virtue of the fact that such Refunded Bonds have been acquired by the Escrow Agent or the Trustee at the direction of the District) or this Escrow Agreement; the District shall provide to the Trustee an Accountant’s Report that after any such withdrawal the principal of and interest on the moneys and securities on deposit in the Escrow Fund, together with other moneys or securities held in the Escrow Fund for such purpose, shall be sufficient to pay without reinvestment, when due, the principal or redemption price of and interest on the Refunded Bonds.

6. The District hereby represents, warrants and certifies to the Escrow Agent that the Escrow Securities deposited in the Escrow Fund are and shall be Defeasance Obligations and that the Escrow Securities mature at such times and in such amounts such that, based solely upon calculations and certifications made to it by [Bingham Arbitrage Rebate Services, Inc.], verification agent, the maturing principal of and the interest on the Escrow Securities and the cash in the amount of \$ _____ not applied to the purchase of the Escrow Securities (the “Cash Amount”), collectively, will be sufficient to pay when due the principal or redemption price, if applicable, of and interest due and to become due on the Refunded Bonds, on and prior to the redemption date or maturity date thereof, as the case may be, provided that amounts received from the Escrow Securities and not needed to pay amounts due on the Refunded Bonds, on the date received shall be held uninvested until applied to pay amounts due on the Refunded Bonds, or reinvested as provided in paragraph (4), all in accordance with and in satisfaction of the provisions of the Trust Agreement and this Escrow Deposit Agreement.

7. The District hereby irrevocably designates the Refunded Bonds for redemption on the dates set forth in **Exhibit A** hereto. The forms of the notice required to be mailed pursuant to

the requirements of the applicable Series Agreement are attached hereto as **Appendix A** and the District hereby irrevocably instructs the Trustee to mail such notices at the times and in the manner required by the applicable Series Agreement. Further, the District hereby irrevocably instructs the Trustee to deliver the notice of defeasance, the form of which is attached hereto as **Appendix B**, on the date hereof.

8. The District irrevocably covenants that it will take, or cause to be taken, all actions necessary to cause any Refunded Bonds anticipated to be redeemed to be so redeemed, including the timely mailing or publication of notices of redemption and the Escrow Agent shall have no obligation or liability with respect thereto.

9. The deposit of the Escrow Securities and moneys in the Escrow Fund shall constitute an irrevocable deposit in trust solely for the payment of the Refunded Bonds, and the principal of and interest earnings on such Escrow Securities and moneys shall be used solely for such purposes, as necessary, subject to paragraphs (4) and (5) hereof.

10. Neither the District nor the Escrow Agent shall sell, transfer or otherwise dispose of the Escrow Securities or the funds held uninvested under this Escrow Deposit Agreement, except as otherwise provided in paragraphs (4) and (5) hereof and except that the Escrow Agent may effect the transfer of such Escrow Securities or funds to a successor escrow agent in accordance with the Trust Agreement relating to the transfer of rights and property to successor trustees.

11. Subject to the provisions of paragraphs (4) and (5) hereof, the lien and pledge hereby created shall be irrevocable and the holders of the Refunded Bonds shall have an express lien on all moneys and Escrow Securities deposited in the Escrow Fund pursuant to paragraphs (3), (4) and (5) hereof and the interest earnings thereon until paid out, used and applied in accordance with this Escrow Deposit Agreement. Nothing in this Escrow Deposit Agreement shall be deemed to imply that the Refunded Bonds have been paid or deemed paid by reason of the execution of this Escrow Deposit Agreement.

12. In consideration of the services rendered by the Escrow Agent under this Escrow Deposit Agreement, the District agrees to and shall pay to the Escrow Agent such fees and expenses as the District and the Escrow Agent shall agree in writing, including all reasonable expenses, charges, counsel fees and other disbursements incurred by the Escrow Agent or by its attorneys, agents and employees in and about the performance of their powers and duties hereunder, from any moneys of the District lawfully available therefor and the Escrow Agent shall have no lien, claim, or right of setoff whatsoever upon or against any of the Escrow Securities, Defeasance Obligations, or the funds held uninvested in said Escrow Fund for the payment of such fees and expenses. The District further agrees, to the extent permitted by law, to indemnify and save the Escrow Agent, any successor escrow agent, and its officers, directors, agents, and employees harmless against any extraordinary expenses, services or liabilities which it may incur as a result of entering into this Escrow Deposit Agreement or which it may incur in the exercise and performance of its powers and duties hereunder and which are not due to the Escrow Agent's willful misconduct or bad faith. The provisions of this paragraph (12) shall survive the discharge of this Escrow Deposit Agreement or the earlier resignation or removal of the Escrow Agent.

13. The District hereby acknowledges that the rights, duties, immunities and indemnities of the Trustee set out in Article IX of the Trust Agreement, and the obligations of the District in respect thereof shall be applicable to the Trustee in its capacity as Escrow Agent hereunder.

14. The Escrow Agent will have no duties or responsibilities to the District or any other person in connection herewith except those specifically provided herein and will not be responsible for anything done or omitted to be done by it except for its own negligence, gross negligence, willful or intentional misconduct or default in the performance of any obligation imposed on it hereunder.

15. The Escrow Agent may consult with legal counsel or other experts concerning its duties hereunder, and the opinion of such counsel will be full and complete authority and protection to the Escrow Agent as to any action taken or omitted by it in good faith and in accordance with such opinion.

The Escrow Agent may perform its duties hereunder by or through attorneys, agents, receivers, or employees. The Escrow Agent shall not be obligated to use or risk its own funds in the performance of its duties hereunder or to pay the principal of, premium, if any, or interest on the Refunded Bonds.

16. Notices. All notice and communications to the District shall be addressed in writing to:

Jay A. Bernas
Director of Finance and CFO
Hampton Roads Sanitation District
1434 Air Rail Avenue
Virginia Beach, Virginia 23455

or at such other address as is furnished from time to time by the District.

All notices and communications to the Escrow Agent shall be addressed in writing to:

The Bank of New York Mellon Trust Company, N.A.
500 Ross Street, 12th Floor
Pittsburgh, Pennsylvania, 15262
Attention: Corporate Trust - Public Finance

or at such other address as is furnished from time to time by the Escrow Agent.

17. Resignation and Discharge of Escrow Agent. The Escrow Agent may resign and thereby become discharged from the trusts hereby created, by written notice mailed to the District by registered or certified mail. Such resignation shall take effect upon the appointment of a new Escrow Agent hereunder and acceptance of the trusts hereby created. The Escrow Agent shall continue to serve as Escrow Agent until a successor is appointed by the District, and the Escrow Agent may, after 60 days subsequent to its resignation, petition the Circuit Court of

the City of Virginia Beach, Virginia, for the appointment of a successor Escrow Agent if one has not yet been appointed.

18. This Escrow Deposit Agreement shall terminate when the Escrow Agent shall have transferred all amounts to be transferred hereunder in accordance with **Exhibit C** hereto.

19. This Escrow Deposit Agreement and the rights and duties of the parties hereunder shall be governed by, and construed in accordance with, the law of the Commonwealth of Virginia.

20. If any one or more of the covenants or agreements provided in this Escrow Deposit Agreement on the part of the District or the Escrow Agent to be performed should be determined by a court of competent jurisdiction to be contrary to law, such covenant or agreement shall be deemed and construed to be severable from the remaining covenants and agreements herein contained and shall in no way affect the validity of the remaining provisions of this Escrow Deposit Agreement.

21. This Escrow Deposit Agreement may be executed in several counterparts, all or any of which shall be regarded for all purposes as one original and shall constitute and be but one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have each caused this Escrow Deposit Agreement to be executed by their duly authorized officers as of the date first above written.

HAMPTON ROADS SANITATION DISTRICT

By: _____

Name: Jay A. Bernas

Title: Director of Finance

THE BANK OF NEW YORK MELLON TRUST
COMPANY, N.A.,
as Escrow Agent

By: _____

Name:

Title:

EXHIBIT A

Refunded Bonds

Subordinate Wastewater Revenue Bonds, Series 20 A

<u>Original CUSIPs</u> ¹	<u>Maturity (August 1)</u>	<u>Outstanding Principal Amount</u>	<u>Refunded Bonds</u>	<u>Refunded CUSIP</u> ²	<u>Non- Refunded Bonds</u>	<u>Non- Refunded CUSIP</u> ²
409327____		\$	\$	409327____	\$	409327____
409327____				409327____		409327____

All Refunded Bonds will be redeemed on _____, 202_, at a Redemption Price of 100%.

¹ This column indicates the CUSIP numbers that were assigned upon the original issuance of the Refunded Bonds and does not reflect subsequent changes, if any.

² New CUSIP numbers assigned on the date hereof for the Refunded Bonds and Non-Refunded CUSIPS.

FORM OF NOTICE OF REDEMPTION

HAMPTON ROADS SANITATION DISTRICT, VIRGINIA

Subordinate Wastewater Revenue Bonds, Series 20__A

Dated Date: _____, 20__
 Redemption Date: _____, 20__

<u>Maturity</u> <u>(____ 1)</u>	<u>Principal</u> <u>Amount</u> [*]	<u>Redemption</u> <u>Price</u>	<u>CUSIPs</u> [†]
	\$	100%	409327__
		100	409327__

NOTICE IS HEREBY GIVEN that pursuant to the provisions of the Amended and Restated Trust Agreement, dated as of March 1, 2016, as supplemented, between Hampton Roads Sanitation District (the “District”) and The Bank of New York Mellon Trust Company, N.A., as successor Trustee (the “Trustee”), securing the Bonds described above, the District has called and does hereby call for redemption on _____, 20__, the bonds described above at the redemption price set forth above, together with accrued interest to the date fixed for redemption.

The bonds will become and be due and payable by wire transfer to The Depository Trust Company, New York, New York, or its nominee, as registered owner of the bonds. From _____, 20__, interest on the above-described bonds will cease to accrue.

Under the Jobs and Growth Tax Relief Reconciliation Act of 2003, payers are required to withhold 28% of the amount paid upon redemption to those bondholders who have not returned a correctly completed Form W-9 entitled “Payer’s Request for Taxpayer Identification Number.” If you need a copy of the Form W-9, you should be able to obtain one at your local bank or IRS Service Center. Please return a correctly completed Form W-9 with your bonds to avoid any such withholding.

Dated: _____, 202__

THE BANK OF NEW YORK MELLON TRUST
 COMPANY, N.A.,
 as Trustee under the Amended and Restated
 Trust Agreement and as Escrow Agent

* Partial maturity. New CUSIP numbers were assigned to these bonds upon their defeasance.

† None of the District, the Escrow Agent or the Trustee shall be responsible for the accuracy of the CUSIP numbers provided above. The CUSIP numbers are provided solely for the convenience of the bondholders.

FORM OF NOTICE OF DEFEASANCE

NOTICE OF ESTABLISHMENT OF ESCROW FUND

HAMPTON ROADS SANITATION DISTRICT, VIRGINIA

Subordinate Wastewater Revenue Bonds, Series 20__A

Dated Date: _____, 20__

Redemption Date: _____, 20__

NOTICE IS HEREBY GIVEN by Hampton Roads Sanitation District (the “District”) to the holders of the Bonds described below that, pursuant to the terms of an Escrow Agreement, dated as of _____, 2019 (the “Escrow Agreement”), between the District and The Bank of New York Mellon Trust Company, N.A., in its capacity as escrow agent (the “Escrow Agent”), there has been deposited, in trust, with the Escrow Agent, cash and Defeasance Obligations in an amount that, together with interest thereon, will provide for the payment, when due, of the principal of and the interest on the portion of said bonds (collectively, the “Defeased Bonds”) to their respective maturity dates, as set forth below:

<u>Original CUSIPs</u> [*]	<u>Maturity (August 1)</u>	<u>Outstanding Principal Amount</u>	<u>Refunded Bonds</u>	<u>Refunded CUSIP</u> [†]	<u>Non-Refunded Bonds</u>	<u>Non-Refunded CUSIP</u> ^{†,‡}
409327__	__	\$	\$	409327__	\$	409327__
409327__	__			409327__		409327__

This notice is provided solely for informational purposes and does not constitute a notice of redemption. There is no need for the holders of the Defeased Bonds to take any action with respect to the Defeased Bonds.

Dated: _____, 2019

THE BANK OF NEW YORK MELLON TRUST
COMPANY, N.A.,
as Trustee under the Amended and Restated
Trust Agreement and as Escrow Agent

* This column indicates the CUSIP numbers that were assigned upon the original issuance of the Refunded Bonds and does not reflect subsequent changes, if any.

† New CUSIP numbers assigned on the date hereof for the Refunded Bonds and Non-Refunded CUSIPS.

‡ None of the District, the Escrow Agent or the Trustee shall be responsible for the accuracy of the CUSIP numbers provided above. The CUSIP numbers are provided solely for the convenience of the bondholders.

HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #3

AGENDA ITEM 5. – MASTER TRUST INDENTURE SENIOR LIEN CLOSURE
RESOLUTION

Hampton Roads Sanitation District
Resolution of
August 27, 2019

HAMPTON ROADS SANITATION DISTRICT COMMISSION

RESOLUTION AUTHORIZING THE CLOSURE OF THE MASTER TRUST INDENTURE,
DATED AS OF DECEMBER 1, 1993, AS AMENDED AND RESTATED AS OF MARCH 1,
2008, AS SUPPLEMENTED AND AMENDED

Adopted August 27, 2019

RESOLUTION AUTHORIZING THE CLOSURE OF THE MASTER TRUST INDENTURE,
DATED AS OF DECEMBER 1, 1993, AS AMENDED AND RESTATED AS OF MARCH 1,
2008, AS SUPPLEMENTED AND AMENDED

WHEREAS, Hampton Roads Sanitation District (the “District”) is a political subdivision organized and existing under the laws of the Commonwealth of Virginia; and

WHEREAS, the Commission has previously executed and delivered a Master Trust Indenture, dated as of December 1, 1993, as amended and restated March 1, 2008 (as supplemented and as further amended and supplemented from time to time, the “Senior Trust Agreement”), between the District and The Bank of New York Mellon Trust Company, N.A., as successor Trustee (in such capacity, the “Senior Trustee”), pursuant to which District provided for issuance and incurrence of Senior Obligations (as defined in the Senior Trust Agreement); and

WHEREAS, the Commission executed and delivered a Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, as supplemented and amended (the “Subordinate Trust Agreement”), between the District and The Bank of New York Mellon Trust Company, N.A., as Trustee (in such capacity, the “Trustee”) to provide for the issuance of Subordinate Obligations payable solely from the Net Revenues Available for Debt Service (as defined therein) derived by the District from its Wastewater System and the money attributable to proceeds of the Bonds and the income from the investment thereof; and

WHEREAS, the Commission has previously indicated its intention to issue future indebtedness in accordance with the Subordinate Trust Agreement;

WHEREAS, the Commission understands that there is limited benefit to the District in maintaining the ability to issue indebtedness under the Senior Trust Agreement;

NOW, THEREFORE, THE HAMPTON ROADS SANITATION DISTRICT COMMISSION DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. The Commission hereby authorizes the General Manager of the District and the Director of Finance of the District (each, a “Delegate”), any of whom may act, to take such steps as may be necessary prevent the future issuance of the indebtedness of District under the Senior Trust Agreement, including, but not limited to, the amendment of the Senior Trust Agreement, the amendment of the Subordinate Trust Agreement and any agreement with the Virginia Resources Authority relating to the migration of indebtedness issued by the District under the Senior Trust Agreement to the Subordinate Trust Agreement.

Section 2. This resolution shall take effect immediately upon its passage.

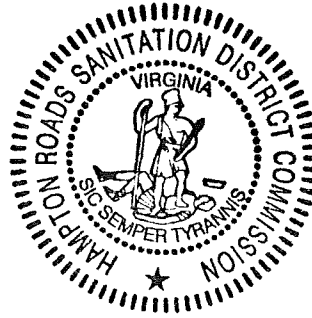
[End of Resolution]

RESOLUTION AUTHORIZING THE CLOSURE OF THE MASTER TRUST INDENTURE,
DATED AS OF DECEMBER 1, 1993, AS AMENDED AND RESTATED AS OF MARCH 1,
2008, AS SUPPLEMENTED AND AMENDED

PASSED AND ADOPTED this 27th day of August, 2019.

The undersigned further certifies that the foregoing has been properly approved and adopted in accordance with all applicable requirements of the Hampton Roads Sanitation District Commission.


Frederick N. Elofson, Chair



HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #4

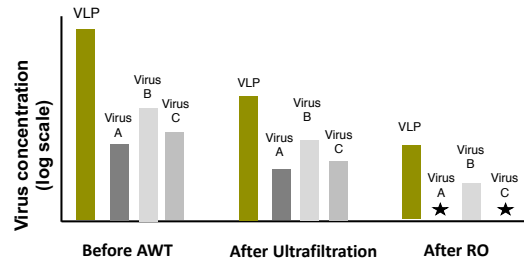
AGENDA ITEM 8. – IMPROVED ASSESSMENT OF VIRUS REDUCTIONS STUDY

Wigginton/HRSD Collaboration on Improved Assessment of Virus Reductions

Proposed Project Duration. September 1, 2019 – June 30, 2020

Brief Summary. This collaboration between HRSD and the Wigginton research group at the University of Michigan aims to improve methods for tracking virus reduction during advanced water treatment processes aimed at water reuse. Failure to track viruses through treatment upsets could lead to the consumption of under-treated water by the public. If reliable and practical virus monitoring strategies were available, major cost reductions could be achieved in future advanced water treatment plants – which are generally overengineered to achieve these treatment targets and beyond.

We will therefore focus on improving virus surrogate measurements to more effectively measure and, as a result, more accurately credit advanced water treatment operations for the virus concentrations they achieve.



★ Below culture- or qPCR-based method detection limits

Figure 1. Example of how we expect VLP concentrations may change and be tracked through physical unit process in relation to human virus concentrations. The detection limits of specific viruses by culture and qPCR methods are exceeded before the VLP detection limits by flow virometry.

Background. Advanced water treatment systems earn virus reduction credits depending on the types of treatment processes used, measured as log-removal of virus reduction for treatment processes. The resulting log-reduction credits are summed up across the entire advanced water treatment train to reach the required total virus reduction. In lieu of measuring human viruses in finished drinking waters, crediting frameworks exist that rely on the use of surrogate parameters. Although surrogate parameters could theoretically be biological in nature, most are chemical or physical. For example, the use of the “CT” framework (concentration x time) for chemical disinfectants like chlorine and ozone (EPA 1999) has been widely and successfully applied in many water treatment applications. Turbidity removal and membrane integrity tests are common for membrane filtration (EPA 2005), whereas conductivity and total organic carbon (TOC) removal are common for reverse osmosis (RO). Advanced water treatment systems rely on membrane-based, activated carbon-based, and disinfection unit processes coupled with groundwater recharge. Although the CT framework for chemical disinfectants and the UV intensity/transmittance surrogates for UV disinfection have generally been effective and efficient surrogates for assuring virus reduction through disinfection processes and advanced oxidation processes, major issues arise with virus credits for physical treatment processes and biological treatment processes. We assert that advanced water treatment is today vastly overdesigned due to a gross under-crediting of virus removal.

To help address this issues, we propose that virus-like particles are a more effective surrogate for virus credits and are in much higher abundance than any individual virus species in the water. Flow cytometry is a high-throughput method for the detection and quantification of particles using light-scattering and fluorescence characteristics (Shapiro 2003). Real-time monitoring of total bacteria with flow cytometry has been applied in drinking water systems, including for monitoring of source water quality and distribution system water quality (Besmer et al., 2014, Besmer & Hammes 2016; Nescerecka, 2018). By combining the use of powerful cytometers, improved staining approaches, and critical quality controls, we propose to apply flow virometry to characterize virus reductions through advanced water treatment processes. Rather than enumerating human viruses, this technique will enumerate the virus-like particles (VLP) in the water. VLPs are particles in the same size range of human viruses, are present in higher concentrations than specific human and surrogate viruses, and when stained with nucleic acid dyes, fluoresce with the same characteristics as stained human virus particles.

The problem with human virus monitoring through advanced water treatment lies in the low concentrations at which individual human virus species are present. The very highest reported concentrations of specific viruses in untreated wastewater, including human viruses during community outbreaks, highly abundant bacteriophages (e.g., crAssphage), and highly abundant plant viruses (e.g., tobacco mosaic virus), are in the range of 10^8 – 10^9 gc/L (Wigginton, 2019, Garcia-Aljaro, 2017). VLP concentrations in untreated wastewater, on the other hand, have been

estimated to be on the order of 10^{11} particles/L (Ma et al., 2013). A critical research need is to characterize the ranges and detection limits of flow virometry for viruses with different genome types and genome sizes, in real waters with varied characteristics, and with flow cytometers that were designed for small particle detection.

In summary, flow cytometry provides an exciting opportunity to rethink how virus concentration reductions are credited and confirmed through both physical and biological unit processes. Figure 1 illustrates the expected trends observed for VLPs and for specific viruses through physical unit processes.

Research Approach. The ultimate goal of this project is the development of an effective method for confirming virus reduction through advanced water treatment processes. This initial collaboration will focus on the following two objectives and corresponding tasks:

Objective 1. Correlate VLP reductions with the concentrations of specific viruses through bench-scale unit processes.

Task 1 involves bench-scale experiments with ultrafiltration and reverse osmosis to compare virus concentrations measured with culture-based methods to VLP concentrations measured with flow virometry. It will take place in the environmental biotechnology laboratories at the University of Michigan.

The detection limits will first be tested for several viruses with a range of particle diameters, genome types, and genome sizes with flow cytometers in the the University of Michigan Flow Cytometry Core Facility. Viruses will be propagated in their host bacteria or tissue culture system. A cocktail of viruses (e.g., mock community) that are readily detectable with flow virometry will be employed in the bench-scale and pilot-scale challenge tests. For the bench-scale experiments, virus particle reductions measured with flow virometry will be compared to virus reductions measured with culture-based methods. The virus cocktail solutions will be spiked into wastewater and drinking water samples. The water will then be treated with bench-scale membrane processes or coagulation/sedimentation processes. The virus particle concentrations will be measured before and after the membrane and flocculation processes with culture-based methods and with flow virometry. The reductions measured with flow virometry will then be compared to the reductions measured with traditional virus enumeration methods.

At the end of this task, the relationships between virus particles measured with flow virometry and the viruses measured by culturing will have been established. We anticipate that the reductions of total virus counts measured with flow virometry will more closely relate to the reductions of virus concentrations measured by culturing than with the surrogate measurements that are presently employed to confirm virus reductions (e.g., TOC and conductivity). Furthermore, we expect that the range of virus reductions measured with flow virometry will be greater than the range of TOC reductions and conductivity reductions that can be tracked across treatment processes.

Objective 2. Initiate a study at HRSD SWIFT advanced water treatment facility to demonstrate virus concentration reductions through physical and biological treatment steps.

Task 2 experiments apply the VLP methods optimized in Task 1 at HRSD's SWIFT advanced water treatment facility to confirm virus reductions across pilot-scale and full-scale water treatment processes. Challenge studies will be conducted to compare the virus particle measurements collected across unit processes in a pilot-scale advanced treatment plant to the virus concentrations measured with culture methods. The 5,000 GPD pilot system is fully equipped with sampling ports throughout the treatment train and the feed to each treatment step can be easily modified; it is therefore compatible with virus challenge tests.

For these experiments, we will measure virus-like particle reductions with the flow virometry technique optimized with bench-scale experiments in Task 2 and compare them with culture-based reductions. The virus-like particle reductions will be measured through the following unit processes: flocculation/sedimentation, biologically activated carbon, granular activated carbon and soil aquifer columns. Samples collected from these steps will be fixed and sent to UM where they will be analyzed with flow virometry. Surrogate virus culturing will take place in the HRSD microbiology laboratories.

Once the VLP reductions and culturable virus reductions have been well-established through each of the unit processes, the measured values will be compared to common unit process performance surrogates, including TOC, turbidity, pressure tests, and electrical conductivity. Statistical tests will be conducted to describe correlations between measurements made with flow virometry, culture-based methods, and the various performance surrogates.

Personnel. Ph.D. student Kate Harrison will initiate these research tasks over the 2019/2020 year. Ms. Harrison has undergraduate research experience in microbiology, molecular biology, and water treatment. She will work closely between her Ph.D. advisor Krista Wigginton at the University of Michigan and with HRSD researchers Charles Bott, Christopher Wilson, and Raul Gonzalez.

Project budget and justification.

Funds are requested to support the work of a University of Michigan Ph.D. student. This includes graduate student tuition, stipend, and fringe benefits. We are requesting funds for the student and PI to travel to HRSD. Finally, we are requesting supply funds to purchase necessary consumables (e.g., standards, extraction and PCR kits, general lab supplies).

Table 1. Budget overview

Graduate Student Stipend	\$32,573
Graduate Student Fringe Benefits	\$6,515
Travel	\$3,000
Materials and Supplies	\$5,000
Graduate Student Tuition	\$15,702
Indirect Costs (25%)	\$11,772
Total Funds Requested	\$74,562

Works Cited.

Besmer MD, Hammes F: Short-term microbial dynamics in a drinking water plant treating groundwater with occasional high microbial loads. *Water Research*, 2016, 107:11–18.

Besmer MD, Epting J, Page RM, Sigrist JA, Huggenberger P, Hammes F: Online flow cytometry reveals microbial dynamics influenced by concurrent natural and operational events in groundwater used for drinking water treatment. *Scientific Reports*, 2016, 6:38462.

EPA, 1999. Disinfection Profiling and Benchmarking Guidance Manual, U.S. Environmental Protection Agency.

EPA, 2005. Membrane Filtration Guidance Manual, U.S. Environmental Protection Agency.

García-Aljaro, Cristina, Elisenda Ballesté, Maite Muniesa, and Juan Jofre. "Determination of crAssphage in water samples and applicability for tracking human faecal pollution." *Microbial biotechnology* 10, no. 6 (2017): 1775-1780.

Ma, L. et al., 2013. Rapid quantification of bacteria and viruses in influent, settled water, activated sludge and effluent from a wastewater treatment plant using flow cytometry. *Water Science & Technology*, 68(8), pp.1763–1769.

Nescerecka A, Juhna T, Hammes F. Identifying the underlying causes of biological instability in a full-scale drinking water supply system. *Water Research*. 2018 May 15;135:11-21.

Shapiro HM: Practical Flow Cytometry. Joh Wiley & Sons, Inc.; 2003.

Wigginton, K.R., Kohn, T., Pecson, B., Dodd, M., Bischel, H., Rockey, N., Fontaine, N., Salveson, A., "White Paper on Non-Culture-Based Methods for Pathogen Monitoring in Potable Reuse," The Water Research Foundation Project 14-17, 2019.

HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #5

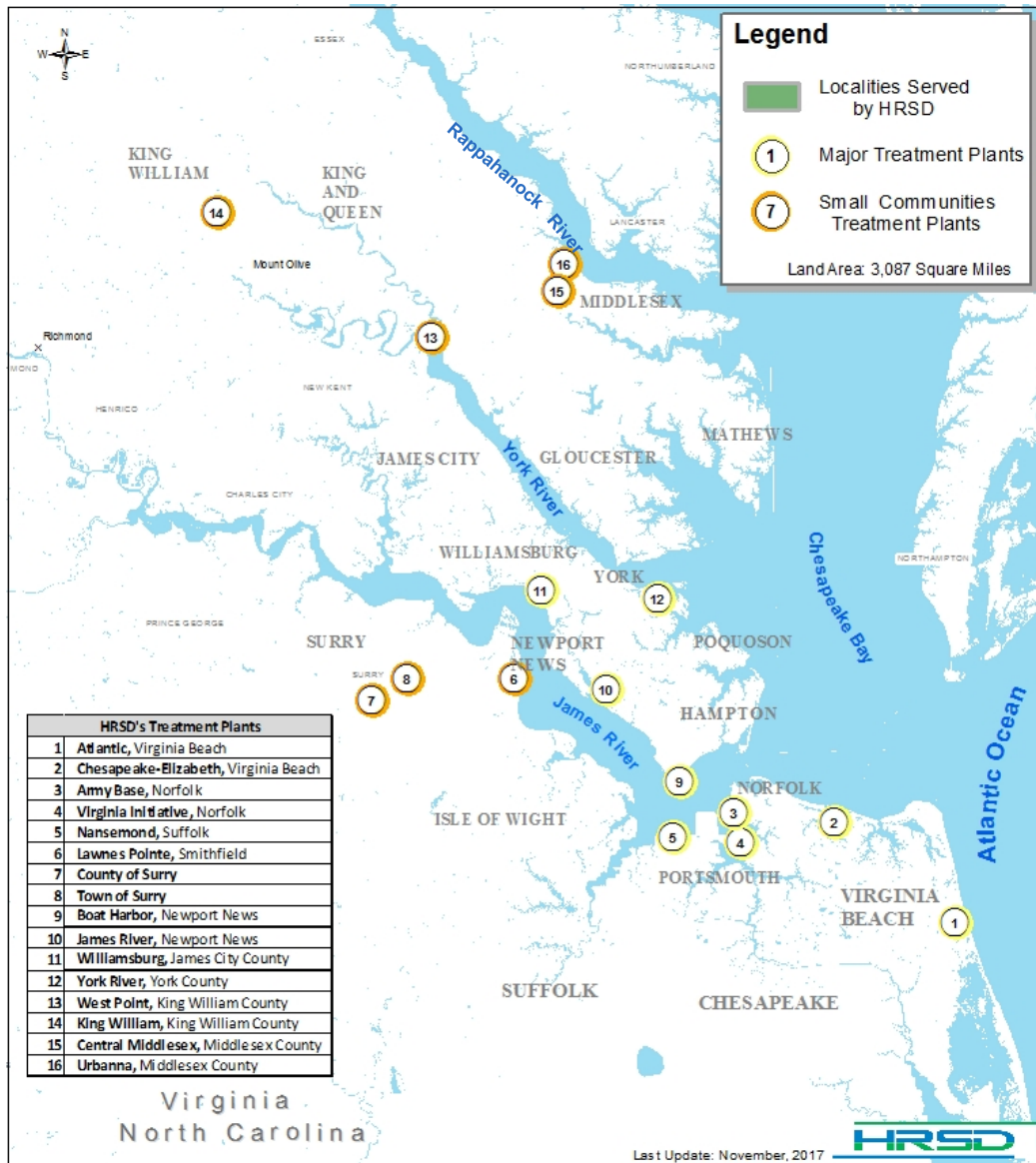
AGENDA ITEM 11. – URBANNA TREATMENT PLANT NUTRIENT CREDIT
ACQUISITION PRESENTATION



Urbanna Nutrient Credit Acquisition Commission Briefing

August 27, 2019

HRSD-River Basin Map



Chesapeake Bay restoration plan limits nutrient loading

- EPA calculated the maximum loading of nutrients to the Bay that would continue to support aquatic life and habitat
- The total amount was divided among the jurisdictions and then subdivided among the major tidal tributary basins
- Each jurisdiction identified needed reductions in both point and non-point sources to meet EPA's allocation

Nutrient allocations assigned independent of local water quality needs

- The Watershed General Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed assigned allocations for existing wastewater facilities that discharged > 100,000 gallons per day (gpd)
- With a design flow of 100,000 gpd, HRSD's Urbanna facility is captured in this permit
 - Actual flows approximately 60,000 gpd
- Most facilities on the Rappahannock assigned an allocation based on 4 mg/L TN and 0.3 mg/L TP
 - These were not based on local water needs but assigned for the purposes of meeting the total assigned allocation for the Rappahannock

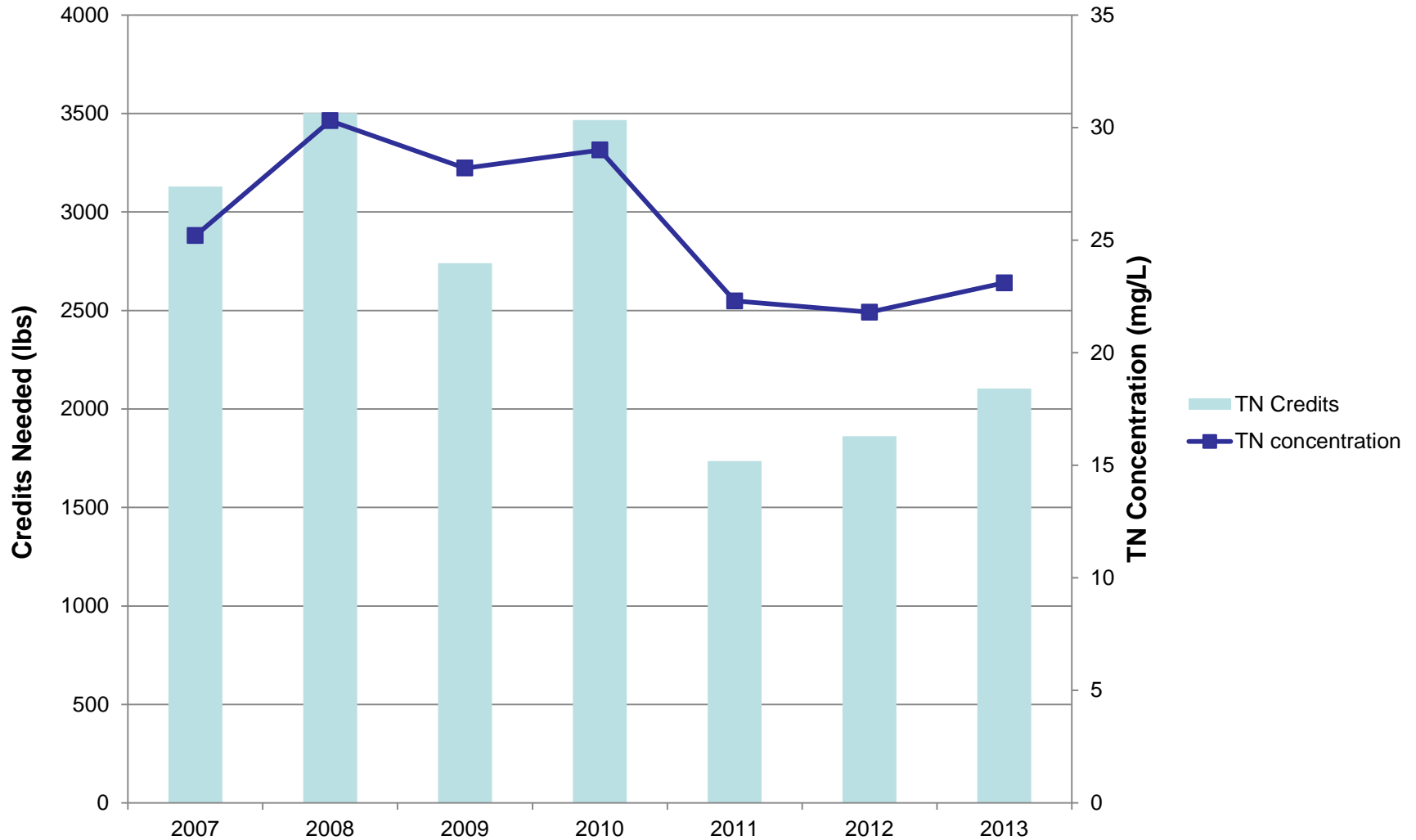
Nutrient trading provides cost-effective means for compliance

- General Assembly enacted legislation to implement a nutrient trading program to meet the pollution reductions needed as cost-effectively and as soon as possible
- The Virginia Nutrient Credit Exchange allows flexibility in the implementation of necessary nutrient reduction practices
- Credits cannot be acquired if doing so would cause an exceedance of a local water quality based limit
- This requirement allows trading to occur at a large watershed scale while providing protection for local waters
- DEQ has not identified a need for a local water quality limit for nutrients in Urbanna Creek

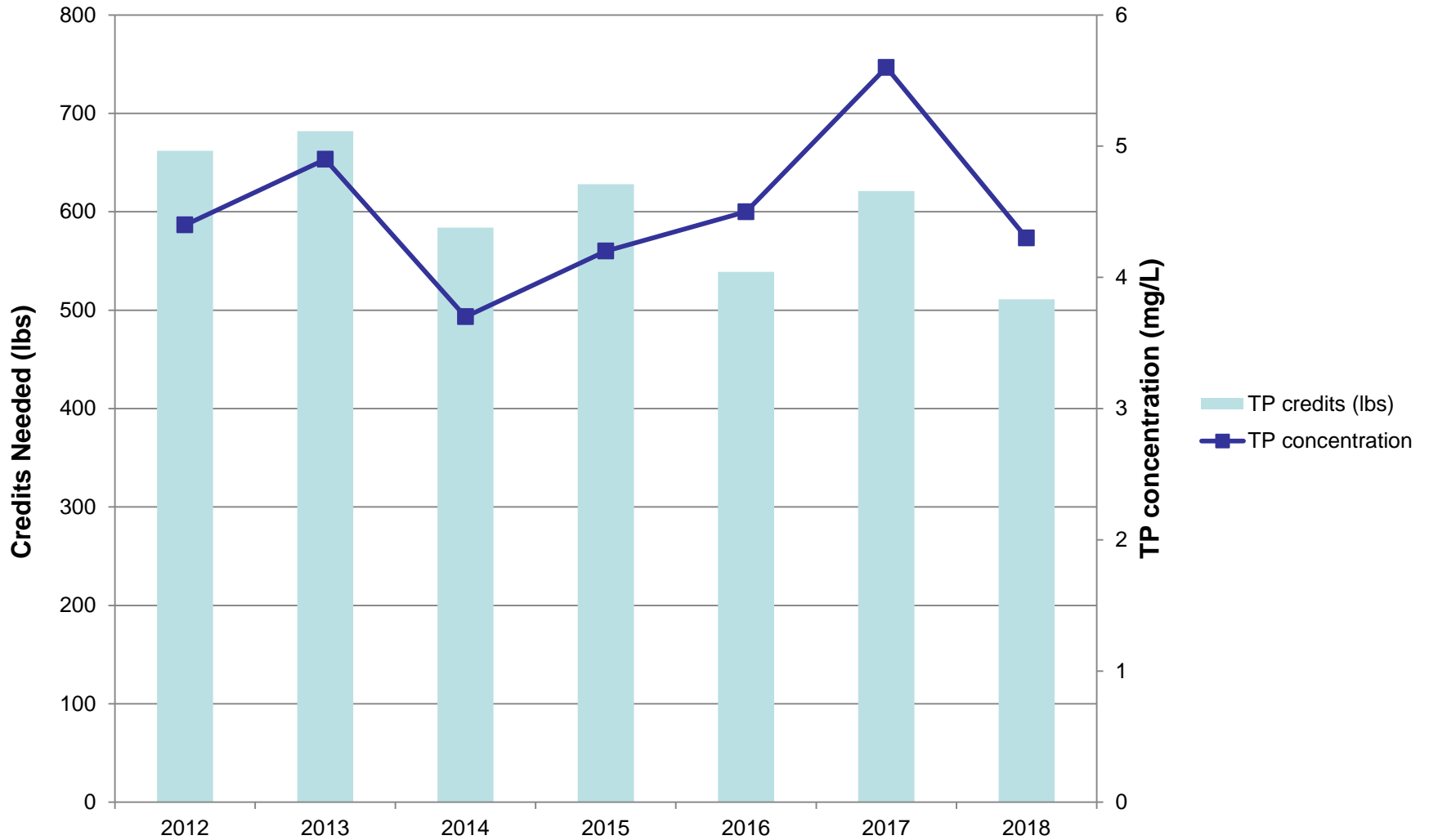
HRSD continues to optimize treatment and plan for future needs

- HRSD operates the facility as efficiently as possible to optimize wastewater treatment performance
- A phased plan to manage increasing flows within Middlesex County includes closing the facility so that current and future flows can be treated at a larger facility

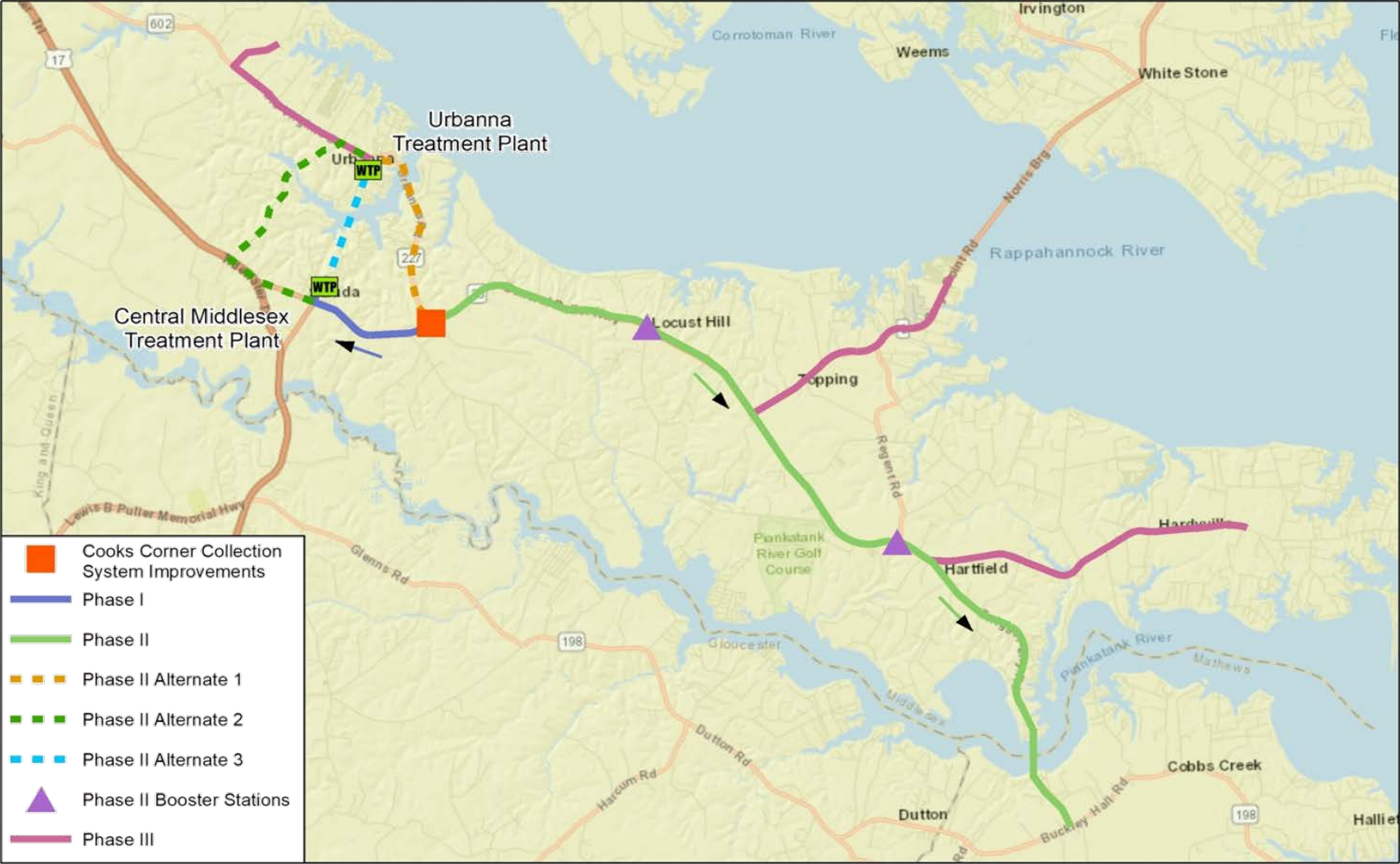
Nitrogen concentrations have declined, reducing needed credits



Phosphorus credit needs generally stable



Middlesex County Sewer Improvements



HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #6

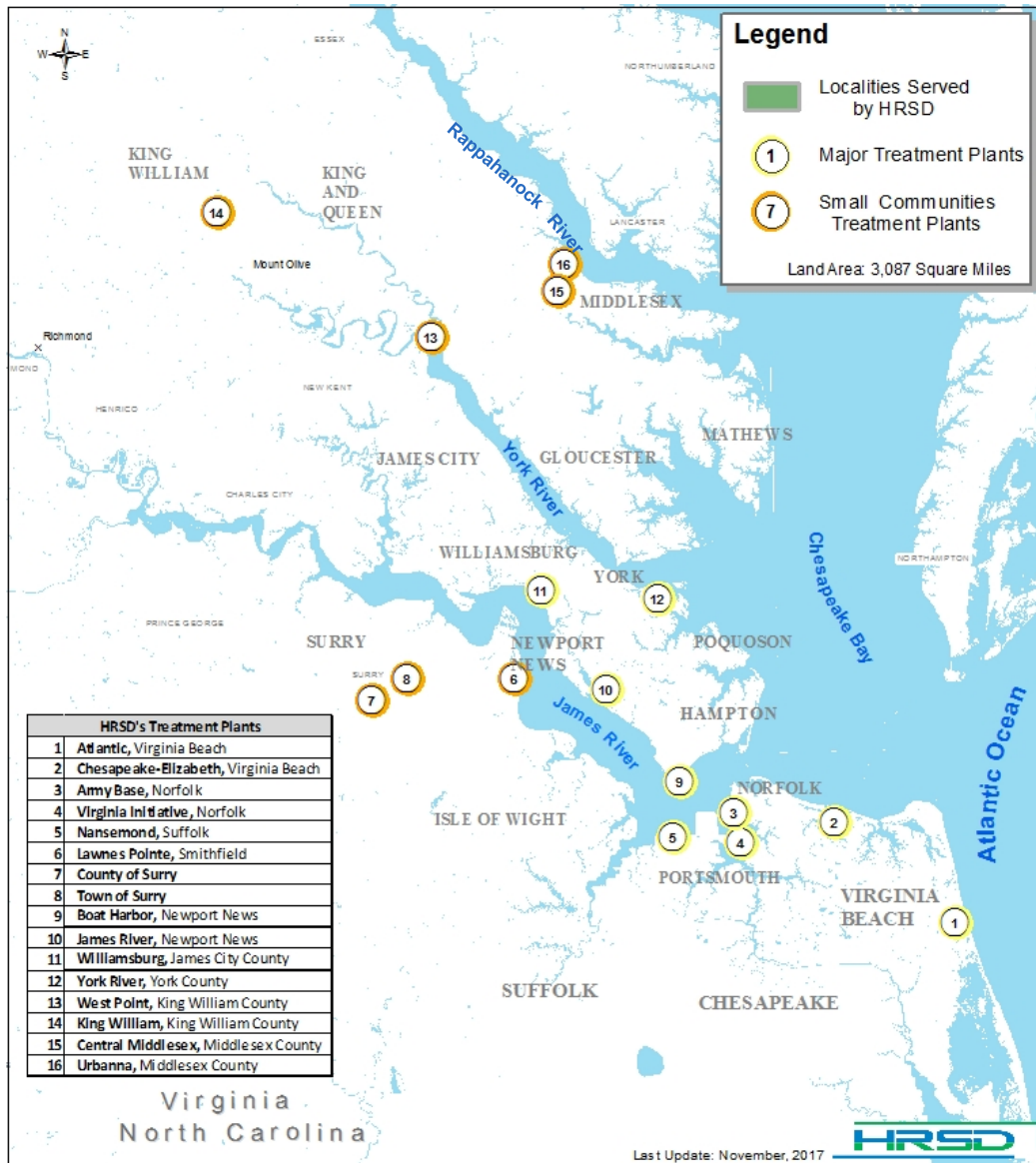
AGENDA ITEM 12. – NUTRIENT COMPLIANCE PLAN UPDATE



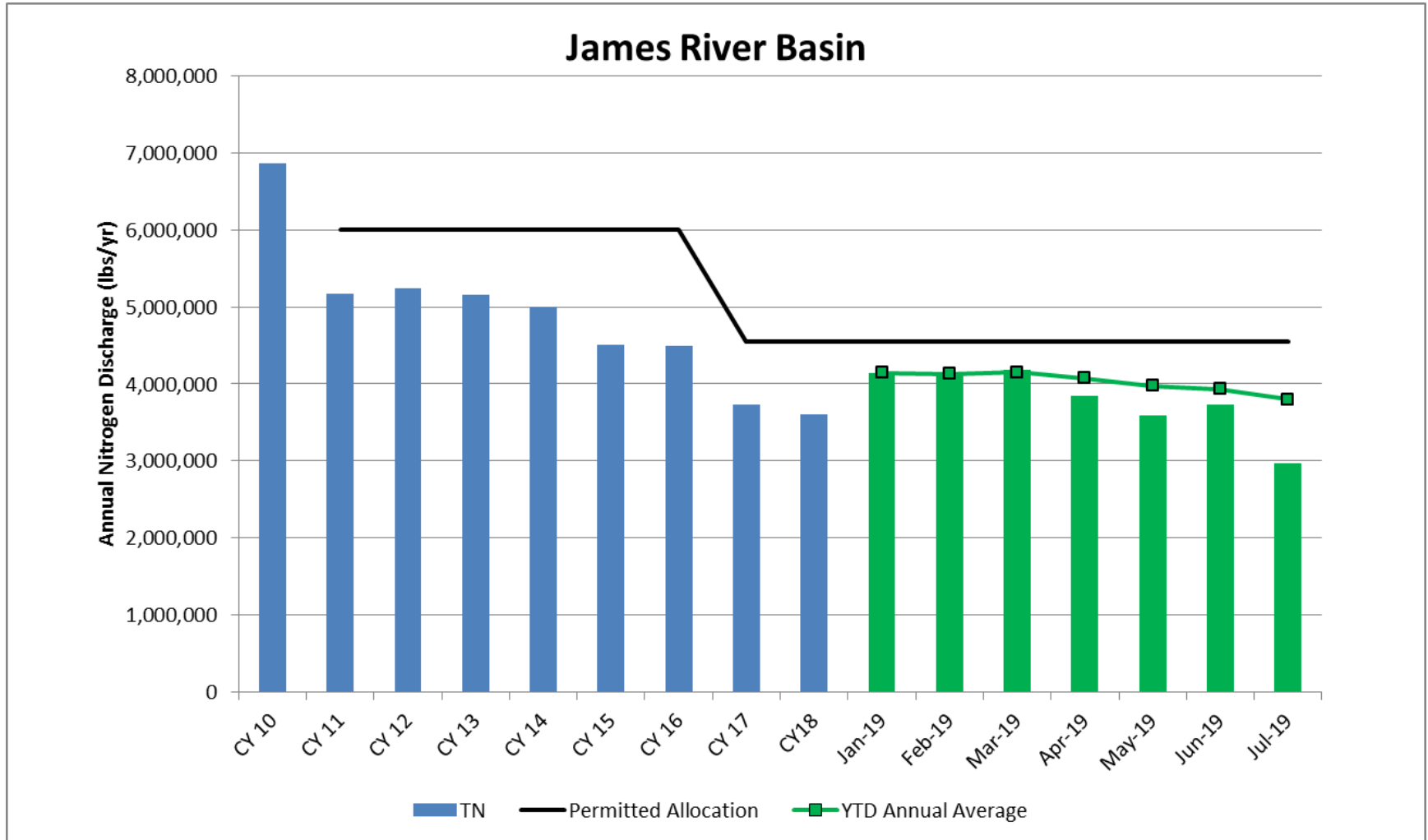
Nutrient Compliance Plan Update Commission Briefing

