COMMISSION MEETING MINUTES
October 22, 2019

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Name	Title	Present for Item Nos.
Elofson, Frederick N.	Commission Chair	Absent
Lynch, Maurice P.	Commission Vice-Chair	1-24
Glenn, Michael E.	Commissioner	1-24
Lakdawala, Vishnu K.	Commissioner	1-24
Levenston, Jr., Willie	Commissioner	1-24
Rodriguez, Stephen C.	Commissioner	1-24
Taraski, Elizabeth	Commissioner	1-24
Ward, Molly Joseph	Commissioner	1-24

1. AWARDS AND RECOGNITION

Action: No action required.

Brief: Mr. Henifin introduced Ms. Dana Gonzalez, who was recently promoted to Treatment Process Engineer in the Army Base, Boat Harbor and Nansemond group. Prior to joining Operations, Dana was the trace metals chemist in HRSD's Central Environmental Lab. For the past several years, Dana has been leading HRSD research efforts related to an emerging organic contaminant known as PFAS (Per- and Polyfluoroalkyl Substances), which is common in firefighting foams, non-stick coatings, and stain-proofing products. Dana has a Bachelor of Science in Biology from UCLA and a PhD in Environmental Science from the University of Virginia. She is currently completing a Masters in Civil and Environmental Engineering at Virginia Tech. Prior to HRSD, Dana worked at the Virginia Department of Environmental Quality, where she wrote water pollution reduction plans for impaired watersheds in Virginia.

Attachment: None

Public Comment: None

2. CONSENT AGENDA

Action: Approve the items listed in the Consent Agenda.

Moved:	Stephen Rodriguez	**Ayes:**	7
Seconded:	Willie Levenston	**Nays:**	0

Brief:

a. Approval of minutes from previous meeting.

b. Contract Awards

1.	Carbon-Based Pilot Testing and Soil Aquifer Treatment Study	$239,000
2.	Electrical Services	$1,000,000
3.	York River Treatment Plant Solids Handling Electrical Improvements	$299,300

c. Task Orders

1.	Cisco SmartNet Technical Support Services	$245,640
2.	Ferebee Avenue Pump Station Replacement	$675,809
3.	Park Avenue Pump Station Replacement	$728,163
4.	Sanitary Sewer Project 1950 12-Inch Force Main and 24 and 18-Inch Gravity Replacement	$845,990

d. Sole Source

1. Deragger+ Monitoring System, Parts and Installation
2. Moyno Progressive Cavity Pumps, Parts and Repairs
3. Netzsch Progressive Cavity Pumps, Parts and Repairs

Item(s) Removed for Discussion: None

Discussion Summary:

Attachment #1: Consent Agenda

Public Comment: None

3. **WASTEWATER PUMP AND HAUL SERVICES - LAWNES POINT TREATMENT PLANT REJECTION OF ALL BIDS (>$200,000)**

Action: Approve rejection of all bids submitted for the Wastewater Pump and Haul Services contract for Lawnes Point Treatment Plant.

Moved:	Willie Levenston	**Ayes:**	7
Seconded:	Michael Glenn	**Nays:**	0

Type of Procurement: Competitive Bid

Bidder	Bid Amount
Virginia Pump and Motor Co. Inc.	$216,000
WA & J LLC Goodman's Septic Tank Service	$288,000

HRSD Estimate: $60,000

Contract Description: This contract is an agreement to perform pump and haul services for wastewater from the Lawnes Point Treatment Plant. HRSD North Shore Operations staff currently performs these services on a weekly basis. On average, Lawnes Point produces an estimated 60,000 gallons of wastewater that needs to be pumped per month.

The estimated cost of $60,000 was based on the existing Wastewater Pump and Haul Services contract rates with Atlantic Heating and Cooling. After calculating the bids based on estimated gallons and hourly rates, both bids exceed the HRSD estimate.

Staff recommends rejection of all bids. HRSD will utilize the existing wastewater pumping and hauling services contract with Atlantic Heating and Cooling, which provides pump and haul operations for the majority of HRSD service area. Specific response times required for Lawnes Point will be included in the contract.

Attachment: None

Public Comment: None

4. **DEEP CREEK INTERCEPTOR FORCE MAIN REPLACEMENT
VIRGINIA CLEAN WATER REVOLVING LOAN FUND (VCWRLF)
RESOLUTION**

Action: Adopt the resolution authorizing the issuance of a subordinate wastewater revenue bond, not to exceed $6,094,306 in principal amount, for the purpose of providing funds, with other available money, to pay the costs of certain improvements for Deep Creek Interceptor Force Main Replacement, fixing the principal installment and maturity dates, the interest rate, the redemption provisions and certain other details of the bond, directing the authentication and delivery of the bond, and authorizing the execution of a financing agreement with the Virginia Resources Authority (VRA).

Moved:	Michael Glenn	**Ayes:**	7
Seconded:	Willie Levenston	**Nays:**	0

CIP Project: NP 102600

Brief: The VCWRLF provides subsidized interest rates for local governments for projects that improve water quality or prevent future problems. The VRA manages the loans, and the Department of Environmental Quality administers the program and policy aspects of the fund on behalf of the State Water Control Board (SWCB). On December 12, 2016, the SWCB approved seven HRSD projects to receive subsidized interest rates that vary based on the term and project type. The loans require adhering to Davis-Bacon wages and using American Iron and Steel, which increases total project cost. Staff determined that the interest savings far outweigh the potential increased project costs.

The loan authorized in the attached resolution for the Deep Creek Interceptor Force Main Replacement is scheduled to close in November. The loan amount is set at a not-to-exceed amount of $6,094,306 at an interest rate not to exceed 2.5 percent for a term up to 30 years. The rate is based on a one percent subsidy for a 30-year loan. However, shorter loans terms will be considered prior to closing if rates remain at current lows (ex. October rate of 1.1 percent for 20 year term). The gross interest savings using projected November closing rates, compared to HRSD issuing debt in the open market, is estimated at $1,071,000 (net savings of $767,000 after five percent cost increase for adhering to VCWRLF requirements).

These documents have been reviewed by bond and local counsel.

Attachment #2: Resolution

Public Comment: None

5. **HUXLEY PLACE TO MIDDLE GROUND BOULEVARD FORCE MAIN EXTENSION VIRGINIA CLEAN WATER REVOLVING LOAN FUND (VCWRLF) RESOLUTION**

Action: Adopt the resolution authorizing the issuance of a subordinate wastewater revenue bond, not to exceed $3,896,616 in principal amount, for the purpose of providing funds, with other available money, to pay the costs of certain improvements for Huxley Place to Middle Ground Boulevard Force Main Extension, fixing the principal installment and maturity dates, the interest rate, the redemption provisions and certain other details of the bond, directing the authentication and delivery of the bond, and authorizing the execution of a financing agreement with the Virginia Resources Authority(VRA).

Moved:	Willie Levenston	**Ayes:**	7
Seconded:	Elizabeth Taraski	**Nays:**	0

CIP Project: JR012100

Brief: The VCWRLF provides subsidized interest rates for local governments for projects that improve water quality or prevent future problems. The VRA manages the loans, and the Department of Environmental Quality administers the program and policy aspects of the fund on behalf of the State Water Control Board (SWCB). On December 12, 2016, the SWCB approved seven HRSD projects to receive subsidized interest rates that vary based on the term and project type. The loans require adhering to Davis-Bacon wages and using American Iron and Steel, which increases total project cost. Staff determined that the interest savings far outweigh the potential increased project costs.

The loan authorized in the attached resolution for the Huxley Place to Middle Ground Boulevard Force Main Extension is scheduled to close in November. The loan is authorized at a not-to-exceed amount of $3,896,616 at an interest rate not to exceed 2.5 percent for a loan term up to 30 years. The rate is based on a one percent subsidy for a 30-year loan. However, shorter loans terms will be considered prior to closing if rates remain at current lows (ex. October rate of 1.1 percent for 20 year term). The gross interest savings using projected November closing rates, compared to HRSD issuing debt in the open market, is estimated at $678,000 (net savings of $483,000 after five percent cost increase for adhering to VCWRLF requirements).

These documents have been reviewed by bond and local counsel.

Attachment #3: Resolution

Public Comment: None

6. **TREATMENT PLANT DEWATERING REPLACEMENT PHASE I VIRGINIA CLEAN WATER REVOLVING LOAN FUND (VCWRLF) RESOLUTION**

Action: Adopt the resolution authorizing the issuance of a subordinate wastewater revenue bond, not to exceed $3,500,000 in principal amount, for the purpose of providing funds, with other available money, to pay the costs of certain improvements for Treatment Plant Dewatering Replacement Phase I, fixing the principal installment and maturity dates, the interest rate, the redemption provisions and certain other details of the bond, directing the authentication and delivery of the bond, and authorizing the execution of a financing agreement with the Virginia Resources Authority(VRA).

Moved:	Willie Levenston	**Ayes:**	7
Seconded:	Michael Glenn	**Nays:**	0

CIP Project: GN016400

Brief: The VCWRLF provides subsidized interest rates for local governments for projects that improve water quality or prevent future problems. The VRA manages the loans and the Department of Environmental Quality administers the program and policy aspects of the fund on behalf of the State Water Control Board (SWCB). On December 7, 2017, the SWCB approved three HRSD projects to receive subsidized interest rates that vary based on the term and project type. The loans require adhering to Davis-Bacon wages and using American Iron and Steel, which increases total project cost. Staff determined that the interest savings far outweigh the potential increased project costs.

The loan authorized in the attached resolution for the Treatment Plant Dewatering Replacement Phase I is scheduled to close in November. The loan is authorized at a not-to-exceed amount of $3,500,000 at an interest rate not to exceed 2.5 percent for a term up to 30 years. The rate is based on a one percent subsidy for a 30-year loan. However, shorter loans terms will be considered prior to closing if rates remain at current lows (ex. October rate of 1.1 percent for 20 year term). The gross interest savings using projected November closing rates, compared to HRSD issuing debt in the open market, is estimated at $607,000 (net savings of $432,000 after five percent cost increase for adhering to VCWRLF requirements).

These documents have been reviewed by bond and local counsel.

Attachment #4: Resolution

Public Comment: None

7. DIVERSITY PROCUREMENT REPORT

Action: No action required.

Brief: The goal of HRSD's Diversity Procurement Policy is to promote business opportunities for small businesses and businesses owned by women, minorities and service disabled veterans (SWaM). The objectives of the policy are to identify goods and services provided by SWaM businesses; increase competition through a diverse source of contractors and suppliers; and maintain and strengthen the overall competitiveness of HRSD procurements.

A few of the higher value contracts for commodities and services awarded to SWaM businesses this past fiscal year included engineering and construction services; bulk fuel; electrical services, coating services and technology services.

The following is a comparison of fiscal years 2017 to 2019 on total spend for Operating Contracts, Corporate VISA Card Transactions, and Capital Improvement Program (CIP) Agreements and Contracts compared to total spend with SWaM businesses:

Three Year Comparison of Spend Activity with SWaM Contractors and Suppliers

Payment Type	Percentage SWaM Spend of Total Spend		
	FY-2017	FY-2018	FY-2019
Operating	28%	19%	16%
Corporate VISA Card	13%	8%	7%
Capital Improvement Program	38%	25%	24%
Total	33%	23%	20%

A summary of activities for the period of July 1, 2018 through June 30, 2019 are attached.

Discussion Summary: Staff believes the Hampton Roads region is challenged for SWAM vendors. There are not enough who supply the things we need. Commissioner Lynch said he noticed there was not a lot of diversity of vendors at WEFTEC. Staff asked for guidance and suggestions from Commissioners on how to promote SWaM vendors. Staff will continue to seek qualified SWaM vendors for HRSD projects. Staff discussed conducting a Diversity Study next year.

Attachment #5: Summary

Public Comment: None

8. **BOAT HARBOR OUTLET SEWER IMPROVEMENTS**
ADDITIONAL APPROPRIATION, CONTRACT AWARD (>$200,000), TASK ORDER (>$200,000)

Actions:

a. Appropriate additional funding in the amount of $2,420,709.

b. Award a contract to SAK Construction, LLC in the amount of $5,244,607.

c. Approve a task order with Dewberry Engineers, Inc. (Dewberry) in the amount of $374,268.

Moved:	Stephen Rodriguez	**Ayes:**	7
Seconded:	Michael Glenn	**Nays:**	0

CIP Project: BH014700

Budget	$4,100,082
Previous Expenditures and Encumbrances	($377,455)
Available Balance	$3,722,627
Proposed Task Order to Dewberry	($374,268)
Proposed Contract Award to SAK Construction LLC	($5,244,607)
Proposed Contingency	($524,461)
Project Shortage/Requested Additional Funding	($2,420,709)
Revised Total Project Authorized Funding	$6,520,791

Type of Procurement: Competitive Bid

Bidder	Bid Amount
SAK Construction, LLC	$5,224,607
IPR Northeast, LLC	$5,729,999
MEB General Contractors, Inc.	$6,727,554
Bridgeman Civil, Inc.	$7,778,000
Shaw Construction Corporation	$8,709,847

Engineer Estimate: $5,374,900

Contract Status with Task Orders:	Amount
Original Contract with Dewberry	$90,050
Total Value of Previous Task Orders	$287,405
Requested Task Order	$374,268
Total Value of All Task Orders	$661,673
Revised Contract Value	$751,723
Engineering Services as % of Construction	14%

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 on August 27, 2019, and five bids were received on October 2, 2019. The design engineer, Dewberry, evaluated the bids and recommends award to the lowest responsive and responsible bidder, SAK Construction, LLC in the amount of $5,224,607.

Project Description: The project consists of rehabilitating approximately 3,500 linear feet of 21-inch, 33-inch, and 54-inch diameter sanitary sewer. The sewer mains are within Jefferson Avenue and parallel to Terminal Avenue from 18th Street to 34th Street in Newport News. Mainline and siphon pipe rehabilitation consists of a cured-in-place pipe liner installation. Manhole and siphon chamber rehabilitation consists of epoxy coating systems. Temporary sewage pumping around the project area and traffic control are necessary to complete the work. This project is included in the Inflow and Infiltration Abatement Rehabilitation – Phase I, which is part of the Federal Consent Decree to address sanitary sewer overflows in the region.

Funding Description and Analysis of Cost: The total cost estimate for this project is approximately $6,520,791. The estimate includes $751,723 in engineering costs, $5,244,607 in construction costs, and a 10 percent construction contingency of $524,461. The original estimate of $4.16 million dollars was a very early estimate prepared before a bypass piping system corridor was established. Upon completion of the preliminary engineering report, the bypass pumping corridor was agreed upon, and a revised project budget of $6.59 million dollars was determined. This project requires approximately $2,420,709 in additional funding to execute the construction phase.

Task Order Description and Analysis of Cost: This task order will provide construction administration and construction inspection services for Boat Harbor Outlet Sewer Improvements. The construction administration and construction inspection services for the project were negotiated, and a fee of $374,268 was considered to be appropriate for the scope of work. With an apparent low bid of $5,244,607 for construction, the engineering fee to construction cost ratio is approximately seven percent, which is representative of similar HRSD projects.

Schedule:

Construction	November 2019
Project Completion	March 2021

Attachment: None

Public Comment: None

9. **LUCAS CREEK-WOODHAVEN INTERCEPTOR FORCE MAIN REPLACEMENT PHASE II INITIAL APPROPRIATION AND CONTRACT AWARD**

Actions:

a. Appropriate total project funding in the amount of $2,445,000.
b. Award a contract to Michael Baker International Inc. (Michael Baker).

Moved:	Vishnu Lakdawala	**Ayes:**	7
Seconded:	Michael Glenn	**Nays:**	0

CIP Project: JR013200

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
Michael Baker International, Inc.	88	1
Kimley-Horn and Associates, Inc.	83	2
Dewberry Engineers, Inc.	81	3
Tetra Tech, Inc.	80	4

Contract Description: A Public Notice was issued on June 30, 2019. Eleven firms submitted Proposals on August 7, 2019 and all firms were determined to be responsive and deemed fully qualified, responsible and suitable to the requirements in the Request for Proposals. Four firms were short listed, interviewed and technically ranked. The Professional Services Selection Committee selected the firm of Michael Baker whose professional qualifications and proposed services best serve the interest of HRSD. Michael Baker will provide professional services including preliminary engineering report services, design services, pre-construction services, contract administration services, field engineering and inspection services, startup and testing services, operations and training services, and post-startup and certification services for the project. A fee of $112,225 has been negotiated for the preparation of a PER. All other Professional Services will be negotiated at a later date.

Project Description: This project involves the replacement of approximately 1,500 linear feet of ductile iron (DI) pipe between Denbigh High School and Epes Elementary School. This section of pipe will be replaced with a 30-inch horizontal directional drilled polyethylene pipe underneath Stony Run. The 1,500 linear feet of pipe to be replaced represents the most difficult section of force main to access and repair in case of a failure. This pipeline was installed in 1970 under a salt marsh which creates a risk of severe external corrosion.

Schedule:	PER	November 2019
	Design	March 2020
	Bid	January 2021
	Construction	April 2021
	Project Completion	November 2021

Attachment: None
Public Comment: None

10. **MAGRUDER MERCURY INTERCEPTOR FORCE MAIN REPLACEMENT - SECTION B INITIAL APPROPRIATION AND CONTRACT AWARD**

Actions:

a. Appropriate total project funding in the amount of $5,201,935.
b. Award a contract to Dewberry Engineers Inc. (Dewberry).

Moved:	Michael Glenn	**Ayes:**	7
Seconded:	Willie Levenston	**Nays:**	0

CIP Project: YR010520

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
Dewberry Engineers, Inc.	86	1
Michael Baker International, Inc.	82	2

Contract Description: A Public Notice was issued on June 30, 2019. Eleven firms submitted proposals on August 7, 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, interviewed and technically ranked. The Professional Services Selection Committee selected the firm of Dewberry Engineers, Inc. whose professional qualifications and proposed services best serve the interest of HRSD. This is one of the first CIP projects that includes a requirement for condition assessment as part of the preliminary engineering efforts. Dewberry will work with HRSD to develop the scope for the condition assessment work. The estimated cost for this initial effort is $50,000. Compensation will be on a reimbursable basis not to exceed cost limit. After this scope is finalized, the required professional services to develop a Preliminary Engineering Report will be prepared. The condition assessment data and analysis will define the ultimate scope of this project.

Project Description: This project is to replace approximately 6,200 linear feet of 30-inch prestressed concrete cylinder and ductile iron pipe from the Langley Circle Pump Station to just east of the Newmarket Creek Crossing in Hampton. The project will require bypass pumping and temporary piping to maintain existing flows during construction. Several conditional issues are driving the replacement of this pipeline.

Schedule:		
	Pre-Planning	November 2019
	PER	December 2019
	Design	June 2020
	Bid	January 2021
	Construction	April 2021
	Project Completion	October 2022

Attachment: None
Public Comment: None

11. **NORTH SHORE GRAVITY IMPROVEMENTS PHASE I INITIAL APPROPRIATION AND CONTRACT AWARD**

Actions:

a. Appropriate total project funding in the amount of $5,639,906.
b. Award a contract to Tetra Tech Inc.

Moved:	Willie Levenston	**Ayes:**	7
Seconded:	Elizabeth Taraski	**Nays:**	0

CIP Project: GN014900

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
Tetra Tech, Inc.	86	1
Dewberry Engineers, Inc.	83	2
Kimley-Horn and Associates, Inc.	81	3

Contract Description: A Public Notice was issued on June 30, 2019. Eleven firms submitted proposals on August 7, 2019 and all firms were determined to be responsive and deemed fully qualified, responsible and suitable to the requirements in the Request for Proposals. Three firms were short listed, interviewed and technically ranked. The Professional Services Selection Committee selected the firm of Tetra Tech, Inc. whose professional qualifications and proposed services best serve the interest of HRSD. Tetra Tech will provide professional services including preliminary engineering report services, design services, pre-construction services, contract administration services, field engineering and inspection services, startup and testing services, operations and training services, and post-startup and certification services for the project. A fee of $158,425 has been negotiated with Tetra Tech for the preparation of a PER. All other Professional Services will be negotiated at a later date.

Project Description: This project will provide for rehabilitation and replacement of gravity sewer infrastructure in the North Shore system. Condition assessment activities indicate that these assets present a material risk of failure due to sanitary sewer overflow, inflow and infiltration, and physical condition defects. This project is included in the Inflow and Infiltration Abatement Rehabilitation Plan – Phase 2, which is part of the Federal Consent Decree to address sanitary sewer overflows in the region.

Schedule:		
	PER	November 2019
	Design	April 2020
	Bid	May 2021
	Construction	September 2021
	Project Completion	January 2023

Attachment: None
Public Comment: None

12. **YORK RIVER SYSTEM ISOLATION VALVE INSTALLATION AND REPLACEMENT INITIAL APPROPRIATION AND CONTRACT AWARD**

Actions:

a. Appropriate total project funding in the amount of $2,242,000.
b. Award a contract to Kimley-Horn and Associates, Inc.

Moved:	Willie Levenston	**Ayes:**	7
Seconded:	Michael Glenn	**Nays:**	0

CIP Project: YR013900

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
Kimley-Horn and Associates, Inc.	84	1
Michael Baker International, Inc.	81	2
Tetra Tech, Inc.	78	3

Contract Description: A Public Notice was issued on June 30, 2019. Eleven firms submitted proposals on August 7, 2019 and all firms were determined to be responsive and deemed fully qualified, responsible and suitable to the requirements in the Request for Proposals. Three firms were short listed, interviewed and technically ranked. The Professional Services Selection Committee selected Kimley-Horn and Associates, Inc., whose professional qualifications and proposed services will best serve the interest of HRSD. Kimley-Horn and Associates, Inc. will provide professional services including preliminary engineering report services, design services, pre-construction services, contract administration services, field engineering and inspection services, startup and testing services, operations and training services, and post-startup and certification services for the project. A meeting was held to discuss the project and scope of services. A fee of $70,400 was negotiated with Kimley-Horn and Associates, Inc. for preparation of the PER. Future phases of the work will be negotiated after the PER is completed.

Project Description: This project will install eight new valves and replace three existing valves. These valves are main line and branch isolation valves within the force main system from Coliseum Pressure Reducing Station (PRS) to the proposed Tabb PRS in York County and will provide operational flexibility for isolation and flow diversion.

Schedule:		
	PER	November 2019
	Design	February 2020
	Bid	August 2020
	Construction	November 2020
	Project Completion	November 2021

Attachment: None
Public Comment: None

13. **NORTH SHORE AUTOMATED DIVERSION FACILITIES INITIAL APPROPRIATION**

Action: Appropriate total project funding in the amount of $1,813,062.

Moved:	Michael Glenn	**Ayes:**	7
Seconded:	Willie Levenston	**Nays:**	0

CIP Project: GN015800

Project Description: The project will install automated control valves, piping, and other necessary infrastructure at three pump station sites within the North Shore Interceptor System including North Avenue Pump Station, Woodland Road Pump Station, and Big Bethel Pressure Reducing Station. Installing this infrastructure will provide greater operational flexibility and system diversion capabilities during localized wet weather events. Specific needs being addressed with this CIP are to provide a means to reduce the three month average flow at York River Treatment Plant when approaching its 95 percent capacity threshold and dry weather equalizing and coordination of flows between James River Treatment Plant and York River Treatment Plant.

Funding Description: The total cost for this project is estimated to be $1,813,062. The estimated project cost is based on a construction cost estimate of $1,276,125 combined with an engineering services estimate of $282,737 and a 20 percent contingency allowance of $254,200. Engineering services will be provided by Rummel, Klepper and Kahl, LLP under the Interceptor Systems Projects annual services contract and include preliminary engineering, design and construction phase services.

Schedule:	PER	November 2019
	Design	February 2020
	Bid	August 2020
	Construction	October 2020
	Project Completion	August 2021

Attachment: None

Public Comment: None

14. **OUTFALL DISPERSION MODELING FOR FULL-SCALE SWIFT INITIAL APPROPRIATION**

Action: Appropriate total project funding in the amount of $1,225,000.

Moved:	Michael Glenn	**Ayes:**	7
Seconded:	Willie Levenston	**Nays:**	0

CIP Project: GN016311

Project Description: This project will assist HRSD in development of a regulatory strategy related to dispersion of treated effluent from outfalls associated with the seven facilities that will be impacted by full-scale implementation of SWIFT.

One objective of full-scale SWIFT implementation is to substantially reduce surface discharge by maximizing aquifer recharge at each SWIFT facility. This will result in a reduction in daily flow to surface waters from the associated treatment plants. The variability of effluent flow rate for each facility may also significantly increase. These changes may impact the operation of the existing outfalls and may require outfall modifications. Dispersion modeling of each outfall will provide an understanding of the related impacts of these changes and will inform subsequent conversations with state regulators.

Funding Description: The initial appropriation of $1,225,000 is based on a total of Class 5 CIP-prioritization level estimates for similar modeling and professional engineering services for all impacted outfalls. The project is primarily modeling services that will be conducted through the general engineering services contract with HDR. The fee for the initial modeling at the James River Treatment Plant is estimated at $50,000.

Schedule: Study November 2019

Attachment: None

Public Comment: None

15. **VIRGINIA BEACH BOULEVARD FORCE MAIN PHASE VI EASEMENT ACQUISITION FUNDING**

Action: Appropriate $226,200 for funding, to be paid into the custody of the City of Virginia Beach Circuit Court, for acquisition of easements located at 2403 Virginia Beach Boulevard (Tax ID #1497-85-7195-0000) and 207 Parker Lane (Tax ID #1497-74-8394-0000).

Moved:	Vishnu Lakdawala	**Ayes:**	7
Seconded:	Michael Glenn	**Nays:**	0

CIP Project: CE011823

Budget	$27,863,000
Previous Expenditures and Encumbrances	($2,726,375)
Available Balance	$25,136,625

Project Description: This project will upgrade the existing 24-inch reinforced concrete pipe to a 42-inch pipe from North Lynnhaven Road to North Great Neck Road. The new pipeline alignment falls primarily within the Virginia Beach Boulevard right-of-way from North Lynnhaven Road to Eureka Avenue, travels through the Southern Boulevard right-of-way until it crosses London Bridge Creek and will connect back into the existing force main at Great Neck Road by way of Parker Lane. As a result, the total length of the new pipeline will be approximately 9,500 linear feet. This project must be substantially complete by June 2021. The project is needed to provide reliable capacity and maintain HRSD's Pressure Policy when flow is diverted in support of the Chesapeake-Elizabeth Treatment Plant closure and for the eventual Regional Wet Weather Management Plan.

Brief: At the July 23, 2019 meeting, the Commission adopted a resolution providing for the acquisition, by condemnation or other means, of parcels and easements needed for construction. Despite numerous attempts, staff has not finalized negotiations with the following property owners:

Address	Tax Parcel ID Number	Property Owner	Appraised Amount
2403 Virginia Beach Boulevard	1497-85-7195-0000	Lowe's	$51,200
207 Parker Lane	1497-74-8394-0000	Sadler Materials Corporation / Vulcan	$175,000

Due to the regulatory component of this project, it is critical at this juncture to proceed with the next step. This funding, which will be paid into the custody of the City of Virginia Beach Circuit Court, is part of the requirement needed to file a Certificate of Take under eminent domain statutes as provided for in Title 25, Sections 25.1-305 and 25.1-307 of the Code of Virginia. The filing of a Certificate of Take certifies that HRSD has legal authority to access these properties in an effort to meet construction deadlines and maintain the project schedule. However, the filing of the Certificate of Take does not preclude staff from continued negotiations. This item has been reviewed by HRSD legal counsel.

Discussion Summary: Construction is expected to begin in the Spring of 2020. Staff will continue to work with owners to minimize disruption and acquire the needed easements through negotiation.

Attachment: None
Public Comment: None

16. **WILLARD AVENUE PUMP STATION REPLACEMENT**
ACQUISITION OF REAL PROPERTY LOCATED AT 218 DOWNES STREET, HAMPTON, VIRGINIA

Action: Approve the purchase of 218 Downes Street for $135,000 in accordance with the terms and conditions of the Purchase and Sale Agreement with Judith Anderson, owner of subject property in Hampton, Virginia 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 and further authorize the General Manager to execute the forthcoming deed of bargain and sale upon approval of legal counsel.

Moved:	Vishnu Lakdawala	**Ayes:**	7
Seconded:	Willie Levenston	**Nays:**	0

CIP Project: **BH013020**

Budget	$10,000,000
Previous Expenditures and Encumbrances	($921,022)
Available Balance	$9,078,978

Project Description: The purpose of this project is to design and construct a replacement pump station for the existing station located at 219 National Avenue in Hampton. The current pump station is undersized for the current and future development in the Phoebus area. The proposed pump station will be designed to accommodate the planned new development in this area of Hampton. In conjunction with this project, HRSD purchased 302 S. Willard Avenue in August 2019 for the new pump station site. However, due to the proximity of the adjacent lot at 218 Downes Street and the desire for a buffer, landscaping and more room for access, HRSD staff would like to purchase the adjacent property. The owner is a willing seller.

Attachments: The Purchase and Sale Agreement was reviewed by HRSD staff and legal counsel. The deed of bargain and sale is forthcoming and will also be reviewed by HRSD staff and legal counsel before execution. A map is provided for clarification purposes.

Analysis of Cost: HRSD will purchase the property for the negotiated price of $135,000. The offer amount is reflective of sales of single family homes, current listings in the area, and the rental income the owner derived from the property.

Attachment #6: Agreement and Map

Public Comment: None

17. **CAPITAL IMPROVEMENT PROGRAM (CIP) QUARTERLY UPDATE**

Action: No action required.

Brief: Implementing the CIP continues to be a significant challenge as we address numerous regulatory requirements, SWIFT Program implementation and the need to replace aging infrastructure. Staff will provide a briefing describing the status of the CIP, financial projections, projects of significance and other issues affecting the program.

Discussion Summary: During the discussion of the Asset Management condition assessment at the treatment plants, staff explained the assessment is being conducted by both staff and consultants. The first assessment is being conducted at the Atlantic Treatment Plant and has been underway for approximately 1.5 years. During this time, treatment plant and interceptor system asset risk assessment criteria and key performance indicators (KPIs) have been developed. Once the assessment at the Atlantic Treatment Plant is complete, we will have a better idea how long the assessments will take at the remaining treatment plants. Staff explained that it is a time consuming process as each treatment plant has a variety of equipment made by multiple manufacturers and specified by different engineers. Staff would prefer to have standardization among all facilities, but since each facility was constructed over the years, new and emerging equipment and technology was used.

Staff explained capital project budgeting related to design-build. There is an option during design-build to take the “off ramp” option if the fixed price is excessively high. Taking this option would allow HRSD to bid the project using the developed design. Staff explained how the design-build concept allowed staff to be flexible when deciding on the most cost effective option for the Surry pipeline.

Attachment #7: Presentation

Public Comment: None

18. **UNFINISHED BUSINESS**

Mr. Henifin said he was recently contacted by one of the residents who live in the vicinity of pipeline failure we experienced in December. They commented on the great response by HRSD and thanked staff for their dedication and professional work the team performed under the most challenging and extreme circumstances to make repairs quickly. Mr. Henifin said he was proud of what HRSD accomplished and it was great to receive comments from citizens who appreciate the efforts made by staff.

Mr. Henifin commented on the Virginia*forever* Bridge Builder Celebration held last week in Richmond. He said it was a good event and a great opportunity to continue discussions with regulators on the Watershed Implementation Plan (WIP III).

19. **NEW BUSINESS** – None

20. **COMMISSIONER COMMENTS** – None

21. **PUBLIC COMMENTS NOT RELATED TO AGENDA** – None

22. **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

Attachment #8: Informational Items

Public Comment: None

23. **CLOSED MEETING**

Action: Motion to go into Closed Meeting for discussion with legal counsel and staff regarding a personnel matter (General Manager Annual Performance Review) [Specific Exemption: Va. Code §2.2-3711.A1]

Moved:	Michael Glenn	**Ayes:**	7
Seconded:	Stephen Rodriguez	**Nays:**	0

Brief: Discussion of performance of specific public officers, appointees or employees of any public body; and evaluation of performance where such evaluation will necessarily involve discussion of the performance of specific individuals.

Certification of Proceedings: Pursuant to Section 2.2-3712.D of the Code of Virginia, a roll call vote was conducted to certify that to the best of each Commission member's knowledge: (i) only public business matters lawfully exempted from open meeting requirements under this chapter, and (ii) only such public business matters as were identified in the motion by which the closed meeting was convened were heard, discussed or considered. Any Commissioner who believes there was a departure from these two requirements shall so state prior to the vote, indicating the substance of the departure.

Roll call vote to return to Open Session: **Ayes:** 7 **Nays:** 0

Molly Ward
Elizabeth Taraski
Willie Levenston
Steve Rodriguez
Mike Glenn
Maurice Lynch
Vishnu Lakdawala

23. RECONVENED MEETING

Action: In accordance with the General Manager's employment agreement, the Commission has reviewed the General Manager's performance. In recognition of the continued strong performance of HRSD under the General Manager's leadership, it is recommended his total compensation package be increased by 1.8 percent, effective November 1, 2019.

Moved:	Stephen Rodriguez	**Ayes:**	7
Seconded:	Vishnu Lakdawala	**Nays:**	0

Attachment: None
Public Comment: None

24. ANNOUNCEMENTS

The Finance Committee will meet to review CAFR at 8:30 a.m. on November 26, 2019, prior to regular meeting.

Next Commission Meeting Date: November 26, 2019 at the HRSD South Shore Operations Complex, 1434 Air Rail Avenue, Virginia Beach, VA 23455

Meeting Adjourned: 10:49 a.m.

SUBMITTED:

Jennifer L. Cascio

Jennifer L. Cascio
Secretary

APPROVED:

Frederick N. Elofson

Frederick N. Elofson, CPA
Chair

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #1

AGENDA ITEM 2. – CONSENT AGENDA

CONSENT AGENDA ITEM 2.b.1. – October 22, 2019

Subject: Carbon-Based Pilot Testing and Soil Aquifer Treatment Study
Continued Virginia Tech - HRSD SWIFT Collaboration
Research Study Contract Award (>$200,000)

Recommended Action: Award a contract to Virginia Polytechnic Institute and State University (Virginia Tech) in the amount of $239,000.

Contract Description: As part of the Sustainable Water Initiative for Tomorrow (SWIFT), HRSD is conducting a study of advanced treatment technologies to allow managed aquifer recharge of highly treated water. This contract will continue the Carbon-Based Pilot Testing and Soil Aquifer Treatment Study collaboration between Virginia Tech and HRSD, which was previously approved by the Commission in August 2017.

This study will build on recent collaboration between Virginia Tech and HRSD to advance understanding and optimize performance of the carbon-based advanced water treatment pilot system. The pilot system operated for approximately two years at the York River Treatment Plant and was relocated to the Nansemond Treatment Plant SWIFT Research Center. This study will continue work associated with emerging contaminant removal by ozone biofiltration, soil column studies to assess the benefit of soil aquifer treatment, and evaluation of recharge data at the SWIFT Research Center considering the transport of SWIFT Water in the aquifer and the potential for soil aquifer treatment. Other aspects involve continued evaluation of the removal and attenuation of antibiotic resistance genes and optimization of 1,4-dioxane removal through biofiltration.

CONSENT AGENDA ITEM 2.b.2. – October 22, 2019

Subject: Electrical Services
Contract Award (>$200,000)

Recommended Action: Award a contract for electrical services to Saunders Contracting Services, Inc. in the estimated amount of $200,000 for year one with four annual renewal options and an estimated cumulative value in the amount of $1,000,000.

Type of Procurement: Competitive Negotiation

Proposers	Technical Points	Recommended Selection Ranking
Saunders Contracting Services, Inc.	95	1
Systems East, Inc.	87	2

HRSD Estimate: $200,000

Contract Description: This contract is an agreement for various electrical services on an as needed basis through scheduled requests and/or emergency contact for the Electrical and Instrumentation Division. Services include, but are not limited to switchgear, motor control centers, lighting, variable frequency drives, transformers, panel boards, motors, generators, transfer switches, cable, duct banks and medium voltage work.

A Public Notice was issued on August 6, 2019. Two firms submitted proposals on August 21, 2019 and both Offerors were determined to be responsive and deemed fully qualified, responsible and suitable to the requirements in the Request for Proposals. Informal interviews were held with both Offerors. Saunders Contracting Services, Inc. was determined to be fully qualified and demonstrated exceptional understanding of the range of services required for this contract and will be providing a sizeable pool of trained and skilled personnel to perform the all levels of work.

It is HRSD's intent to award this as a second contract vehicle for electrical services. The first contract was awarded to REW Corporation in July 2019. The REW contract is not exclusive and having a second contract available will provide greater flexibility and faster response.

Analysis of Cost: Based on sample job order scenarios published in the RFP, Saunders Contracting is, on average, 18 percent lower than REW Corporation, which will prove advantageous to HRSD.

CONSENT AGENDA ITEM 2.b.3. – October 22, 2019

Subject: York River Treatment Plant Solids Handling Electrical Improvements Contract Award (>$200,000)

Recommended Action: Award a contract to REW Corporation in the amount of $299,300.

CIP Project: YR013600

Budget	$602,600
Previous Expenditures and Encumbrances	($68,000)
Available Balance	$534,600

Type of Procurement: Competitive Bid

Bidder	Bid Amount
REW Corporation	$299,300
Systems East Inc.	$324,844
Saunders Contracting Services, Inc.	$340,940
EG Middleton Inc.	$370,669

Engineer Estimate: $580,661

Contract Description: This contract is for electrical upgrades and improvements to the solids handling facility at the York River Treatment Plant. In accordance with HRSD's competitive sealed bidding procedures, the Procurement Division advertised and solicited bids directly from potential bidders on August 12, 2019. Multiple bids were received and evaluated based upon the requirements for the Invitation for Bid. REW Corporation is the apparent low bidder with a bid amount of $299,300.

Project Description: This project will replace the Solids Handling Building motor control center (MCC) located on the second floor of the York River Treatment Plant Dewatering building. In addition, the project provides a new feeder, transformer, and breaker via the aeration MCC, which will allow backup power (treatment plant diesel generators) to the solids handling building through the MCC.

Analysis of Cost: Costs were compared to past similar projects and were determined to be fair and reasonable.

Schedule:

PER	07/2018
Design	07/2018
Bid	07/2018
Construction	10/2019
Project Completion	06/2020

CONSENT AGENDA ITEM 2.c.1. – October 22, 2019

Subject: Cisco SmartNet Technical Support Services Task Order (>$200,000)

Recommended Action: Approve a task order with Savant Ltd in the amount of $245,640.

Contract Status:	**Amount**
Original Contract with Savant Ltd.	$50,000
Total Value of Previous Task Orders	$131,181
Requested Task Order	$245,640
Total Value of All Task Orders	$376,821
Revised Contract Value	$376,821

Task Order Description: This task order will provide technical support services on Cisco equipment furnished with SmartNet support in accordance with the existing HRSD Cisco Based Converged Infrastructure Annual Support Contract Agreement and the cooperative contract competitively solicited by Virginia Association of State College & University Purchasing Professionals (VASCUUP). SmartNet provides total care support capabilities for Cisco hardware for the Information Technology Department.

Analysis of Cost: The cost for this task order is based on past average annual spend amount for five years. The HRSD asset list fluctuates throughout the year based on equipment being removed for end of life or added due to new equipment installed.

CONSENT AGENDA ITEM 2.c.2. – October 22, 2019

Subject: Ferebee Avenue Pump Station Replacement
Task Order (>$200,000)

Recommended Action: Approve a task order with Gannett Fleming, Inc. in the amount of $675,809.

CIP Project: VP014010

Budget	$5,852,747
Previous Expenditures and Encumbrances	($710,315)
Available Balance	$5,142,432

Contract Status:	**Amount**
Original Contract with Gannett Fleming	$163,516
Total Value of Previous Task Orders	$76,115
Requested Task Order	$675,809
Total Value of All Task Orders	$751,924
Revised Contract Value	$915,440
Engineering Services as % of Construction	10.4%

Project Description: This project will design and construct a replacement pump station for the Ferebee Avenue Pump Station which was built in 1951. This project is part of the Federal Consent Decree to address sanitary sewer overflows in the region and is one of the components of the Rehabilitation Action Plan – Phase 2.

Task Order Description and Analysis of Cost: This task order will provide design phase services for the replacement of the Ferebee Avenue Pump Station in accordance with the approved Preliminary Engineering Report. A total fee of $675,809 was negotiated with Gannett Fleming. The total engineering services to construction cost ratio is 10.4 percent. This cost is in agreement with other similar efforts from other firms, particularly the Norchester Pump Station and Elbow Road Pressure Reducing Station.

Schedule:

PER	June 2017
Design	November 2019
Bid	December 2020
Construction	March 2021
Project Completion	October 2024

CONSENT AGENDA ITEM 2.c.3. – October 22, 2019

Subject: Park Avenue Pump Station Replacement
Task Order (>$200,000)

Recommended Action: Approve a task order with Gannett Fleming, Inc. in the amount of $728,163.

CIP Project: VP018000

Budget	$5,955,271
Previous Expenditures and Encumbrances	($470,218)
Available Balance	$5,485,053

Contract Status:	**Amount**
Original Contract with Gannett Fleming	$177,355
Total Value of Previous Task Orders	$77,690
Requested Task Order	$728,163
Total Value of All Task Orders	$805,853
Revised Contract Value	$983,208
Engineering Services as % of Construction	9.8%

Project Description: This project will design and construct a replacement pump station for the existing Park Avenue Pump Station, which was built in 1922. This project is part of the Federal Consent Decree to address sanitary sewer overflows in the region and is one of the components of the Rehabilitation Action Plan – Phase 2.

Task Order Description and Analysis of Cost: This task order will provide design phase services for the replacement of the Park Avenue Pump Station in accordance with the approved Preliminary Engineering Report. A total fee of $728,163 was negotiated with Gannett Fleming. The total engineering services to construction cost ratio is 9.8 percent. This cost is in agreement with other similar efforts from other firms, particularly the Norchester Pump Station and Elbow Road Pressure Reducing Station.