August 27, 2019

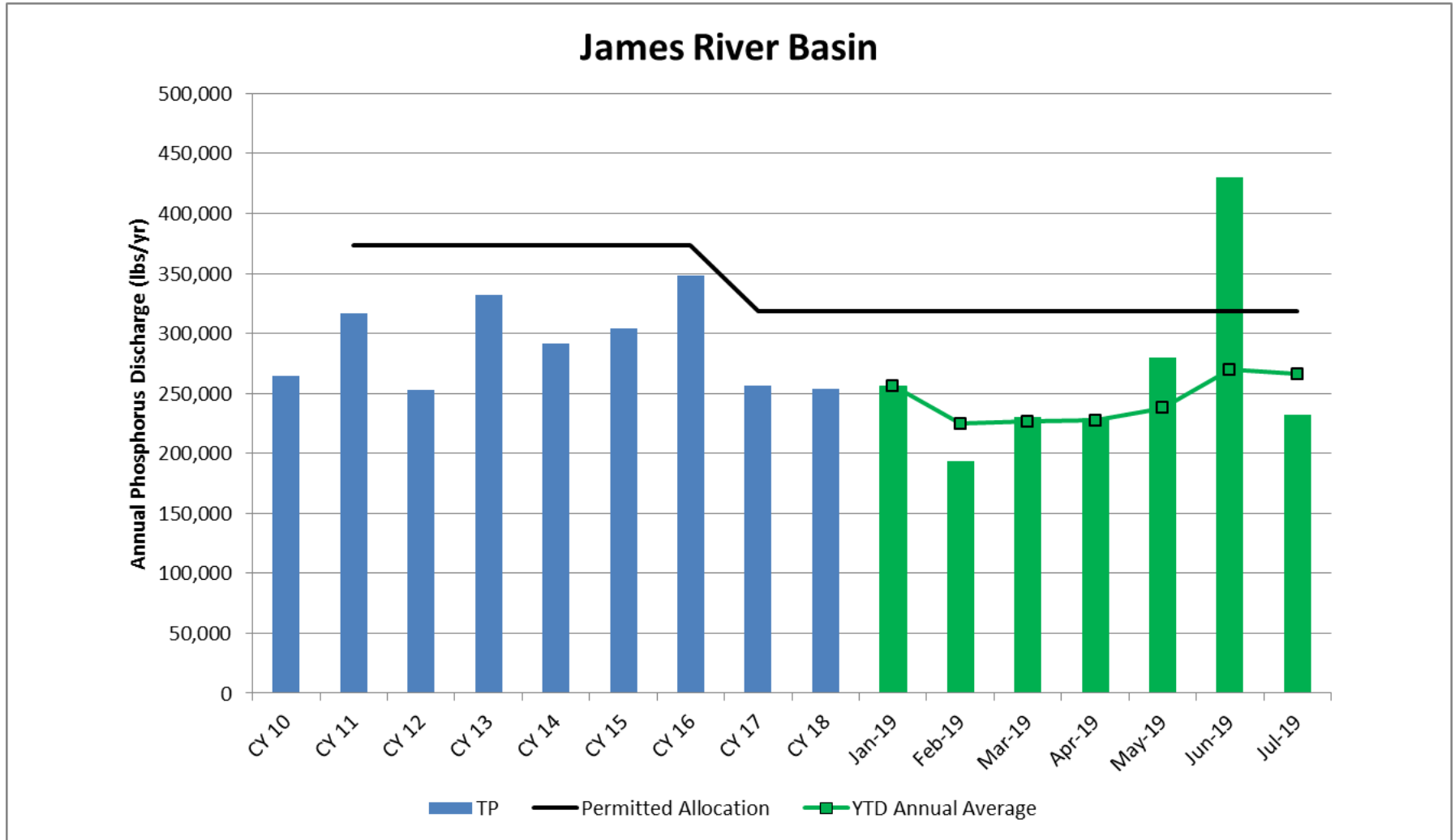
HRSD-River Basin Map



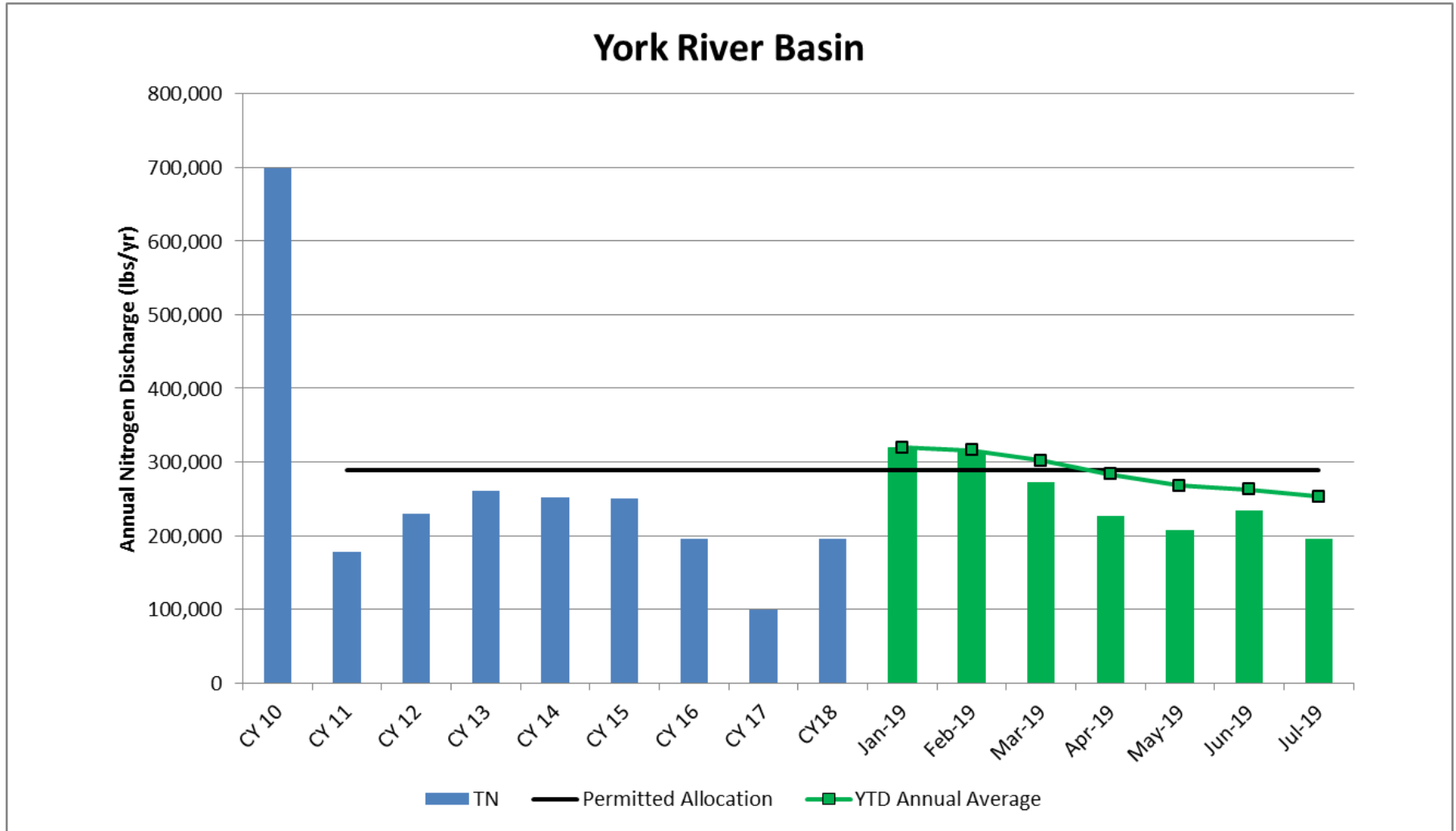
James River Basin: Annual Nitrogen Discharge



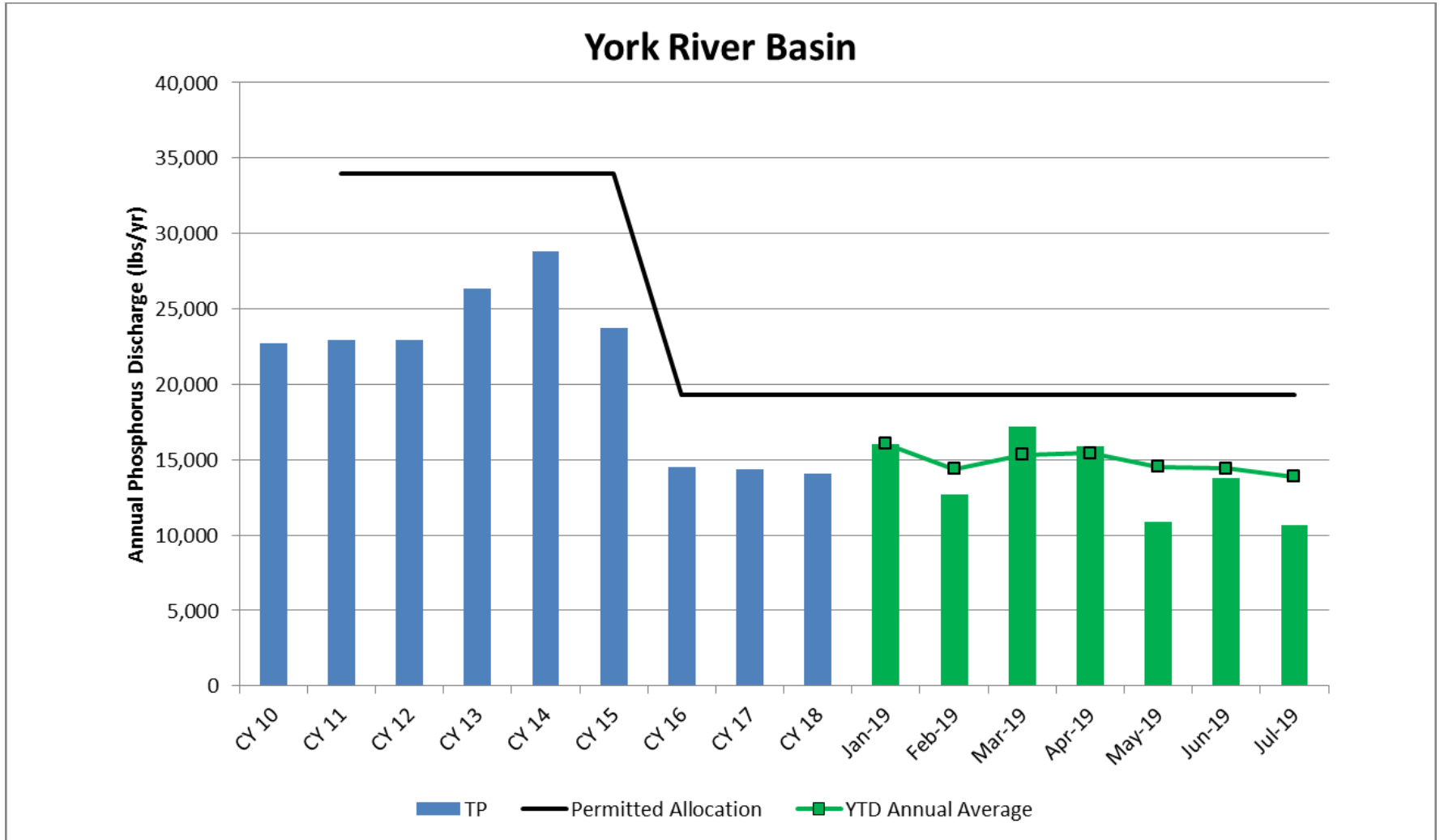
James River Basin: Annual Phosphorus Discharge



York River Basin: Annual Nitrogen Discharge



York River Basin: Annual Phosphorus Discharge



Rappahannock River Basin: 2018 Discharge

- Total Nitrogen

3,325 lbs discharged

1,218 lbs permitted

2,107 lbs credit needed

2,407 lbs credit purchased

\$3.78/lb

\$9,098

- Total Phosphorus

623 lbs discharged

87 lbs permitted

623 lbs credit needed

716 lbs credit purchased

\$5.70/lb

\$4,081

Nitrogen – 5 yr: James River Basin

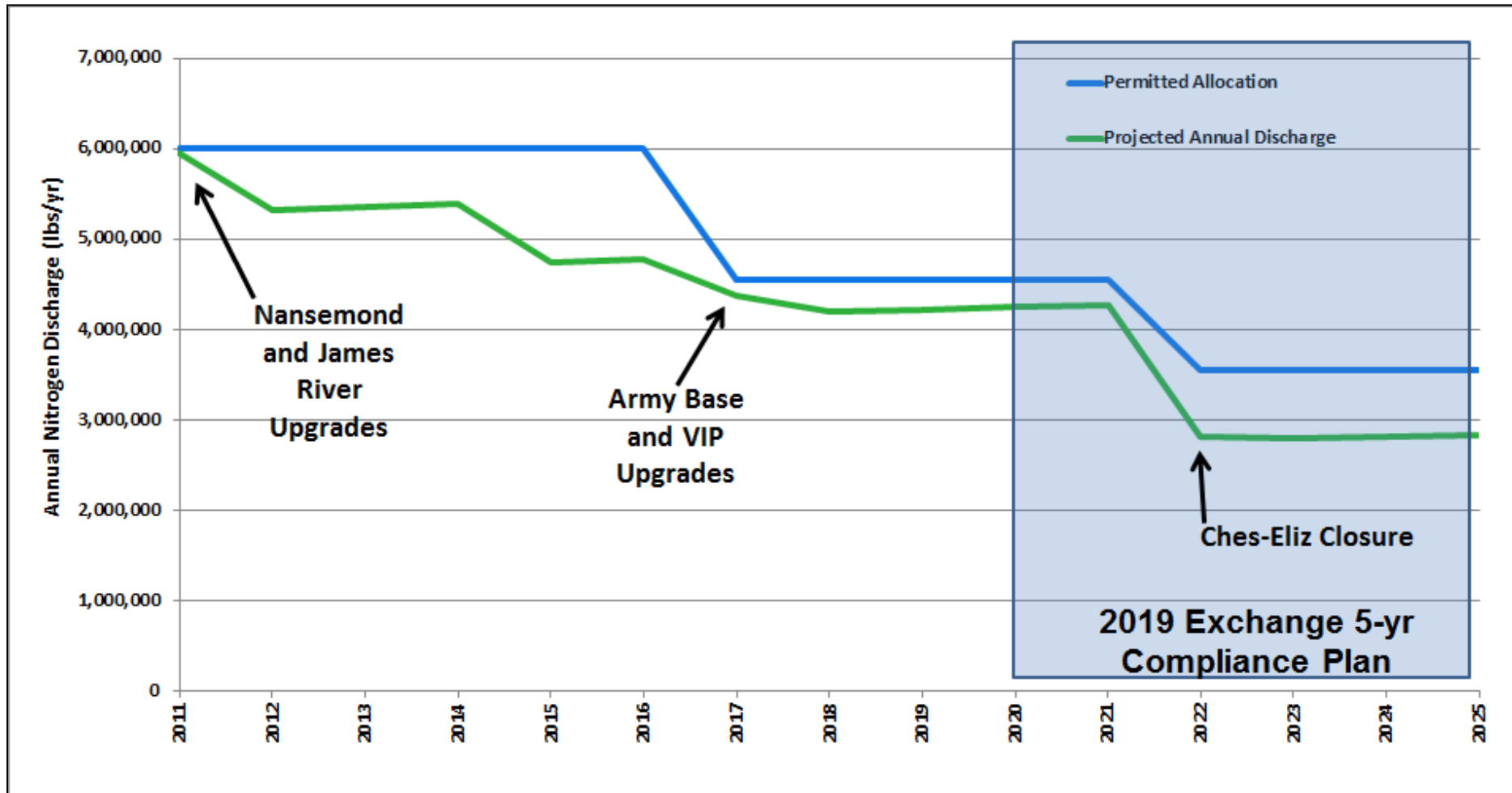
	2020	2021	2022	2023	2024
Army Base: Flow (MGD)	10.42 MGD	10.43 MGD	10.22 MGD	10.24 MGD	10.45 MGD
Proj Conc (mg/L)	4.5 mg/L	4.5 mg/L	4.5 mg/L	4.5 mg/L	4.5 mg/L
Proj Mass (lbs/yr)	142,789 lbs/yr	142,927 lbs/yr	140,033 lbs/yr	140,274 lbs/yr	143,196 lbs/yr
Boat Harbor: Flow (MGD)	14.74 MGD	14.74 MGD	14.87 MGD	14.78 MGD	14.99 MGD
Proj Conc (mg/L)	26.0 mg/L	26.0 mg/L	29.0 mg/L	29.0 mg/L	29.0 mg/L
Proj Mass (lbs/yr)	1,167,275 lbs/yr	1,167,414 lbs/yr	1,313,407 lbs/yr	1,305,253 lbs/yr	1,323,973 lbs/yr
Ches-Eliz: Flow (MGD)	18.04 MGD	18.13 MGD	0.00 MGD	0.00 MGD	0.00 MGD
Proj Conc (mg/L)	26.5 mg/L	26.5 mg/L	0.0 mg/L	0.0 mg/L	0.0 mg/L
Proj Mass (lbs/yr)	1,455,884 lbs/yr	1,463,063 lbs/yr	0 lbs/yr	0 lbs/yr	0 lbs/yr
James River: Flow (MGD)	13.14 MGD	13.16 MGD	13.21 MGD	13.19 MGD	13.36 MGD
Proj Conc (mg/L)	9.0 mg/L	9.0 mg/L	9.0 mg/L	9.0 mg/L	9.0 mg/L
Proj Mass (lbs/yr)	360,057 lbs/yr	360,580 lbs/yr	362,100 lbs/yr	361,496 lbs/yr	366,075 lbs/yr
Lawnes Point: Flow (MGD)	0.00 MGD	0.00 MGD	0.00 MGD	0.00 MGD	0.00 MGD
Proj Conc (mg/L)	0.0 mg/L	0.0 mg/L	0.0 mg/L	0.0 mg/L	0.0 mg/L
Proj Mass (lbs/yr)	0 lbs/yr	0 lbs/yr	0 lbs/yr	0 lbs/yr	0 lbs/yr
Nansemond: Flow (MGD)	18.10 MGD	18.46 MGD	19.37 MGD	19.45 MGD	19.22 MGD
Proj Conc (mg/L)	7.5 mg/L	7.5 mg/L	5.0 mg/L	5.0 mg/L	5.0 mg/L
Proj Mass (lbs/yr)	413,393 lbs/yr	421,584 lbs/yr	294,975 lbs/yr	296,245 lbs/yr	292,735 lbs/yr
VIP: Flow (MGD)	30.89 MGD	30.95 MGD	31.53 MGD	30.80 MGD	30.58 MGD
Proj Conc (mg/L)	4.5 mg/L	4.5 mg/L	4.5 mg/L	4.5 mg/L	4.5 mg/L
Proj Mass (lbs/yr)	423,308 lbs/yr	424,199 lbs/yr	432,080 lbs/yr	422,161 lbs/yr	419,066 lbs/yr
Williamsburg: Flow (MGD)	9.18 MGD	9.29 MGD	9.10 MGD	8.95 MGD	9.08 MGD
Proj Conc (mg/L)	10.0 mg/L	10.0 mg/L	10.0 mg/L	10.0 mg/L	10.0 mg/L
Proj Mass (lbs/yr)	279,494 lbs/yr	282,921 lbs/yr	277,068 lbs/yr	272,659 lbs/yr	276,395 lbs/yr
Expected Discharge (lbs/yr)	4,242,201 lbs/yr	4,262,687 lbs/yr	2,819,663 lbs/yr	2,798,088 lbs/yr	2,821,440 lbs/yr
Permitted Wasteload Allocation (lbs/yr)	4,553,500 lbs/yr	4,553,500 lbs/yr	3,553,500 lbs/yr	3,553,500 lbs/yr	3,553,500 lbs/yr
Total Flow (MGD)	114.5 MGD	115.2 MGD	98.3 MGD	97.4 MGD	97.7 MGD
Safety Factor	6.8%	6.4%	20.7%	21.3%	20.6%

Phosphorus – 5 yr: James River Basin

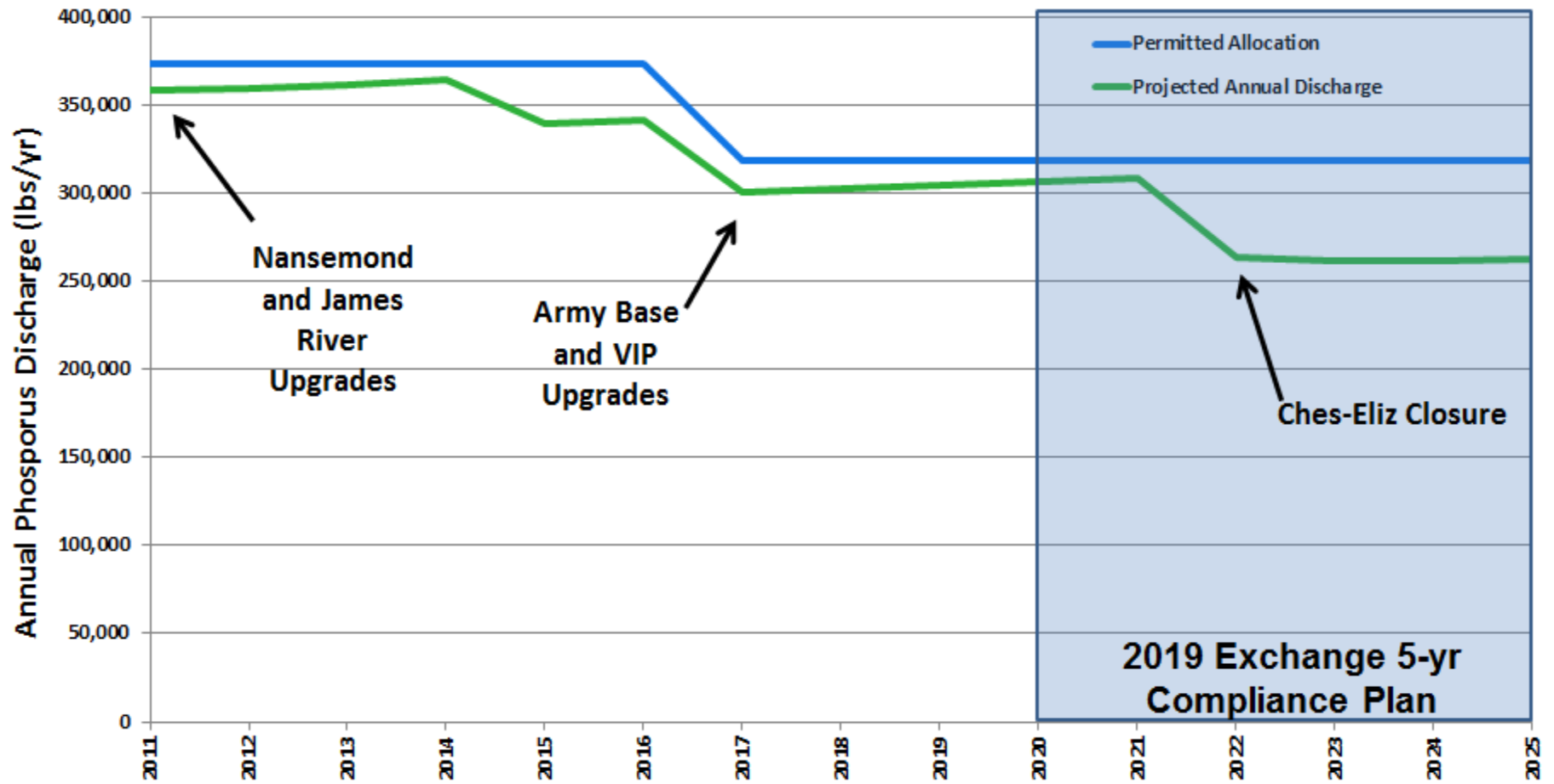
	2020	2021	2022	2023	2024
Army Base: Flow (MGD)	10.42	10.43	10.22	10.24	10.45
Proj Conc (mg/L)	0.8	0.8	0.8	0.8	0.8
Proj Mass (lbs/yr)	25,385	25,409	24,895	24,938	25,457
Boat Harbor: Flow (MGD)	14.74	14.74	14.87	14.78	14.99
Proj Conc (mg/L)	0.8	0.8	0.8	0.8	0.8
Proj Mass (lbs/yr)	35,916	35,920	36,232	36,007	36,523
Ches-Eliz: Flow (MGD)	18.04	18.13	0.00	0.00	0.00
Proj Conc (mg/L)	0.9	0.9	0.0	0.0	0.0
Proj Mass (lbs/yr)	49,445	49,689	0	0	0
James River: Flow (MGD)	13.14	13.16	13.21	13.19	13.36
Proj Conc (mg/L)	0.8	0.8	0.8	0.8	0.8
Proj Mass (lbs/yr)	32,005	32,052	32,187	32,133	32,540
Lawnes Point: Flow (MGD)	0.00	0.00	0.00	0.00	0.00
Proj Conc (mg/L)	0.0	0.0	0.0	0.0	0.0
Proj Mass (lbs/yr)	0	0	0	0	0
Nansemond: Flow (MGD)	18.10	18.46	19.37	19.45	19.22
Proj Conc (mg/L)	1.2	1.2	1.2	1.2	1.2
Proj Mass (lbs/yr)	66,143	67,453	70,794	71,099	70,256
VIP: Flow (MGD)	30.89	30.95	31.53	30.80	30.58
Proj Conc (mg/L)	0.8	0.8	0.8	0.8	0.8
Proj Mass (lbs/yr)	75,255	75,413	76,814	75,051	74,501
Williamsburg: Flow (MGD)	9.18	9.29	9.10	8.95	9.08
Proj Conc (mg/L)	0.8	0.8	0.8	0.8	0.8
Proj Mass (lbs/yr)	22,360	22,634	22,165	21,813	22,112
Expected Discharge (lbs/yr)	306,508 lbs/yr	308,570 lbs/yr	263,087 lbs/yr	261,040 lbs/yr	261,389 lbs/yr
Permitted Wasteload Allocation (lbs/yr)	318,436 lbs/yr	318,436 lbs/yr	318,436 lbs/yr	318,436 lbs/yr	318,436 lbs/yr
Total Flow (MGD)	114.5 MGD	115.2 MGD	98.3 MGD	97.4 MGD	97.7 MGD
Safety Factor	3.7%	3.1%	17.4%	18.0%	17.9%



James River Basin Nitrogen Reduction Strategy



James River Basin Phosphorus Reduction Strategy



HRSD COMMISSION MEETING MINUTES
AUGUST 27, 2019

ATTACHMENT #7

AGENDA ITEM 17. – INFORMATIONAL ITEMS

- a. Management Reports
 - (1) [General Manager](#)
 - (2) [Communications](#)
 - (3) [Engineering](#)
 - (4) [Finance](#)
 - (5) [Information Technology](#)
 - (6) [Operations](#)
 - (7) [Talent Management](#)
 - (8) [Water Quality](#)
 - (9) [Report of Internal Audit Activities](#)
 - (10) [Customer Care Audit Report](#)
- b. [Strategic Planning Metrics Summary](#)
- c. [Effluent Summary](#)
- d. [Air Summary](#)
- e. [Emergency Declaration Update – Langley Magruder 30-Inch Ductile Iron Force Main Emergency Repairs \(Semple Farm\)](#)



August 18, 2019

Re: General Manager's Report

Dear Commissioners:

The West Point plant continues to feel the effects of the industrial waste discharged to the plant at the very end of June. We exceeded a permit exceedance for pH as a result of the West Rock discharge. The impact on the plant's trickling filter biofilm was extensive and while treatment is recovering, the West Point Plant was unable to meet the monthly average BOD limit. We continue to work with West Rock to recover all costs associated with this event and ensure appropriate enforcement action prevents future similar incidents.

The highlights of June's activities are detailed in the attached monthly reports.

- A. **Treatment Compliance and System Operations:** With the exception of West Point, all treatment plants met permit. The highlights for the month are included in the attached monthly reports.
- B. **Internal Communications:** I participated in the following meetings/activities with HRSD personnel:
1. One new employee orientation session
 2. A meeting to discuss SCADA and the path forward
 3. The Apprentice Graduation celebration
 4. Two length of service recognition breakfasts
 5. A meeting to discuss an environmental textbook and HRSD's inclusion
 6. A briefing for Commissioner Ward
 7. Architectural review of two pump station projects
 8. Social media policy training
 9. Review of the Middlesex County draft service agreement
 10. Multiple review of finishes for the new Water Quality building
 11. A Watershed Implementation Plan Phase 3 (WIP 3) planning call.

PO Box 5911, Virginia Beach, VA 23471-0911 • 757.460.7003

Commissioners: Frederick N. Elofson, CPA, Chair • Maurice P. Lynch, PhD, Vice-Chair • Vishnu K. Lakdawala, PhD
Michael E. Glenn • Stephen C. Rodriguez • Willie Levenston, Jr. • Elizabeth A. Taraski, PhD • Molly Joseph Ward
www.hrsd.com

C. External Communications: I participated in the following meetings/activities:

1. The quarterly board of directors meeting and membership meeting for the National Association of Clean Water Agencies (NACWA).
2. Hosted a visioning session for repurposing Chesapeake-Elizabeth Treatment Plant to support aquaculture uses after closure in 2021
3. Multiple calls with Eastern Shore officials to plan public outreach associated with their potential inclusion in the HRSD territory
4. Two meetings focused on identifying the next set of High Priority Wet Weather Projects to be included with the Integrated Plan
5. A presentation to the Suffolk Rotary
6. A meeting to discuss a potential partnership with WHRO for environmental journalism
7. Multiple conference calls with the US EPA Environmental Financial Advisory Board (EFAB)
8. A meeting of the EFAB in Washington, D.C.
9. A conference call with a firm focused on biological engineering looking for potential wastewater application of their technology

D. Consent Decree Update:

1. Brown and Caldwell continues to develop the list of additional High Priority Projects for Wet Weather capacity improvements and to quantify the impact of these projects on reduction of modeled overflows. This work is scheduled to be complete in early September, at which time we will discuss with EPA/DOJ/DEQ.