Schedule:

PER	June 2017
Design	November 2019
Bid	December 2020
Construction	March 2021
Project Completion	October 2024

CONSENT AGENDA ITEM 2.c.4. – October 22, 2019

Subject: Sanitary Sewer Project 1950 12-Inch Force Main and 24 and 18-Inch Gravity Replacement
Task Order (>$200,000)

Recommended Action: Approve a task order with Gannett Fleming, Inc. in the amount of $845,990.

CIP Project: VP014020

Budget	$7,179,000
Previous Expenditures and Encumbrances	($183,507)
Available Balance	$6,995,493

Contract Status:	**Amount**
Original Contract with Gannett Fleming	$143,869
Total Value of Previous Task Orders	$38,845
Requested Task Order	$845,990
Total Value of All Task Orders	$884,835
Revised Contract Value	$1,028,704
Engineering Services as % of Construction	9.2%

Project Description: This project will design and construct a force main to replace an 850 foot cast iron discharge force main, a 2,900 foot 18-inch gravity line, and a 3,500 foot 24-inch gravity line in the South Norfolk area of Chesapeake. This project is part of the Federal Consent Decree to address sanitary sewer overflows in the region and is one of the components of the Rehabilitation Action Plan – Phase 2.

Task Order Description and Analysis of Cost: This task order will provide design phase services for a replacement force main and gravity piping in the South Norfolk area of Chesapeake in accordance with the approved Preliminary Engineering Report. A total fee of $845,990 was negotiated with Gannett Fleming. The total engineering services to construction cost ratio is 9.2 percent. This cost is in agreement with other similar efforts from other firms, particularly the Holland Road Interceptor Force Main, Newtown Road Force Main and Army Base 24-Inch and 20-Inch Transmission Main Replacements.

Schedule:

PER	June 2017
Design	November 2019
Bid	December 2020
Construction	March 2021
Project Completion	October 2024

CONSENT AGENDA ITEM 2.d.1. – October 22, 2019

Subject: Deragger+® Monitoring System, Parts and Installation
Sole Source (>$10,000)

Recommended Action: Approve the use of Deragger+® Monitoring System, Parts and Installation at all HRSD facilities.

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 the Deragger+® which is an interchangeable system that monitors the voltage going across pump controls effectively catching large rags hitting the impeller. The reversing component allows for rags to be pushed back and eliminating the need for HRSD to manually remove. The system provides the ability to perform real time deragging and is able to be installed on all existing pumps; variable frequency drives and motors in the HRSD collection system. Installation of the Deragger+® can be setup with 10,000 different variables monitoring multiple pump controls.

There are three existing Deragger+® systems previously purchased via ProCard and installed throughout the Small Communities and North and South Shore Operations facilities. Substantial savings in man-hours and electricity at pump stations have been recorded since these systems have been installed. For example, at the Willard Ave Pump Station there has been a decrease in work orders from approximately 14 per month to one per month.

Resource: Steve de Mik

CONSENT AGENDA ITEM 2.d.2. – October 22, 2019

Subject: Moyno Progressive Cavity Pumps, Parts and Repairs
Sole Source (>$10,000)

Recommended Action: Approve the use of Moyno Progressive Cavity Pumps, Parts and Repairs at all HRSD facilities.

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 Moyno Progressive Cavity brand pumps and parts for general inventory. The replacement parts will act as drop in replacement and allow for the use of existing equipment and piping without costly modifications to HRSD infrastructure. Repairs include general maintenance services to Moyno brand pumps.

CONSENT AGENDA ITEM 2.d.3. – October 22, 2019

Subject: Netzsch Progressive Cavity Pumps, Parts and Repairs
Sole Source (>$10,000)

Recommended Action: Approve the use of Netzsch Progressive Cavity Pumps, Parts and Repairs at all HRSD facilities.

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 Netzsch Thickening Waste Activated Sludge (TWAS) Progressive Cavity Pumps. The pump must be an exact replacement to insure proper fit with piping re-configuration for the thickening system and collection process. Repairs include general maintenance services to Netzsch brand pumps.

The Commission previously approved limited sole source authority for Netzsch TWAS pumps for use at the Atlantic Treatment Plant in February 2016 and Netzsch TWAS parts in November 2018. This action supersedes previous actions and expands the scope to cover parts and repair services and includes all of HRSD. A competitive solicitation was completed in May 2019 with acceptance of equal pumps and parts. Evaluation and award was made to the current authorized distributor and service provider for Netzsch brand.

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #2

AGENDA ITEM 4. – Deep Creek Interceptor Force Main Replacement
Virginia Clean Water Revolving Loan Fund (VCWRLF) Resolution

Hampton Roads Sanitation District
Resolution of
October 22, 2019

HAMPTON ROADS SANITATION DISTRICT COMMISSION

****

RESOLUTION
PROVIDING FOR THE ISSUANCE OF

A SUBORDINATE WASTEWATER REVENUE BOND

Adopted October 22, 2019

Deep Creek Interceptor Force Main Replacement Project: #C-515614-02

Resolution

RESOLUTION AUTHORIZING THE ISSUANCE OF A SUBORDINATE WASTEWATER REVENUE BOND, NOT TO EXCEED $6,094,306 IN PRINCIPAL AMOUNT, FOR THE PURPOSE OF PROVIDING FUNDS, WITH OTHER AVAILABLE MONEY, TO PAY THE COSTS OF CERTAIN IMPROVEMENTS TO THE DEEP CREEK INTERCEPTOR FORCE MAIN REPLACEMENT PROJECT, FIXING THE PRINCIPAL INSTALLMENT MATURITY DATES, THE INTEREST RATE, THE REDEMPTION PROVISIONS AND CERTAIN OTHER DETAILS OF THE BOND, DIRECTING THE AUTHENTICATION AND DELIVERY OF THE BOND, AND AUTHORIZING THE EXECUTION OF A FINANCING AGREEMENT WITH THE VIRGINIA RESOURCES AUTHORITY.

WHEREAS, the Hampton Roads Sanitation District (the "Borrower") entered into a Trust Agreement, dated as of October 1, 2011 (the "Trust Agreement"), with The Bank of New York Mellon Trust Company, N.A., as trustee (the "Trustee"), as amended and restated as of March 1, 2016, as further amended and supplemented, pursuant to which the Borrower may incur Parity Obligations, as defined in the Trust Agreement; and

WHEREAS, pursuant to Chapter 22, Title 62.1, Code of Virginia of 1950, as amended (the "VWFRF Act"), the General Assembly of the Commonwealth of Virginia created a permanent and perpetual fund known as the Virginia Water Facilities Revolving Fund (the "Fund"); and

WHEREAS, the Hampton Roads Sanitation District Commission (the "Commission") heretofore received an offer from the Virginia Resources Authority (the "Authority"), as Administrator of the Virginia Water Facilities Revolving Fund (the "Fund"), to make a loan from the Fund to the Borrower in an amount expected not to exceed $6,094,306 for the purpose of financing a project described in such offer as Deep Creek Interceptor Force Main Replacement

Project, together with related expenses; and

WHEREAS, the Commission, as the governing body of the Borrower, has determined to accept such offer and close on the loan from the Authority, as Administrator of the Fund, by authorizing and issuing its subordinate wastewater revenue bond for the purpose of financing Capital Improvement Program Costs (as defined in the Trust Agreement) of improvements to the Borrower's Deep Creek Interceptor Force Main Replacement (the "2019 Deep Creek Local Bond"), to be payable solely from the Net Revenues Available for Debt Service (as defined in the Trust Agreement) on a parity with all Parity Obligations (as defined in the Trust Agreement) of the Borrower and subordinated to all Senior Indebtedness, as defined in, and to extent set forth, in the Trust Agreement, all in conformity with the terms and provisions of the Trust Agreement; now, therefore,

BE IT RESOLVED by the Hampton Roads Sanitation District Commission as follows:

Section 1. (a) Definitions. The capitalized terms contained in this Resolution and not defined above shall have the meanings set forth in the Glossary of Defined Terms attached to this Resolution as Exhibit A, unless the context requires otherwise.

(b) Rules of Construction. The following rules shall apply to the construction of this Resolution unless the context requires otherwise:

(i) Singular words shall connote the plural number as well as the singular and vice versa.

(ii) All references in this Resolution to particular Sections or Exhibits are references to Sections or Exhibits of this Resolution unless otherwise indicated.

Section 2. Authorization of 2019 Deep Creek Local Bond. Pursuant to Sections 209(b) and 704(a) of the Trust Agreement and for the purpose of financing the Capital

Improvement Program Costs of the Project, which are Project Costs within the definition thereof found in the Financing Agreement, the 2019 Deep Creek Local Bond of the Borrower is hereby authorized to be issued in the principal amount not to exceed $6,094,306. The 2019 Deep Creek Local Bond shall be issuable as a single registered bond without coupons and shall be dated as of its date of issue. The 2019 Deep Creek Local Bond shall be substantially in the form attached to this Resolution as Exhibit B, with such variations, omissions and insertions as may be necessary or appropriate to conform to the provisions of this Resolution. The 2019 Deep Creek Local Bond shall be a Parity Obligation and shall be a VRA Subordinate Obligation, each as defined in the Trust Agreement, shall be secured on a parity with all other Parity Obligations of the Borrower under the Trust Agreement, and shall be senior to all Junior Obligations (as defined in the Trust Agreement), as set forth therein.

The 2019 Deep Creek Local Bond shall be dated as of its date of issue and shall bear interest (or "Cost of Funds" as described in the 2019 Deep Creek Financing Agreement Supplement) on the disbursed principal balance of the 2019 Deep Creek Local Bond at a rate not to exceed 2.50% per annum. Such interest shall be payable commencing on the date set forth in a certificate of the General Manager delivered on the date of issue of the 2019 Deep Creek Local Bond (the "General Manager's Certificate"), such principal and interest shall be payable in essentially equal semi-annual installments (rounded to the nearest $100), with the balance due on the date set forth in the General Manager's Certificate, but not later than December 1, 2050.

Section 3. <u>Redemption Provisions</u>. The principal installments on the 2019 Deep Creek Local Bond shall be subject to redemption prior to their respective maturities, at the option of the Borrower, from any money that may be made available for such purpose, either in whole or in part on any date at the redemption price of par plus accrued interest on ten (10) days' written

notice to the Authority and otherwise as provided in the Financing Agreement. Any such partial redemption shall not postpone the due date of any subsequent payment on the 2019 Deep Creek Local Bond, or change the amount of such installment, unless the Borrower and the Authority agree otherwise in writing.

Section 4. Deposits to Local Bond Fund. The Borrower shall deposit money with or to the order of the Authority, as Administrator of the Fund, in amounts sufficient to pay in full, when due (whether by maturity, redemption, acceleration or otherwise), the 2019 Deep Creek Local Bond issued under this Resolution, together with the interest thereon, all as set forth in the 2019 Deep Creek Local Bond.

Section 5. Authority to Execute 2019 Deep Creek Financing Agreement Supplement. The execution and delivery of the 2019 Deep Creek Financing Agreement Supplement, substantially in the form presented at this meeting, relating to the loan from the Authority, as Administrator to the Fund, to the Borrower and the repayment of the loan by the Borrower in accordance with the 2019 Deep Creek Local Bond, are hereby authorized, with such changes, insertions and omissions as may be approved by the Chair or Vice-Chair of the Commission, the execution of the 2019 Deep Creek Financing Agreement Supplement by the Chair or the Vice-Chair to be conclusive evidence of his approval of any changes, insertions and omissions therein.

Section 6. Manner of Execution of 2019 Deep Creek Local Bond. The 2019 Deep Creek Local Bond shall be executed by the Chair or Vice-Chair and the Secretary or an Assistant Secretary of the Commission, and the seal of the Commission shall be impressed on the 2019 Deep Creek Local Bond. The 2019 Deep Creek Local Bond shall be delivered to or for the

account of the Authority, as Administrator of the Fund, upon execution and delivery of the 2019 Deep Creek Financing Agreement.

Section 7. Obligations of Borrower Unconditional. Subject to the terms of the Trust Agreement, nothing contained in this Resolution or the 2019 Deep Creek Local Bond is intended to or shall impair, as between the Borrower, its creditors, and the holder of the 2019 Deep Creek Local Bond, the obligation of the Borrower, which is absolute and unconditional, to pay to the holder of the 2019 Deep Creek Local Bond the principal of, redemption premium, if any, and interest on the 2019 Deep Creek Local Bond as and when the same shall become due and payable in accordance with its terms, or affect the relative rights of the holder of the 2019 Deep Creek Local Bond and creditors of the Borrower, nor shall anything herein or therein prevent the holder of the 2019 Deep Creek Local Bond from exercising all remedies otherwise permitted by applicable law and under the Trust Agreement upon default under the 2019 Deep Creek Local Bond and the 2019 Deep Creek Financing Agreement Supplement.

Section 8. Payments on 2019 Deep Creek Local Bond Permitted. Nothing contained in this Resolution or the 2019 Deep Creek Local Bond shall affect the obligation of the Borrower to make, or prevent the Borrower from making, payment of the principal of, redemption premium, if any, or interest on the 2019 Deep Creek Local Bond in accordance with the provisions hereof, except as otherwise provided in this Resolution.

Section 9. Benefits of Resolution. Nothing in this Resolution or the 2019 Deep Creek Local Bond, express or implied, shall give to any person, other than the holder of the 2019 Deep Creek Local Bond, any benefit or any legal or equitable right, remedy or claim under this Resolution.

Section 10. Further Action. The Chair, the Vice-Chair, the Secretary and any Assistant

Secretary of the Commission and the General Manager, the Director of Engineering and the Director of Finance of the Borrower are authorized and directed (without limitation except as may be expressly set forth therein) 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 effect the transactions contemplated by the 2019 Deep Creek Financing Agreement Supplement.

Section 11. Effectiveness. This Resolution shall take effect immediately upon its adoption.

[END OF RESOLUTION]

Adopted by the Hampton Roads Sanitation District Commission on October 22, 2019.

Maurice P. Lynch, Vice-Chair

EXHIBIT A

GLOSSARY OF DEFINED TERMS

"2019 Deep Creek Financing Agreement Supplement" means the Supplement to Master Financing Agreement relating to the 2019 Deep Creek Local Bond, between the Borrower and the Authority, as Administrator of the Fund, together with any amendments or supplements thereto.

"*2019 Deep Creek Local Bond*" means the bond in substantially the form attached to this Resolution as Exhibit B, to be issued by the Borrower to the Authority, as Administrator of the Fund, pursuant to this Resolution and the 2019 Deep Creek Financing Agreement Supplement.

"*2019 Deep Creek Local Bond Proceeds*" means proceeds of the issuance and sale of the 2019 Deep Creek Local Bond to the Authority, as Administrator of the Fund, pursuant to the 2019 Deep Creek Financing Agreement Supplement.

"*Capital Improvement Program Costs*" means "Capital Improvement Program Costs" as defined in the Trust Agreement.

"Financing Agreement" means the Master Financing Agreement, dated as of February 1, 2016, between the Authority, as Administrator of the Fund, and the Borrower, as amended to the date hereof, and as supplemented by the 2019 Deep Creek Financing Agreement Supplement.

"*General Manager's Certificate*" means the certificate of the General Manager delivered on the date of issue of the 2019 Deep Creek Local Bond.

"*Junior Indebtedness*" means "Junior Indebtedness," as defined in the Trust Agreement.

"*Net Revenues*" means "Net Revenues" as defined in the Trust Agreement.

"*Parity Obligations*" means "Parity Obligations," as defined in the Trust Agreement.

"*Project*" means the project described in Exhibit B to the 2019 Deep Creek Financing Agreement Supplement, the costs of the acquisition, construction, improving or equipping of which are to be financed or refinanced in part with the 2019 Deep Creek Local Bond Proceeds.

"*Project Budget*" means the budget for the financing or the refinancing of the Project, a copy of which is attached to the 2019 Deep Creek Financing Agreement Supplement as Exhibit C, with such changes therein as may be approved in writing by the Authority.

"*Senior Indebtedness*" means "Senior Indebtedness," as defined in the Trust Agreement.

"*Trust Agreement*" means the Trust Agreement, dated as of October 1, 2011, by and between the Borrower and the Trustee, as amended and restated as of March 1, 2016, as further amended and supplemented.

"*Trustee*" means The Bank of New York Mellon Trust Company, N.A., as trustee under the Trust Agreement, and any successor in trust thereto.

EXHIBIT B

FORM OF LOCAL BOND

United States of America
Commonwealth of Virginia

HAMPTON ROADS SANITATION DISTRICT
Subordinate Wastewater Revenue Bond

Hampton Roads Sanitation District (the "Borrower"), a political subdivision of the Commonwealth of Virginia, by Hampton Roads Sanitation District Commission (the "Commission"), the governing body of the Borrower, acknowledges itself indebted and, for value received, hereby promises to pay, solely from the revenues and other property hereinafter described and pledged to the payment of this Bond, to the order of the Virginia Resources Authority (the "Authority"), as Administrator of the Virginia Water Facilities Revolving Fund, Richmond, Virginia (the "Fund"), the principal amount equal to the sum of the principal disbursements made by the Authority, as Administrator of the Fund, to the Borrower (as shown in Schedule 1) pursuant to the Master Financing Agreement, dated as of February 1, 2016, between the Authority, as Administrator of the Fund, and the Borrower, as amended to the date hereof, and as supplemented by the Supplement to Master Financing Agreement, dated as of _____ 1, 2019 (as so amended and supplemented, the "Financing Agreement") not to exceed _____ Dollars ($_____), together with interest (or "Cost of Funds" as described in the Financing Agreement) on the disbursed principal at the rate of _____% per annum, as follows:

Interest shall be payable on _____ 1, _____, and thereafter principal and interest due under this Bond shall be payable in essentially equal semi-annual installments (rounded to the nearest one hundred dollars ($100)) on _____ 1 and _____ 1 of each year, commencing _____ 1, 20__ (as shown on Schedule 2), provided that if not sooner paid, all amounts under this Bond shall be due and payable in full on _____ 1, 20__.

In addition, if any installment of principal or interest is not received by the holder of this Bond within ten (10) days from its due date, the Borrower shall pay to the holder of this Bond, a late payment charge in an amount equal to five percent (5.00%) per annum on such overdue installment. Both principal and interest are payable in lawful money of the United States.

No notation is required to be made on this Bond of the payment of any principal or interest on normal installment payment dates. HENCE, THE FACE AMOUNT OF THIS BOND MAY EXCEED THE PRINCIPAL SUM REMAINING OUTSTANDING AND DUE HEREUNDER. This Bond and the premium, if any, and the interest thereon are limited obligations of the Borrower and (except to the extent payment with respect to the Bond shall be made from the proceeds from the sale of the Bond or the income, if any, derived from the investment thereof) are payable solely from Net Revenues Available for Debt Service (as defined in the below-mentioned Trust Agreement) from time to time deposited by the Borrower with or to the order of the Authority, as the Administrator of the Fund pursuant to the Resolution (the "Resolution") adopted by the Commission on October 22, 2019, authorizing the issuance of this

Bond, which Net Revenues Available for Debt Service have been pledged pursuant to the Financing Agreement to secure payment hereof. Neither the Commonwealth of Virginia nor any political subdivision thereof, including the Borrower, shall be obligated to pay the principal of or premium, if any, or interest on this Bond or other costs incident thereto except from the revenues pledged therefor, and neither the faith and credit nor the taxing power of the Commonwealth of Virginia or any political subdivision thereof, including the Borrower, is pledged to the payment of the principal of or premium, if any, or interest on this Bond or other costs incident thereto.

This Bond shall be a Parity Obligation and a VRA Subordinate Obligation and secured on parity with all other all Parity Obligations and VRA Subordinate Obligations heretofore and hereafter issued and outstanding under the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, as further amended and supplemented (the "Trust Agreement"), by and between the Borrower and the predecessor in trust to The Bank of New York Mellon Trust Company, N.A., as trustee (the "Trustee"), and shall be senior to all Junior Indebtedness (as defined in the Trust Agreement), to the extent and in the manner set forth therein.

This Bond is being issued pursuant to the terms of the Resolution and the Financing Agreement to evidence a loan from the Authority, as Administrator of the Fund, to the Borrower to finance Capital Improvement Program Costs (as defined in the Trust Agreement).

This Bond is subject to optional prepayment to the extent and on the terms set forth in the Resolution and the Financing Agreement.

If an Event of Default (as defined in the Financing Agreement) occurs, the principal of and accrued interest on this Bond may be declared immediately due and payable by the holder by written notice to the Borrower.

The obligations of the Borrower under this Bond shall terminate when all amounts due and to become due pursuant to this Bond have been paid in full.

All provisions of this Bond are subject to the terms of the Trust Agreement, and all capitalized terms used herein and not otherwise defined herein shall have the meanings assigned thereto by the Resolution and the Financing Agreement.

All acts, conditions and things required to happen, exist or be performed precedent to and in the issuance of this Bond have happened, exist and have been performed.