There has been no shortage of significant topics on the table this summer. The ongoing consent decree negotiations, the potential expansion to the Eastern Shore, the Virginia WIP 3 proposal, and property acquisition issues related to SWIFT have all required attention throughout the summer. Our issues, however, pale in comparison to the issues the City of Virginia Beach continues to face as they recover from the tragedy of May 31. We had offered support to the City staff and over the past month made a first step in that direction. We are providing an experienced project manager, Jeff Layne, to the Department of Utilities one day per week to assist the City with management of capital projects and more importantly, mentoring and developing less experienced staff at Virginia Beach.

Additionally, Bruce Husselbee has been working to help the City develop their design-build capabilities to leverage private sector resources. We will continue to provide whatever assistance we can to the City of Virginia Beach in the weeks and months ahead.

The leadership and support you provide are the keys to our success as an organization. Thanks for your continued dedicated service to HRSD, the Hampton Roads region, the Commonwealth and the environment. **I look forward to seeing you on Tuesday, August 27, 2019 in Virginia Beach.**

Respectfully submitted,

Ted Henifin

Ted Henifin, P.E.
General Manager

TO: General Manager
FROM: Director of Communications
SUBJECT: Monthly Report for July 2019
DATE: August 15, 2019

A. Publicity and Promotion

1. [James could be first bay river to get more protections against harmful algae](#) | July 8, 2019 | [Daily Press](#) (story also ran in The Virginian-Pilot on July 9, 2019)
2. [Virginia Beach company charged with violating Clean Water Act](#) | July 11, 2019 | WAVY TV 10
3. [Middlesex wants to end dumping of effluent into Urbanna Creek](#) | July 11, 2019 | Southside Sentinel
4. [HRSD line may go up Route 10: James River crossing is out. Change could have major impact on Isle of Wight](#) | July 23, 2019 | Smithfield Times
5. [Virginia Beach company pleads guilty to dumping grease down manholes](#) | July 24, 2019 | The Virginian Pilot
6. [Company pleads guilty to Clean Water Act violations](#) | July 24, 2019 | [13 News Now](#) (WVEC TV)
7. [Virginia Beach pump company pleads guilty to Clean Water Act violations](#) | July 24, 2019 | WTKR-TV
8. [Could Mathews be test site for broadband program?](#) | July 24, 2019 | Gloucester-Mathews Gazette-Journal (HRSD is mentioned in second item under ('Other matters in other news'))
9. [Pump Service Pleads Guilty to Clean Water Act Violations](#) | July 25, 2019 | Water & Waste Digest
10. [HRSD puts James City water treatment plant on backburner](#) | July 30, 2019 | The Virginia Gazette

B. Social Media and Online Engagement

1. Facebook: 10,000 page impressions; 7,900 post impressions reaching 5,600 users, and Facebook Engagement of 285
2. Twitter: 10,600 impressions
3. SWIFT website visits: 475
4. LinkedIn Impressions: 416 page impressions and 391 post impressions
5. Blog posts: 0
6. Construction Project Page Visits: 949 total (this number does not include direct visits from home page), broken down as follows:
 - a. 402 visits to construction status page
 - b. 547 visits to individual project pages
7. Next Door unique impressions: 0 (one post made to neighborhood in Surry)

B. News Releases, Advisories, Advertisements, Project Notices, Community Meetings and Project Websites

1. News Releases/Traffic Advisories/Construction Notices: 5 (construction notices)
2. Advertisements: 0
3. Project Notices: 7 (via door hanging/door knocking, USPS mailings reaching approximately 366 residents)
4. Project/Community Meetings: 1, Surry Open House on 7/15/19
5. New Project Web Pages/Blogs/Videos: 2 – [Mathews Main Vacuum Sewer Improvements](#) and [Jefferson Avenue Sewer Improvements](#)

C. Special Projects and Highlights

1. Director, together with the General Manager and engineering staff participated in a planning meeting with Eastern Shore stakeholders in preparation for upcoming public meetings and locality meetings.

2. Director attended and assisted with the Apprenticeship Graduation, commemorating the program's "40 Years of Sustainable Success."
3. Director provided several tours of the SWIFT Research Center to school groups, STEM camp groups, a local reporter and a college student participating in a shadowing experience at the SWIFT RC.
4. Director participated in the Providence Road Offline Storage Facility (PROLSF) Construction Phase partnering session.
5. Director, together with P3 and operations staff, provided a media interview related to proper disposal of Fats, Oils and Grease (FOG) and the importance of keeping FOG out of pipes.
6. Staff participated in the PROLSF teambuilding event with engineering staff, consultants and contractors.

D. Internal Communications

1. Director participated in the following internal meetings and events:
 - a. Met with Water quality staff to discuss SWIFT Water quality reporting features on SWIFT website
 - b. Attended Water Quality Services building color schemes and finishes meeting
 - c. Attended training at SWIFT RC for new control panel and kiosk controls
 - d. Worked with engineering, procurement and talent management staff to develop updates for contract language around social media
 - e. Met with safety manager and operations staff to update facility tour guidelines
 - f. Met with SWIFT program management team to finalize Public Information Project Management Plan
 - g. Worked with Talent Management and Safety staff to develop content for a visitor Safety guide
 - h. Meetings with talent management to review employee engagement survey tools and services
 - i. Architectural review committee meeting
 - j. Communications department briefing with Commissioner Molly Ward
 - k. Meetings with staff and consultant to produce and finalize a video of the Chesapeake-Elizabeth Treatment Plant for aquaculture visioning workshop
 - l. Provided a tour of the SWIFT RC to IT staff

- m. New Employee Orientation meetings
- n. SWIFT QST, QST and DMR meetings

2. Director conducted bi-weekly communications department status meetings.

E. Metrics

1. Educational and Outreach Activities: 4

- a. 07/10/19 – SWIFT Research Center (SWIFT RC) tour to Portsmouth Envirobase students (18 attendees)
- b. 7/11/19 – SWIFT RC tour to Portsmouth STEM camp students (15 attendees)
- c. 07/17/19 –SWIFT RC tour to Portsmouth Envirobase students (16 attendees)
- d. 07/24/19 – SWIFT RC Tour to Daily Press reporter

2. Number of Community Partners: 2

- a. City of Portsmouth Public Schools
- b. Starbase Victory Portsmouth

3. Additional Activities Coordinated by Communications Department: 0

4. Monthly Metrics Summary

Item #	Strategic Planning Measure	Unit	July 2019
M-1.4a	Total Training Hours per Full Time Employee (3) - Current Month	Hours / #FTE	15.17
M-1.4b	Total Training Hours per Full Time Employee (3) - Cumulative Fiscal Year-to-Date	Hours / #FTE	15.17
M-5.2	Educational and Outreach Events	Number	4
M-5.3	Number of Community Partners	Number	2

Respectfully,

Leila Rice, APR
 Director of Communications

TO: General Manager

FROM: Director of Engineering

SUBJECT: Engineering Monthly Report for July 2019

DATE: August 8, 2019

A. General

1. Capital Improvement Program (CIP) spending for the 12th and final month of Fiscal Year (FY) 2019 exceeded the planned spending target.

CIP Spending (\$M):

	Current Period	FYTD
Actual	22.91	95.02
Plan	12.90	134.00

No Water Quality Improvement Fund Grant reimbursements were received in the month of July.

2. CIP expenditures for FY 2019 were \$95.02 million, which was 70 percent of planned spending for the year. Water Quality Improvement Fund grant reimbursements were \$2.44 million in FY 2019 and no reimbursements are expected in FY 2020. CIP expenditures are projected to be \$215 million in FY 2020. Expenditures are projected to average \$18 million per month to complete this volume of work. The three largest projects, from a cash flow spending standpoint in FY 2020, will be:

- Providence Road Off-Line Storage Facility
- Water Quality Services Building Phase II
- Atlantic Treatment Plant Thermal Hydrolysis Process & Grease Handling Facility

Planning efforts continue for the SWIFT Program and will slowly increase over the coming year. By FY 2023, HRSD will be spending over \$100 million on the SWIFT Program and this level of spending will continue for a number of years beyond FY 2023. In addition to a number of large CIP projects, there will be a number of relatively small projects to be completed in the coming year. This program will include 130 active CIP projects in FY 2020. Numerous interceptor sewer rehabilitation and/or replacement projects and a number of pump station projects will also be a focus of work over the coming fiscal year. The interceptor sewer system projects are typically smaller in scope and cost less than treatment plant projects, they

but can often be more challenging to administer due to their direct impact to the public during the construction process.

B. Asset Management Division

1. Communication continues to be a key part of the Asset Management Program. Through the use of work center SMART (Systematically Managing Assets for a Reliable Tomorrow) ambassadors, we are able to get constructive feedback on challenges with the new program and the effort to implement new concepts across the organization. This feedback loop with staff reinforces the goal of collaboration and makes everyone take ownership of the program and outcomes related to asset management.
2. One communication tool available to HRSD during emergencies is the use of the existing radio system. The existing radio system is used infrequently by staff and is often not maintained or inspected at regular intervals. During a major storm or other emergency, the radio system can be a valuable tool when cellular and internet service is disrupted. Staff is in the process of developing a periodic testing procedure for inclusion in the Hurricane Plan to identify and make needed repairs to the radio system. An annual contract is also under consideration to assist with maintenance and repairs that might be needed for the existing radio system.

C. North Shore, South Shore and SWIFT Design & Construction Divisions

1. Repairs to the existing Williamsburg Treatment Plant outfall and diffuser were completed in July. The repairs included replacement of plastic riser pipes and clearing of plugged sections of the outfall and removal of debris in adjacent areas. This effort has been challenging due to limited access and difficult working conditions in the James River. The engineer and contractor worked well to resolve issues in the field in a timely fashion. The engineer provided underwater inspection services to assure the needed repairs were made in this muddy and difficult work zone.
2. Design for the Virginia Beach Boulevard Force Main Phase VI project is nearing completion. Final approvals from the City are expected soon and the negotiations continue for needed easements to build sections of the project on private property. The project includes approximately 9,500 linear feet of 42-inch diameter pipe and seven trenchless crossings. The project should be advertised for bids in the coming month with a plan to award this contract in October. This project must be completed by June 2021 to allow for the closure of the Chesapeake-Elizabeth Treatment Plant.

3. The SWIFT Full-Scale Implementation Program (FSIP) efforts continued in July as numerous meetings were held with HRSD staff to review the SWIFT Program Management Plan (PMP) and associated standard operating procedures (SOPs). The PMP was drafted in January and the SOPs were recently prepared to direct the team on specific details related to managing this large program and specific projects within the program. A number of work flow processes were highlighted and will be integrated into the software program (Oracle-Unifier) used to assist with business processes. As the SWIFT FSIP team expands as work progresses, the PMP will be a valuable tool to assure project quality and uniformity. The PMP is a living document and will be reviewed regularly as the SWIFT FSIP develops with time. This is a very important tool since much of the management of the program will be handled by individuals outside of HRSD with limited direct knowledge of the procedures and processes that are well known by HRSD staff, but not necessarily documented or shared with others outside the organization.

D. Planning & Analysis Division

1. Staff has been working with the Operations Department to model and better understand how the existing Coliseum Storage Tank and Pressure Reducing Station can be used during dry weather periods to control flow to the York River Treatment Plant. The tank has been operated for the last few weeks during various hydraulic conditions and the early results look promising that it can assist with controlling flows and optimizing the adjacent interceptor system.
2. A request for proposals (RFP) has been issued for the Climate Change Planning Program. This effort has been included in the CIP and will involve engineering studies over the next three years. This effort will analyze the impacts of expected climate change on all major infrastructure including treatment plants, pump stations and sewers. The engineer selection effort is actively underway and a recommendation will be made at the August Commission Meeting.

E. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 1
 - a. 07/24/19 - Staff facilitated and provided a panelist for the Design Build Institute of America (DBIA) Hampton Roads Chapter Forum on Design-Build for Owners.

2. Number of Community Partners: 1
 - a. DBIA – Hampton Roads Chapter
3. Number of Research Partners: 0
4. Metrics Summary

Item #	Strategic Planning Measure	Unit	July 2019
M-1.4a	Total Training Hours per Full Time Employee (44) - Current Month	Hours / #FTE	3.36
M-1.4b	Total Training Hours per Full Time Employee (44) - Cumulative Fiscal Year-to-Date	Hours / #FTE	3.36
M-5.2	Educational and Outreach Events	Number	1
M-5.3	Number of Community Partners	Number	1
M-5.4	Number of Research Partners	Number	0

Bruce W. Husselbee, P.E.

Bruce W. Husselbee, P.E.

TO: General Manager
FROM: Director of Finance
SUBJECT: Monthly Report for July 2019
DATE: August 14, 2019

A. General

1. Staff submitted two Virginia Clean Water Revolving Loan Fund (VCWRLF) requests in July. The Virginia Resources Authority (VRA) is implementing a new approach called "Programmatic Financing" which will provide HRSD with a predictable funding source for large capital programs as opposed to the current process where each project is approved individually. The first application is primarily for the SWIFT program and Regional Wet Weather Management Plan (RWWMP). With the new approach, HRSD has the flexibility to fund projects within the approved program and the ability to shift project funding if there is a major change. The second application is for the Eastern Shore transmission force main and the purchase of existing assets, with a request for \$5 million in principal forgiveness for the asset purchase. This is intended to eliminate the existing debt and facilitate the Eastern Shore's interest in joining HRSD.
2. Staff developed a revised Reserve and Capital Activity table. This version more clearly shows the restricted and unrestricted activity on a monthly basis and additional fund balances. Debt Service is the accrual amount due for both principal and interest as of the prior year end. Capital is broken up into Paygo (cash for CIP projects) and Debt Proceeds (from revenue bond sales and/or interest earned on bond proceeds.)
3. Wastewater revenues are slightly higher than budget from the prior year due to the higher than expected water consumption. Facility Charges are also higher which is typical for the summer building season. Expenses are on track to start the fiscal year.
4. The Quarterly investment summary for [HRSD's Operating Cash Strategies and Retiree Health Trust \(OPEB\)](#) is attached.

B. Interim Financial Report

1. Operating Budget for the Period Ended July 31, 2019

	Adopted Budget	Current YTD	Current YTD as % of Budget (8% Budget to Date)	Prior YTD as % of Prior Year Budget
Operating Revenues				
Wastewater	\$ 316,217,000	\$ 28,757,155	9%	9%
Surcharge	1,500,000	141,282	9%	9%
Indirect Discharge	2,750,000	265,215	10%	9%
Fees	2,858,000	229,090	8%	8%
Municipal Assistance	725,000	80,582	11%	10%
Miscellaneous	600,000	19,432	3%	3%
Total Operating Revenue	324,650,000	29,492,756	9%	9%
Non Operating Revenues				
Facility Charge	6,160,000	841,075	14%	13%
Interest Income	4,000,000	320,352	8%	13%
Build America Bond Subsidy	2,400,000	-	0%	0%
Other	595,000	70,000	12%	0%
Total Non Operating Revenue	13,155,000	1,231,427	9%	10%
Total Revenues	337,805,000	30,724,183	9%	9%
Transfers from Reserves	-	-	-	-
Total Revenues and Transfers	\$ 337,805,000	\$ 30,724,183	9%	9%
Operating Expenses				
Personal Services	\$ 57,346,225	\$ 4,459,817	8%	8%
Fringe Benefits	24,216,573	1,987,212	8%	8%
Materials & Supplies	8,128,521	218,096	3%	4%
Transportation	1,578,806	93,806	6%	4%
Utilities	12,725,560	347,932	3%	6%
Chemical Purchases	10,714,718	409,344	4%	6%
Contractual Services	38,684,027	2,888,501	7%	7%
Major Repairs	9,001,479	225,320	3%	2%
Capital Assets	301,600	32	0%	2%
Miscellaneous Expense	2,961,310	143,558	5%	7%
Total Operating Expenses	165,658,819	10,773,618	7%	7%
Debt Service and Transfers				
Debt Service	63,544,841	8,691,464	14%	14%
Transfer to CIP	108,341,340	9,028,445	8%	8%
Transfer to Risk management	260,000	21,667	8%	8%
Total Debt Service and Transfers	172,146,181	17,741,576	10%	11%
Total Expenses and Transfers	\$ 337,805,000	\$ 28,515,194	8%	9%

2. Notes to Interim Financial Report

The Interim Financial Report summarizes the results of HRSD's operations on a basis of accounting that differs from generally accepted accounting principles. Revenues are recorded on an accrual basis, whereby they are recognized when billed; expenses are generally recorded on a cash basis. No provision is made for non-cash items such as depreciation and bad debt expense.

This interim report does not reflect financial activity for capital projects contained in HRSD's Capital Improvement Program (CIP).

Transfers represent certain budgetary policy designations as follows:

- a. Transfer to CIP: represents current period's cash and investments that are designated to partially fund HRSD's capital improvement program.
- b. Transfers to Reserves: represents the current period's cash and investments that have been set aside to meet HRSD's cash and investments policy objectives.

3. Reserves and Capital Resources (Cash and Investments Activity) for the Period Ended July 31, 2019

HRSD - RESERVE AND CAPITAL ACTIVITY

July 31, 2019

	General Reserve			Capital		
	General	Debt Service	Risk Mgmt Reserve	Reserve	Paygo	Debt Proceeds
	Unrestricted	Restricted	Unrestricted	Unrestricted	Unrestricted	Restricted
Beginning - July 1, 2019	\$ 178,937,154	\$ 28,553,343	\$ 3,499,535	\$ 15,266,324	\$ 86,279,809	\$ 14,334,553
Current Year Sources of Funds						
Current Receipts	29,591,503					-
Capital Grants					-	
VRA Draws					2,025,975	
Bond Proceeds (includes interest)						25,497
Transfers In	-		21,667		9,028,445	
Sources of Funds	29,591,503	-	21,667	-	11,054,420	25,497
Total Funds Available	\$ 208,528,657	\$ 28,553,343	\$ 3,521,202	\$ 15,266,324	\$ 97,334,229	\$ 14,360,050
Current Year Uses of Funds						
Cash Disbursements	25,174,558				3,285,119	5,566,357
Transfers Out	9,050,112					-
Uses of Funds	34,224,670	-	-	-	3,285,119	5,566,357
End of Period - July 31, 2019	\$ 174,303,987	\$ 28,553,343	\$ 3,521,202	\$ 15,266,324	\$ 94,049,110	\$ 8,793,693
Unrestricted Funds	\$ 287,140,623					

4. Capital Improvements Budget and Activity Summary for Active Projects for the Period Ended July 31, 2019

Classification/ Treatment Service Area	Budget	Expenditures prior to June 30, 2019	Year to Date FY2020 Expenditures	Total Expenditures	Outstanding Encumbrances	Available Balance
Administration	\$ 74,586,023	\$ 43,226,275	\$ 119,465	\$ 43,345,740	\$ 2,469,414	\$ 28,770,869
Army Base	158,584,000	125,110,560	-	125,110,560	2,546,769	30,926,671
Atlantic	127,815,138	88,977,494	134	88,977,628	19,451,856	19,385,654
Boat Harbor	136,850,842	60,512,133	-	60,512,133	16,541,635	59,797,074
Ches-Eliz	175,032,583	21,557,919	52,392	21,610,311	66,881,395	86,540,877
James River	286,313,687	58,537,356	-	58,537,356	8,195,851	219,580,480
Middle Peninsula	87,389,819	10,996,758	686	10,997,444	7,506,396	68,885,979
Nansemond	86,801,179	42,439,857	-	42,439,857	5,133,024	39,228,298
Surry	13,980,950	1,905,064	5,383	1,910,447	8,147,962	3,922,541
VIP	293,797,711	259,851,080	-	259,851,080	1,861,534	32,085,097
Williamsburg	19,338,971	12,215,242	8,828	12,224,070	1,330,988	5,783,913
York River	51,754,404	44,095,395	19,010	44,114,405	1,445,621	6,194,378
General	674,287,433	232,467,538	66,474	232,534,012	23,669,418	418,084,003
	<u>\$ 2,186,532,740</u>	<u>\$ 1,001,892,671</u>	<u>\$ 272,372</u>	<u>\$ 1,002,165,043</u>	<u>\$ 165,181,863</u>	<u>\$ 1,019,185,834</u>

5. Debt Management Overview

HRSD - Debt Outstanding (\$000's) July 31, 2019

	Principal Jun 2019	Principal Payments	Principal Draws	Principal Jul 2019	Interest Payments
Fixed Rate					
Senior	\$ 308,095	\$ (5,785)	\$ -	\$ 302,310	\$ (2,790)
Subordinate	467,413	(43)	2,026	469,396	(8)
Variable Rate					
Subordinate	50,000	-	-	50,000	(65)
Line of Credit					
Total	<u>\$ 825,508</u>	<u>\$ (5,828)</u>	<u>\$ 2,026</u>	<u>\$ 821,706</u>	<u>\$ (2,863)</u>

HRSD- Series 2016VR Bond Analysis August 2, 2019

	SIFMA Index	HRSD	Spread to SIFMA
Maximum	2.30%	2.25%	-0.05%
Average	0.51%	0.50%	-0.01%
Minimum	0.01%	0.01%	0.00%
As of 8/2/19	1.40%	1.37%	-0.03%

* Since October 20, 2011 HRSD has averaged 50 basis points on Variable Rate Debt

Financial Performance Metrics for the Period Ended July 31, 2019

HRSD - UNRESTRICTED CASH

July 31, 2019

Can be used for any purpose since it is not earmarked for a specific use and is extremely liquid

		Days Cash on		
		Hand	Days Cash on Hand	
Total Unrestricted Cash	\$ 287,140,623			633
Risk Management Reserve	\$ (3,521,202)	(8)		625
Reserve	\$ (15,266,324)	(34)		591
Capital (PAYGO only)	\$ (94,049,110)	(207)		384
Net Unassigned Cash	\$ 174,303,987			384

Risk Management Reserve as a % of Projected Claims Cost is 25% YTD compared to 25% Policy Minimum
Days Cash on Hand Policy Minimum is 270-365 days.

HRSD - SOURCES OF FUNDS

July 31, 2019

Primary Source

	Beginning Market Value July 1, 2018	YTD Contributions	YTD Withdrawals	YTD Income Earned	Ending Market Value July 31, 2019	Allocation of Funds	Credit Quality	Current Mo Avg Yield
BAML Corp Disbursement Account	7,755,006	35,591,544	34,841,185	6,889	8,512,254	4.9%	N/A	0.70%
VIP Stable NAV Liquidity Pool	163,658,801	-	-	335,076	163,993,877	95.1%	AAAm	2.41%
Total Primary Source	\$ 171,413,807	\$ 35,591,544	\$ 34,841,185	\$ 341,965	\$ 172,506,131	100.0%		

VIP Stable NAV Liquidity Pool out performance Va Local Government Investment Pool (the market benchmark) by 0.01% in the month of July.

Secondary Source

	Beginning Market Value July 1, 2019	YTD Contributions	YTD Withdrawals	YTD Income Earned & Realized G/L	Ending Market Value July 31, 2019	Ending Cost	YTD Mkt Adj	Yield to Maturity at Market
VIP 1-3 Year High Quality Bond Fund	128,529,607	-	2,106	263,710	128,476,727	128,791,211	(314,484)	1.99%
Total Secondary Source	\$ 128,529,607	\$ -	\$ 2,106	\$ 263,710	\$ 128,476,727	\$ 128,791,211	\$ (314,484)	

VIP 1-3 Year High Quality Bond Fund out performed ICE BofA ML 1-3 yr AAA-AA Corp/Gov Index (the market benchmark) by 0.02% in the month of July.

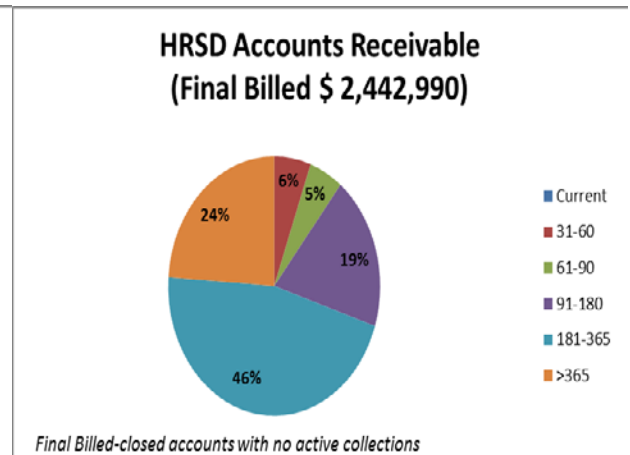
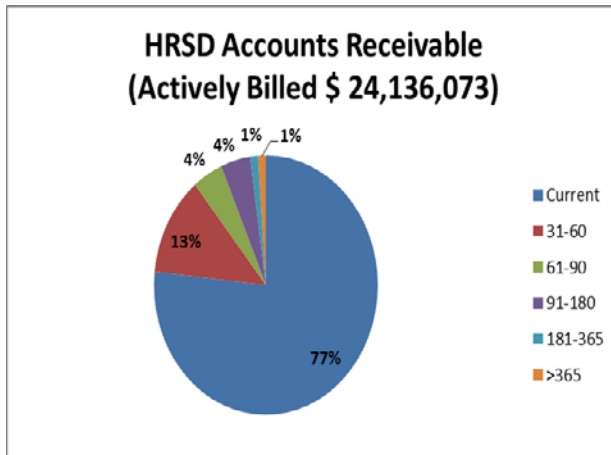
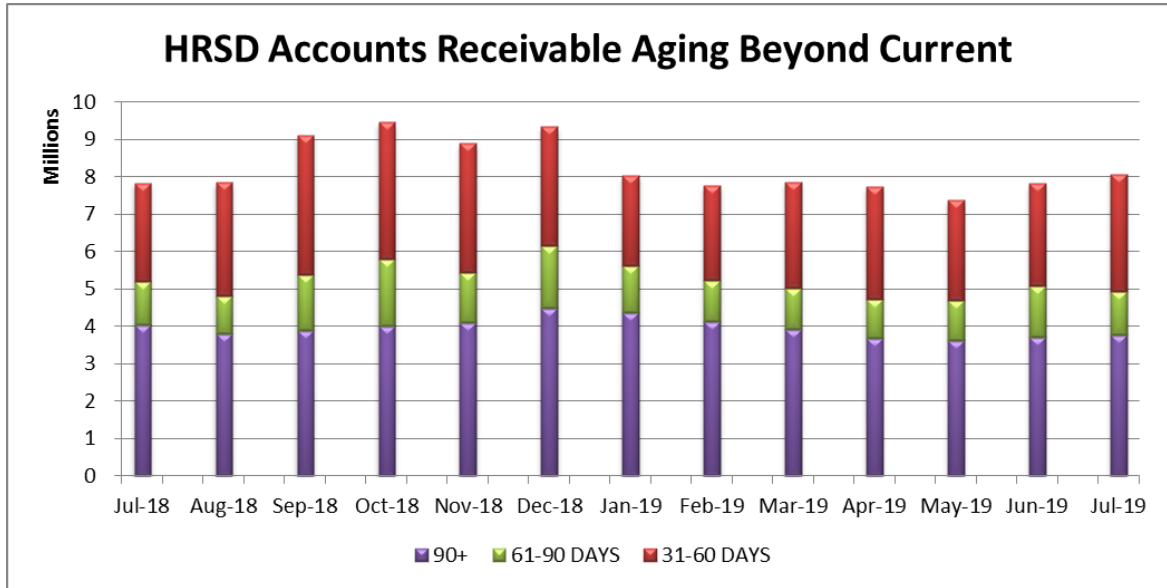
	Total	Fund Alloc
Total Primary Source	\$ 172,506,131	57.3%
Total Secondary Source	\$ 128,476,727	42.7%
TOTAL SOURCES	\$ 300,982,857	100.0%

6. Summary of Billed Consumption

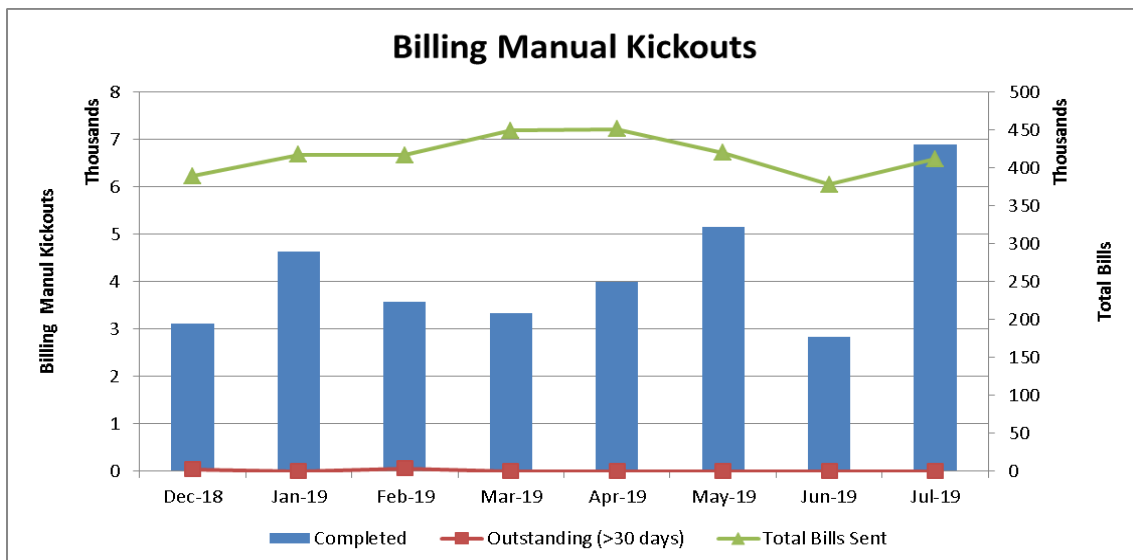
Summary of Billed Consumption (,000s ccf)							
Month	FY2020 Cumulative Budget Estimate	FY2020 Cumulative Actual	% Difference		% Difference		% Difference
			From Budget	Cumulative FY2019 Actual	From FY2019	Cumulative 3 Year Average	From 3 Year Average
July	4,845	5,135	6.0%	5,175	-0.8%	4,940	4.0%
Aug	9,649	-	N/A	10,233	N/A	9,815	N/A
Sept	14,488	-	N/A	14,294	N/A	14,384	N/A
Oct	18,842	-	N/A	19,087	N/A	19,036	N/A
Nov	22,952	-	N/A	23,249	N/A	23,278	N/A
Dec	27,344	-	N/A	27,376	N/A	27,532	N/A
Jan	31,535	-	N/A	32,010	N/A	32,003	N/A
Feb	36,079	-	N/A	36,551	N/A	36,443	N/A
March	40,427	-	N/A	40,187	N/A	40,480	N/A
Apr	44,149	-	N/A	44,551	N/A	44,554	N/A
May	48,421	-	N/A	48,790	N/A	48,786	N/A
June	52,985	-	N/A	53,172	N/A	53,280	N/A

C. Customer Care Center

1. Accounts Receivable Overview



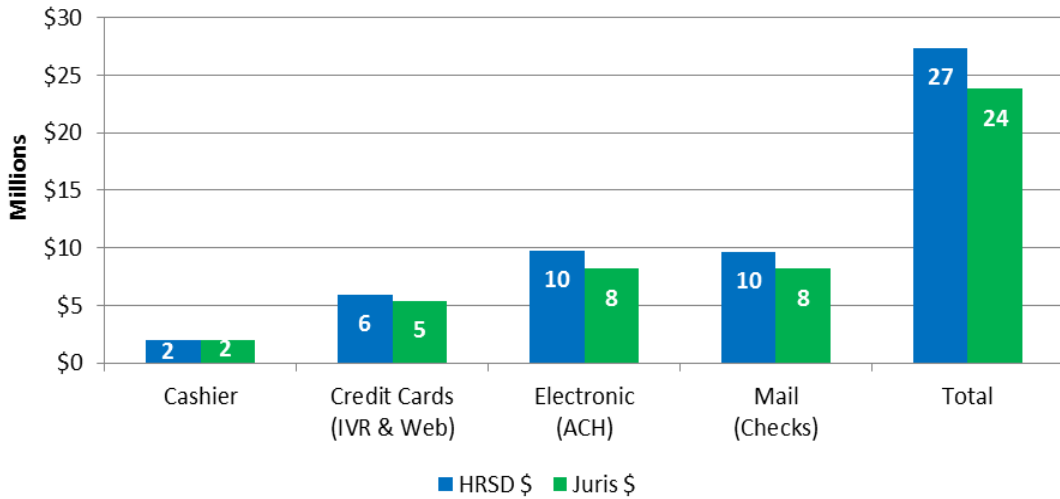
2. Customer Care Center Statistics



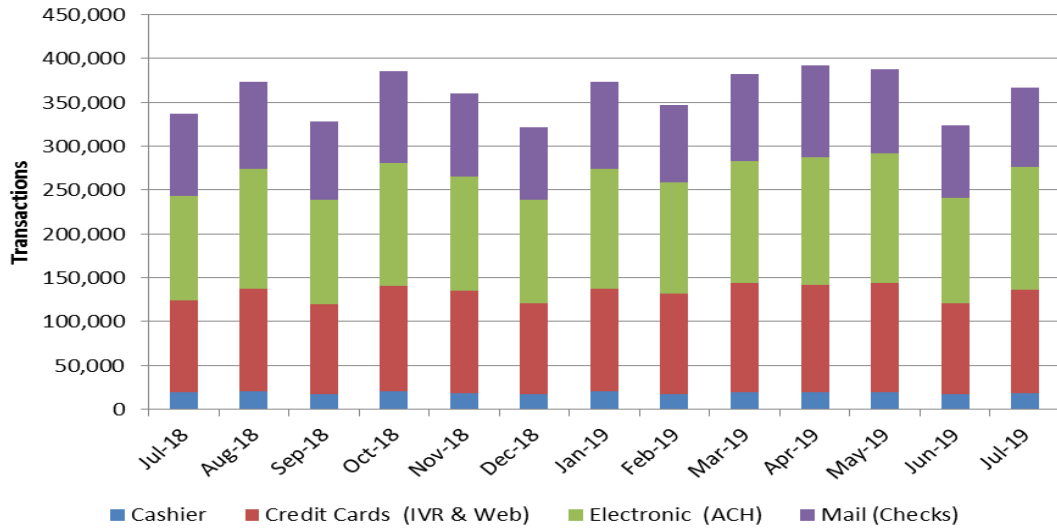
Jun-19 Billing Activity was affected by Virginia Beach tragedy.

Jul-19 A formatting change caused an increase in manual kickouts. We expect the levels to normalize in the next few months.

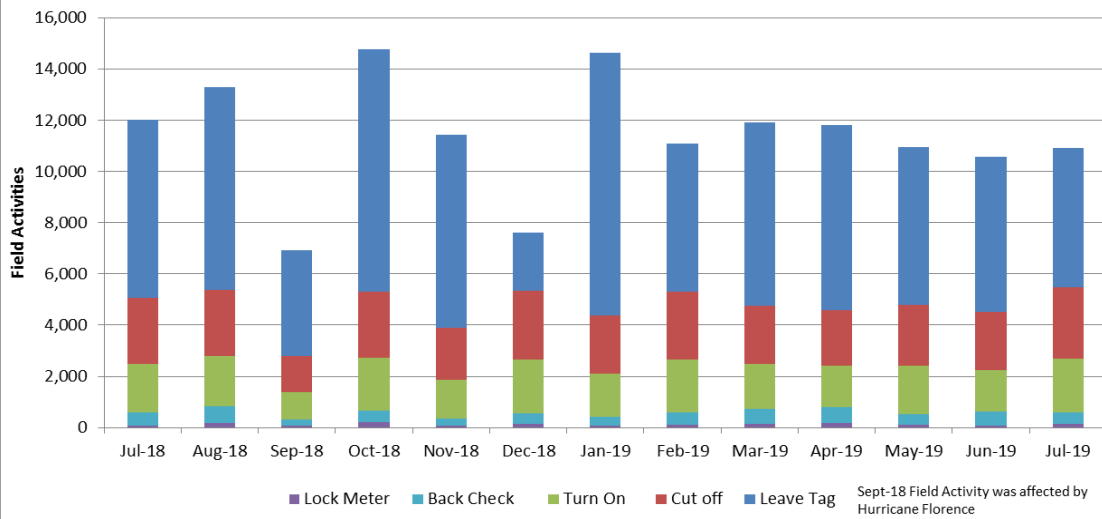
Payments Processed July 2019

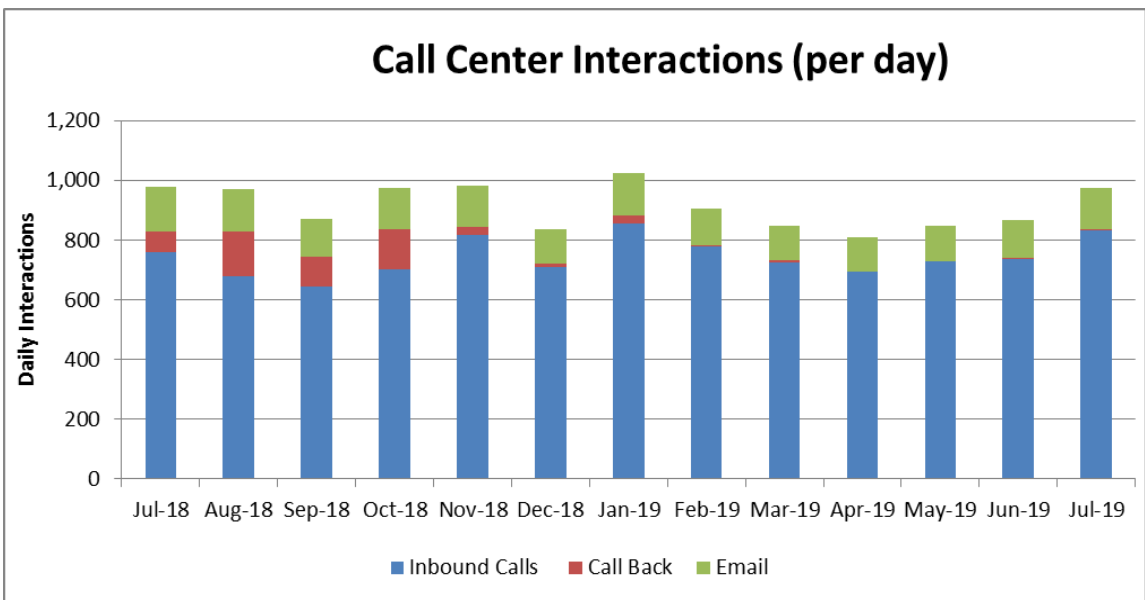
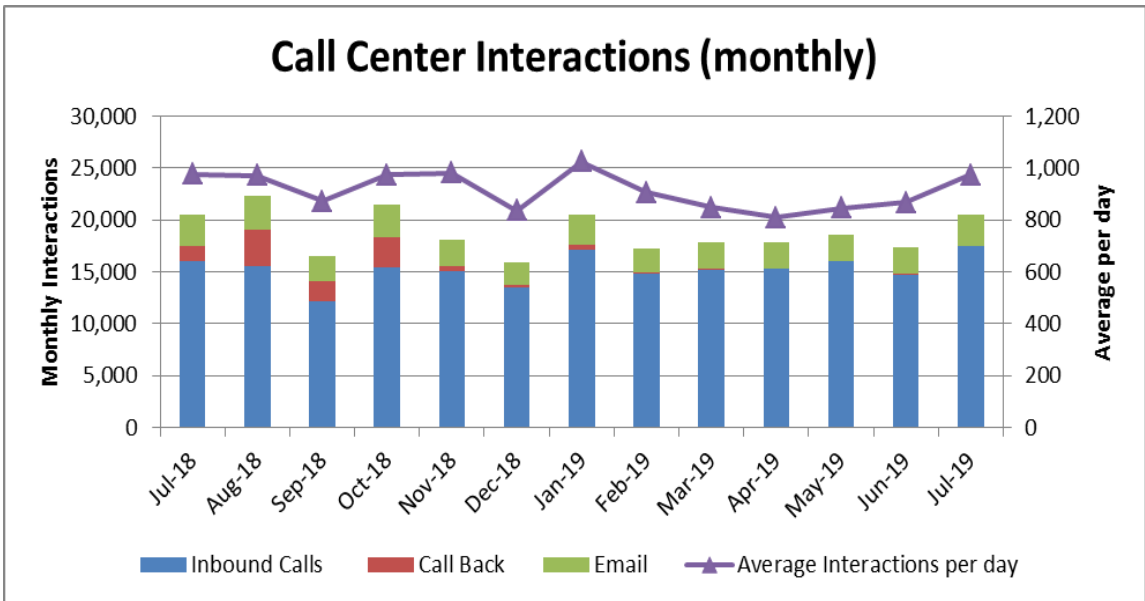
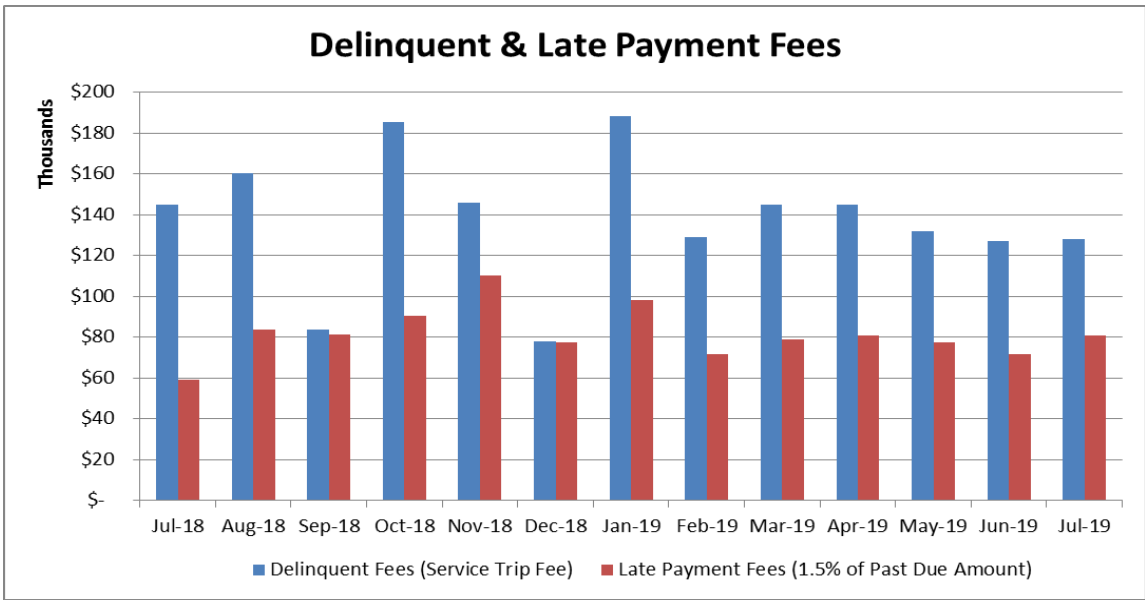


Payment Transactions



Field Activity

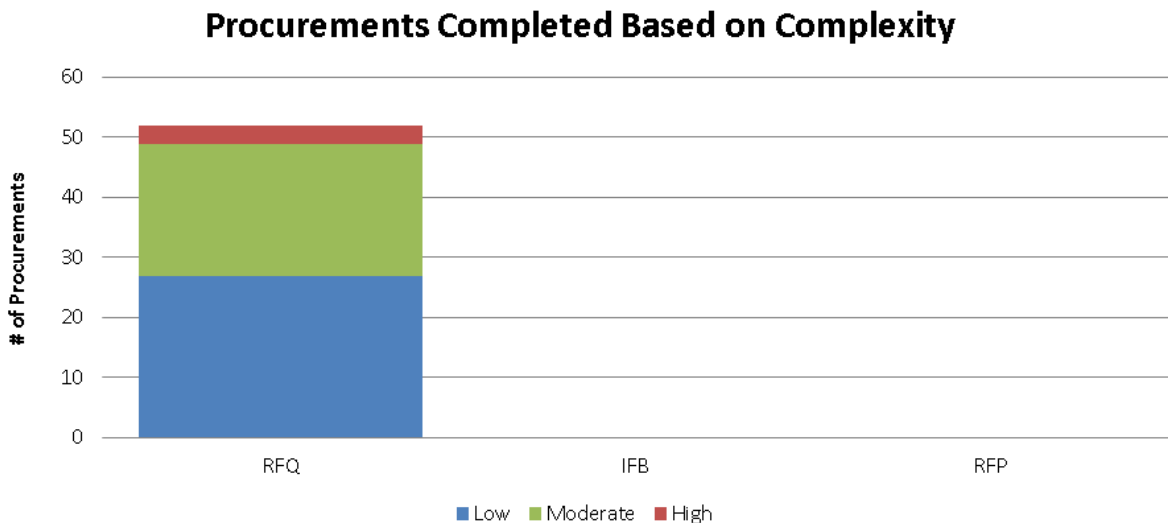
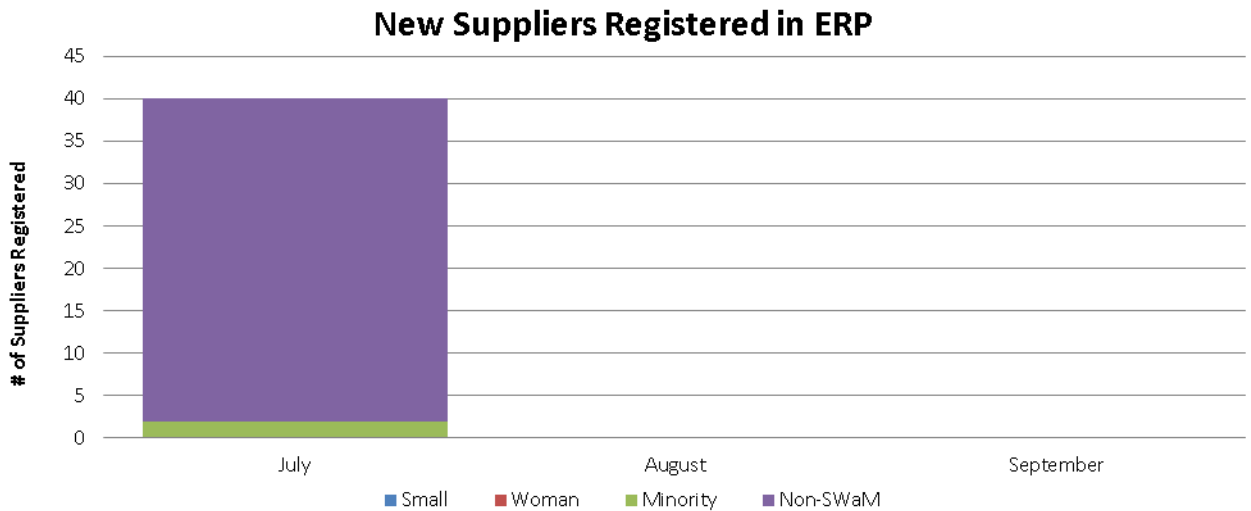




Customer Interaction Statistics	Feb	Mar	Apr	May	Jun	Jul
Calls Answered within 3 minutes	94%	94%	96%	96%	94%	89%
Average Wait Time (seconds)	0:37	0:39	0:26	0:29	0:40	0:67
Calls Abandoned	4%	4%	3%	3%	4%	7%

D. Procurement Statistics

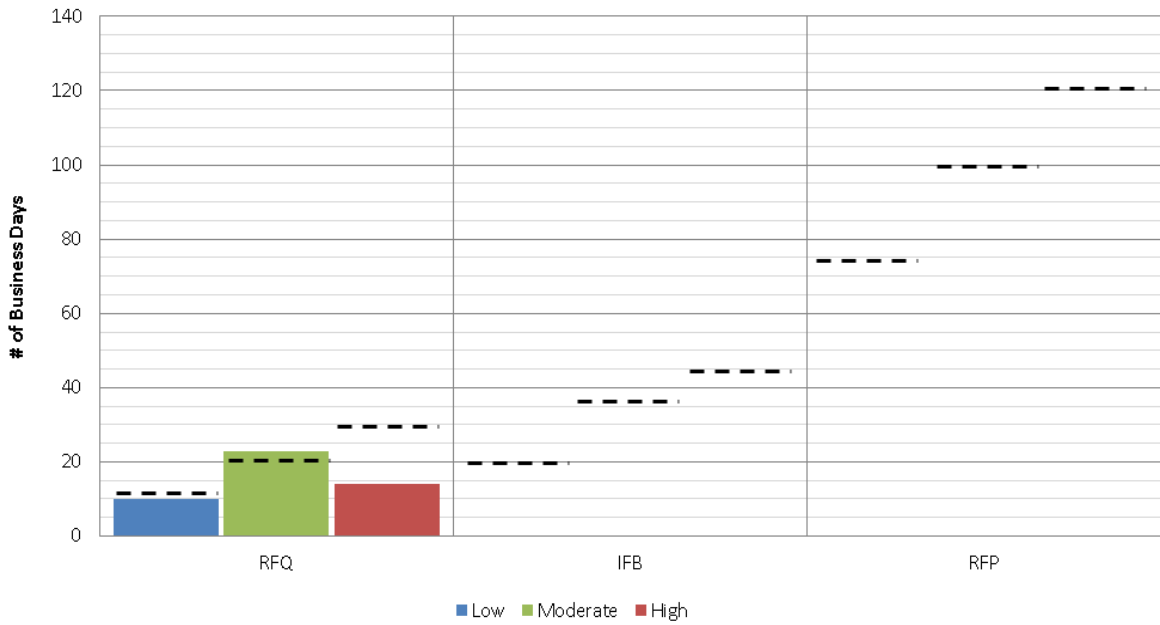
Savings	Current Period	FYTD
Competitive Savings ¹	\$9,367	\$9,367
Negotiated Savings ²	\$5,616	\$5,616
Salvage Revenues	\$1,004	\$1,004
Corporate VISA Card - Estimated Rebate	\$22,924	\$22,924



¹ Competitive savings are those savings obtained through the informal/formal bidding process. All bids received (except for the lowest responsive/responsible bid) added together and averaged. The average cost is subtracted from the apparent low responsive/responsible bidder.

² Negotiated savings are savings obtained during a Request for Proposal process, or if all bids received exceed the budgeted amount, or if only one bid is received.

Cycle Time per Method of Procurement and Complexity

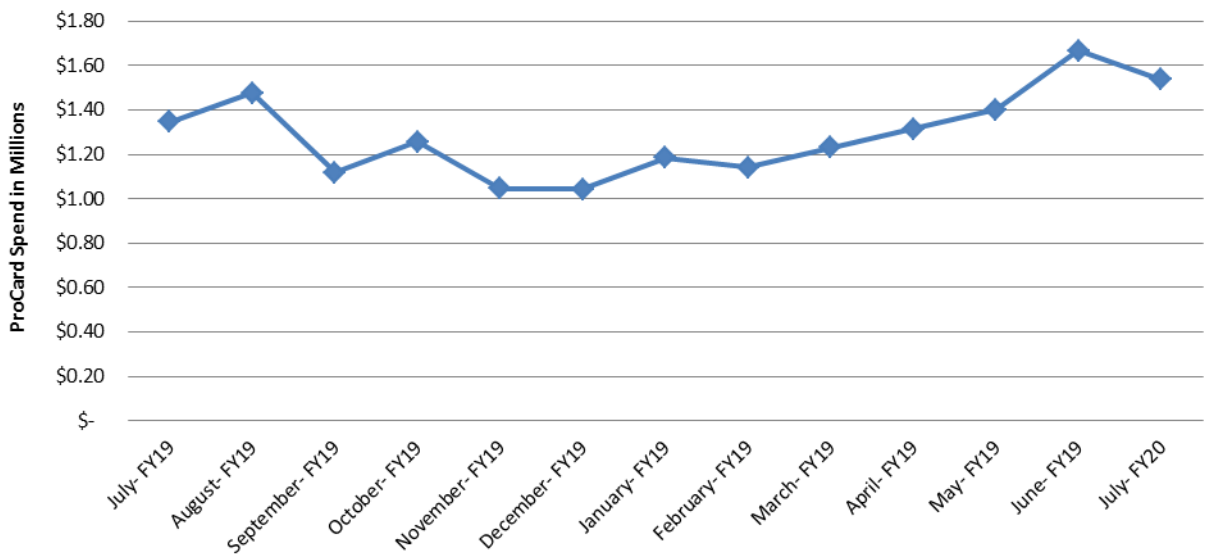


Dashed Line: Target Service Level Cycle Time

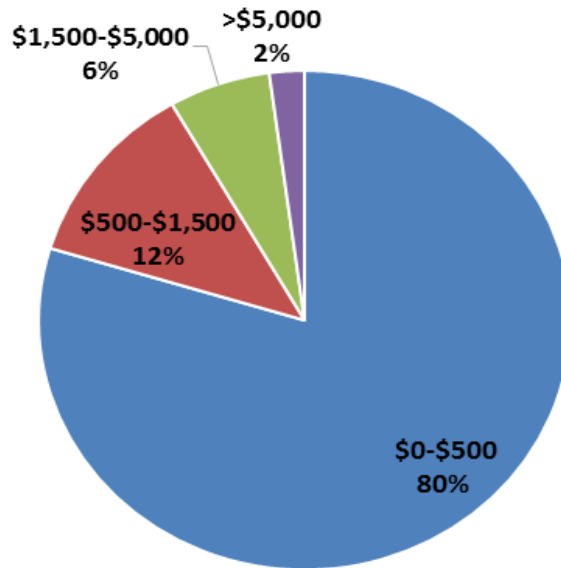
	Low	Moderate	High
RFQ	12	20	30
IFB	20	35	45
RFP	75	100	120

Low: Low technical, quick turnaround, **Moderate:** Technical, routine, **High:** Highly technical, time intensive,

ProCard Spend



ProCard Transaction Dollar Amounts



ProCard Fraud	External Fraud Transactions *	Comments
July	2	Caught by Bank Immediately
Total	2	

***External Fraud:** Fraud from outside HRSD (i.e.: a lost or stolen card, phishing, or identity theft)

Accidental Use, which is anything that is not purchased for use and ownership by HRSD, was at 1 transaction (0.07%) out of the 2,813 July ProCard transactions, with a total of \$504.07.