IN WITNESS WHEREOF, the Borrower has caused this Bond to be signed by the [Vice-] Chair of its Commission and its seal to be impressed hereon and attested by the Secretary of its Commission all as of _____ __, 2019.

HAMPTON ROADS SANITATION DISTRICT

By: _____
[Vice-] Chair of the Hampton Roads Sanitation District Commission

(SEAL)
ATTEST:

_____
Secretary of the Hampton Roads Sanitation District Commission

Schedule 1

SCHEDULE OF PRINCIPAL DISBURSEMENTS

The amount and date of disbursements of the principal of the Bond to which this Schedule is attached, not to exceed $________, shall be entered hereon by the authorized representative of Virginia Resources Authority when each such disbursement of principal is made to the Borrower.

Date	Amount	Cumulative Amount	Authorized Signature
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________
__________	$__________	$__________	__________

Schedule 2

AMORTIZATION SCHEDULE

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #3

AGENDA ITEM 5. – Huxley Place to Middle Ground Boulevard Force Main Extension
Virginia Clean Water Revolving Loan Fund (VCWRLF) Resolution

Hampton Roads Sanitation District
Resolution of
October 22, 2019

HAMPTON ROADS SANITATION DISTRICT COMMISSION

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RESOLUTION
PROVIDING FOR THE ISSUANCE OF

A SUBORDINATE WASTEWATER REVENUE BOND

Adopted October 22, 2019

Huxley to Middle Ground Force Main Extension Project: #C-515608-02

Resolution

RESOLUTION AUTHORIZING THE ISSUANCE OF A SUBORDINATE WASTEWATER REVENUE BOND, NOT TO EXCEED $3,896,616 IN PRINCIPAL AMOUNT, FOR THE PURPOSE OF PROVIDING FUNDS, WITH OTHER AVAILABLE MONEY, TO PAY THE COSTS OF CERTAIN IMPROVEMENTS TO THE HUXLEY TO MIDDLE GROUND FORCE MAIN EXTENSION PROJECT, FIXING THE PRINCIPAL INSTALLMENT MATURITY DATES, THE INTEREST RATE, THE REDEMPTION PROVISIONS AND CERTAIN OTHER DETAILS OF THE BOND, DIRECTING THE AUTHENTICATION AND DELIVERY OF THE BOND, AND AUTHORIZING THE EXECUTION OF A FINANCING AGREEMENT WITH THE VIRGINIA RESOURCES AUTHORITY.

WHEREAS, the Hampton Roads Sanitation District (the "Borrower") entered into a Trust Agreement, dated as of October 1, 2011 (the "Trust Agreement"), with The Bank of New York Mellon Trust Company, N.A., as trustee (the "Trustee"), as amended and restated as of March 1, 2016, as further amended and supplemented, pursuant to which the Borrower may incur Parity Obligations, as defined in the Trust Agreement; and

WHEREAS, pursuant to Chapter 22, Title 62.1, Code of Virginia of 1950, as amended (the "VWFRF Act"), the General Assembly of the Commonwealth of Virginia created a permanent and perpetual fund known as the Virginia Water Facilities Revolving Fund (the "Fund"); and

WHEREAS, the Hampton Roads Sanitation District Commission (the "Commission") heretofore received an offer from the Virginia Resources Authority (the "Authority"), as Administrator of the Virginia Water Facilities Revolving Fund (the "Fund"), to make a loan from the Fund to the Borrower in an amount expected not to exceed $3,896,616 for the purpose of financing a project described in such offer as Huxley to Middle Ground Force Main Extension

Project, together with related expenses; and

WHEREAS, the Commission, as the governing body of the Borrower, has determined to accept such offer and close on the loan from the Authority, as Administrator of the Fund, by authorizing and issuing its subordinate wastewater revenue bond for the purpose of financing Capital Improvement Program Costs (as defined in the Trust Agreement) of improvements to the Borrower's Huxley to Middle Ground Force Main Extension (the "2019 Huxley – Middle Ground Local Bond"), to be payable solely from the Net Revenues Available for Debt Service (as defined in the Trust Agreement) on a parity with all Parity Obligations (as defined in the Trust Agreement) of the Borrower and subordinated to all Senior Indebtedness, as defined in, and to extent set forth, in the Trust Agreement, all in conformity with the terms and provisions of the Trust Agreement; now, therefore,

BE IT RESOLVED by the Hampton Roads Sanitation District Commission as follows:

Section 1. (a) Definitions. The capitalized terms contained in this Resolution and not defined above shall have the meanings set forth in the Glossary of Defined Terms attached to this Resolution as Exhibit A, unless the context requires otherwise.

(b) Rules of Construction. The following rules shall apply to the construction of this Resolution unless the context requires otherwise:

(i) Singular words shall connote the plural number as well as the singular and vice versa.

(ii) All references in this Resolution to particular Sections or Exhibits are references to Sections or Exhibits of this Resolution unless otherwise indicated.

Section 2. Authorization of 2019 Huxley – Middle Ground Local Bond. Pursuant to Sections 209(b) and 704(a) of the Trust Agreement and for the purpose of financing the Capital

Improvement Program Costs of the Project, which are Project Costs within the definition thereof found in the Financing Agreement, the 2019 Huxley – Middle Ground Local Bond of the Borrower is hereby authorized to be issued in the principal amount not to exceed $3,896,616. The 2019 Huxley – Middle Ground Local Bond shall be issuable as a single registered bond without coupons and shall be dated as of its date of issue. The 2019 Huxley – Middle Ground Local Bond shall be substantially in the form attached to this Resolution as Exhibit B, with such variations, omissions and insertions as may be necessary or appropriate to conform to the provisions of this Resolution. The 2019 Huxley – Middle Ground Local Bond shall be a Parity Obligation and shall be a VRA Subordinate Obligation, each as defined in the Trust Agreement, shall be secured on a parity with all other Parity Obligations of the Borrower under the Trust Agreement, and shall be senior to all Junior Obligations (as defined in the Trust Agreement), as set forth therein.

The 2019 Huxley – Middle Ground Local Bond shall be dated as of its date of issue and shall bear interest (or "Cost of Funds" as described in the 2019 Huxley – Middle Ground Financing Agreement Supplement) on the disbursed principal balance of the 2019 Huxley – Middle Ground Local Bond at a rate not to exceed 2.50% per annum. Such interest shall be payable commencing on the date set forth in a certificate of the General Manager delivered on the date of issue of the 2019 Huxley – Middle Ground Local Bond (the "General Manager's Certificate"), such principal and interest shall be payable in essentially equal semi-annual installments (rounded to the nearest $100), with the balance due on the date set forth in the General Manager's Certificate, but not later than December 1, 2050.

Section 3. Redemption Provisions. The principal installments on the 2019 Huxley – Middle Ground Local Bond shall be subject to redemption prior to their respective maturities, at

the option of the Borrower, from any money that may be made available for such purpose, either in whole or in part on any date at the redemption price of par plus accrued interest on ten (10) days' written notice to the Authority and otherwise as provided in the Financing Agreement. Any such partial redemption shall not postpone the due date of any subsequent payment on the 2019 Huxley – Middle Ground Local Bond, or change the amount of such installment, unless the Borrower and the Authority agree otherwise in writing.

Section 4. Deposits to Local Bond Fund. The Borrower shall deposit money with or to the order of the Authority, as Administrator of the Fund, in amounts sufficient to pay in full, when due (whether by maturity, redemption, acceleration or otherwise), the 2019 Huxley – Middle Ground Local Bond issued under this Resolution, together with the interest thereon, all as set forth in the 2019 Huxley – Middle Ground Local Bond.

Section 5. Authority to Execute 2019 Huxley – Middle Ground Financing Agreement Supplement. The execution and delivery of the 2019 Huxley – Middle Ground Financing Agreement Supplement, substantially in the form presented at this meeting, relating to the loan from the Authority, as Administrator to the Fund, to the Borrower and the repayment of the loan by the Borrower in accordance with the 2019 Huxley – Middle Ground Local Bond, are hereby authorized, with such changes, insertions and omissions as may be approved by the Chair or Vice-Chair of the Commission, the execution of the 2019 Huxley – Middle Ground Financing Agreement Supplement by the Chair or the Vice-Chair to be conclusive evidence of his approval of any changes, insertions and omissions therein.

Section 6. Manner of Execution of 2019 Huxley – Middle Ground Local Bond. The 2019 Huxley – Middle Ground Local Bond shall be executed by the Chair or Vice-Chair and the Secretary or an Assistant Secretary of the Commission, and the seal of the Commission shall be

impressed on the 2019 Huxley – Middle Ground Local Bond. The 2019 Huxley – Middle Ground Local Bond shall be delivered to or for the account of the Authority, as Administrator of the Fund, upon execution and delivery of the 2019 Huxley – Middle Ground Financing Agreement.

Section 7. Obligations of Borrower Unconditional. Subject to the terms of the Trust Agreement, nothing contained in this Resolution or the 2019 Huxley – Middle Ground Local Bond is intended to or shall impair, as between the Borrower, its creditors, and the holder of the 2019 Huxley – Middle Ground Local Bond, the obligation of the Borrower, which is absolute and unconditional, to pay to the holder of the 2019 Huxley – Middle Ground Local Bond the principal of, redemption premium, if any, and interest on the 2019 Huxley – Middle Ground Local Bond as and when the same shall become due and payable in accordance with its terms, or affect the relative rights of the holder of the 2019 Huxley – Middle Ground Local Bond and creditors of the Borrower, nor shall anything herein or therein prevent the holder of the 2019 Huxley – Middle Ground Local Bond from exercising all remedies otherwise permitted by applicable law and under the Trust Agreement upon default under the 2019 Huxley – Middle Ground Local Bond and the 2019 Huxley – Middle Ground Financing Agreement Supplement.

Section 8. Payments on 2019 Huxley – Middle Ground Local Bond Permitted. Nothing contained in this Resolution or the 2019 Huxley – Middle Ground Local Bond shall affect the obligation of the Borrower to make, or prevent the Borrower from making, payment of the principal of, redemption premium, if any, or interest on the 2019 Huxley – Middle Ground Local Bond in accordance with the provisions hereof, except as otherwise provided in this Resolution.

Section 9. Benefits of Resolution. Nothing in this Resolution or the 2019 Huxley –

Middle Ground Local Bond, express or implied, shall give to any person, other than the holder of the 2019 Huxley – Middle Ground Local Bond, any benefit or any legal or equitable right, remedy or claim under this Resolution.

Section 10. Further Action. The Chair, the Vice-Chair, the Secretary and any Assistant Secretary of the Commission and the General Manager, the Director of Engineering and the Director of Finance of the Borrower are authorized and directed (without limitation except as may be expressly set forth therein) 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 effect the transactions contemplated by the 2019 Huxley – Middle Ground Financing Agreement Supplement.

Section 11. Effectiveness. This Resolution shall take effect immediately upon its adoption.

[END OF RESOLUTION]

Adopted by the Hampton Roads Sanitation District Commission on October 22, 2019.

Maurice P. Lynch, Vice-Chair

EXHIBIT A

GLOSSARY OF DEFINED TERMS

"2019 Huxley – Middle Ground Financing Agreement Supplement" means the Supplement to Master Financing Agreement relating to the 2019 Huxley – Middle Ground Local Bond, between the Borrower and the Authority, as Administrator of the Fund, together with any amendments or supplements thereto.

"*2019 Huxley – Middle Ground Local Bond*" means the bond in substantially the form attached to this Resolution as Exhibit B, to be issued by the Borrower to the Authority, as Administrator of the Fund, pursuant to this Resolution and the 2019 Huxley – Middle Ground Financing Agreement Supplement.

"*2019 Huxley – Middle Ground Local Bond Proceeds*" means proceeds of the issuance and sale of the 2019 Huxley – Middle Ground Local Bond to the Authority, as Administrator of the Fund, pursuant to the 2019 Huxley – Middle Ground Financing Agreement Supplement.

"*Capital Improvement Program Costs*" means "Capital Improvement Program Costs" as defined in the Trust Agreement.

"Financing Agreement" means the Master Financing Agreement, dated as of February 1, 2016, between the Authority, as Administrator of the Fund, and the Borrower, as amended to the date hereof, and as supplemented by the 2019 Huxley – Middle Ground Financing Agreement Supplement.

"*General Manager's Certificate*" means the certificate of the General Manager delivered on the date of issue of the 2019 Huxley – Middle Ground Local Bond.

"*Junior Indebtedness*" means "Junior Indebtedness," as defined in the Trust Agreement.

"*Net Revenues*" means "Net Revenues" as defined in the Trust Agreement.

"*Parity Obligations*" means "Parity Obligations," as defined in the Trust Agreement.

"*Project*" means the project described in Exhibit B to the 2019 Huxley – Middle Ground Financing Agreement Supplement, the costs of the acquisition, construction, improving or equipping of which are to be financed or refinanced in part with the 2019 Huxley – Middle Ground Local Bond Proceeds.

"*Project Budget*" means the budget for the financing or the refinancing of the Project, a copy of which is attached to the 2019 Huxley – Middle Ground Financing Agreement Supplement as Exhibit C, with such changes therein as may be approved in writing by the Authority.

"*Senior Indebtedness*" means "Senior Indebtedness," as defined in the Trust Agreement.

"*Trust Agreement*" means the Trust Agreement, dated as of October 1, 2011, by and between the Borrower and the Trustee, as amended and restated as of March 1, 2016, as further amended and supplemented.

"*Trustee*" means The Bank of New York Mellon Trust Company, N.A., as trustee under the Trust Agreement, and any successor in trust thereto.

EXHIBIT B

FORM OF LOCAL BOND

United States of America
Commonwealth of Virginia

HAMPTON ROADS SANITATION DISTRICT
Subordinate Wastewater Revenue Bond

Hampton Roads Sanitation District (the "Borrower"), a political subdivision of the Commonwealth of Virginia, by Hampton Roads Sanitation District Commission (the "Commission"), the governing body of the Borrower, acknowledges itself indebted and, for value received, hereby promises to pay, solely from the revenues and other property hereinafter described and pledged to the payment of this Bond, to the order of the Virginia Resources Authority (the "Authority"), as Administrator of the Virginia Water Facilities Revolving Fund, Richmond, Virginia (the "Fund"), the principal amount equal to the sum of the principal disbursements made by the Authority, as Administrator of the Fund, to the Borrower (as shown in Schedule 1) pursuant to the Master Financing Agreement, dated as of February 1, 2016, between the Authority, as Administrator of the Fund, and the Borrower, as amended to the date hereof, and as supplemented by the Supplement to Master Financing Agreement, dated as of _____ 1, 2019 (as so amended and supplemented, the "Financing Agreement") not to exceed _____ Dollars ($_____), together with interest (or "Cost of Funds" as described in the Financing Agreement) on the disbursed principal at the rate of _____% per annum, as follows:

Interest shall be payable on _____ 1, _____, and thereafter principal and interest due under this Bond shall be payable in essentially equal semi-annual installments (rounded to the nearest one hundred dollars ($100)) on _____ 1 and _____ 1 of each year, commencing _____ 1, 20__ (as shown on Schedule 2), provided that if not sooner paid, all amounts under this Bond shall be due and payable in full on _____ 1, 20__.

In addition, if any installment of principal or interest is not received by the holder of this Bond within ten (10) days from its due date, the Borrower shall pay to the holder of this Bond, a late payment charge in an amount equal to five percent (5.00%) per annum on such overdue installment. Both principal and interest are payable in lawful money of the United States.

No notation is required to be made on this Bond of the payment of any principal or interest on normal installment payment dates. HENCE, THE FACE AMOUNT OF THIS BOND MAY EXCEED THE PRINCIPAL SUM REMAINING OUTSTANDING AND DUE HEREUNDER. This Bond and the premium, if any, and the interest thereon are limited obligations of the Borrower and (except to the extent payment with respect to the Bond shall be made from the proceeds from the sale of the Bond or the income, if any, derived from the investment thereof) are payable solely from Net Revenues Available for Debt Service (as defined in the below-mentioned Trust Agreement) from time to time deposited by the Borrower with or to the order of the Authority, as the Administrator of the Fund pursuant to the Resolution (the "Resolution") adopted by the Commission on October 22, 2019, authorizing the issuance of this

Bond, which Net Revenues Available for Debt Service have been pledged pursuant to the Financing Agreement to secure payment hereof. Neither the Commonwealth of Virginia nor any political subdivision thereof, including the Borrower, shall be obligated to pay the principal of or premium, if any, or interest on this Bond or other costs incident thereto except from the revenues pledged therefor, and neither the faith and credit nor the taxing power of the Commonwealth of Virginia or any political subdivision thereof, including the Borrower, is pledged to the payment of the principal of or premium, if any, or interest on this Bond or other costs incident thereto.

This Bond shall be a Parity Obligation and a VRA Subordinate Obligation and secured on parity with all other all Parity Obligations and VRA Subordinate Obligations heretofore and hereafter issued and outstanding under the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, as further amended and supplemented (the "Trust Agreement"), by and between the Borrower and the predecessor in trust to The Bank of New York Mellon Trust Company, N.A., as trustee (the "Trustee"), and shall be senior to all Junior Indebtedness (as defined in the Trust Agreement), to the extent and in the manner set forth therein.

This Bond is being issued pursuant to the terms of the Resolution and the Financing Agreement to evidence a loan from the Authority, as Administrator of the Fund, to the Borrower to finance Capital Improvement Program Costs (as defined in the Trust Agreement).

This Bond is subject to optional prepayment to the extent and on the terms set forth in the Resolution and the Financing Agreement.

If an Event of Default (as defined in the Financing Agreement) occurs, the principal of and accrued interest on this Bond may be declared immediately due and payable by the holder by written notice to the Borrower.

The obligations of the Borrower under this Bond shall terminate when all amounts due and to become due pursuant to this Bond have been paid in full.

All provisions of this Bond are subject to the terms of the Trust Agreement, and all capitalized terms used herein and not otherwise defined herein shall have the meanings assigned thereto by the Resolution and the Financing Agreement.

All acts, conditions and things required to happen, exist or be performed precedent to and in the issuance of this Bond have happened, exist and have been performed.

IN WITNESS WHEREOF, the Borrower has caused this Bond to be signed by the [Vice-] Chair of its Commission and its seal to be impressed hereon and attested by the Secretary of its Commission all as of _____ __, 2019.

HAMPTON ROADS SANITATION DISTRICT

By: _____
[Vice-]Chair of the Hampton Roads Sanitation District Commission

(SEAL)
ATTEST:

_____
Secretary of the Hampton Roads Sanitation District Commission

Schedule 1

SCHEDULE OF PRINCIPAL DISBURSEMENTS

The amount and date of disbursements of the principal of the Bond to which this Schedule is attached, not to exceed $__________, shall be entered hereon by the authorized representative of Virginia Resources Authority when each such disbursement of principal is made to the Borrower.

Date	Amount	Cumulative Amount	Authorized Signature
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________
__________________	$______________	$_______________	_________________________

Schedule 2

AMORTIZATION SCHEDULE

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #4

AGENDA ITEM 6. – Treatment Plant Dewatering Replacement Phase I
Virginia Clean Water Revolving Loan Fund (VCWRLF) Resolution

Hampton Roads Sanitation District
Resolution of
October 22, 2019

HAMPTON ROADS SANITATION DISTRICT COMMISSION

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RESOLUTION
PROVIDING FOR THE ISSUANCE OF

A SUBORDINATE WASTEWATER REVENUE BOND

Adopted October 22, 2019

Treatment Plant Dewatering Replacement Phase I Project: #C-515638-02

Resolution

RESOLUTION AUTHORIZING THE ISSUANCE OF A SUBORDINATE WASTEWATER REVENUE BOND, NOT TO EXCEED $3,500,000 IN PRINCIPAL AMOUNT, FOR THE PURPOSE OF PROVIDING FUNDS, WITH OTHER AVAILABLE MONEY, TO PAY THE COSTS OF CERTAIN IMPROVEMENTS TO THE TREATMENT PLANT DEWATERING REPLACEMENT PHASE I PROJECT, FIXING THE PRINCIPAL INSTALLMENT MATURITY DATES, THE INTEREST RATE, THE REDEMPTION PROVISIONS AND CERTAIN OTHER DETAILS OF THE BOND, DIRECTING THE AUTHENTICATION AND DELIVERY OF THE BOND, AND AUTHORIZING THE EXECUTION OF A FINANCING AGREEMENT WITH THE VIRGINIA RESOURCES AUTHORITY.