Procurement Client Training		
	Current Period	YTD
ProCard Policy and Process	5	5
Procurement Cycle	1	1
Total	6	6

E. Business Intelligence – Enterprise Resource Planning (ERP)

- ERP Helpdesk currently has 156 open work orders in the following statuses:

Escalated	3
In progress	55
On Hold	14
Open	39
Waiting on User	1

- ERP Helpdesk received 303 work orders in July. In July, 292 work orders were closed and 148 were closed within one hour.

3. Projects

a. Unifier and Oracle Primavera P6 Administrative (Admin) Support

- (1) Capitol Program Analyst received 15 Unifier work requests with 100 percent resolved.
- (2) Capitol Program Analyst received six P6 related work requests with 83 percent resolved.

b. ERP Enhancements

- (1) Coordinated preparation of Request for Proposal (RFP) for ERP Ad-Hoc Reporting software
- (2) Tested new grade ladders in Hyperion to make sure changes from EBS (e-Business Suite) were populating correctly.
- (3) Assisted Water Quality with hours tracking for the Boater Pump Out Program by writing a report to capture information from EBS to reduce errors when data is entered manually by WQ staff.

c. ERP Patching

The team is testing the most recent Oracle RUP 13 patch that includes enhancements, various fixes, and other system updates.

d. Project EVO Initiative - Unifier improvement project

This project will improve HRSD's project management system, Unifier, to provide real-time visibility into budgets and schedules and empower data-driven decisions.

- (1) Oracle Primavera P6 Phase 1 implementation is live. Project Managers are now using P6 to update project schedules.
- (2) EBS/Unifier detailed design is underway. Testing continues on Expense reports and interface with Unifier.
- (3) The Data warehouse (Panoptra) has been tested and approved. Go-live was pushed to early August due to a bug fix.
- (4) Initial work has begun on risk management and executive dashboard.
- (5) Change management and stakeholder communication continues.

F. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 0
2. Community Partners: 0
3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	July 2019
M-1.4a	Training During Work Hours Per Full Time Employee (102) – Current Month	Hours / #FTE	1.13
M-1.4b	Total Training During Work Hours Per Full Time Employee (102) – Cumulative Fiscal Year-to-Date	Hours / #FTE	1.13
M-5.2	Educational and Outreach Events	Number	0
M-5.3	Number of Community Partners	Number	0
	Wastewater Revenue	Percentage of budgeted	113%
	General Reserves	Percentage of Operating Budget less Depreciation	122%
	Liquidity	Days Cash on Hand	633 Days
	Accounts Receivable (HRSD)	Dollars	\$26,579,063
	Aging Accounts Receivable	Percentage of receivables greater than 90 days	14%

4. Annual Metrics

Item #	Strategic Planning Measure	Unit	FY-2019
M-2.4	Infrastructure Investment	Percentage of Total Cost of Infrastructure	*
M-4.3	Labor Cost/MGD	Personal Services + Fringe Benefits/365/5-Year Average Daily Flow	*
M-4.4	Affordability	6.5 CCF Monthly Charge/Median Household Income ³	*
M-4.5	Operating Cost/MGD	Total Operating Expense /365/5-Year Average Daily Flow	*
	Billed Flow	Percentage of Total Treated	*
	Senior Debt Coverage	Cash Reserves/ Senior Annual Debt Service	*
	Total Debt Coverage		*

Respectfully,
Jay A. Bernas
 Jay A. Bernas, P.E.
 Director of Finance

Attachment: [HRSD's Operating Cash Strategies and Retiree Health Trust \(OPEB\)](#)

³ Median Household Income is based on the American Community Survey (US Census) for Hampton Roads

**Hampton Roads Sanitation District
Quarterly Performance Report
For the Quarter Ending June 30, 2019**

Total Portfolio Summary

Operating Strategies	June 30, 2019	March 31, 2019
Primary Source	\$ 171,413,807	\$ 149,025,060
Secondary Source	128,529,607	126,787,477
SNAP Investment	14,334,553	25,115,153
	\$ 314,277,966	\$ 300,927,690

Primary Source Summary

The Primary Source Portfolio consists of BAML Corp Disbursement Account \$7.8m and VaCo/VML VIP Stable NAV Liquidity Pool \$163.6m. BAML Corp Disbursement Account returned 0.70% for the quarter ending June 30, 2019. VaCo/VML VIP Stable NAV Liquidity Pool 30 Day Average Net Yield was 2.46% for the quarter ending June 30, 2019, a decrease from 2.58% at the beginning of the quarter. VaCo/VML VIP Stable NAV Liquidity Pool's weighted average credit rating was A-1 for the quarter.

Secondary Source Summary

The Secondary Source Portfolio consists of VaCo/VML VIP 1-3 Year High Quality Bond Fund. The gross book yield of the 1-3 Year portfolio was 2.49% for the quarter ending June 30, 2019, no change from 2.49% at the beginning of the quarter. The weighted average credit rating for VaCo/VML VIP 1-3 Year High Quality Bond Fund's portfolio is AA for the quarter.

SNAP Investment

The SNAP Investments current yield was 2.47% as of June 30, 2019, a decrease from 2.64% as of March 31, 2019.

Retirement Health Plan Trust	June 30, 2019	March 31, 2019
Investment Assets	51,863,757	49,770,992
Liquidity Assets	161,528	175,097
Combined Assets	\$ 52,025,285	\$ 49,946,089

Retiree Health Plan Trust Summary

The Retiree Health Plan Trust portfolio (the "portfolio") returned 3.37% (combined assets) for the quarter ended June 30, 2019, below the 3.59% return of the Blended Benchmark. The one-year trailing return for the portfolio was 6.63% compared to the Blended Benchmark return of 7.34%. Since its inception date of September 1, 2009, the portfolio trailing annual return of 8.12% is ahead of the Benchmark return of 7.88%. As of June 30 2019, the weighted average credit quality of fixed income holdings for the portfolio is A.

TO: General Manager

FROM: Director of Information Technology

SUBJECT: Information Technology Department Report for July 2019

DATE: August 14, 2019

A. General

1. Routing, switching, and server configuration updates were completed at the treatment plants in preparation for a wireless access point upgrade to be completed in early fall.
2. The Surface Pro deployment project highlighted in the June report is on schedule, with the master disk image currently being compiled. This is the reference image containing all applications, files, and configuration settings that will be installed on the Surface Pros. End user training is scheduled to begin in October, concurrent with device deployment.
3. Staff continues working with several departments in defining and refining their reporting and data management processes, goals, and objectives.
4. The SAP Business Objects reporting software upgrade is complete. Testing is ongoing and scheduled for completion and placement into production by the end of August.
5. The data circuit supporting Central Middlesex County was successfully upgraded in response to the need for additional bandwidth and reliability.

B. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 0
2. Number of Community Partners: 0

3. Metrics Summary

Item #	Strategic Planning Measure	Unit	July 2019
M-1.4a	Training During Work Hours Per Full-Time Employee (50) – Current Month	Total Training Hours / # FTE	3.46
M-1.4b	Total Training During Work Hours Per Full-Time Employee (50) – Cumulative Fiscal Year-to-Date	Total Training Hours / # FTE	3.46
M-5.2	Educational and Outreach Events	Number	0
M-5.3	Number of Community Partners	Number	0

Respectfully,
Don Corrado

TO: General Manager
FROM: Director of Operations
SUBJECT: Operations Report for July 2019
DATE: August 12, 2019

A. Interceptor Systems

1. North Shore (NS) Interceptor Systems

- a. There was one odor complaint, three interceptor complaints, and four system alarms during the month. Staff resolved all issues and alarms.
- b. Progress continued on programming and operation of the Coliseum Pressure Reducing Station (PRS) and Offline Storage tank in an effort to flat line diurnal flows at York River Treatment Plant (YRTP). July was the first full month of testing and there were significant advances in reliability and effectiveness at YRTP. Chemical feed levels and aeration were more consistent throughout the plant.
- c. Much time and effort was spent on the Supervisory Control and Data Acquisition (SCADA) project. Staff is moving forward with testing at the Patrick Henry Pump Station (PS).
- d. The Washington Street PS beautification project was completed this month.

2. South Shore (SS) Interceptor Systems

- a. There were four interceptor complaints reported this month. Three were city issues. A motorist in Virginia Beach reported a missing valve lid and pavement settlement. Staff leveled the pavement and replaced the lid.
- b. Staff responded to and resolved 18 system alarms this month.
- c. Staff assisted the Chesapeake-Elizabeth Treatment Plant (CETP) by removing approximately five yards of grease from the septic well. Staff also helped the plant raise a manhole casting.

- d. Staff assisted the Nansemond Treatment Plant (NTP) by removing four and a half yards of debris from the Regional Residual Facility (RRF). Staff also helped the plant replace two fire hydrants and aided in a cleanup effort after a digester mixing pump mechanical seal failed.
- e. Staff operated system valves to assist the City of Suffolk in starting up their new pump station on Hillpoint Road.
- f. Staff operated system valves to assist the City of Virginia Beach in starting up their new pump station on Witchduck Road.

B. Major Treatment Plant Operations

1. Army Base Treatment Plant (ABTP)

- a. Staff took the Nitrification Enhancement Facility out of service to perform annual preventive maintenance. The final effluent nitrogen levels spiked after taking the facility out of service, but returned to normal concentrations within a week. The elevated concentrations will not impact the plant's ability to meet the total nitrogen annual permit limits.
- b. Staff replaced an obsolete strainer for the non-potable water pumping system. The strainer cleans one million gallons of water per day (mgd) and is used by various chemical and mechanical processes throughout the plant.
- c. Staff replaced leaking piping and valves on the sodium hypochlorite tanks.

2. Atlantic Treatment Plant (ATP)

- a. Construction of the Thermal Hydrolysis Process (THP) facilities continues. The side panels on the pre-dewatering building were installed enclosing the top floor, and construction of the roof began. Contractors continued work on the steam boiler piping and the heat exchangers. Testing for leaks began on the piping for the THP. Electrical work continues in the pre-dewatering building, screening room and on the THP skids. THP clean water testing of the equipment is set for mid-September.
- b. Staff completed an overhaul of barscreen #1.

- c. Staff completed repairs to contact tank #1. The tank should be returned to service in early August. The repairs included repairing a leaking influent gate and replacing the chemical feed line to the mixer. A new chemical mixer was also installed.

3. Boat Harbor Treatment Plant (BHTP)

- a. The nitrification process continues to improve at the plant. Staff modified the Aeration tank strategy by running the cell A selector zone in aerobic mode as needed in order to reduce the ammonia in the aeration process, and by adjusting the dissolved oxygen set points in cells B and C to either further nitrify the ammonia, or to encourage simultaneous nitrification and denitrification in the cells. As a result, the final effluent total nitrogen levels were successfully reduced, enabling us to meet our target goals.
- b. Staff rotated to the # 2 incinerator to facilitate the routine annual repairs and preventative maintenance on # 1 incinerator.
- c. Staff performed emergency repairs on the incinerator #2 ash bucket elevator to replace a broken driveshaft.

4. Chesapeake-Elizabeth Treatment Plant (CETP)

- a. Staff switched from ferric sulfate to alum for total phosphorus process control.
- b. Staff and contractors installed baffle walls in two aeration tanks as part of an ongoing project to develop a biological phosphorus removal population.
- c. Staff reassembled the #1 centrifuge.

5. James River Treatment Plant (JRTP)

- a. There was one reportable odor event when scrubbers were offline for more than an hour to accommodate planned electrical maintenance on the plant's main breakers.
- b. Staff completed several maintenance and repair projects that included rebuilding a centrifuge concentrate pump, repairing a leaking nonpotable water line and repairing a mixer on Integrated Fixed Film Activated Solids (IFAS) tank #3.

- c. Staff manufactured stainless steel plates for the walls separating the anaerobic and anoxic zone in the IFAS tanks. The plates will extend the height of existing walls a little over a foot and reduce openings at the bottom. The plates should help reduce the amount of dissolved oxygen back flowing from the anoxic zone to the anaerobic zone.
- d. Testing continued with the magnesium hydroxide system for removing phosphorus through the dewatered cake solids. Air was increased in the carbon dioxide stripping part of the system, resulting in removal of almost half the phosphorus in the digested feed solids going to the centrifuge.
- e. Staff completed preventive maintenance efforts on the main, generator, primary treatment, secondary treatment and dewatering circuit breakers. The effort required a power outage and diverting of night time flow to empty tanks.
- f. A contractor began conditioning soil around the SWIFT test well by feeding aluminum chloride.
- g. Replacement of the steel raceway and rake arm was completed by a contractor on gravity thickener #2.
- h. The centrifuge replacement contractor completed the support structure and solids discharge for the new centrifuge. The new centrifuge and its control panel are on site.

6. Nansemond Treatment Plant (NTP)

- a. On the evening of July 20, a mechanical seal failed on a digester mixing pump, resulting in a spill of approximately 22,000 gallons. Approximately 2,000 gallons was unrecoverable. Staff worked through the night to clean up and recover the spill. Additional maintenance and clean-up efforts continued through July 22. Staff is taking steps to mitigate this from happening again. Efforts include installing larger sump pumps and alarms in the digester building.
- b. The total volume of SWIFT recharge into the Potomac aquifer for the month of July was 13.43 million gallons.
- c. Contractors removed the cross section baffle in the Struvite Recovery Facility Reactor #1, and removed approximately one ton of struvite that was built up on the baffle and inner wall of the reactor.

- d. The coatings work Nitrified Recycle (NRCY) pipe in Aeration tank #5 is complete.
- e. Efforts to install big bubble mixers in the Aeration tanks began. Staff completed fabrication of a testing set of firing cylinders and will install them in the August.
- f. Now that the biofilters (BAFs) have acclimated with complete nitrification, and because nitrite (NO₂-N) is no longer present on SWIFT Water, the decision was made to switch back to monochloramine addition instead of free chlorine addition after ultraviolet disinfection.
- g. A booster pump was installed right after the softener water system on the preformed monochloramine system to correct an inconsistent flow rate.
- h. Repairs on the Granular Activated Carbon (GAC) vessel #2 were completed in July. Once the SWIFT Water total organic compound levels approach a consistent level of 3.5 mg/L, the plan is to put the second GAC vessel into service with virgin GAC.

7. Virginia Initiative Plant (VIP)

- a. Staff removed one secondary clarifier from service and cleaned, inspected and prepared the tank for painting by a contractor. Staff also removed a 24-inch odor control duct from the administration building that was not part of the scope of the construction project.
- b. Staff inspected the #1 furnace for future repairs and rehabilitation. Inspection of the center shaft and upper bearing revealed significant wear, requiring removal and replacement.
- c. Staff assisted contractors with the installation of a power transformer and removal of another for rehabilitation at the blower building.
- d. Staff worked with contractors to transition power to the new chemical storage motor control center, focusing efforts on bringing ferric and caustic pump controls online.
- e. Staff removed the aeration tank low-mass air flow meters and returned them to the manufacturer for recalibration to help prepare for ammonia-based air control.

- f. Staff successfully faced process control challenges, including lowering dissolved oxygen levels, solids retention time, and aerobic volume for warm weather operation while maintaining nutrient removal efficiency without chemical addition capabilities.

8. Williamsburg Treatment Plant (WBTP)

- a. Staff replaced corroded aluminum walls separating different zones of the nutrient removal process in aeration tank #2. Once complete, the tank was placed in service.
- b. Staff dislodged solids that clogged the feed line to the solids storage tank. Solids could not be removed from both the primary clarifiers or from the aeration tanks for six hours because of the plug in the line.
- c. Staff removed the two old and leaking sodium bisulfite tanks from the dechlorination building and installed two new tanks. Staff started the piping work from the new tanks to the rest of the dechlorination feed system.
- d. A contractor completed the installation of the conduit support structure over the walkway between aeration tanks #1 and #2.

9. York River Treatment Plant (YRTP)

- a. Staff worked on the nutrient removal improvements for aeration tank #5. Work included fabricating bubble-generating devices and support structures for zone separation walls, and cleaning out the tank.
- b. Staff modified piping at the centrate storage tank to allow for controlled flow of centrate to the primary clarifier influent when centrate levels get too high.
- c. Work to replace bearings and races on secondary clarifier #3 continued.

10. Incinerator Operations Events Summary

There were no deviations from the required Sewer Secondary Incineration Rule minimum operating parameters. There were seven minor (less than 60 minutes) non-reportable bypass events.

C. Small Communities (SC)

1. Middle Peninsula Small Communities Treatment and Collections

a. West Point System

- (1) Staff continues to face treatment operations challenges as a result of the non-permitted accidental industrial discharge from the WestRock Papermill on June 28. The industrial waste flowed through the gravity collection system and entered the West Point treatment plant. An operator responding to an unrelated maintenance call observed the blackish-brown flow coming into the plant. Staff discovered that the industrial flow was coming from the WestRock facility. pH samples indicated values of up to 14 Standard Units (SU).

Once discovered, several measures were taken to divert the contaminated flow from the biological treatment filters. However, an unknown volume of the industrial waste entered the treatment plant prior to initially observing the industrial discharge. The high pH waste caused substantial damage to the plant's trickling filter biofilm, reducing ability to effectively treat the biochemical oxygen demand (BOD). While regrowth of biofilm continues and all weekly BOD limits were met, the monthly average concentration (36 mg/L) exceeded the permit limit (30 mg/L). WestRock continued to pump and haul the industrial waste out of the offline storage pond this month.

- (2) Staff installed a repurposed blower from Mount Olive Treatment Plant (MOTP).
- (3) Drying bed #1 was rehabilitated to include new underdrain piping and to allow for the continued hydraulic excavation. Work continues on the waterline installation for the new septic receiving station.
- (4) Staff reinstalled the newly painted permanent outdoor standby pumps at West PS #5.

b. Urbanna System

Staff pumped and hauled approximately 12,000 gallons of activated sludge from YRTP to the Urbanna Treatment Plant (UBTP) aeration tanks to improve flocculation settling; the effort was successful and settling improved quickly.

c. King William System

During the week of June 30, the required frequency of cBOD sample analysis for the King William Effluent Outfall 001 was not met. A cBOD sample was collected on July 4, but during the data review, the cBOD analytical result was flagged with quality control data outside of acceptance limits. This designation determines the analytical result invalid. Although the result (<2 mg/L) was well under the permit limit, it was not included in the monthly average calculation. Reuse water was delivered to Nestle-Purina for six calendar days during this week, allowing for only one Effluent Outfall sample day; therefore, additional samples could not be collected. The permit requires one cBOD samples per week when Outfall 001 is utilized for less than two days.

During the calendar week of June 30 two samples were collected for the King William Reuse Outfall 650 according to permit. Given that there is no discernible difference in quality between water discharged through Outfall 001 and Outfall 650 at this time, the analytical results for the valid samples from Outfall 650 can be used to estimate the quality of water discharged through Outfall 001. The valid Outfall 650 results show effluent quality was high, and HRSD has no other information suggesting effluent quality varied significantly during this calendar week. In total, three cBOD effluent samples were collected and analyzed for the facility, two of which were valid, all with values of <2 mg/L and all well under the permit cBOD limits. These observations suggest that effluent quality required for both the Outfall 001 and Outfall 650 discharges was acceptable as defined by permit concentration limits.

d. Matthews Systems

The Mathews Vacuum System Pump Station Replacement project continues. Concrete walls and subgrade installation continues to progress well. Construction is expected to last until late summer 2020.

e. Mount Olive Treatment Plant (MOTP)

The new storage tank is now online. The availability of the tank, combined with tank level monitoring through the telog system, allows staff to efficiently pump and haul during the normal work week and eliminates the need for weekend pump and haul operations.

2. Small Communities – Surry Systems

- a. Sussex Service Authority (SSA) continued contract operations of the Town of Surry TP and the Surry County TP.
- b. On July 11, heavy rainfall inundated the Dendron Pump Station 1 area. The Wakefield Municipal Airport recorded 0.85 inches of rainfall on already saturated ground. Though the spill was not visually verified, it was estimated that no more than 1,000 gallons of raw wastewater were released to the ground near Cypress Swamp. SSA verified that the pumps were operating properly, checked the area for debris, and cleaned the site and applied lime as needed.
- c. Staff worked with the Water Quality Department to try and identify the fats, oils and grease (FOG) sources in the Pump Station #6 service area.
- d. The main bearing failed on the Rotating Biological Contactor (RBC) #1 at the town plant. Staff was able to complete the repair quickly, greatly reducing the impact on the plant's treatment process.

3. Small Communities - Lawnes Point

There were five pump and haul operations of the Lawnes Point Treatment Plant.

D. Support Systems

1. Automotive

- a. Staff performed load bank tests at Shipps Corner PS, Bowers Hill PS, Rolling Hills PS, and Patrick Henry PS. Staff performed monthly generator tests at the North Shore (NS) and South Shore (SS) Main Operations Complexes. All generators operated as designed and were returned to service.

- b. A contractor removed the fuel for the standby generators that was found to have excessive sulfur content at the YRTP and ATP.

2. Condition Assessment

- a. A contractor performed CCTV inspection of 305 Linear Feet (LF) for SS.
- b. Staff inspected the #1 incinerator at VIP.
- c. Staff continued working on the restoration of the BHTP secondary clarifiers. The restoration of the NTP aeration tank #5 ductile iron pipe restorations is now complete. Staff worked on the coating rehabilitation of the GAC pump at the SWIFT Research Center.

3. Facilities Maintenance

- a. Renovations of the NTP solids handling locker room are now complete.
- b. Staff completed preparations of the warehouse at 1460 Air Rail Avenue for demolition.
- c. Staff completed twelve sampler barrels/bases for Pretreatment & Pollution Prevention (P3) Division.
- b. Staff rebuilt four pumps and made a new centrifuge shaft for CETP.

E. Energy Management

- 1. Virginia Energy Purchasing Governmental Association (VEPGA) has reached a final, three-year agreement with Dominion Energy Virginia (DEV) for electric power. The effective date of the contract is August 1, 2019. It provides a slight decrease in electrical costs for fiscal year (FY) 2020 and offsets likely rider increases associated with FY 2021 and FY 2022.
- 2. Installations of the diesel oxidation catalysts on the BHTP and NTP are complete. The NTP system was tested and is fully operational. BHTP is still awaiting approval from Virginia Department of Environmental Quality (DEQ) concerning the Title V permit. The catalysts will reduce carbon monoxide (CO) emissions and allow the generators greater operational flexibility.

3. Staff continues to review the treatment plant aeration systems study as well as the ABTP solids diversion study.

F. Electrical and Instrumentation

1. Staff repaired Drop 53 at ATP. Drop 53 is the backup controller which provides process control for the preliminary treatment facility (PTF), Secondary Treatment and Dewatering unit processes. Because of built-in redundancies within the Ovation Distributive Control System (DCS), plant processes were not interrupted.
2. Staff continues to be actively engaged in developing maintenance of plant operation (MOPO) documentation for the BHTP and WBTP switchgear capital projects.
3. Staff completed the DCS programming and integration for the Centrifuge Polymer Makeup System at BHTP.
4. Staff assisted a contractor with replacing all roadway lighting LED fixtures at CETP.
5. Staff completed the DCS programming for the new polymer skid at NTP.
6. Staff repaired various process control components at VIP.
7. Staff optimized the aeration control system at VIP.
8. Staff assisted a contractor with reinstalling transformers at VIP for repairs. Equipment deficiencies requiring repair were identified during the annual thermographic inspections.
9. Staff continues to work with NS to improve the controls at the Coliseum storage tank for the flatlining of diurnal flows to YRTP.
10. Staff installed wiring and hardware for security enhancements at the 1434 Air Rail Avenue campus.
11. Staff continues design and research of a nitrate and nitrite (NOX) wet chemical analyzer. Additional research, experimentation, and equipment modifications to the analyzer are in progress to make phosphorus, ammonia, and iron analysis possible in the future.
12. Staff responded to 13 SCADA communication failures and 12 Telog communication failures. A communication failure is defined as a total loss of communication at a site that requires staff to respond to the site.

G. Water Technology and Research

Over the last few years, we created a new team of four treatment process engineers (TPEs). As the treatment plants become more complex and automated, and as we contemplate SWIFT, there is a need for focused and dedicated technical support. Although this function has always been important and necessary, it was previously spread over a wide range of staff, primarily the responsibility of plant managers. The Plant Manager position no longer exists in the previous sense; instead Operations Department staff for our nine large treatment plants are now overseen and managed by three Chiefs of Treatment (formerly called Senior Plant Managers) with technical assistance from the TPEs. This arrangement is working well as we continue to optimize roles and responsibilities within Treatment.

The purpose of this summary is to provide an overview of the function and responsibilities of the TPEs. The TPE position is intentionally nonmanagerial and technical in nature. TPEs have no supervisory responsibility. Merit is judged primarily on their technical competence and capability, and performance is judged based on accomplishments at the treatment plants. TPEs report to the Chiefs of Treatment and interact regularly with staff at the treatment plants, often working closely with the plant Superintendents and operations-focused Lead Operators. TPEs also coordinate closely with Water Technology and Research staff and are involved in many of these projects.