WHEREAS, the Hampton Roads Sanitation District (the "Borrower") entered into a Trust Agreement, dated as of October 1, 2011 (the "Trust Agreement"), with The Bank of New York Mellon Trust Company, N.A., as trustee (the "Trustee"), as amended and restated as of March 1, 2016, as further amended and supplemented, pursuant to which the Borrower may incur Parity Obligations, as defined in the Trust Agreement; and

WHEREAS, pursuant to Chapter 22, Title 62.1, Code of Virginia of 1950, as amended (the "VWFRF Act"), the General Assembly of the Commonwealth of Virginia created a permanent and perpetual fund known as the Virginia Water Facilities Revolving Fund (the "Fund"); and

WHEREAS, the Hampton Roads Sanitation District Commission (the "Commission") expects to receive an offer from the Virginia Resources Authority (the "Authority"), as Administrator of the Virginia Water Facilities Revolving Fund (the "Fund"), to make a loan from the Fund to the Borrower in an amount expected not to exceed $3,500,000 for the purpose of financing a project described in such offer as Treatment Plant Dewatering Replacement Phase I

Project, together with related expenses; and

WHEREAS, the Commission, as the governing body of the Borrower, has determined to accept such offer and close on the loan from the Authority, as Administrator of the Fund, by authorizing and issuing its subordinate wastewater revenue bond for the purpose of financing Capital Improvement Program Costs (as defined in the Trust Agreement) of improvements to the Borrower's Treatment Plant Dewatering Replacement Phase I (the "2019 Treatment Plant Local Bond"), to be payable solely from the Net Revenues Available for Debt Service (as defined in the Trust Agreement) on a parity with all Parity Obligations (as defined in the Trust Agreement) of the Borrower and subordinated to all Senior Indebtedness, as defined in, and to extent set forth, in the Trust Agreement, all in conformity with the terms and provisions of the Trust Agreement; now, therefore,

BE IT RESOLVED by the Hampton Roads Sanitation District Commission as follows:

Section 1. (a) Definitions. The capitalized terms contained in this Resolution and not defined above shall have the meanings set forth in the Glossary of Defined Terms attached to this Resolution as Exhibit A, unless the context requires otherwise.

(b) Rules of Construction. The following rules shall apply to the construction of this Resolution unless the context requires otherwise:

(i) Singular words shall connote the plural number as well as the singular and vice versa.

(ii) All references in this Resolution to particular Sections or Exhibits are references to Sections or Exhibits of this Resolution unless otherwise indicated.

Section 2. Authorization of 2019 Treatment Plant Local Bond. Pursuant to Sections 209(b) and 704(a) of the Trust Agreement and for the purpose of financing the Capital

Improvement Program Costs of the Project, which are Project Costs within the definition thereof found in the Financing Agreement, the 2019 Treatment Plant Local Bond of the Borrower is hereby authorized to be issued in the principal amount not to exceed $3,500,000. The 2019 Treatment Plant Local Bond shall be issuable as a single registered bond without coupons and shall be dated as of its date of issue. The 2019 Treatment Plant Local Bond shall be substantially in the form attached to this Resolution as Exhibit B, with such variations, omissions and insertions as may be necessary or appropriate to conform to the provisions of this Resolution. The 2019 Treatment Plant Local Bond shall be a Parity Obligation and shall be a VRA Subordinate Obligation, each as defined in the Trust Agreement, shall be secured on a parity with all other Parity Obligations of the Borrower under the Trust Agreement, and shall be senior to all Junior Obligations (as defined in the Trust Agreement), as set forth therein.

The 2019 Treatment Plant Local Bond shall be dated as of its date of issue and shall bear interest (or "Cost of Funds" as described in the 2019 Treatment Plant Financing Agreement Supplement) on the disbursed principal balance of the 2019 Treatment Plant Local Bond at a rate not to exceed 2.50% per annum. Such interest shall be payable commencing on the date set forth in a certificate of the General Manager delivered on the date of issue of the 2019 Treatment Plant Local Bond (the "General Manager's Certificate"), such principal and interest shall be payable in essentially equal semi-annual installments (rounded to the nearest $100), with the balance due on the date set forth in the General Manager's Certificate, but not later than December 1, 2050.

Section 3. <u>Redemption Provisions</u>. The principal installments on the 2019 Treatment Plant Local Bond shall be subject to redemption prior to their respective maturities, at the option of the Borrower, from any money that may be made available for such purpose, either in whole or in part on any date at the redemption price of par plus accrued interest on ten (10) days'

written notice to the Authority and otherwise as provided in the Financing Agreement. Any such partial redemption shall not postpone the due date of any subsequent payment on the 2019 Treatment Plant Local Bond, or change the amount of such installment, unless the Borrower and the Authority agree otherwise in writing.

Section 4. Deposits to Local Bond Fund. The Borrower shall deposit money with or to the order of the Authority, as Administrator of the Fund, in amounts sufficient to pay in full, when due (whether by maturity, redemption, acceleration or otherwise), the 2019 Treatment Plant Local Bond issued under this Resolution, together with the interest thereon, all as set forth in the 2019 Treatment Plant Local Bond.

Section 5. Authority to Execute 2019 Treatment Plant Financing Agreement Supplement. The execution and delivery of the 2019 Treatment Plant Financing Agreement Supplement, substantially in the form presented at this meeting, relating to the loan from the Authority, as Administrator to the Fund, to the Borrower and the repayment of the loan by the Borrower in accordance with the 2019 Treatment Plant Local Bond, are hereby authorized, with such changes, insertions and omissions as may be approved by the Chair or Vice-Chair of the Commission, the execution of the 2019 Treatment Plant Financing Agreement Supplement by the Chair or the Vice-Chair to be conclusive evidence of his approval of any changes, insertions and omissions therein.

Section 6. Manner of Execution of 2019 Treatment Plant Local Bond. The 2019 Treatment Plant Local Bond shall be executed by the Chair or Vice-Chair and the Secretary or an Assistant Secretary of the Commission, and the seal of the Commission shall be impressed on the 2019 Treatment Plant Local Bond. The 2019 Treatment Plant Local Bond shall be delivered to

or for the account of the Authority, as Administrator of the Fund, upon execution and delivery of the 2019 Treatment Plant Financing Agreement.

Section 7. Obligations of Borrower Unconditional. Subject to the terms of the Trust Agreement, nothing contained in this Resolution or the 2019 Treatment Plant Local Bond is intended to or shall impair, as between the Borrower, its creditors, and the holder of the 2019 Treatment Plant Local Bond, the obligation of the Borrower, which is absolute and unconditional, to pay to the holder of the 2019 Treatment Plant Local Bond the principal of, redemption premium, if any, and interest on the 2019 Treatment Plant Local Bond as and when the same shall become due and payable in accordance with its terms, or affect the relative rights of the holder of the 2019 Treatment Plant Local Bond and creditors of the Borrower, nor shall anything herein or therein prevent the holder of the 2019 Treatment Plant Local Bond from exercising all remedies otherwise permitted by applicable law and under the Trust Agreement upon default under the 2019 Treatment Plant Local Bond and the 2019 Treatment Plant Financing Agreement Supplement.

Section 8. Payments on 2019 Treatment Plant Local Bond Permitted. Nothing contained in this Resolution or the 2019 Treatment Plant Local Bond shall affect the obligation of the Borrower to make, or prevent the Borrower from making, payment of the principal of, redemption premium, if any, or interest on the 2019 Treatment Plant Local Bond in accordance with the provisions hereof, except as otherwise provided in this Resolution.

Section 9. Benefits of Resolution. Nothing in this Resolution or the 2019 Treatment Plant Local Bond, express or implied, shall give to any person, other than the holder of the 2019 Treatment Plant Local Bond, any benefit or any legal or equitable right, remedy or claim under this Resolution.

Section 10. Further Action. The Chair, the Vice-Chair, the Secretary and any Assistant Secretary of the Commission and the General Manager, the Director of Engineering and the Director of Finance of the Borrower are authorized and directed (without limitation except as may be expressly set forth therein) 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 effect the transactions contemplated by the 2019 Treatment Plant Financing Agreement Supplement.

Section 11. Effectiveness. This Resolution shall take effect immediately upon its adoption.

[END OF RESOLUTION]

Adopted by the Hampton Roads Sanitation District Commission on October 22, 2019.

Maurice P. Lynch, Vice-Chair

EXHIBIT A

GLOSSARY OF DEFINED TERMS

"2019 Treatment Plant Financing Agreement Supplement" means the Supplement to Master Financing Agreement relating to the 2019 Treatment Plant Local Bond, between the Borrower and the Authority, as Administrator of the Fund, together with any amendments or supplements thereto.

"*2019 Treatment Plant Local Bond*" means the bond in substantially the form attached to this Resolution as Exhibit B, to be issued by the Borrower to the Authority, as Administrator of the Fund, pursuant to this Resolution and the 2019 Treatment Plant Financing Agreement Supplement.

"*2019 Treatment Plant Local Bond Proceeds*" means proceeds of the issuance and sale of the 2019 Treatment Plant Local Bond to the Authority, as Administrator of the Fund, pursuant to the 2019 Treatment Plant Financing Agreement Supplement.

"*Capital Improvement Program Costs*" means "Capital Improvement Program Costs" as defined in the Trust Agreement.

"Financing Agreement" means the Master Financing Agreement, dated as of February 1, 2016, between the Authority, as Administrator of the Fund, and the Borrower, as amended to the date hereof, and as supplemented by the 2019 Treatment Plant Financing Agreement Supplement.

"*General Manager's Certificate*" means the certificate of the General Manager delivered on the date of issue of the 2019 Treatment Plant Local Bond.

"*Junior Indebtedness*" means "Junior Indebtedness," as defined in the Trust Agreement.

"*Net Revenues*" means "Net Revenues" as defined in the Trust Agreement.

"*Parity Obligations*" means "Parity Obligations," as defined in the Trust Agreement.

"*Project*" means the project described in Exhibit B to the 2019 Treatment Plant Financing Agreement Supplement, the costs of the acquisition, construction, improving or equipping of which are to be financed or refinanced in part with the 2019 Treatment Plant Local Bond Proceeds.

"*Project Budget*" means the budget for the financing or the refinancing of the Project, a copy of which is attached to the 2019 Treatment Plant Financing Agreement Supplement as Exhibit C, with such changes therein as may be approved in writing by the Authority.

"*Senior Indebtedness*" means "Senior Indebtedness," as defined in the Trust Agreement.

"*Trust Agreement*" means the Trust Agreement, dated as of October 1, 2011, by and between the Borrower and the Trustee, as amended and restated as of March 1, 2016, as further amended and supplemented.

"*Trustee*" means The Bank of New York Mellon Trust Company, N.A., as trustee under the Trust Agreement, and any successor in trust thereto.

EXHIBIT B

FORM OF LOCAL BOND

United States of America
Commonwealth of Virginia

HAMPTON ROADS SANITATION DISTRICT
Subordinate Wastewater Revenue Bond

Hampton Roads Sanitation District (the "Borrower"), a political subdivision of the Commonwealth of Virginia, by Hampton Roads Sanitation District Commission (the "Commission"), the governing body of the Borrower, acknowledges itself indebted and, for value received, hereby promises to pay, solely from the revenues and other property hereinafter described and pledged to the payment of this Bond, to the order of the Virginia Resources Authority (the "Authority"), as Administrator of the Virginia Water Facilities Revolving Fund, Richmond, Virginia (the "Fund"), the principal amount equal to the sum of the principal disbursements made by the Authority, as Administrator of the Fund, to the Borrower (as shown in Schedule 1) pursuant to the Master Financing Agreement, dated as of February 1, 2016, between the Authority, as Administrator of the Fund, and the Borrower, as amended to the date hereof, and as supplemented by the Supplement to Master Financing Agreement, dated as of _____ 1, 2019 (as so amended and supplemented, the "Financing Agreement") not to exceed _____ Dollars ($_____), together with interest (or "Cost of Funds" as described in the Financing Agreement) on the disbursed principal at the rate of _____% per annum, as follows:

Interest shall be payable on _____ 1, _____, and thereafter principal and interest due under this Bond shall be payable in essentially equal semi-annual installments (rounded to the nearest one hundred dollars ($100)) on _____ 1 and _____ 1 of each year, commencing _____ 1, 20__ (as shown on Schedule 2), provided that if not sooner paid, all amounts under this Bond shall be due and payable in full on _____ 1, 20__.

In addition, if any installment of principal or interest is not received by the holder of this Bond within ten (10) days from its due date, the Borrower shall pay to the holder of this Bond, a late payment charge in an amount equal to five percent (5.00%) per annum on such overdue installment. Both principal and interest are payable in lawful money of the United States.

No notation is required to be made on this Bond of the payment of any principal or interest on normal installment payment dates. HENCE, THE FACE AMOUNT OF THIS BOND MAY EXCEED THE PRINCIPAL SUM REMAINING OUTSTANDING AND DUE HEREUNDER. This Bond and the premium, if any, and the interest thereon are limited obligations of the Borrower and (except to the extent payment with respect to the Bond shall be made from the proceeds from the sale of the Bond or the income, if any, derived from the investment thereof) are payable solely from Net Revenues Available for Debt Service (as defined in the below-mentioned Trust Agreement) from time to time deposited by the Borrower with or to the order of the Authority, as the Administrator of the Fund pursuant to the Resolution (the "Resolution") adopted by the Commission on October 22, 2019, authorizing the issuance of this

Bond, which Net Revenues Available for Debt Service have been pledged pursuant to the Financing Agreement to secure payment hereof. Neither the Commonwealth of Virginia nor any political subdivision thereof, including the Borrower, shall be obligated to pay the principal of or premium, if any, or interest on this Bond or other costs incident thereto except from the revenues pledged therefor, and neither the faith and credit nor the taxing power of the Commonwealth of Virginia or any political subdivision thereof, including the Borrower, is pledged to the payment of the principal of or premium, if any, or interest on this Bond or other costs incident thereto.

This Bond shall be a Parity Obligation and a VRA Subordinate Obligation and secured on parity with all other all Parity Obligations and VRA Subordinate Obligations heretofore and hereafter issued and outstanding under the Trust Agreement, dated as of October 1, 2011, as amended and restated as of March 1, 2016, as further amended and supplemented (the "Trust Agreement"), by and between the Borrower and the predecessor in trust to The Bank of New York Mellon Trust Company, N.A., as trustee (the "Trustee"), and shall be senior to all Junior Indebtedness (as defined in the Trust Agreement), to the extent and in the manner set forth therein.

This Bond is being issued pursuant to the terms of the Resolution and the Financing Agreement to evidence a loan from the Authority, as Administrator of the Fund, to the Borrower to finance Capital Improvement Program Costs (as defined in the Trust Agreement).

This Bond is subject to optional prepayment to the extent and on the terms set forth in the Resolution and the Financing Agreement.

If an Event of Default (as defined in the Financing Agreement) occurs, the principal of and accrued interest on this Bond may be declared immediately due and payable by the holder by written notice to the Borrower.

The obligations of the Borrower under this Bond shall terminate when all amounts due and to become due pursuant to this Bond have been paid in full.

All provisions of this Bond are subject to the terms of the Trust Agreement, and all capitalized terms used herein and not otherwise defined herein shall have the meanings assigned thereto by the Resolution and the Financing Agreement.

All acts, conditions and things required to happen, exist or be performed precedent to and in the issuance of this Bond have happened, exist and have been performed.

IN WITNESS WHEREOF, the Borrower has caused this Bond to be signed by the [Vice-] Chair of its Commission and its seal to be impressed hereon and attested by the Secretary of its Commission all as of _____ __, 2019.

HAMPTON ROADS SANITATION DISTRICT

By: _____
[Vice-] Chair of the Hampton Roads Sanitation District Commission

(SEAL)
ATTEST:

_____
Secretary of the Hampton Roads Sanitation District Commission

Schedule 1

SCHEDULE OF PRINCIPAL DISBURSEMENTS

The amount and date of disbursements of the principal of the Bond to which this Schedule is attached, not to exceed $____________, shall be entered hereon by the authorized representative of Virginia Resources Authority when each such disbursement of principal is made to the Borrower.

Date	Amount	Cumulative Amount	Authorized Signature
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________
____________	$____________	$____________	____________

Schedule 2

AMORTIZATION SCHEDULE

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #5

AGENDA ITEM 7. – Diversity Procurement Report

HRSD DIVERSITY PROCUREMENT REPORT
FISCAL YEAR 2019

PAYMENT TYPE	TOTAL OF ALL PAYMENT TRANSACTIONS[1]				TOTAL PAYMENTS MADE TO SWaM CONTRACTORS COMPARED TO HRSD's TOTAL PAYMENTS	
	ALL BUSINESS TYPES		SMALL, WOMEN-OWNED AND MINORITY-OWNED BUSINESSES (SWaM)			
	NO.	SPEND	NO.	SPEND	NO.	SPEND
OPERATING	5,187	$37,981,982	953	$6,237,482	18%	16%
CORPORATE VISA CARD	30,452	$15,226,230	1,527	$1,038,800	5%	7%
CAPITAL IMPROVEMENT PROGRAM	1,189	$91,815,981	166	$22,255,784 [2]	14%	24%
TOTAL	36,828	$145,024,193	2,646	$29,532,066	7%	20%

[1]Excludes expenses for utilities, rent, easements, municipal expenditures, personal services, professional development, etc.

[2]Includes payments of $5,230,422 made to SWaM subcontractors, as reported by HRSD's prime contractors.

DIVERSITY PROCUREMENT PROGRAM ACTIVITIES

HRSD participated in several outreach opportunities throughout the year including:

- Christopher Newport University SWaM Fair in Newport News, VA
- City of Virginia Beach Minority Business Council Vendor Expo in Virginia Beach, VA
- Commonwealth of Virginia, Department of General Services Forum Expo in Virginia Beach, VA
- The Institute for Public Procurement (NIGP) Products Expo in Nashville, TN
- Virginia American Water Works Association (VA AWWA) and the Virginia Water Environment Association (VWEA) WaterJAM Vendor Expo in Virginia Beach, VA
- WEFTEC in New Orleans, NO
- Virginia Association of Governmental Purchasing Vendor Expo in Virginia Beach, VA
- Virginia Association of State College and University Purchasing Professionals (VASCUUP®) SWaMfest in Harrisonburg, VA

HRSD uses the Virginia Department of Small Business and Supplier Diversity (SBSD) as a resource to identify and locate SWaM businesses for HRSD bid opportunities. SBSD promotes access to the Commonwealth of Virginia's contracting opportunities by providing SWaM businesses a certification program, access to state-wide bid opportunities and other resources.

HRSD is a member of the Carolinas-Virginia Minority Supplier Development Council (CVMSDC). The CVMSDC certifies Minority Business Enterprises (MBEs), serves as a resource for corporations and government agencies searching for qualified suppliers, and sponsors networking and outreach events. The CVMSDC also offers training programs and business assistance for MBEs.

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #6

AGENDA ITEM 16. – Willard Avenue Pump Station Replacement
Acquisition of Real Property located at
218 Downes Street, Hampton, Virginia
Agreement and Map

PURCHASE AND SALE AGREEMENT

THIS PURCHASE AND SALE AGREEMENT (this "Agreement") made this 19th day of September, 2019, by and **JUDITH H. ANDERSON,** hereinafter referred to as Seller, and **HAMPTON ROADS SANITATION DISTRICT**, a political subdivision of the Commonwealth of Virginia ("HRSD"), Purchaser.

RECITALS

A. Seller is the owner in fee simple absolute of a certain parcel of property approximately .13 acres in area (more or less), located at 218 Downes Street in the City of Hampton, such property being more particularly described in Exhibit A which is attached to and made a part of this Agreement (the "Property").

B. HRSD desires to purchase the Property from the Seller for the purpose of the Willard Avenue Pump Station Replacement Project.

C. Seller is willing to sell the Property to HRSD subject to the terms and conditions set forth in this Agreement.

D. These recitals are incorporated by this reference into this Agreement.

NOW, THEREFORE, in consideration of the purchase price and the mutual promises contained in this Agreement, the parties agree as follows:

1. SALE. Seller agrees to sell and HRSD agrees to purchase the Property, together with all rights and appurtenances thereto, including all right, title and interest of Seller in and to any land lying in the bed of any highway, street, road, or avenue, open or proposed, in front of or abutting, or adjoining such tract or piece of land and any riparian rights, if any, and any rights, easements, and appurtenances pertaining thereto, and any building and other property situated thereon, (excluding personal property except to the extent that Seller chooses to leave on premises upon vacation) attached or appurtenant to, located in or on, or used in connection with the real property, if any. The real property and the personal property are called "the Property".

2. PURCHASE PRICE. The purchase price ("Purchase Price") for the Property is **ONE HUNDRED THIRTY-FIVE THOUSAND and 00/100 DOLLARS** ($135,000.00); and shall be paid by HRSD to the Seller at settlement, minus payment required by lien holder.

3. CONVEYANCE.

   a. At the Closing, Seller shall convey title to the Property in fee simple, by general warranty deed, free and clear of any and all

liens, mortgages, deeds of trust, security interests, leases, covenants, conditions, restrictions, easements, rights-of-way, licenses, encroachments, judgments or encumbrances of any kind, except for the following permitted exceptions: (a) the lien of real estate taxes not yet due and payable; (b) zoning and building restrictions and other laws, ordinances, and regulations of governmental bodies having jurisdiction over the Property; and (c) matters of record affecting title to the property, as reviewed and approved (or deemed approved) by HRSD in accordance with this Agreement. Except as expressly stated in this Agreement, the Property shall be conveyed in "AS IS" condition, and with all defects.

b. Title to the Property shall be good and marketable and, if HRSD chooses to obtain title insurance, insurable by a nationally recognized ALTA title insurance company of HRSD's choice at or below normal rates. In the event that a title examination discloses defects of title or other matters unsatisfactory to HRSD, HRSD shall notify Seller in writing (an "Objection Notice"), within 15 days of the Effective Date, of such title defects or other matters to which HRSD objects. Seller covenants that it shall cure all monetary encumbrances and all title objections which may be cured by execution of a document requiring the signature of no party other than Seller (including any affidavits which may reasonably be required by the title insurer). Seller may notify HRSD in writing (an "Objection Response"), within ten (10) business days after receiving an Objection Notice if it believes that the Objection Notice makes reference to any title defect or other matter that Seller cannot or elects not to cure. Upon receipt of an Objection Response from Seller, HRSD shall have the option either to (i) terminate this Agreement by notice to Seller given within ten (10) business days of the Objection Response or (ii) accept the defects, exceptions or other matters referenced in such Objection Response and proceed to Closing hereunder with no reduction of the Purchase Price. Seller shall have the period until the Closing date within which to correct all defects, exceptions or other matters that it is required or elects to cure. Seller shall provide such documents (including evidence of authority), affidavits, and other instruments that may be reasonably required for the issuance of a title insurance policy to HRSD.

c. Possession of the Property will be given to HRSD at Closing, per attached Possession Agreement (attached as Exhibit B) except

that HRSD will have access to the Property for the purposes specified herein.

d. Seller agrees to pay proration of real estate taxes and storm water fees and agrees to deliver possession of the Property to HRSD at settlement, or as per Exhibit B. HRSD will pay all other fees charged in connection with preparation and recordation of the deed, including grantor's tax and other applicable closing costs.

e. Seller and HRSD agree that the attorney selected by HRSD shall act as the Settlement Agent at HRSD's expense. The Settlement Agent shall prepare the settlement statement, update and record the deed, collect and disburse settlement funds in accordance with this Agreement and the settlement statement, and file any required state and federal tax forms or other certifications.

4. RIGHT OF ENTRY. HRSD and HRSD's authorized representatives may at any reasonable time and after giving reasonable notice to Seller, enter upon the Property for the purpose of making inspections, appraisals, surveys, including the cutting of survey lines and putting up markers and driving stubs and stakes, site analysis, engineering studies, core sampling for engineering reports, and locating existing rights of way, easements, and utilities. HRSD will exercise this right of entry in such a way so as to not cause unreasonable damage to the Property. HRSD agrees to indemnify and save harmless the Seller from all claims of liability for any personal injury or property damage or otherwise to any person or property caused by any action or omission of HRSD or its agents on the Property before or after Closing.

5. CONDITIONS PRECEDENT.

a. Seller hereby acknowledges that Buyer is acquiring the property for the purpose of operating twenty-four hours a day a pump station for use and the infrastructure of the HRSD sewage treatment facilities, in accordance with the ordinances of the City of Hampton, and the parties agree that all Conditions Precedent that are relevant to the Buyer must be satisfied within 180 days of the effective date of this Agreement. Should the Conditions Precedent mentioned herein not be satisfied within the 180-day timeframe, Seller may keep the deposit as liquidated damages, and shall have no other remedies should Buyer terminate this Agreement. Accordingly, during the period of 180 days from the date of the full execution of this

Agreement, or as such period may be extended in accordance with the mutual extension agreement of the parties to this Agreement, the parties shall use commercially reasonable efforts to satisfy the following Conditions Precedent: (i) the receipt of satisfactory construction bids and/or cost estimates for Buyer's construction in connection with Buyer's intended use of the property having been obtained which in Buyer's sole opinion makes Buyer's construction and use for its intended use of the property economically feasible; (ii) all permits, licenses, and approvals with conditions acceptable to Buyer required for the construction or installation of Buyer's pump station in accordance with its intended use of the property having been obtained at the expense of Buyer, including without limitation, approvals required under all applicable zoning, environmental, wetlands, subdivision control, sanitary, health, safety and land-use law and regulations of the City of Hampton; (iii) all other operational licenses City and Governmental approvals and conditions acceptable to Buyer required for the completion of construction and operation of the pump station anticipated in accordance with Buyer's intended use; (iv) environmental testing to include wetlands delineation, which reports are satisfactory, in Buyer's sole discretion, to the completion of Buyer's intended use of the property.

b. In the event these initial Conditions Precedent have not been satisfied or waived by Buyer on or before the conclusion of the 180th day from the effective date of this Agreement, this Agreement may be terminated in its entirety by Buyer sending written notice to Seller of the same in accordance with the Notices paragraph in this Agreement (Paragraph 7).

c. This Agreement is contingent on the review and approval of the Hampton Roads Sanitation District Commission and upon such Commission granting authorization to the General Manager to proceed under the terms of this Agreement.

6. REPRESENTATIONS AND WARRANTIES BY SELLER. Seller represents and warrants as of the date of this Agreement and as of the date of Closing that: Seller has the right, title, and authority to enter into this Agreement and to perform its obligations hereunder.

Seller further represents and warrants and shall deliver to HRSD at or prior to the Settlement, an Owner's Affidavit (prepared by HRSD) and all

other documents required by the title company to issue an owner's policy evidencing the following facts:

(i) Other than this Agreement, there are no other contracts for sale or options involving the Property now in effect;

(ii) To the best of Seller's knowledge, no other party has any right, title or interest in the Property; other than deeds of trust or other documents of record.

(iii) There are no unrecorded leases, options, licenses or easements existing in connection with the property to which the Seller has knowledge;

(iv) There are no adverse government notifications or proceedings and there is no pending or threatened litigation or any other potentially adverse claims affecting the property to which the Seller has knowledge.

(v) Foreign Status. Seller is not a foreign corporation, person or entity and is a "United States Corporations, Person or Entity" as such terms is defined in Section 1445 and in Section 7701 (a)(30) of the Internal Revenue Code of 1986, as amended (the "Code") and shall deliver to HRSD at or prior to the Settlement an Affidavit prepared by HRSD evidencing such fact and such other documents as may be required under the Code.

(vi) From and after the date of this Agreement, Seller shall not transfer any interest in, or grant any easements or enter into any contractual agreement or understanding, written or oral, with respect to the Property or any portion thereof or make any changes at all that require recordation and therefore modifications to title, without the prior written consent of HRSD.

7. NOTICES. All notices to the parties hereto will be delivered by hand, via certified mail return receipt requested, or via facsimile and all be deemed effective upon delivery if by hand and upon confirmation of receipt if by other means, to the following address until the address is changed by notice in writing to the other party:

HRSD: Ayanna R. Williams, R.E. Manager
1434 Air Rail Avenue
Virginia Beach, Virginia 23471-0911

Copy to: Conway Sheild, III, Esq.
Jones, Blechman, Woltz & Kelly, P.C.
701 Town Center Drive, Suite 800
Newport News, Virginia 23606

Seller: Judith H. Anderson
218 Downes Street
Hampton, VA 23663

8. CLOSING. Unless this Agreement is terminated pursuant to its terms or by mutual agreement of the parties, Closing will be made at the offices of the Settlement Agent on or about October 25, 2019.

9. SURVIVAL. The provisions contained in this Agreement will be true as of the date of this Agreement and as of the date of Closing.

10. PRORATIONS. All rents, interest, taxes, insurance premiums, utility bills, and fuel oil, if any, will be prorated as of the date of Closing.

11. RISK OF LOSS. All risk of loss or damage to the Property by fire, windstorm, casualty, or other cause is assumed by Seller until Closing. In the event of substantial loss or damage to the Property before Closing, HRSD will have the option of either:

    a. Terminating this Agreement, or

    b. Affirming this Agreement and proceeding to Closing.

12. RIGHT OF FIRST REFUSAL. In the event that HRSD shall determine to sell all or a portion of the property for private development within two (2) years of the Settlement Date, it agrees to notify Seller and give Seller first opportunity to purchase the property on such terms as the parties shall mutually agree. Such notice shall be writing addressed in accordance with the provisions of Section 8 herein or such other address provided to HRSD by the Seller and shall provide Seller with at least thirty (30) calendar days to present HRSD with an offer to purchase the property.

13. BROKERS. Seller and HRSD both represent and warrant to the other that it has not hired, engaged, or consulted with any broker or agent in regard to this transaction.

14. CONDEMNATION. Seller covenants and warrants that Seller has not heretofore received any notice of any condemnation proceeding or other proceeding in the nature of eminent domain in connection with the Property. If prior to Settlement any such proceeding is commenced or any change is made, or proposed to be made, to the current means of ingress and egress to the Property or to the roads or driveways adjoining the Property, or to change such ingress or egress or to change the grade thereof, Seller agrees immediately to notify HRSD thereof. HRSD then shall have the right, at HRSD's option, to terminate this Agreement by giving written notice to Seller within thirty (30) days after receipt of such notice.

15. RELOCATION ASSISTANCE: Buyer agrees to pay Seller $6,000.00 (six thousand dollars and 00/100 cents) within 30 days of signing this Agreement to assist with moving and relocation expenses. The parties acknowledge that this a one-time lump sum payment associated with the purchase of 218 Downes Street. If closing does not occur due to Seller's fault or breach, Seller hereby agrees to refund and return to HRSD the Relocation Assistance paid by HRSD. Upon closing, in accordance with this Agreement, Buyer shall be entitled to retain all funds received as relocation assistance.

16. DEFAULT AND REMEDIES.

a. If the sale and purchase contemplated by this Agreement is not consummated because of Seller's or HRSD's default, the non-defaulting party may elect to:

i Terminate this Agreement;

ii Seek and obtain specific performance of this Agreement; or

iii Pursue all other rights or remedies available at law or in equity, including an action for damages.

b. If either Seller or HRSD defaults under this Agreement, the defaulting party will be liable for any expenses incurred by the non-defaulting party in connection with the enforcement of its rights under this Agreement.

c. These remedies are cumulative and non-exclusive and may be pursued at the option of the non-defaulting party without a requirement of election of remedies.

17. ENTIRE AGREEMENT. This Agreement contains the entire agreement of the parties and will supersede the terms and conditions of all prior written and oral agreements, if any, concerning the matters it covers. The parties acknowledge there are no oral agreements, understandings, representations, or warranties that supplement or explain the terms and conditions contained in this Agreement. This Agreement may not be modified except by an agreement in writing signed by the parties.

18. WAIVER. Failure to insist upon strict compliance with any of the terms, covenants, or conditions hereof will not be deemed a waiver of the term, covenant, or condition, nor will any waiver or relinquishment of any right or power at any one time or more times be deemed a waiver or relinquishment of the right or power at any other time or times.

19. SEVERABILITY. This Agreement will be construed in its entirety and will not be divisible, except that the invalidity or unenforceability of any provision hereof will in no way affect the validity or enforceability of any other provision.

20. CAPTIONS. Captions are used in this Agreement for convenience only and will not be used to interpret this Agreement or any part of it.

21. GOVERNING LAW. This Agreement is to be construed in accordance with the laws of the Commonwealth of Virginia.

22. CHOICE OF FORUM/JURISDICTION. The parties hereby consent to the jurisdiction and venue of the courts of the Commonwealth of Virginia, specifically to the courts of the City of Hampton, Virginia, and to the jurisdiction and venue of the United States District Court for the Eastern District of Virginia in connection with any action, suit, or proceeding arising out of or relating to this Agreement and further waive and agree not to assert in any action, suit, or proceeding brought in the City of Hampton, Virginia, or the Eastern District of Virginia that the parties are not personally subject to the jurisdiction of these courts, that the action, suit, or proceeding is brought in an inconvenient forum or that venue is improper.

23. WAIVER OF TRIAL BY JURY. THE PARTIES WAIVE TRIAL BY JURY IN ANY ACTION, PROCEEDING, OR COUNTERCLAIM BROUGHT BY EITHER PARTY AGAINST THE OTHER ON ANY MATTER WHATSOEVER ARISING OUT OF OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ANY RELATED AGREEMENTS OR INSTRUMENTS AND THE ENFORCEMENT THEREOF, INCLUDING ANY CLAIM OF INJURY OR DAMAGE TO ANY PARTY OR THE PROPERTY OF ANY PARTY.

24. SUCCESSOR/ASSIGNMENT. This Agreement will be binding upon and the obligations and benefits hereof will accrue to the parties hereto, their heirs, personal representatives, successors, and assigns. This Agreement is assignable by HRSD only upon written consent of the Seller, which consent will not be unreasonably withheld. If this Agreement is assigned by HRSD with Seller's consent, HRSD will nevertheless remain fully liable for its performance.

25. COUNTERPARTS. This Agreement may be executed in any number of counterparts, each will be considered an original, and together they will constitute one Agreement.

26. FACSIMILE SIGNATURES. Facsimile signatures will be considered original signatures for the purpose of execution and enforcement of the rights delineated in this Agreement.

[SIGNATURE PAGES TO FOLLOW]

SELLER:

Judith H. Anderson *(signature)*

COMMONWEALTH OF VIRGINIA
CITY OF Hampton, to-wit:

I, Marina L. Evans, a Notary Public in and for the City of Hampton, in the Commonwealth of Virginia, whose term of office expires on March 31, 2021, do hereby certify that Judith H. Anderson, Seller herein, whose name is signed to the foregoing Purchase and Sale Agreement, has acknowledged the same before me in my City and State aforesaid.

Given under my hand this 19 day of September, 2019.

Notary Public

My Commission Expires: 3/31/21

Registration Number: 7569657

MARINA LYNNE EVANS NOTARY PUBLIC COMMONWEALTH OF VIRGINIA My Comm. Expires 3/31/21 No. 7569657

IN WITNESS WHEREOF, the Hampton Roads Sanitation District Commission has caused this Agreement to be signed on its behalf by its General Manager in accordance with authorization granted at its regular meeting held on October 22, 2019. This Agreement is expressly subject to approval by the HRSD Commission.

HAMPTON ROADS SANITATION DISTRICT

By: _____
Edward G. Henifin, P.E.
General Manager

COMMONWEALTH OF VIRGINIA
CITY OF VIRGINIA BEACH, to-wit:

The foregoing Purchase and Sale Agreement was acknowledged before me this 28th day of October, 2019, by Edward G. Henifin, P.E., General Manager, Hampton Roads Sanitation District.

_____
Notary Public

My Commission Expires: 08/31/2022

Registration No.: 361710

JENNIFER LYNN CASCIO
NOTARY PUBLIC - REG. #361710
COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES AUGUST 31, 2022

Exhibit "A"

Formal Legal Description

ALL THAT certain lot, piece or parcel of land, situate and being in the City of Hampton, Virginia fronting on Downes Street (formerly Armistead Street, Phoebus, Virginia); a distance of 53'3" and running back therefrom between parallel lines 106' more or less and being the southerly one-half of the lot mentioned as Lot Number B in a certain deed of partition dated January 5, 1905, and of record in Deed Book 14, page 5, in the Clerk's Office of the Circuit Court for the City of Hampton, Virginia.

Together with all and singular the buildings and improvements thereon the tenements hereditaments and appurtenances thereunto belonging or in anywise appertaining.

IT BEING the same property conveyed to Judith Anderson, now known as Judith Anderson Hill, by deed from Steven A. Anderson, dated 10-30-95, recorded 11-14-95 in Book 1157, page 1207, in the Clerk's Office of the Circuit Court of Hampton City County, VA.

Exhibit "B"

Post-Closing Agreement

POST-CLOSING POSSESSION AGREEMENT

PURCHASER: **HAMPTON ROADS SANITATION DISTRICT (HRSD),** a political subdivision of the Commonwealth of Virginia

SELLER: **JUDITH H. ANDERSON**

PROPERTY: 218 Downes Street, Hampton, VA 23663

DATES OF POSSESSION: October 25, 2019 to October 31, 2019

WHEREAS, the Seller has entered into a Contract for the purchase of the above captioned property from the Purchaser, which contract is dated September 19, 2019; and

WHEREAS, the Seller wishes to possess and occupy the property after the closing date; October 25, 2019.

NOW, THEREFORE, in consideration of mutual promises, the parties agree as follows:

1. During the Dates of Possession, October 25, 2019 to October 31, 2019, Seller may occupy the property at the rate of $ 0.00 per day.
2. The Seller agrees to procure and maintain in effect, prior to entering into possession, a policy or policies of insurance adequately covering the subject property satisfactory to Purchaser and insuring against fire and any casualty and/or public liability which may arise out of or by virtue of the use and occupancy of the subject property by the Seller.
3. The Seller hereby agrees to indemnify and hold the Purchaser harmless from any and all claims, demands, action, causes of action, damages, expenses, losses, attorney's fees or liabilities arising in any way from or out of this occupancy, use or enjoyment of the subject property after closing.
4. The Seller accepts the subject property "as is" as of the Date of Possession, and will take no action to damage the property during Seller's tenancy. If damage occurs to the property, or any deterioration which is beyond reasonable wear and tear, the Seller shall remediate the property immediately, at his expense.
5. Should Seller maintain possession, or not turn possession over to Purchaser on or before November 1, 2019, Seller owes Purchaser $50.00 per day for rent. Further should Seller not vacate the premises by November 30, 2019, Seller agrees to be responsible for the expenses of Purchaser in any legal

proceedings to evict Seller from premises, to include attorney's fees and costs.

6. The Seller agrees to pay all expenses in connection with his occupancy of the subject property, including, but not limited to, utilities and fuel during possession.
7. This agreement may be executed in counterparts.

IN WITNESS WHEREOF, the parties have caused their hands and seals to be affixed this 25th day of Oct., 2019.

Purchaser: HAMPTON ROADS SANITATION DISTRICT

By: Ayanna R. Williams

Ayanna R. Williams, SR/WA
Real Estate Manager, HRSD

Seller:

Judith H. Anderson

Legend

- Parcels
- Lot Lines
- Boundary

Feet

0 50 100 150 200

Map Scale: 1:2,257

Title: 218 Downes Street, Hampton, VA **Date: 10/7/2019**

DISCLAIMER:This drawing is neither a legally recorded map nor a survey and is not intended to be used as such. The information displayed is a compilation of records,information, and data obtained from various sources, and Hampton is not responsible for its accuracy or how current it may be.

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #7

AGENDA ITEM 17. – Capital Improvement Program Quarterly Update presentation

HRSD

Cleaning wastewater every day for a better Bay.