TPE roles and responsibilities include:

- Monitoring plant operations and ensuring compliance
- Identifying problems and then engineering, testing, developing, and implementing solutions
- Optimizing plant operations focused on resource efficiency – labor, chemicals, energy, etc
- Training plant staff
- Optimizing plant sampling and analysis to meet operating needs
- Analyzing plant operating data with an eye on optimization and problem solving
- Using sophisticated process and hydraulic models to analyze and design plant improvements
- Designing and implementing new technologies and systems, from fundamental preliminary process designs to “nuts and bolts” drawings needed for construction and fabrication
- Participating in HRSD and external research projects that address treatment plant needs
- Serving as lead technical resource for reviewing and contributing to capital project design, commissioning, startup, and optimization

- Providing technical vision and leadership with respect to continuous treatment plant improvement
- Remaining current with and engaged in the technology trends of the water treatment sector

I. Strategic Measurement Data

1. Education and Outreach Events: 15

- a. 7/11/19: Tour of Nansemond Plant for STEM Consulting Company – Tour conducted by Tim Scott
- b. 07/11/19 Participated in a NWRI expert panel review of five emerging direct potable reuse projects in California – Charles Bott
- c. 7/12/19: VIP Plant tour for ODU Environmental Engineering students, led by Garrett Clower
- d. 7/15/19 – 7/19/19: The Electrical Manager supported a summer camp hosted by Chrome, held at Norfolk State University (NSU) for middle school students. The camp focused on Drone technology, artificial intelligence, cybersecurity, and the Internet of Things (IoT).
- e. 7/15/19: South Shore Interceptor staff met with City of Virginia Beach Public Utilities Operations staff to collaborate and discuss locality issues – quarterly meeting.
- f. 7/22/19: Tour of SWIFT for HRSD Design & Construction interns – Tour conducted by Tony Rivera
- g. 7/22/19 – 7/26/19: The Electrical Manager supported a summer camp hosted by Chrome, held at Christopher Newport University (CNU) for high school students. The camp focused on Drone technology, artificial intelligence, cybersecurity, and the Internet of Things (IoT).
- h. 7/23/19: Podium Presentation at WEF Nutrient Removal and Recovery Conference on BNR pilot work – Stephanie Klaus
- i. 7/23/19: Workshop Presentation at WEF Nutrient Removal and Recovery Conference on BNR pilot work – Stephanie Klaus and Ali Gagnon
- j. 7/24/19: South Shore Interceptor staff met with City of Portsmouth Public Utilities Operations staff to collaborate and discuss locality issues – quarterly meeting.
- k. 7/30/19: Invited Podium Presentation on SWIFT Program – WEF and Singapore Society of Environmental Engineering Conference – Charles Bott

2. Community Partners: 6

- a. Chesapeake Bay Foundation – (oyster cage maintenance at BHTP for oyster gardening program)
- b. United Way of South Hampton Roads
- c. VIMS
- d. ODU
- e. Norfolk State University
- f. Christopher Newport University

3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	July 2019
M-1.4a	Training During Work Hours per Full Time Employee (FTE) (516) – Current Month	Hours / FTE	1.86
M-1.4b	Total Training During Work Hours per FTE (516) – Cumulative Year-to-Date	Hours / FTE	1.86
M-2.3a	Planned Maintenance Total Maintenance Hours	Total Recorded Maintenance Labor Hours	29,624.75
M-2.3b	Planned Maintenance – Preventive and Condition Based	% of Total Maintenance Hours	57%
M-2.3c	Planned Maintenance - Corrective Maintenance	% of Total Maintenance Hours	15%
M-2.3d	Planned Maintenance - Projects	% of Total Maintenance Hours	28%
M- 4.1a	Energy Use: Treatment *reported for June 2019	kWh/MG	2,497
M-4.1b	Energy Use: Pump Stations *reported for June 2019	kWh/MG	148
M-4.1c	Energy Use: Office Building *reported for June 2019	kWh/MG	110
M-5.2	Educational and Outreach Events	Number	15
M-5.3	Number of Community Partners	Number	4

4. Annual Metrics

Item #	Strategic Planning Measure	Unit	FY-2019
M-2.3a	Planned Maintenance Total Maintenance Hours	Total Recorded Maintenance Labor Hours(average)	31,542.80
M-2.3b	Planned Maintenance – Preventive and Condition Based	% of Total Maintenance Hours (average)	58.70%
M-2.3c	Planned Maintenance-Corrective Maintenance	% of Total Maintenance Hours (average)	18.07%
M-2.3d	Planned Maintenance-Projects	% of Total Maintenance Hours (average)	27.19%
M-3.6	Alternate Energy (incl. Green Energy)	Total KWH	47,375,940
M- 4.1a	Energy Use: Treatment	kWh/MG	2,277
M-4.1b	Energy Use: Pump Stations	kWh/MG	181
M-4.1c	Energy Use: Office Building	kWh/MG	95

Respectfully submitted,
Steve de Mik
 Director of Operations

TO: General Manager
FROM: Director of Talent Management (TM)
SUBJECT: Monthly Report for July 2019
DATE: August 14, 2019

A. Human Resources (HR)

1. Recruitment Summary

New Recruitment Campaigns	6
Job Offers Accepted – Internal Selections	8
Job Offers Accepted – External Selections	1
Internal Applications	23
External Applications	154
Average Days to Fill Position	51

2. Enterprise Resource Planning (ERP)

- a. HRSD worked with the Managed Services consultant on updates to system setups for several benefit interfaces.
- b. The Business Analyst worked with Information Technology staff on benefit interface updates and reporting demographic and salary details.
- c. Staff worked with Oracle Support on employee reporting.

3. Benefits and Compensation

The Compensation and Classification team evaluated positions based on Department requests, Compensation Study results and budget proposals.

4. Wellness

a. Participation Activities

Year Six Participation Activities	Unit	July 2019	Year to Date (March 2019–February 2020)
Biometric Screenings	Number	1	6
Preventive Health Exams	Number	5	22
Preventive Health Assessments	Number	11	56
Coaching Calls	Number	0	0
Online Health Improvement Programs	Number	9	82
Web-MD Online Health Tracking	Number	58	417
Challenges Completed	Number	0	0
Fit-Bit Promotion	Number	7	46

b. Wellness Program information was updated on SharePoint.

c. The Wellness Specialist prepared for August and September work center visits.

d. Wellness Wednesday e-mail communications were restructured to provide weekly fitness, nutrition and work-life balance information.

5. Workers Compensation

Six new cases were opened with 11 cases remaining active.

6. Employee Relations

a. Staff partnered with work center supervisors and employees to support employee relations and address HR issues:

- (1) Participated on interview panels for Finance and Operations
- (2) Assisted with job descriptions for Operations and Water Quality
- (3) Continued work with Operations Quality Steering Team (QST) to evaluate shift scheduling options
- (4) Worked on several HR policies for QST review
- (5) ERP and HR Policy and Procedure training was provided to new supervisors

- (6) Worked with Engineering, Communications and Procurement staff on updating contract language to include social media policy language
 - b. National Intern Day was celebrated on July 25th. Interns were featured on SharePoint and work centers recognized interns through various activities including a recognition breakfast at the Main Office.
7. General
- a. HR and Accounting staff met to streamline and improve HR and payroll processes.
 - b. The HR Manager continued to implement changes affecting ERP position set-up and control associated with the Fiscal Year 2020 budget.
 - c. HR and Operations staff worked on developing a session for the American Water Works Association/Water Environment Federation Transformative Issues Symposium on Workforce. The session highlights HRSD's Partnership with Hampton Roads Public Works Academy Summer Internship Program. In addition, a presentation was developed for the symposium's Innovative Recruitment session.
 - d. Staff participated in the following HRSD activities:
 - (1) Service Recognition Breakfast with the General Manager
 - (2) Senior Leadership Meeting
 - (3) HRSD Safety Team
 - (4) Facilitated *Your Role in Quality*
 - e. Staff participated in the following training:
 - (1) Cardio Pulmonary Resuscitation (CPR) training
 - (2) HRSD Social Media Policy training
 - (3) Hampton Roads Society of Human Resources (HRSHRM) *Active Shooter* seminar
 - (4) Leadership Strategies Facilitator Training
 - (5) Marsh and McLennan Agency (MMA) *Annual Notices Requirements* Seminar
 - (6) MMA *Active Assailant* Seminar

B. Organization Development and Training (OD&T)

1. Training

- a. The facilitator team prepared for upcoming FY 2021 Work Center Planning Day meetings to include coordinating 30 work center meetings and rehearsing brainstorming techniques and activities.
- b. Subject matter experts continue to update the Project Management 101 Workshop which is scheduled in August.
- c. OD&T Training Specialist began developing an e-learning module for employee Social Media Policy training.

2. Apprenticeship Program

- a. The Apprenticeship Graduation, celebrating “40 Years of Sustainable Success” was held, honoring 31 apprentices graduating in four trades.
- b. The Learning Management System (LMS) project team began the implementation phase. Weekly conference calls were held to begin system module set-up.

3. General

- a. Ashleigh Gagnon was hired as the OD&T Coordinator.
- b. Staff participated in the following training:
 - (1) Mentor Coach’s *Individual Intensive Coaching*
 - (2) Leadership Strategies Facilitator Training
 - (3) Real Colors- City of Norfolk
 - (4) HRSD Social Media Policy training

C. Safety

1. Mishaps and Work Related Injuries

a. HRSD-Wide Injury Mishap Status to Date (OSHA Recordable)

	<u>2018</u>	<u>2019</u>
Mishaps	45	16
Lost Time Mishaps	6	6
<i>Numbers subject to change pending HR review of each case.</i>		

b. MOM Program Year Performance Measure Work-Related Injuries

July 2019 Injuries For Operations	July 2019 Injuries for Other HRSD Departments	Total Lost Time Injuries Since July 2019	Total HRSD Injuries Since July 2019
8	0	3	8

c. Follow-up investigations were performed on eight reported work-related injuries and two auto/property incidents.

2. HRSD Safety Training

Strategic Planning Measure	Unit	July 2019
Total Safety Training Hours per Full Time Employee (847) All HRSD – July 2019	724.34 Hours / 847 FTE	0.86
Total Safety Training Hours Per Full Time Employee (847) – Cumulative July 2019	724.34 Hours / 847 FTE	0.86

3. In addition to regularly scheduled safety training and medical monitoring, the following sessions were conducted:
 - a. Four external briefings for contractors working at treatment plants and pump stations
 - b. Continued activities to complete annual pulmonary function and respirator fit evaluations
 - c. Confined Space Training for North Shore Electrical and Instrumentation and Technical Services Division (TSD) employees
 - d. Chemical Hygiene Plan training sessions for new Water Quality and Water Research and Technology employees
 - e. Two additional Forklift Safety training sessions for Williamsburg Treatment Plant (TP) employees and one session on the new electric forklift for SWIFT Research Center (SWIFT RC) employees
 - f. Cardio Pulmonary Resuscitation (CPR)/First Aid/ Automated External Defibrillator (AED) Training for North Shore Interceptor Systems and North Shore Electrical and Instrumentation employees
 - g. Aerial Lift Safety Training for Army Base TP employees
4. Safety Inspections, Testing and Monitoring
 - a. Weekly onsite inspections of the following construction sites:
 - (1) Army Base TP
 - (2) Atlantic TP
 - (3) Boat Harbor TP
 - (4) Laskin Road Pump Station (PS)
 - (5) Luxemburg Avenue PS
 - (6) Pine Tree PS
 - (7) Providence Road PS
 - (8) Shipps Corner PS
 - (9) Virginia Initiative Plant (VIP)
 - (10) Providence Road Offline Storage Facility (Woodstock Park)

b. Quarterly safety inspections of the following work centers:

- (1) Army Base TP
- (2) Boat Harbor TP
- (3) Lawnes Point TP
- (4) Nansemond TP
- (5) North Shore Automotive, Carpentry and Electrical Shops
- (6) North Shore Operations
- (7) North Shore Pretreatment and Pollution Prevention (P3)
- (8) Surry TPs and Pump Stations
- (9) SWIFT RC

c. Monitoring and testing for the following:

- (1) Soil sampling near Independence Pump Station with TSD to determine soil pH
- (2) Monthly velocity tests on Central Environmental Lab (CEL), TSD, SWIFT Research Center and VIP lab hoods
- (3) Worked with vendor to complete testing for TSD fire extinguishers

d. Safety walk-throughs and evaluations:

- (1) Met with North Shore Operations Managers to discuss pump station dry well ventilation survey results
- (2) Evaluated Main Office AEDs
- (3) Re-surveyed Norchester pump station dry well ventilation
- (4) Evaluated fall protection system within Chesapeake-Elizabeth TP Incinerator building

5. Safety Programs

a. Safety Recognition Program:

- (1) Safety Innovation Award luncheons were held with HRSD QST members and Atlantic TP and P3 employees to receive work center safety innovation awards.
- (2) Twenty-one work centers received full recognition for no Occupational Safety and Health Administration (OSHA) recordable or lost time injuries and no preventable automotive or property damage incidents.
- (3) Twelve work centers received partial recognition for a reduced number of injuries and incidents.

- b. The following was performed for the Confined Space Entry Program:
 - (1) Reviewed completed confined space entry permits for North and South Shore Interceptors
 - (2) Developed electronic confined space permits for Chesapeake Elizabeth and Nansemond TPs
- c. The following was performed for the Electrical Safety Program:
 - (1) Safety staff met with Electrical and Instrumentation supervisors to discuss program updates for compliance with the 2018 National Fire Protection Association 70E standard.
 - (2) Updates to the Electrical Risk Assessment form
- d. Multiple hot work permits were issued for contractors working at Luxembourg, Norchester and Laskin Road pump stations.
- e. The following was performed for the online Material Safety Data Sheet (MSDS) program:
 - (1) Updated e-binders for several work centers
 - (2) Performed system backup of Material Safety Data Sheets (MSDS) information
- f. A Safety Technician continued developing a training program for Bobcat and Skid Loaders.
- g. The Safety Manager met with Condition Assessment employees to develop safety procedures for coating contractors.
- h. The Safety Manager worked with the Director of Communications, Operations and CEL staff to update facility tour guidelines.
- i. A forklift inspection form was developed for the new electronic forklift at SWIFT RC.
- j. An Industrial Hygienist began developing the new Manual Elevated Work Platform safety training.

6. General

- a. An Eastern Kentucky University Occupational Safety and Health student, Jacob Voges, began a summer internship.

- b. The Safety Program internal audit continued. Safety staff met to discuss and develop the action plan based on audit findings and recommendations made by SC&H staff.
- c. The Safety Team met to address the following:
 - (1) Safety Internship
 - (2) Safety Innovation Award improvements
 - (3) Safety Internal Audit
 - (4) Facility Tour guidelines
 - (5) Chemical Truck Unloading Procedures at Treatment Plants
- d. Safety staff continued to update safety training rosters in ERP
- e. Staff provided the following to support Design and Construction:
 - (1) Attended a Woodstock Park partnering meeting
 - (2) Attended two sessions with HRSD and AECOM represented for SWIFT Project Management Plan Review
 - (3) Reviewed contractor's OSHA 300 Logs
- f. Responded to a potential work place violence incident with Human Resources staff
- g. Safety and HR staff continued work on the Request for Proposal for selection of an employee physicals and testing medical provider.
- h. The Summer Safety Times Newsletter was completed and distributed.
- i. Staff continued to define work processes and roles.
- j. Staff attended the following training:
 - (1) HRSD Social Media Policy
 - (2) Online OSHA Construction Standards

D. Monthly Strategic Planning Metrics Summary

1. Education and Outreach Events: (3)

- a. 07/16/19 – City of Norfolk Local Emergency Planning Commission meeting
- b. 07/24/19 – Lake Taylor High School Senior Festival
- c. 07/1/19 – City of Suffolk Local Emergency Planning Commission meeting

2. Community Partners: (3)

- a. City of Norfolk Local Emergency Planning Commission
- b. City of Norfolk Public Schools, Lake Taylor High School
- c. City of Suffolk Local Emergency Planning Commission

3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	July 2019
M-1.1a	Employee Turnover Rate (Total)	Percentage	0.37%
M-1.1b	Employee Turnover due to Service Retirements	Percentage	0.12%
M-1.4a	Total Training Hours Per Full Time Employee (17) – Current Month	Total Training Hours/ FTE	7.76
M-1.4b	Total Training During Work Hours Per Full Time Employee (17) – Cumulative Fiscal Year-to-Date	Hours / FTE	7.76
M-5.2	Educational and Outreach Events	Number	3
M-5.3	Community Partners	Number	3

4. Annual Metrics

Item #	Strategic Planning Measure	Unit	FY-2019
M-1.1a	Employee Turnover Rate (Total)	Percentage	6.63%
M-1.1b	Employee Turnover due to Service Retirements	Percentage	2.10%
M-1.1c	Employee Turnover Rate within Probationary Period	Percentage	0.25%
M-1.2	Internal Employee Promotion Eligible	Percentage	85%
M-1.3	Average Time to Fill a Position	Calendar Days	66
M-1.5a	Safety OSHA 300 Incidence Rate Total Cases	# per 100 Employees	4.10
M-1.5b	Safety OSHA 300 Incidence Rate Cases with Days Away	# per 100 Employees	0.80
M-1.5c	Safety OSHA 300 Incidence Rate Cases with Restriction, etc.	# per 100 Employees	1.80

Respectfully submitted,
Paula A. Hogg
Director of Talent Management

TO: General Manager

FROM: Director of Water Quality (WQ)

SUBJECT: Monthly Report for July 2019

DATE: August 14, 2019

A. General

1. Pretreatment and Pollution Prevention (P3) division staff assessed no civil penalties this month.
2. The Director attended the National Association of Clean Water Agencies (NACWA) summer conference in Minneapolis, MN and led a meeting of NACWA's Water Quality Committee as its Chairman. The conference included a discussion of the policy, regulatory and legal implications of long-term control plans much like HRSD's consent decree and its proposed integrated plan that are technically completed. Some of NACWA's members hold that once such a plan is completed, the municipality is no longer required to pursue further actions related to the purpose of the original plan (protect the human health and the environment). This position is problematic because the municipality has not necessarily demonstrated that it no longer causes or contributes to exceedances of water quality standards when the plan has been completed. This requirement of the Clean Water Act is one of several drivers for HRSD's integrated plan and the pursuit of SWIFT. Unless discharges to state waters are greatly reduced or eliminated, there will always be increasingly more stringent requirements for those discharges, requiring a never-ending series of actions and plans on the part of the discharger. The Director will be following this discussion closely given its relevance to HRSD's integrated plan.

B. Quality Improvement and Strategic Activities

1. The Sustainability Environment Advocacy Group (SEA) reported the following activities for the month of July:
 - a. Annual planning meeting was held and the SEA Team decided on FY 2020 Initiatives and champions as listed below. Subcommittees will begin FY 2020 goals in August.
 - Communications (Lacie Wever)
 - Metrics Reporting (Christene Mitchell)
 - Oyster Restoration Program (Laura Kirkwood)
 - Community Clean-Ups (Edwin Strange)
 - Learning Week (Michelle Willke)
 - Ash/Biosolids Recycling (Christel Dyer)
 - R3 Support (Christene Mitchell)
 - Pollinators (Jon Nelson)
 - Sustainable Purchasing (Katie Markle)
 - 2020 Earth Day: 50th Anniversary (Christel Dyer)
 - b. Jon Nelson was also nominated and voted the SEA Team First Mate, meaning he will step up as SEA Captain next fiscal year and serve through FY 2022.
2. The WQ Communication Team continues monitoring and measuring inter-divisional communication issues within the WQ Department.

C. Municipal Assistance

HRSD provided sampling and analytical services to Hanover County to support monitoring required for their Virginia Pollution Discharge Elimination System (VPDES) permit.

D. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 2
 - a. 07/13/19 – P3 staff participated in the ODU Cobia Fishing Classic event relative to Boater Pump-Out Education

- b. 07/29/19 – Central Environmental Laboratory (CEL) staff provided three presentations on cutting-edge technologies performed in the CEL at the Virginia American Water Works Association/Virginia Water Environment Association (VA-AWWA/VWEA) Good Laboratory Practices Conference.

2. Community Partners: 8

- a. City of Chesapeake
- b. City of Hampton
- c. City of Newport News
- d. City of Suffolk
- e. City of Virginia Beach
- f. Virginia Department of Environmental Quality
- g. Virginia Department of Health Division of Shellfish Sanitation
- h. United Way

3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	July 2019
M-1.4a	Training During Work Hours Per Full Time Employee (114) (Current Month)	Total Hours / # FTE	7.87
M-1.4b	Total Training During Work Hours Per Full Time Employee (114) (Cumulative Fiscal Year-to-Date)	Total Hours / # FTE	7.87
M-2.5	North Shore/South Shore Capacity Related Overflows	# within Level of Service	0
M-3.1	Permit Compliance	# of Exceedances: # of Permitted Parameters	1:5,073
M-3.2	Odor Complaints	#	0
M-3.4	Pollutant Removal	Total Pounds Removed	17,335,002
M-3.5	Pollutant Discharge	% Pounds Discharged/ Pounds Permitted	14%

Item #	Strategic Planning Measure	Unit	July 2019
M-5.2	Educational and Outreach Events	#	2
M-5.3	Community Partners	#	8
	Average Daily Flow	Total MGD for all Treatment Plants	133.92
	Pretreatment Related System Issues	#	0

4. Annual Metrics

Item #	Strategic Planning Measure	Unit	FY-2019
M-3.3	Carbon Footprint	Tons per MG	1.58
M-4.2	R & D Budget	Percentage of Total Revenue	*%
M-5.4	Value of Research	Number	*
M-5.5	Number of Research Partners	Number	*
	Rolling 5 Year Average Daily Flow	MGD	152.23
	Rainfall reported at Norfolk International Airport	Inches	53.1

*These metrics will be reported upon closeout of fiscal year financials.

Respectfully submitted,
James Plett, PhD
 Director of Water Quality



The following Internal Audit Status document has been prepared by SC&H for the HRSD Commission. Below is a summary of projects in process, upcoming projects, and the status of current management action plan (MAP) monitoring.

I. *Projects in Process*

Customer Care

- **Tasks Completed (July 2019)**
 - Obtained management action plan responses and finalized report
 - Issued final signed report for Commission review

- **Upcoming Tasks (August 2019)**
 - This project has been completed; no additional tasks will be performed

Safety

- **Tasks Completed (July 2019)**
 - Finalized project workpapers
 - Communicated with Safety regarding finalization of report

- **Upcoming Tasks (August 2019)**
 - Obtain management action plan responses
 - Work with process owners to finalize report

Permitting

- **Tasks Completed (July 2019)**
 - Conducted planning exit meeting and objectives discussion with management
 - Finalized fieldwork objectives and audit plan
 - Contacted process owners to obtain fieldwork documentation

- **Upcoming Tasks (August 2019)**
 - Perform fieldwork testing procedures
 - Begin preparation of final report draft

Payroll/ Timekeeping

- **Tasks Completed (July 2019)**
 - Scheduled entrance discussion with process owners
 - Prepared audit kick-off materials

- **Upcoming Tasks (August 2019)**
 - Obtain and review initial documentation requests
 - Perform planning walkthrough discussions
 - Document process understanding

Business Continuity and Disaster Recovery (Audit Fieldwork Complete/ Management Response in Process)

- **Upcoming Tasks (Q3 2019)**
 - HRSD management has communicated its continued progress to develop a plan to address the recommendations included in the BC/DR report. SC&H will continue to work with HRSD process



owners and management to finalize the audit report, incorporating management action plans. A specific completion date has not been identified at this time.

II. Upcoming Projects (FY2020)

SC&H’s next audit will pertain to the Pollution Source Control functions at HRSD and is scheduled to begin in Q4 (October) of calendar year 2019.

III. Management Action Plan (MAP) Monitoring

SC&H is performing on-going MAP monitoring for internal audits previously conducted for HRSD. SC&H begins MAP follow-up approximately one year following the completion of each audit and will assess bi-annually.

For each recommendation noted in an audit report, SC&H gains an understanding of the steps performed to address the action plan and obtains evidence to confirm implementation, when available.

The following describes the current project monitoring status.

Audit	Report Date	Next Follow-up	Recommendations		
			Closed	Open	Total
D&C: CIP Project Management	5/11/2016	February	11	2	13
Biosolids Recycling	10/8/2016	Pending Permit	7	1	8
HR Benefits	11/22/2016	Closed	15	0	15
Inventory	4/20/2017	February	1	4	5
Procurement/ ProCard	8/23/2017	October	8	3	11
Engineering Procurement	4/20/2018	In Process	TBD	TBD	8



Expertise that Works

Internal Audit
Customer Care Division
Hampton Roads Sanitation District

July 26, 2019

Table of Contents

- I. Executive Summary..... 2
 - Background 2
 - Objectives..... 4
 - Scope 4
 - Methodology and Approach..... 4
 - Summary of Work..... 6
- II. Detailed Observations and Recommendations..... 7
 - Observation 1 7
 - Observation 2 10

I. Executive Summary

Background

SC&H conducted an internal audit of management procedures for the Hampton Roads Sanitation District's (HRSD) Customer Care Division.

The Customer Care Division (Customer Care) is responsible for a variety of customer facing functions. Customer Care, in conjunction with the local Hampton Roads jurisdictions, bills for and collects wastewater treatment charges, which are the primary source of revenue for HRSD. HRSD serviced approximately 470,000 customer accounts and collected approximately \$275 and \$254 million in the fiscal years ended 2018 and 2017, respectively.

Customer Care is divided into four primary functional areas: Call Center, Account Investigations, Billing, and Payments.

Call Center

The Call Center receives and addresses customer concerns via telephone, email, and chat via the HRSD website throughout the day. Inquiries may pertain to account information and billing questions. All interactions with customers are documented through a written comment on the associated customer account within Oracle Customer Care and Billing (CC&B) in order to track and monitor customer activity and communication with HRSD.

Call Center representatives are responsible for the creation of payment plans and payment arrangements. Representatives establish a payment plan within CC&B when a customer requests a payment extension of two weeks or less. This process is conducted when the customer is unable to pay their bill by the designated due date, and prevents HRSD from entering the customer into its collections process. Collections is the automated issuance of reminder and delinquency notices to customers who remain past due in payment in an attempt to receive the owed amount. Similarly, payment arrangements are established to develop a payment schedule for customers with outstanding balances that they are unable to pay prior to the bill due date. Depending on the amount owed, a payment arrangement can be established for a period of six months up to a period of twenty-four months based on the total amount owed. Specific thresholds are as follows:

1. \$0-\$500 past due results in a 6-month payment arrangement
2. \$501-\$1,000 past due results in a 12-month payment arrangement
3. \$1,001+ results in a 24-month payment arrangement

When the plan is created within the system, HRSD requires a payment of 10% of the total amount due before finalizing the arrangement, to ensure that a portion of the payment is received in a timely manner.

Account Investigations

Account investigators review customer accounts that have been placed into collections and severance, which is the process of sending payment reminders and discontinuing service by shutting off the customer water meter. When a customer account becomes past due, CC&B automatically routes the account to the collections process. A reminder notice, via email or through the mail, is sent to customers five days after payment becomes past due and a delinquency notice is sent after 30 days. If payment is not received following the delinquency notice, CC&B automatically places customers into severance and flags the customer account for service suspension. Account investigators are dispatched to suspend service to customers placed into severance and are responsible for shutting off water meters at the designated locations. Upon receipt of payment, or establishment of a payment plan or payment arrangement, CC&B generates a field activity task which is used to dispatch an account investigator to restore a customer's water service. Water service is restored between 3:00PM and 6:00PM on the day payment is received. If customers make a payment after 3:00PM service is restored the next day.

Billing

The Billing function is responsible for the creation, distribution, and reconciliation of customer billing statements. HRSD provides wastewater treatment service and manages billing for 18 jurisdictions, which are classified as Model 1, 2, and 3 billing categories.

1. Model 1 jurisdictions are only billed for HRSD water treatment charges
2. Model 2 and 3 customers are billed for both HRSD and jurisdictional service charges

Depending on the jurisdiction and model, bills may be processed on a monthly, semi-monthly, quarterly, or semi-annual basis. When "flat file" (text files detailing point in time meter reading and associated customer account information) meter readings are received from the various jurisdictions, Information Technology (IT) uploads the data into CC&B to be applied to the respective customer accounts. At times, meter reading information will not upload into CC&B correctly and an error message will be returned. Billing representatives are responsible for researching and correcting errors within the system to ensure customers are billed properly for the current cycle. At the end of each business day, completed customer bills are exported from CC&B and transmitted to Utilitec. Utilitec is the third-party vendor utilized to print and send customer bills to all customers. This transmission is initiated by IT and automatically processes in both systems. The result is the most current billing information for customer accounts being made available in Invoice Cloud for electronic payment and processed for bill printing by Utilitec. Utilitec transmits bill data to Invoice Cloud, the third-party, cloud-based e-payment software which sends e-bills to customers and provides a PDF download link between the customer and Utilitec. Confirmation emails with the total number of bills processed and the total amount billed are delivered to designated members of Billing for verification that all information transmitted appropriately. Daily, billing representatives utilize the information received and perform a reconciliation of the number of bills within CC&B to those transmitted to Invoice Cloud and Utilitec. Billing also reviews and addresses billing data corrections and customer account adjustments, as needed.