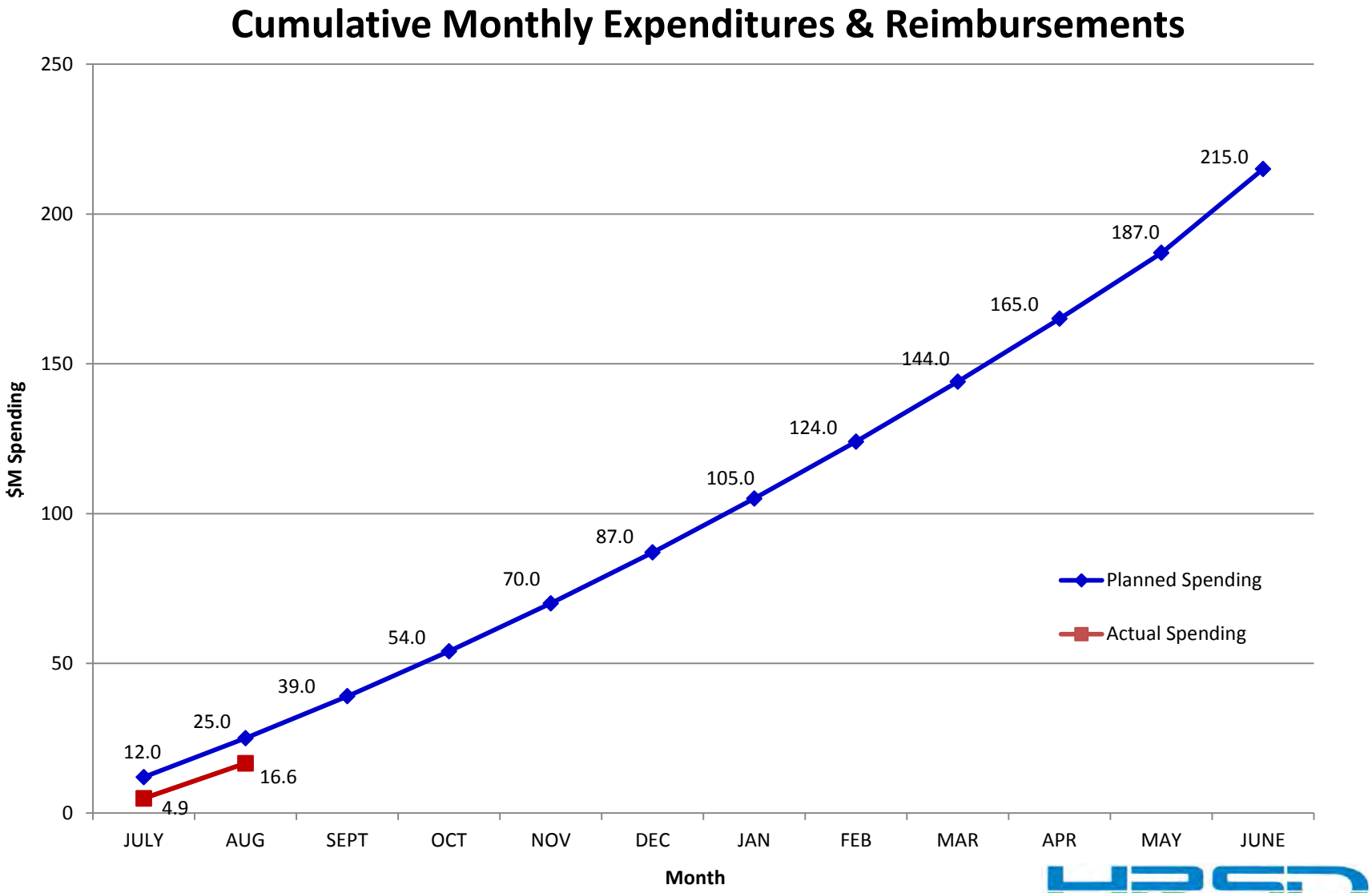
Capital Improvement Program Commission Briefing

October 22, 2019

Outline

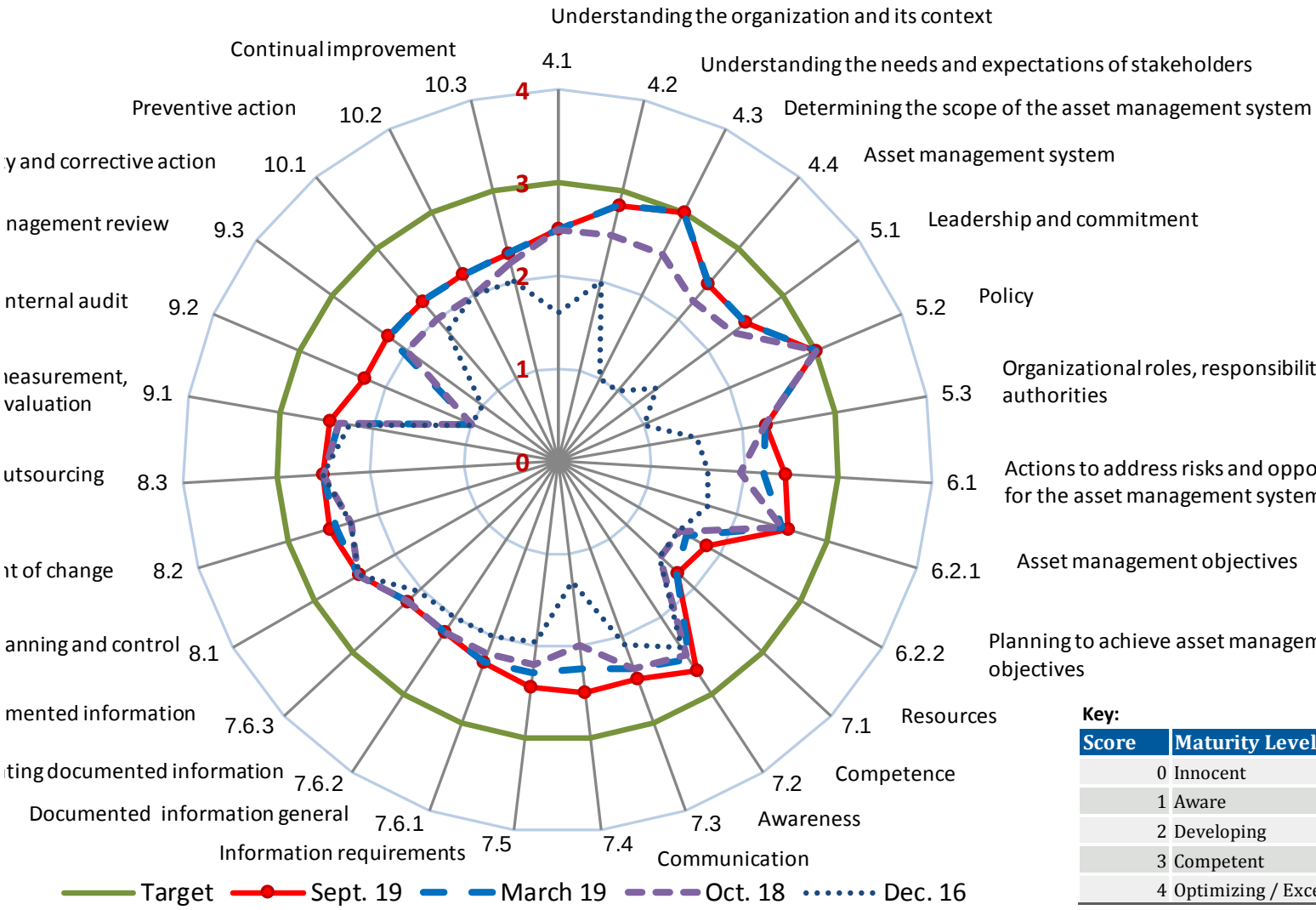
- CIP Expenditures for FY-2020
- Asset Management Program Update
- Consent Decree/Sewer Rehabilitation Plan – Project Status
- Significant Project Updates
- Focus:
  - Capital Project Budgeting

CIP Expenditures for FY-2020



Asset Management Program Roadmap

ISO 55001 Asset Management Maturity Score



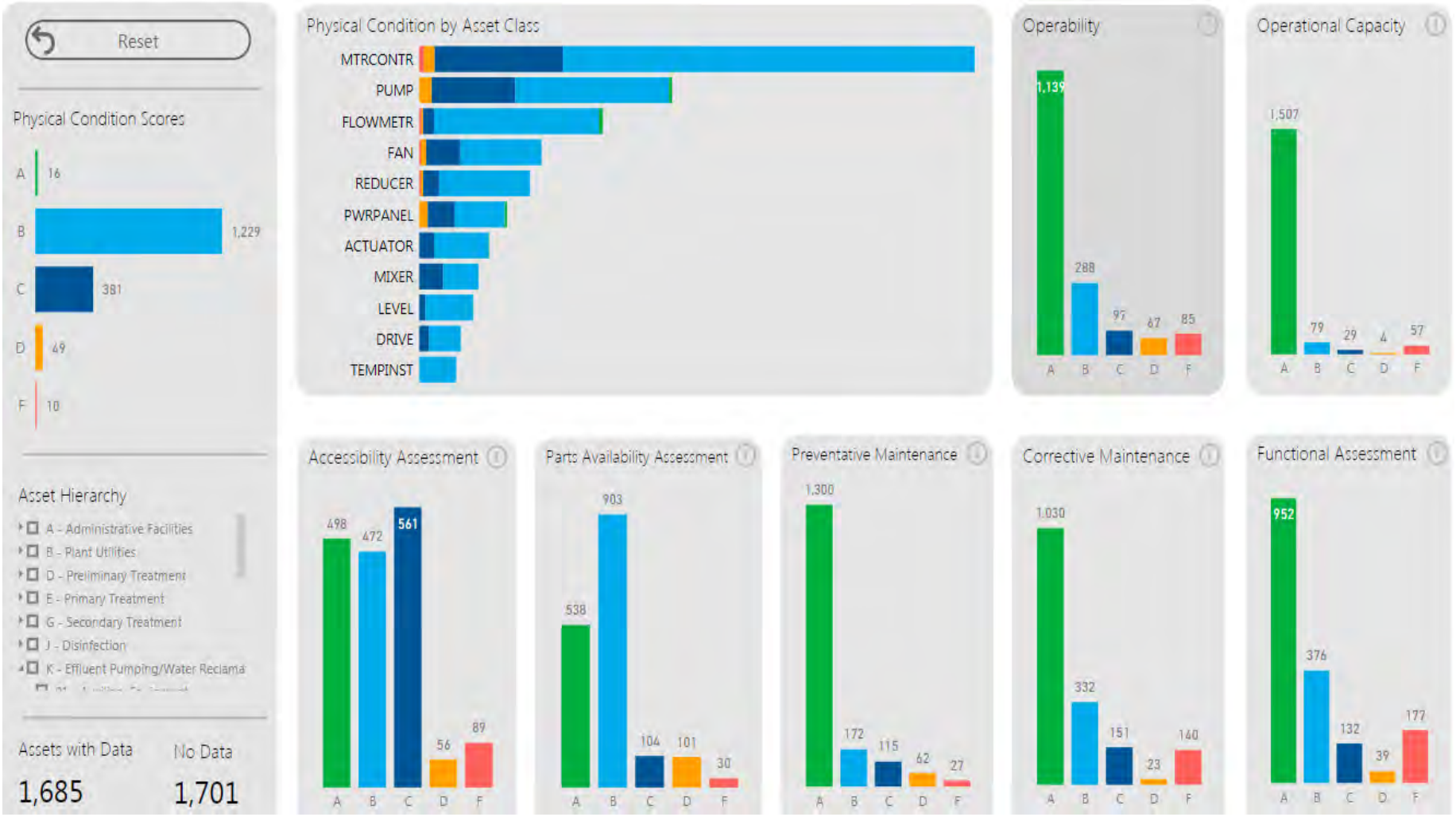
Key:

Score	Maturity Level
0	Innocent
1	Aware
2	Developing
3	Competent
4	Optimizing / Excellent

Progress April 2019 to September 2019

- Completed development of condition assessment manual for treatment plants
- Completed the asset inventory and condition assessment at the Atlantic Treatment Plant (ATP) and commenced survey at James River Treatment Plant
- Developed treatment plant and interceptor system asset risk assessment criteria
- Treatment plant Key Performance Indicators (KPIs) have been developed

ATP Condition Assessment Summary



ATP Replacement Methodology Comparison

Reset

Select Asset Class

All

Select Installation Year Range

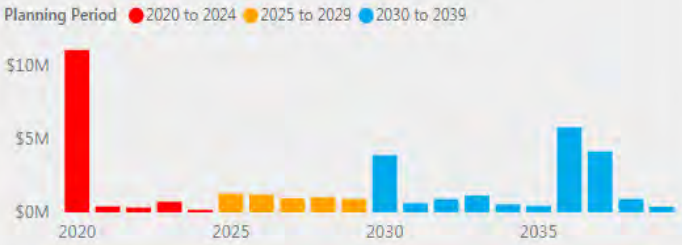
2020 2039

Asset Hierarchy

- A - Administrative Facilities
- B - Plant Utilities
- D - Preliminary Treatment
- E - Primary Treatment
- G - Secondary Treatment
- I - Disinfection
- K - Effluent Pumping/Water Reclamatio
- L - Scum Disposal
- M - Biosolids Thickening
- N - Biosolids Anaerobic Digestion
- P - Biosolids Storage
- Q - Biosolids Dewatering
- T - Biosolids Land Application
- U - Odor Control

Chronological Age-Based Replacement

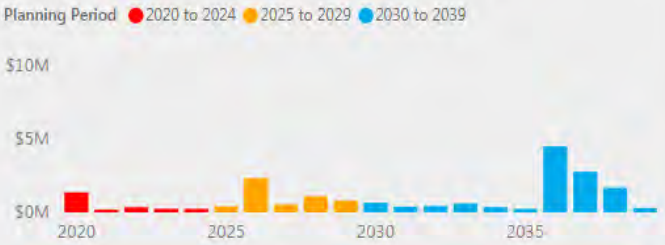
Planned Replacement Cost by Planning Period (2019 $)



Percent of Useful Life Category (Chronological)	Count of Assets	Replacement Value
Less than 5%	492	$15,817,858
5 to 50%	783	$6,771,844
50 to 75%	538	$2,633,578
75 to 90%	265	$1,439,866
More than 90%	1,308	$20,669,466
Total	**3,386**	**$47,332,612**

Effective Age (Modified) Replacement

Planned Replacement Cost by Planning Period (2019 $)



Percent of Useful Life Category (Effective)	Count of Assets	Replacement Value
Less than 5%	581	$17,674,899
5 to 50%	1,973	$21,107,206
50 to 75%	230	$3,811,724
75 to 90%	100	$1,472,281
More than 90%	502	$3,266,502
Total	**3,386**	**$47,332,612**

Cumulative Replacement Cost

NPV Summary

Chronological Age-Based

$38.7M

Effective Age-Based

$13.9M

NPV Savings

$24.8M

Plan for Next 6 Months

- Complete Treatment Plant Asset Replacement Planning Model
  - Incorporate Consequence of Failure scores which would further flatten the replacement expenditures and help prioritize.
- Complete implementation of enhanced capital prioritization process for CIP projects
- Role out Asset Management Plans for three treatment plants (York River, Williamsburg and Boat Harbor)

Consent Decree/Sewer Rehabilitation Plan – Project Updates

- Consent Decree Condition Assessment Program (CAP) identified condition defects in the regional sanitary sewer system.
- EPA/VDEQ approved the Rehabilitation Action Plan (RAP) in May 2015.
- RAP addresses improvements to gravity mains, force mains, pump stations and associated system compounds.
- RAP will be implemented in three phases:
  - Phase 0 (June 2017)
  - Phase 1 (May 2021)
  - Phase 2 (May 2025)

Consent Decree/Sewer Rehabilitation Plan – Project Updates

Phase 0

CIP	Project Name	Project Status	Total CIP Cost
GN014300	North Shore Operations Unvented High Spot Correction	Complete	$945,486
VP012100	State Street Pump Station Electrical Modifications	Complete	$2,158,629

Consent Decree/Sewer Rehabilitation Plan – Project Updates

Phase 1

CIP	Project Name	Project Status	Total CIP Cost
BH012700	Hampton Trunk Sewer Extension Division B - Claremont Force Main Replacement	Complete	$4,715,273
BH014700	Boat Harbor Outlet Sewer Improvements	Design	$6,520,791
BH014800	Jefferson Avenue Extension Gravity Improvements	**Construction**	$3,067,392
BH015000	Orcutt Avenue and Mercury Blvd Gravity Sewer Improvements	Construction	$9,452,686
CE010400	Independence Boulevard Pressure Reducing Station Modifications	Construction	$4,127,452
CE011700	Western Trunk Force Main Replacement	Design	$4,286,000
GN011700	Pump Station Generators and Standby Pump Upgrades	**Construction**	$7,106,000
GN012130	Manhole Rehabilitation-Replacement Phase I and North Shore Siphon Chamber Rehabilitation Phase I	Construction	$10,853,969
GN012140	Pump Station Wet Well Rehabilitation Phase I	Construction	$3,519,659
GN015100	Arctic Avenue Pump Station and Newtown Road Pump Station Electrical Improvements	Complete	$364,708
JR012100	Huxley to Middle Ground Force Main Extension	Construction	$5,185,885
NP011300	Suffolk Interceptor Force Main Section I Main Line Valving Replacement	Design	$1,060,000
NP012600	Deep Creek Interceptor Force Main Replacement	Design	$6,233,000
VP014010	Ferebee Avenue Pump Station Replacement	Design	$5,852,747
WB012200	North Trunk Force Main Part B Replacement	Construction	$2,004,539

Consent Decree/Sewer Rehabilitation Plan – Project Updates

Phase 2

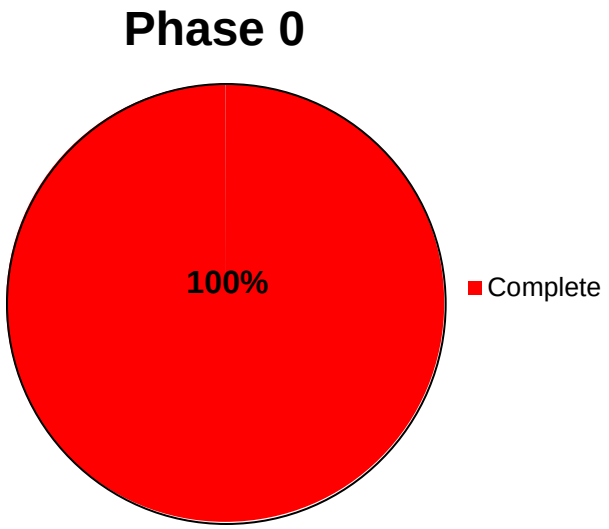
CIP	Project Name	Project Status	Total CIP Cost
AB010000	Army Base 24-Inch and 20-Inch Transmission Main Replacements	Design	$27,343,000
AT011510	Shipps Corner Interim Pressure Reducing Station	Complete	$3,606,738
AT011520	Shipps Corner Pressure Reducing Station Modifications	Proposed	$1,794,131
AT011900	Great Bridge Interceptor Extension 16-Inch Replacement	Proposed	$5,472,744
AT013000	Washington District Pump Station Area Sanitary Sewer Improvements	**Design**	$2,496,266
AT013100	South Norfolk Area Gravity Sewer Improvements	Proposed	$6,666,942
AT013200	Doziers Corner Pump Station and Washington District Pump Station Flooding Mitigation Improvements	Proposed	$314,358
BH014000	West Avenue and 35th Street Interceptor Force Main Replacement	Proposed	$4,404,011
BH014500	Ivy Home-Shell Road Sewer Extension Division I Replacement	Design	$2,243,200
BH014600	46th Street Diversion Sewer Rehabilitation Replacement	Design	$11,470,682
BH014900	Hampton Trunk Sewer Extension Division K Gravity Improvements	Design	$4,644,400
BH015100	Bloxoms Corner Force Main Replacement	Proposed	$3,495,808
CE011300	Birchwood Trunk 24-Inch 30-Inch Force Main at Independence Boulevard Replacement Phase II	Proposed	$1,686,224
CE011600	Poplar Hall Davis Corner Trunk 24-Inch Gravity Sewer Improvements	Proposed	$2,178,815
CE012000	Poplar Hall Davis Corner Trunk 24-Inch Gravity Sewer Improvements (I-264 VDOT Betterment)	Complete	$111,320
GN010730	Horizontal Valve Replacement Phase III	Proposed	$1,189,650

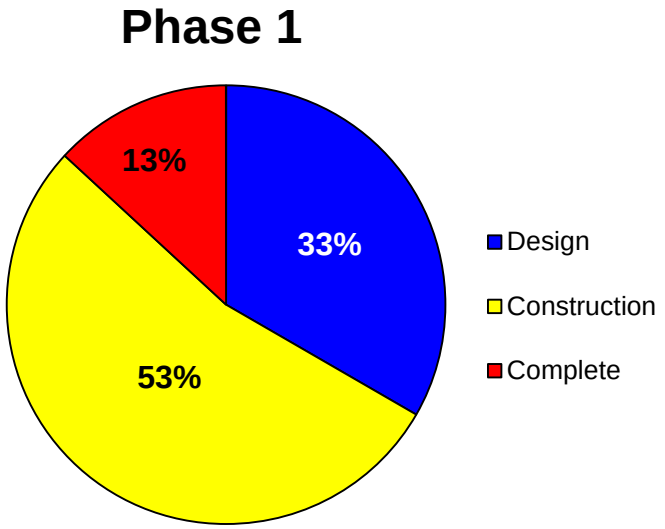
Consent Decree/Sewer Rehabilitation Plan – Project Updates

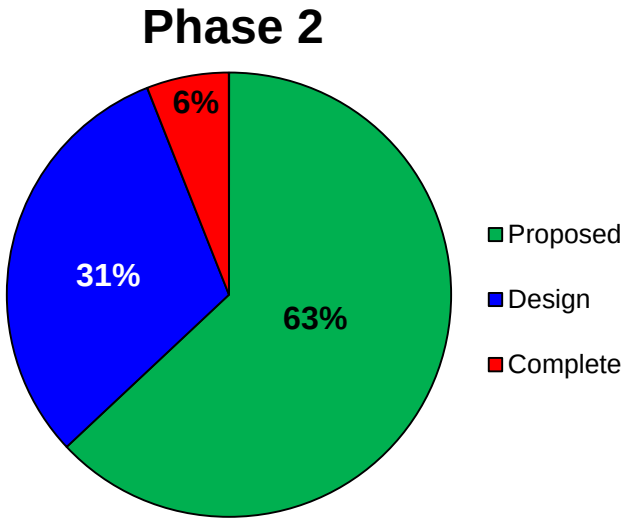
Phase 2 (cont.)