Payments

Customer Care receives payments through an in-person cashier window, mail lockbox, electronically, or over the phone. Payments representatives are responsible for preparing deposits on a daily basis and given to Dunbar, the third-party vendor responsible for transporting the money to Bank of America. A reconciliation of the previous day's deposits are prepared by members of Payments and reviewed and finalized by Hampton Roads Utility Billing Service (HRUBS) Accounting. HRUBS manages the general ledger and assists in the performance of reconciliations for the Customer Care department and reports directly to the Director of Finance. The Payments function is also responsible for correcting errant payments, addressing returned payments and issuing refunds.

Objectives

The following audit objectives were established based on the internal audit planning procedures:

- A. Assess the bill creation and distribution components of the standard billing process to ensure customers are appropriately charged for services rendered.
- B. Assess the billing adjustment process to ensure billing adjustments are appropriately identified, calculated, and applied to a customer account.
- C. Evaluate the payments work center's cashiering and electronic payment components to ensure payments are appropriately handled and applied to respective customer accounts in a timely manner.
- D. Ensure customer payment plans and payment arrangements are appropriately created, reviewed, and monitored.
- E. Ensure delinquent accounts are appropriately identified and placed into severance until payment is received and service is restored.

Scope

The internal audit was initiated in October 2018 and fieldwork procedures were completed in May 2019. The internal audit focused on the policies, procedures, and controls in place at the time of the audit. Documentation sample selections were examined for calendar year 2018.

Methodology and Approach

In order to administer the audit procedures, SC&H performed the following:

Process Walkthrough and Flowchart Creation

SC&H obtained and reviewed Customer Care policy and procedural documentation. SC&H then met with members of the Call Center, Account Investigations, Billing, and Payments functions, as well as the Chief of Customer Care, to conduct detailed walkthrough discussions of their procedures. These discussions focused on process flow, required approval, inputs/ outputs, and risk and control points. Based on discussions and review of the procedural documentation, SC&H created flowchart visualizations to document our understanding of each process. The processes identified and documented include:

- Call Center

- Inquiry Receipt
- Payment Plans
- Payment Arrangements
- Staffing
- Account Investigations
 - Notification/ Severance
 - Service Restoration
 - Meter Pull
- Billing
 - Account Set-up
 - New Meter Installation
 - Bill Creation
 - Bill Review
 - Bill Distribution
 - Billing Corrections
 - Customer Adjustments
 - Jurisdiction Adjustments
- Payments
 - Cashiering
 - Electronic Payments
 - Returned Payments
 - Refunds

Risk Ranking and Creation of Project Plan

Following the documentation of process steps, SC&H developed a comprehensive Customer Care risk and control matrix (RCM). The RCM aligns risks with controls to analyze the control environment and ranks the risks on perceived likelihood and severity. Based on the understanding of the processes, risks, and related controls, SC&H developed an audit program to achieve the objectives described above. This program includes detailed steps to address each objective with the goal of verifying the existence of sound internal controls and identifying opportunities for improvement.

Audit Program Execution

SC&H executed the audit program by completing the following tasks:

- Verified that “flat file” meter reading uploads are appropriately applied to customer billings
- Observed the procedures related to the correct of meter reading upload errors and subsequent upload completion to ensure accurate billing information is disseminated to customers
- Re-performed the reconciliation of billing information between CC&B, Invoice Cloud, and Utilitec
- Reviewed a sample of billing adjustment to ensure they are appropriately supported and reviewed

- Observed the procedures of the cashiering process at the HRSD main office to ensure controls are appropriately performed
- Verified the accuracy of the ePay/ Payment Representative reconciliation of customer payments
- Verified customer payment plans are appropriately created and reviewed
- Verified customer payment arrangements are appropriately created and reviewed
- Observed the automated processing of delinquency reminders and status updates in CC&B
- Performed an analysis to determine whether service is restored in a timely manner for customers whose accounts are no longer in severance and selected a sample of turn-ons to ensure restoration was timely

Summary of Work

SC&H concludes that Customer Care has developed in-depth procedures related to the preparation and dissemination of customer bills and the collection of customer payments through various mediums. Customer Care has also developed a detailed collections process to ensure that customers who are past due on payment are identified and notified prior to the suspension of water services. Further, Customer Care has a Customer Call Center equipped with the resources required to effectively and efficiently manage and resolve customer inquiries and disputes.

However, there are improvement opportunities that can be incorporated into the Customer Care Division. For example, Customer Care does not have a formal process to evidence the daily performance of billing reconciliations to ensure all bills are processed and issued to customers in a timely manner. Additionally, HRSD does not consistently document the justification behind payment extensions extended to various customers.

The following section provides detailed observations and recommendations regarding two separate topics.

We appreciate the assistance and cooperation of the management and staff involved in HRSD's Customer Care Division. Please contact us if you have any questions or comments regarding any of the information contained in the internal audit report.

SC&H Group, Inc.



Matthew Simons, CPA, CIA, CGAP
Principal

II. Detailed Observations and Recommendations

Observation 1

Procedures for performing billing reconciliations are not sufficiently designed to ensure the identification and documentation of billing discrepancies between CC&B, Invoice Cloud, and Utilitec.

Observation Detail

Billing does not have formal policy and procedural documentation establishing guidance for the performance of reconciliations and does not maintain supporting documentation to support that the reconciliations occurred. Further, the reconciliations are not subject to a formal review by an independent Billing representative. As a result, Customer Care is unable to provide evidence to verify the daily performance of this reconciliation function.

At the end of each business day, billing representatives perform a reconciliation of the number of bills processed within CC&B to those transmitted to Invoice Cloud and Utilitec to ensure that all bills were properly transmitted for printing and distribution to customers. A majority of the information utilized in the performance of the reconciliations is obtained via email from Invoice Cloud and Utilitec once bill processing has occurred.

SC&H reviewed 15 billing reconciliations performed for workdays in Calendar Year 2018, which averaged over 19,000 processed bills per day. The following observations were identified:

1. SC&H was unable to validate the accuracy and performance of all reviewed reconciliations. In each reconciliation sampled, testing procedures indicated a disagreement between CC&B, Invoice Cloud, and Utilitec for both the total number of bills and the total amount billed. Per discussion with Customer Care, this results from the following:
 - a. Daily documentation is not maintained for initial occurrence of the reconciliations; as a result, original evidence cannot be provided for appropriately performed reconciliations
 - b. Updates following the 45 day retention period may be made to customer bills related to adjustments, corrections of errors, etc. and the total number of bills may be updated, resulting in a discrepancy between the three systems when viewing historical information
 - c. Due to updates made following the 45 day retention period, Customer Care is unable to retroactively confirm that the total number of bills and total bill amount for a specific business day, as they appeared on the original reconciliation date
2. All reviewed billing reconciliations contained information pertaining to bills that had originally been transmitted on a previous business day, but had not been uploaded into Utilitec. Reasons for this include the bill being:
 - a. Deemed invalid (e.g. a billing error prevents the system from processing the bill)

- b. Suppressed within the system (e.g. a bill is not processed during the current business day, but is held until the next business day for processing)
 - c. Archived for billing at a later date
- Utilitec does not provide additional information related to bills released from previous days. As such, the final number of bills transmitted for the day cannot be confirmed within Utilitec.

3. 8 of the 15 reviewed billing reconciliations evidenced a disagreement in the total number of bills within Utilitec and Invoice Cloud, independent of CC&B. Information provided by Invoice Cloud does not include bills that were invalid, suppressed, and/ or archived. As such, the total number of bills was unable to be confirmed between the two systems.

Risk

A lack of consistent billing reconciliations may result in the following:

1. Customers do not receive bills for a given billing cycle
2. Customers are inappropriately past due in payment, due to being unaware of an amount owed to HRSD
3. Unrealized revenue from HRSD based on incorrect or missed billings

Further, if the same number of bills is not processed within the three systems, customers are at risk of not receiving a bill in a timely manner, or being unable to pay their bill through the e-pay portal. Subsequent issues that may arise include, but are not limited to:

1. A customer bill is transmitted to Utilitec and issued to a customer, however is not being available for e-payment due to it not being properly transmitted to Invoice Cloud
2. A customer bill is applied to the customer account within Invoice Cloud, however is not printed and issued to the customer in Utilitec, resulting in the customer being unaware of an outstanding balance on their account

Recommendation 1.1

Customer Care should develop and document detailed billing reconciliation procedures that includes, but are not limited to the following:

1. Maintaining supporting documentation related to the total number of bills and total amount billed for a given business day within CC&B, Invoice Cloud, and Utilitec
2. Verifying that the total number of bills agrees between all three systems, documenting, researching and resolving any discrepancies
3. Verifying the total dollar amount of the bills agrees between all three systems, documenting, researching, and resolving any discrepancies, prior to finalization of the reconciliation

Management’s Action Plan and Implementation Date

Management Actions Plan:

HRSD Staff will work with Utilitec and Invoice Cloud to develop reporting that identifies the total number of bills and total amount billed per business day to verify it agrees with the total dollar amount and number of bills per day in CC&B. Once reporting is available Billing Staff

will verify the total dollar amount and number of bills for all three systems and research and resolve any discrepancies.

Implementation Date:
January 2020

Recommendation 1.2

Establish an independent Billing representative review of all reconciliations to ensure they are being performed consistently and sufficiently to identify any issues between the three systems. Evidence of review may be a signature or initials on the reconciliation once reviewed.

Management's Action Plan and Implementation Date

Management Actions Plan:

After the Billing representative's review of all reconciliations between the three systems, a secondary review of the reconciliations will be performed and signature provided.

Implementation Date:
January 2020

Observation 2

A formalized process, which incorporates appropriate internal controls, is not in place to ensure all payment plans are in accordance with Customer Care policy and procedures regarding duration and supporting documentation.

Observation Detail

Daily, customers contact the Call Center to request payment extensions on their current HRSD bill. Call Center Agents create a payment plan for the customer, allowing the customer to pay the balance due at a later day, while simultaneously preventing the customer from having their water service discontinued because of non-payment.

The Customer Care policy states that payment plans cannot be created in excess of two weeks without the approval of a Customer Care Coordinator and a comment must be created whenever a payment plan is added in CC&B to ensure appropriate justification for the payment plan is documented.

SC&H reviewed 50 payment plans created in Calendar Year 2018. 25 of the plans were automatically generated by CC&B when the customer independently accessed the HRSD website or completed their request through the interactive voice response (IVR) system without speaking to a Call Center Agent. The remaining 25 plans were created by Call Center Agents after speaking with the customer via phone call. The following were identified:

1. CC&B does not prevent a Cashier or Call Center Agent from creating a payment plan longer than two weeks. All individuals with access to CC&B are able to set up a payment plan for customers. HRSD policy states that payment plans that exceed two weeks must be created by a Call Center Coordinator.
2. 17 of the 50 payment plans selected for testing were established for longer than two weeks (14 calendar days) and did not include Customer Care Coordinator approval evidence. The time frames of the payment plans identified include the following:
 - a. Three weeks (15-21 days): Seven payment plans
 - b. Four weeks (22-28 days): One payment plan
 - c. Greater than four weeks (29-106 days): Nine payment plans
3. 11 of the 25 payment plans created by Call Center Agents did not include a note providing justification in the Pay Plan entry in ERP. However, upon further review and discussion with Call Center personnel, a Customer Contact entry was created for the payment plan that included a justification note, but the information was not transposed to the Pay Plan within the system.
4. There is no formal review of payment arrangements created within the system. A Payment Arrangement Detail Report is run weekly, and reviewed on an ad hoc basis by the Call Center Manager. However, there is no formal, regular process to ensure payment arrangements are valid.

Risk

A lack of a standardized process to document payment plans within the system may result in plans being established for excessive periods of time in violation of Customer Care policy, allowing customers prolonged periods of time to pay past due balances.

Additionally, lack of a standardized process for the appropriate location of recording payment plan justification may result in subsequent Call Center Agents being unaware of existing payment plan justification or status. This may result in inappropriate or extended payment plans being established, allowing customers to extend the payment period prior to paying a past due balance without interruption of services.

Recommendation 2.1

Customer Care should implement a system limitation within CC&B requiring approval of all payment plans that exceed two weeks by a Customer Care Coordinator or above. This will help mitigate the risk of payment plans being established for unjustified or inappropriate periods of time and will establish a formal approval process.

Management’s Action Plan and Implementation Date

Management Actions Plan:

CC&B does not have the ability to systematically limit the length of a payment plan. In order to mitigate the risk, Customer Care staff will monitor and review the Payment Plan report on a monthly basis for any items that are outside of the standardized process.

Implementation Date:

Fall 2019

Recommendation 2.2

Customer Care should develop and implement a standardized process for the creation and inclusion of proper justification for all payment plans created within the system. This will help mitigate the risk of payments plans being inappropriately created within the system.

Management’s Action Plan and Implementation Date

Management Actions Plan:

Customer Care staff will develop and implement a standardized process for the creation of payment plans and inclusion of proper justification for all payment plans created within the system.

Implementation Date:

Fall 2019

Annual Metrics													
Item	Strategic Planning Measure	Unit	Target	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19
M-1.1a	Employee Turnover Rate (Total)	Percentage	< 8%	5.63%	4.09%	6.64%	7.62%	8.22%	9.97%	6.75%	6.66%	9.99%	6.63%
M-1.1b	Employee Turnover Rate within Probationary Period		0%		2.22%	8.16%	14.58%	9.68%	0.66%	0.13%	0.90%	1.01%	2.10%
M-1.2	Internal Employee Promotion Eligible	Percentage	100%		59%	80%	69.57%	71.43%	64.00%	69.00%	68.00%	85.00%	85.00%
M-1.3	Average Time to Fill a Position	Calendar Days	< 30		70	60	52	43.76	51	56	67	67	66
M-1.4	Training Hours per Employee - cumulative fiscal year-to-date	Hours	> 40		30.0	43.8	37.5	35.9	42.8	49.0	48.4	41.1	40.9
M-1.5a	Safety OSHA 300 Incidence Rate Total Cases	# per 100 Employees	< 3.5	6.57	6.15	5.8	11.2	5.07	3.87	7	5.5	5.7	4.1
M-1.5b	Safety OSHA 300 Incidence Rate Cases with Days Away	# per 100 Employees	< 1.1	0.74	1.13	1.33	0.96	1.4	0.82	1.9	1	1.1	0.8
M-1.5c	Safety OSHA 300 Incidence Rate Cases with Restriction, etc.	# per 100 Employees	< 0.8	3.72	4.27	2.55	4.5	2	1.76	3.6	2.8	2.8	1.8
M-2.1	CIP Delivery - Budget	Percentage			113%	96%	124%	149%	160%	151%	156%	160%	170%
M-2.2	CIP Delivery - Schedule	Percentage			169%	169%	161%	150%	190%	172%	173%	167%	159%
M-2.3a	Total Maintenance Hours	Total Available Mtc Labor Hours Monthly Avg			16,495	22,347	27,615	30,863	35,431	34,168	28,786	28,372	31,887
M-2.3b	Planned Maintenance	Percentage of Total Mtc Hours Monthly Avg			20%	27%	70%	48%	41%	43%	44%	59%	59%
M-2.3c	Corrective Maintenance	Percentage of Total Mtc Hours Monthly Avg			63%	51%	12%	10%	18%	25%	25%	24%	18%
M-2.3d	Projects	Percentage of Total Mtc Hours Monthly Avg			18%	22%	20%	18%	32%	34%	32%	32%	27%
M-2.4	Infrastructure Investment	Percentage of Total Cost of Infrastructure	2%		8.18%	6%	6%	4%	7%	7%	5%	5%	*
M-3.3	Carbon Footprint	Tons per MG Annual Total			1.61	1.57	1.47	1.46	1.44	1.45	1.58	1.66	1.58
M-3.6	Alternate Energy (Incl. Green Energy as of FY19)	Total KWH			0	0	0	5,911,289	6,123,399	6,555,096	6,052,142	5,862,256	47,375,940
M-4.1a	Energy Use: Treatment	kWh/MG Monthly Avg			2,473	2,571	2,229	2,189	2,176	2,205	2,294	2,395	2,277
M-4.1b	Energy Use: Pump Stations	kWh/MG Monthly Avg			197	173	152	159	168	163	173	170	181
M-4.1c	Energy Use: Office Buildings	kWh/MG Monthly Avg			84	77	102	96	104	97	104	104	95
M-4.2	R&D Budget	Percentage of Total Revenue	> 0.5%		1.0%	1.4%	1.0%	1.3%	1.0%	0.8%	1.3%	1.4%	*
M-4.3	Total Labor Cost/MGD	Personal Services + Fringe Benefits/365/5-Year Average Daily Flow		\$1,028	\$1,095	\$1,174	\$1,232	\$1,249	\$1,279	\$1,246	\$1,285	\$1,423	*
M-4.4	Affordability	8 CCF Monthly Charge/ Median Household Income	< 0.5%		0.48%	0.48%	0.41%	0.43%	0.53%	0.55%	0.59%	0.60%	*
M-4.5	Total Operating Cost/MGD	Total Operating Expense/ 365/5-Year Average Daily Flow		\$2,741	\$2,970	\$3,262	\$3,316	\$3,305	\$3,526	\$3,434	\$3,592	\$3,959	*
M-5.1	Name Recognition	Percentage (Survey Result)	100%	67%	71%	N/A	62%	N/A	60%	N/A	N/A	53%	N/A
M-5.4	Value of Research	Percentage - Total Value/HRSD Investment			129%	235%	177%	149%	181%	178%	143%	114%	*
M-5.5	Number of Research Partners	Annual Total Number			42	36	31	33	28	35	15	20	*
	Rolling 5 Year Average Daily Flow	MGD		157.8	155.3	152	154.36	155.2	151.51	153.09	154.24	152.8	152.23
	Rainfall	Annual Total Inches		66.9	44.21	56.21	46.65	46.52	51.95	54.14	66.66	49.24	53.1
	Billed Flow	Annual Percentage of Total Treated		71.9%	82.6%	78%	71%	73%	74%	73%	73%	76%	*
	Senior Debt Coverage	Net Revenue/Senior Annual Debt Service	> 1.5	2.51%	2.30%	2.07%	1.88%	1.72%	1.90%	2.56%	3.10%	3.59%	*
	Total Debt Coverage	Net Revenue/Total Annual Debt	> 1.4	1.67%	1.67%	1.46%	1.45%	1.32%	1.46%	1.77%	1.93%	2.03%	*

* To be reported upon completion of the annual financial statements.

Monthly Updated Metrics														FY-19	FY-20
Item	Strategic Planning Measure	Unit	Target	FY-10	FY-11	FY-12	FY-13	FY-14	FY-15	FY-16	FY-17	FY-18	FY-19	Jun-19	Jul-19
	Average Daily Flow	MGD at the Plants	< 249		136	146.5	158.7	156.3	153.5	155.8	153.5	145.8	152.7	144.8	133.9
	Industrial Waste Related System Issues	Number	0		3	6	6	6	2	4	7	4	7	1	0
	Wastewater Revenue	Percentage of budgeted	100%		97%	96%	98%	107%	102%	104%	103%	103%	104%	100%	113%
	General Reserves	Percentage of Operating and Improvement Budget	75% - 100%		72%	82%	84%	92%	94%	95%	104%	112%	117%	125%	122%
	Accounts Receivable (HRSD)	Dollars (Monthly Avg)			\$17,013,784	\$17,359,488	\$18,795,475	\$20,524,316	\$20,758,439	\$22,444,273	\$22,572,788	\$22,243,447	\$23,900,803	\$23,789,602	\$26,579,053
	Aging Accounts Receivable	Percentage of receivables greater than 90 days			21%	20%	18%	19%	21%	20%	18%	18%	17%	16%	14%
M-2.5	Capacity Related Overflows	Number within Level of Service	0		25	1	30	5	11	16	6	10	5	0	0
M-3.1	Permit Compliance	# of Exceedances to # of Permitted Parameters	0		12:55,045	1:51995	2:52491	1:52491	2:52491	2:52,491	9:53236	9:58338	2:60879	2:60879	1:5073
M-3.2	Odor Complaints	Number	0		6	2	7	11	5	9	7	6	9	0	0
M-3.4	Pollutant Removal (total)	Total Pounds Removed			178,163,629	171,247,526	176,102,248	185,677,185	180,168,546	193,247,790	189,765,922	190,536,910	187,612,572	187,612,572	17,335,002
M-3.5	Pollutant Discharge (% of permitted)	Pounds Discharged/Pounds Removed	< 40%		25%	22%	25%	22%	22%	20%	22%	17%	17%	19%	14%
M-5.2	Educational and Outreach Events	Number			302	184	238	322	334	443	502	432	367	29	21
M-5.3	Number of Community Partners	Number			280	289	286	297	321	354	345	381	293	29	17

EFFLUENT SUMMARY FOR JULY 2019

PLANT	FLOW mgd	% of Design	BOD mg/l	TSS mg/l	FC #/UBI	ENTERO #/UBI	TP mg/l	TP CY Avg	TN mg/l	TN CY Avg	TKN mg/l	NH3 mg/l	CONTACT TANK EX
ARMY BASE	9.53	53%	1	3.2	1	2	0.46	0.41	5.7	3.7	NA	NA	17
ATLANTIC	27.30	51%	12	5.0	6	1	NA	NA	NA	NA	NA	NA	5
BOAT HARBOR	11.77	47%	4	5.4	8	1	0.85	0.65	13	21	NA	NA	18
CENT. MIDDLESEX	0.010	39%	<2	1.1	<1	<1	NA	NA	NA	NA	1.4	0.07	NA
CHES-ELIZ	14.57	61%	10	10	11	2	1.2	1.2	35	32	NA	NA	18
JAMES RIVER	10.84	54%	0	1.7	4	2	0.18	0.32	5.1	6.9	NA	NA	3
KING WILLIAM	0.063	63%	<2	<1.0	NA	1	0.038	0.057	0.55	1.2	0.44	NA	NA
NANSEMOND	14.97	50%	4	2.9	1	1	0.53	1.1	3.8	4.5	NA	NA	3
SURRY, COUNTY	0.056	86%	2	<1.0	NA	NA	NA	NA	NA	NA	0.55	<0.10	0
SURRY, TOWN	0.048	80%	4	7.5	NA	8	NA	NA	NA	NA	2.5	0.14	NA
URBANNA	0.060	60%	5	29	5	3	10	5.0	38	17	NA	0.26	NA
VIP	25.24	63%	<1	1.4	2	<1	1.1	0.85	4.5	3.8	NA	NA	0
WEST POINT	0.389	65%	36	18	5	3	2.7	2.2	19	15	NA	NA	0
WILLIAMSBURG	8.32	37%	3	3.8	4	7	0.81	0.54	3.4	2.9	NA	NA	2
YORK RIVER	10.75	72%	3	1.0	<1	2	0.23	0.26	5.3	5.6	NA	NA	4
	<u>133.92</u>												

Tributary Summary

	% of Capacity
North Shore	51%
South Shore	55%
Small Communities	63%

Tributaries	Annual Total Nitrogen			Annual Total Phosphorus		
	Discharged	Operational		Discharged	Operational	
	YTD	Projection	CY19	YTD	Projection	CY19
	%	Lbs	%	%	Lbs	%
James River	48%	3,732,696	82%	48%	284,825	89%
York River	51%	255,293	89%	41%	15,627	81%
Rappahannock	116%	NA	NA	500%	NA	NA

Rainfall (inch)

<u>North</u>	<u>South</u>	<u>Small</u>
<u>Shore</u>	<u>Shore</u>	<u>Communities</u>
<u>(PHF)</u>	<u>(ORF)</u>	<u>(FYJ)</u>

Permit Exceedances: Total Possible Exceedances, FY20 to Date: 1:5,073
Pounds of Pollutants Removed in FY20 to Date: 17,335,002
Pollutant Lbs Discharged/Permitted Discharge FY20 to Date: 14%

Month	4.51"	5.46"	5.50"
Normal for Month	5.88"	6.37"	5.48"
Year to Date Total	30.14"	27.05"	31.20"
Normal for YTD	28.70"	27.80"	28.67"

AIR EMISSIONS SUMMARY FOR JULY 2019

	No. of Permit Deviations below 129 SSI Rule Minimum Operating Parameters								Part 503e Limits		
	Temp	Venturi(s) PD	Precooler Flow	Spray Flow	Venturi Flow	Tray/PBs Flow	Scrubber	Any	THC	THC	BZ Temp
	12 hr ave (F)	12 hr ave (in. WC)	12 hr ave (GPM)	12 hr ave (GPM)	12 hr ave (GPM)	12 hr ave (GPM)	pH 3 hr ave	Bypass Stack Use	Mo. Ave (PPM)	DC (%)	Daily Ave Days >Max
MHI PLANT											
ARMY BASE	0	0	0	0	0	0	0	1	27	100	0
BOAT HARBOR	0	0	0	n/a	0	0	0	4	38	100	0
CHES-ELIZ	0	0	0	0	0	0	0	0	37	100	0
VIP	0	0	0	n/a	0	0	0	0	70	100	0
WILLIAMSBURG	0	0	0	n/a	0	0	0	2	16	98	0

ALL OPERATIONS

DEQ Reportable Air Incidents:	0
DEQ Request for Corrective Action (RCA):	0
DEQ Warning Letter:	0
DEQ Notice of Violation (NOV):	0
Other Air Permit Deviations:	0
Odor Complaints Received:	0
HRSD Odor Scrubber H2S Exceptions:	1

AGENDA ITEM 17.e. – August 27, 2019

Subject: Langley Magruder 30-Inch Ductile Iron Force Main Emergency Repairs (Semple Farm)
Emergency Declaration Update

CIP Project: YR013800

Recommended Action: No action is required. Information Only

Brief: An emergency declaration was authorized on December 21, 2018 for the repair of the 30-inch Langley Magruder Ductile Iron Force Main. On December 20, 2018, this force main failed in the vicinity of Semple Farm Road in Hampton, Virginia. This emergency declaration was for the pump and haul services needed to stop an active spill and perform the necessary repairs and replacement of the damaged force main.

There have been numerous contractors, service providers, and engineers assisting in this effort. Several different pump and haul contractors were utilized during the initial stages of repair for system diversions and service to locality pump stations affected by this failure. Another contractor was also utilized to clean up and restore a homeowner's crawlspace impacted by this spill. Our on-call contractor for sewer repairs, T.A. Sheets, has performed the permanent repairs and replacements. Our annual services engineer for the interceptor system projects engineer, Rummel Klepper & Kahl, LLP, provided construction inspection, site documentation, and design work necessary for the force main repair and replacement.

This failure has been determined to be a localized issue. A section of approximately 300 linear feet of 30-inch ductile iron force main was replaced.

Standard procurement process was waived as a result of the emergency declaration. A contract was issued based upon the initial estimate of the level of effort required to make the necessary repairs. Work is substantially complete and a final change order has been negotiated to include a number of items to close out the contract. The initial estimate for the repair did not include the temporary construction easement cost along with the required repair and restoration of the project site. The cost of this change order is based on the pricing in the current prompt repairs agreement for on-call sewer repairs and other negotiated costs. The change order exceeded 25 percent of the contract value and as part of the emergency declaration was authorized by the General Manager in lieu of the standard procurement requirement of Commission approval.

<u>Schedule:</u>	Construction	December	2018
	Project Completion	November	2019