CIP	Project Name	Project Status	Total CIP Cost
GN014900	North Shore Gravity Sewer Improvements Phase I	Proposed	$5,639,906
GN015000	South Shore Gravity Sewer Improvements Phase I	Proposed	$913,381
GN015300	Interceptor System Valve Improvements Phase I	Proposed	$3,256,743
GN015400	South Shore Aerial Crossing Improvements	Proposed	$326,604
JR010600	Lucas Creek Pump Station Upgrade	Design	$2,595,000
NP010620	Suffolk Pump Station Replacement	Design	$12,049,000
NP012400	Western Branch Sewer System Gravity Improvements	Proposed	$3,404,552
NP012500	Shingle Creek and Hickman's Branch Gravity Sewer Improvements	Design	$9,089,000
VP010920	Norview Estabrook Division I 18-Inch Force Main Replacement Phase II, Section 2	Proposed	$1,719,631
VP014020	Sanitary Sewer Project 1950 12 Inch Force Main and 24 and 18 Inch Gravity Replacement	Design	$5,852,747
VP014700	Ingleside Road Pump Station Replacement	Proposed	$3,810,449
VP014800	Lee Avenue-Wesley Street Horizontal Valve Replacement	Proposed	$1,109,112
VP015320	Larchmont Area Sanitary Sewer Improvements	Proposed	$16,752,950
VP015400	Lafayette Norview-Estabrook Pump Station Replacements	Design	$18,495,895
VP016500	Norview-Estabrook Division I 12-Inch Force Main Replacement	Proposed	$2,490,879
VP016700	Norview-Estabrook Division I 18-Inch Force Main Replacement Phase III	Proposed	$3,061,233
VP017100	Central Norfolk Area Gravity Sewer Improvements	Proposed	$3,094,144
VP018000	Park Avenue Pump Station Replacement	Design	$5,955,271
YR010300	Foxridge Sanitary Sewer System Sections 1, 4 & 5 Gravity and Woodland Road Fox Hill Road Gravity Sewer Rehabilitation	Proposed	$3,816,116
			$260,118,575

Consent Decree/Sewer Rehabilitation Plan – Project Updates







Atlantic Treatment Plant Thermal Hydrolysis Process and FOG Receiving Station

Engineers:
HDR Engineering, Inc. / Brown & Caldwell

Construction Manager:
Crowder Construction Company

Schedule Completion:
October 2020

Project Value: $67.2M

Funding:
HRSD Revenue Bond
VRLF Loan

Providence Road Offline Storage Facility

Engineers:
Kimley Horn / RK&K

Design-Build Team:
- Crowder Construction
- Hazen & Sawyer

Schedule Completion:
February 2021

Project Value: $32.0M

Funding:
HRSD Revenue Bond

Water Quality Services Building – Phase II

Engineer:
Guernsey Tingle

Design-Build Team:
- Henderson, Inc.
- DJG, Inc.

Schedule Completion:
August 2020

Project Value: $20.2M

Funding:
HRSD Revenue Bond

Capital Project Budgeting Process

- Initial Scope, Budget and Schedule for Project
  - Reviewed by Internal Staff
  - Reviewed by HRSD Leadership Team (Each March)
  - Reviewed by HRSD Commission (Each May)
- Projects Updated Each Fiscal Year

19

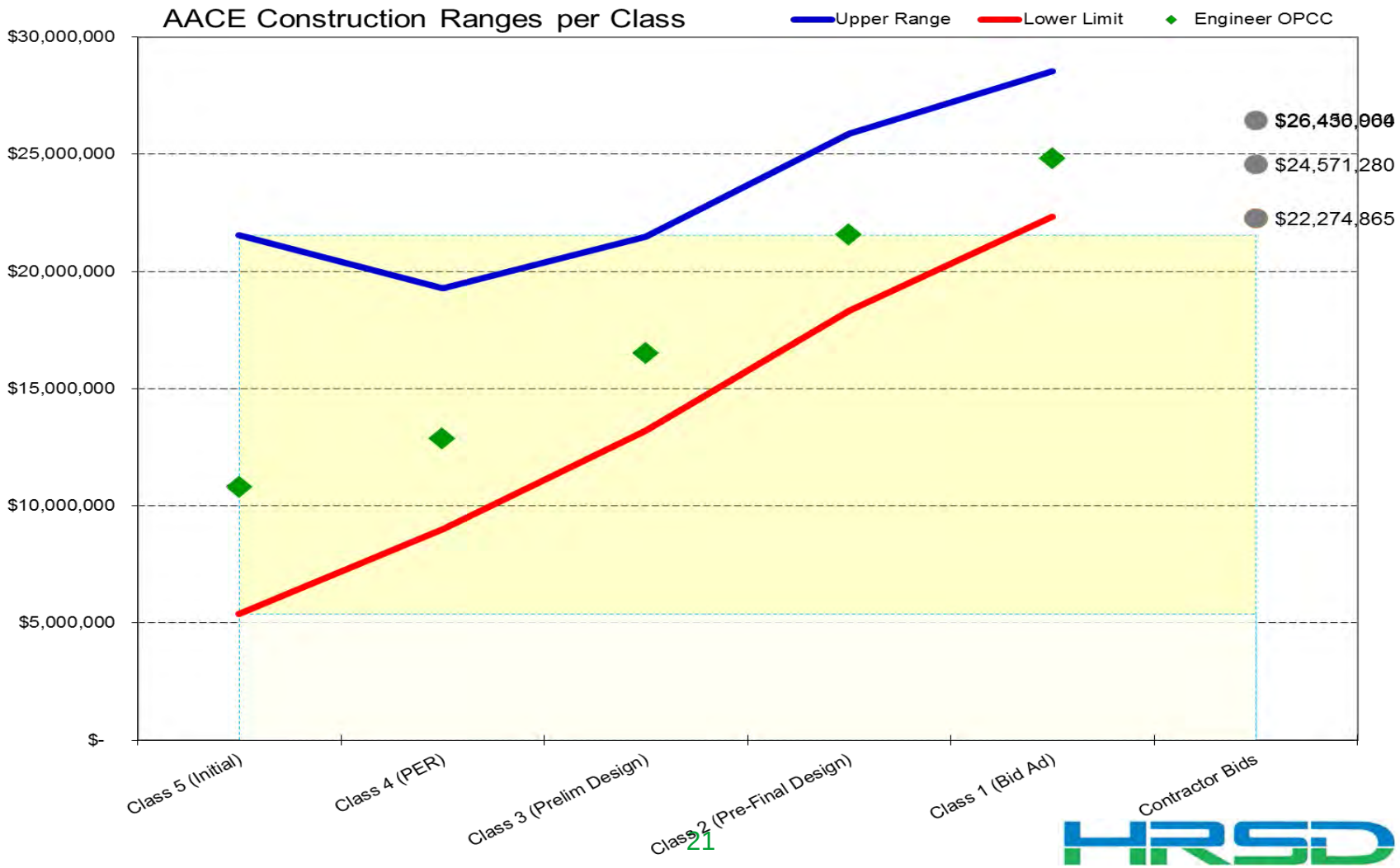
Capital Project Budgeting - Cost Estimating

Estimate Class	Level of Project Definition	Expected Accuracy*	Project Status
Class 5	0-5%	-50% to +100%	Initial CIP
Class 4	5-15%	-30% to +50%	Feasibility Study
Class 3	~30%	-15% to +30%	PER
Class 2	60%	-10% to +20%	60% Design
Class 1	90-100%	-5% to +15%	Final Design

*Association for the Advancement of Cost Engineering (AACE)

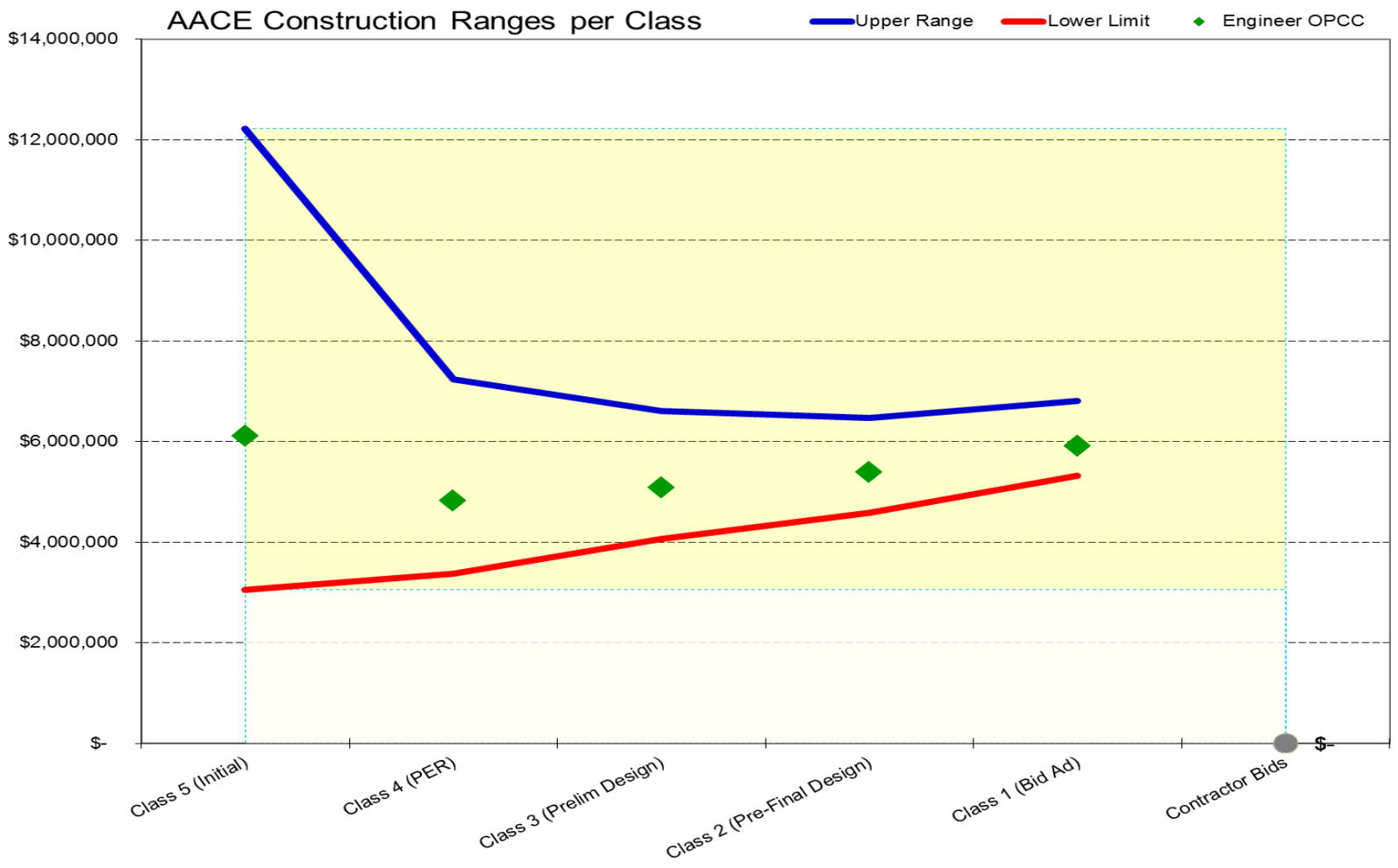
Capital Project Budgeting - Project Examples

CE011823 – Virginia Beach Blvd FM Replacement



Capital Project Budgeting - Project Examples

CE011821 – Elbow Road PRS



Capital Project Budgeting – Design-Build

- Selection of Design-Build Team
  - HRSD Provides Bridging Documents (PER Level)
  - Class 3 Accuracy (-15% to +30%)
  - Construction Cost Limit (CCL)
- Final Approval of Design-Build Team Scope, Fee & Schedule (60-70% Design Level)
- Class 2 Accuracy (-10% to +20%)
- Fixed Price (Off Ramp Option)

Questions?

HRSD COMMISSION MEETING MINUTES
OCTOBER 22, 2019

ATTACHMENT #8

AGENDA ITEM 22. – 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

b. Strategic Planning Metrics Summary

c. Effluent Summary

d. Air Summary

October 15, 2019

Re: General Manager's Report

Dear Commissioners:

September started off with two potential disasters, one natural and the other man-made. Hurricane Dorian provided a great opportunity to exercise our hurricane preparedness planning as it threatened the mid-Atlantic as the month began. Thankfully we were spared any significant impact and will apply the lessons learned from our preparations to revise our hurricane plan in the future.

The potential man-made disaster was the Virginia Watershed Implementation Plan (WIP) III. The plan, as submitted to US EPA, failed to acknowledge SWIFT and did not include HRSD among the utilities in the Commonwealth that would get relief from onerous concentration limits for nitrogen and phosphorus; limits that would produce negligible, if any, environmental benefits. Commissioner Ward and I met with the Secretary of Natural Resources, the Deputy Secretary and the Governor's Chief of Staff to discuss our concerns. As a result, we did receive a letter that committed the Commonwealth to include nutrient trading in the regulatory process required to implement the WIP III initiatives as well as reiterated support for SWIFT. We will need to remain diligent throughout the regulatory process to protect HRSD's interest in cost effective and equitable solutions to restore the Chesapeake Bay. The regulatory process will begin soon and while the Secretary's letter provides some assurance, the regulatory process can be messy and the results unpredictable. Staff will be vigilant throughout the process and keep you updated as details evolve.

The highlights of September's activities are detailed in the attached monthly reports.

A. **Treatment Compliance and System Operations:** 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. A meeting to review additional graphics for the SWIFT Research Center
2. Several calls to review development and implementation of an employee survey

3. Several preparation calls (virtual emergency operations center) in anticipation of Hurricane Dorian
4. A meeting to discuss a request for a hearing by an industrial waste discharge permit holder
5. One length of service recognition breakfast
6. A review of the Nansemond Treatment Plant shoreline stabilization project
7. The kick-off for a "smart sewer" study focused on reducing or eliminating storage required by routing flow to the Atlantic Treatment Plant upon closure of the Chesapeake-Elizabeth Treatment Plant
8. The introductory briefing by the new organizational development consultants

C. **External Communications:** I participated in the following meetings/activities:

1. Meeting with the Secretary of Natural Resources and Commissioner Ward regarding WIP III
2. Multiple calls with the Stormwater Taskforce of the US EPA Environmental Financial Advisory Board (EFAB)
3. The first meeting of the Potomac Aquifer Recharge Oversight Committee
4. A meeting with Doug Powell, General Manager of the James City Service Authority to discuss billing changes and groundwater modeling
5. Participated on a panel at the 34th Annual WateReuse Symposium where HRSD's SWIFT Research Center received an award
6. Presented SWIFT at a Managed Aquifer Recharge symposium at the University of California, Berkeley School of Law's Center for Law, Energy and the Environment (CLEE). CLEE prepared an excellent case study of SWIFT.
7. Participated on a panel, facilitated the One Water Council and served SWIFT Water at the US Water Alliance's One Water Summit
8. Presented to the Utility Management Committee, facilitated the Public Official's Forum and attended numerous technical sessions at WEFTEC
9. A meeting of the Water Agency Leaders Alliance focused on workforce development issues
10. A meeting of the US Water Alliance's One Water Council
11. Several conference calls to prepare for a keynote presentation at the ESRI Water Summit

D. **Consent Decree Update:**

No response has been received from EPA on the technical memorandum submitted in August with the analysis of the impact of a second set of high priority wet weather projects to be executed between 2030 and 2040.

Staff is preparing the annual report to be submitted by November 1, 2019 as required by the Consent Decree.

November 1, 2019 will mark my 13th anniversary with HRSD. There will be a closed session next week to discuss my performance. I will be sending a self-evaluation via a separate email for your use in this process. I look forward to your feedback.

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, October 22, 2019 in Newport News**.

Respectfully submitted,

Ted Henifin

Ted Henifin, P.E.
General Manager

Case Study: Sustainable Water Initiative for Tomorrow (SWIFT)

Incentivizing Groundwater Recharge

Case Study #10

Working Draft

September 3, 2019

Center for Law, Energy, and the Environment
UC Berkeley School of Law

This case study is part of a series focusing on incentives for Managed Aquifer Recharge, and the institutional context in which MAR projects are conducted. The series is being produced as part of a larger project examining this topic. A symposium on September 10, 2019 will highlight these and other projects. More information is available at law.berkeley.edu/recharge2019.

This working draft has not been finalized for publication. Please contact the authors if you would like to circulate or cite this piece.

Funding for this project is provided by Nestlé Waters North America.

Contact: kiparsky@berkeley.edu

BerkeleyLaw
UNIVERSITY OF CALIFORNIA

Center for Law, Energy & the Environment

Sustainable Water Initiative for Tomorrow (SWIFT)

Incentivizing Groundwater Recharge – Case Study #10

Nell Green Nylen

Overview

Location: Hampton Roads Sanitation District, Virginia
Motivation for MAR: Meeting current and future wastewater effluent limitations for nutrients; insulation from uncertainty surrounding future surface water quality standards; regional groundwater overdraft
Groundwater Challenges: Declining aquifer pressure; hydraulic gradient reversal; land subsidence; saltwater intrusion
MAR Challenges: Compatibility of recharge water with native groundwater and aquifer materials; lack of state authority over underground injection
Project Goals: Recharge approximately 100 MGD (million gallons per day)
Key Actor(s): Hampton Roads Sanitation District (HRSD); United States Environmental Protection Agency (EPA); Virginia Department of Environmental Quality (VDEQ); Virginia Department of Health (VDH); Potomac Aquifer Recharge Oversight Committee
Water Source: SWIFT Water (municipal wastewater receiving advanced treatment to meet drinking water standards)
Start Date: 2014 for analysis and pre-planning; 2016 for room-scale treatment process pilots; 2018 for recharge at 1 MGD demonstration facility
Current Status: Demonstration and planning for full-scale implementation
Average Yield: Up to 1 MGD at demonstration facility; ~100 MGD expected at full scale
Cost: $1.1 billion estimated for full-scale construction; $21 to $43 million estimated for full-scale annual operating costs

Figure 1. HRSD's service area, showing the locations of wastewater treatment plants with planned SWIFT facilities (1–5), with planned conveyance of service flows to a nearby plant with a planned SWIFT facility (3b), and with planned conveyance of secondary treated effluent to a nearby SWIFT facility (4b).

1. Motivation and Goals

Hampton Roads Sanitation District (HRSD) is pursuing the Sustainable Water Initiative for Tomorrow (SWIFT), an innovative, multi-benefit program designed to address both nutrient pollution in the Chesapeake Bay watershed and groundwater overdraft in Virginia's Coastal

Plain. At full-scale implementation, HRSD intends to recharge approximately 100 million gallons per day (MGD) of municipal wastewater that has been treated to meet drinking water standards) at five of its wastewater treatment plants in the Chesapeake Bay watershed. This recharged will increase regional aquifer pressures and combat hydraulic gradient reversal, aquifer compaction and related land subsidence, and saltwater intrusion. HRSD expects the SWIFT program to reduce the nutrient loads discharged from the five plants by approximately 90%, enabling it to meet its own mandated nutrient limits while also generating nutrient credits it can trade to other dischargers.

2. Geographic, Historical, and Regulatory Context

2.1. *Creation of HRSD*

In 1940, Hampton Roads area voters approved a referendum establishing HRSD to address regional water pollution caused by the routine discharge of untreated sewage in area waters.[2] Today, HRSD provides regional sanitary sewer conveyance (primarily interceptor mains) and wastewater treatment for approximately 1.7 million people in 18 counties and cities, spanning much of Virginia's Coastal Plain (see Figures 1 and 2). It operates nine major wastewater treatment plants and seven smaller plants with a combined capacity of 249 MGD that collectively treat an average of 150 MGD.[3] HRSD is governed by an eight-member governor-appointed commission that independently sets its rates.[4]

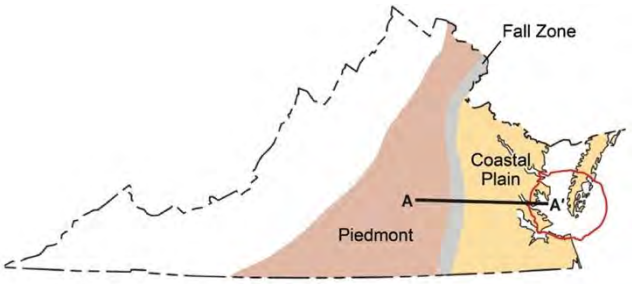


Figure 2. Physiographic provinces in Eastern Virginia, showing the location of the cross section in Figure 3. Red outline indicates the outer edge of the Chesapeake Bay Impact Crater. Modified from McFarland (2015).[1]

2.2. *HRSD and Surface Water Regulation Under the Federal Clean Water Act*

Discharges by wastewater treatment plants to waters of the United States require a permit under the federal Clean Water Act.[5] EPA has delegated primary permitting responsibilities to many states, including Virginia.[6]

2.2.1. Chesapeake Bay Nutrient Regulation

Much of HRSD's service area is located within the Chesapeake Bay watershed, a 64,000 square-mile area that includes parts of Virginia, West Virginia, Maryland, Delaware, Pennsylvania, and New York and the entire District of Columbia.[7]

Nutrient pollution from agricultural and urban sources has degraded the Chesapeake Bay's ecosystems, negatively impacting fisheries and human health[8] and leading state and federal regulators to require significant dischargers to reduce their nutrient discharges over time. Virginia's State Water Control Board first assigned nutrient allocations in 2005.[9] In 2010, the

United States Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL), which established more restrictive watershed-wide and finer scale limits on discharges of nitrogen, phosphorus, and sediment.[10] The Virginia Department of Environmental Quality (VDEQ) is implementing the TMDL in part through a watershed-based Virginia Pollutant Discharge Elimination System General Permit[11] that includes waste load allocations for HRSD's wastewater treatment plants and for other significant Virginia dischargers.[12] Permittees can generate nutrient credits if they discharge an annual mass load that is less than their assigned waste load allocation and may trade these credits to other permittees.[13] Dischargers were required to meet interim loads by 2017 and must meet final loads by 2025.[14]

Since 2007, HRSD has been phasing in nutrient removal technologies at its treatment plants that discharge into the James and York Rivers, and is currently able to meet its aggregate load allocations in both basins.[15] Although HRSD's current nutrient load allocations are based on the design flows of its wastewater treatment plants, which were intended to support future wastewater needs with projected population growth, current average annual flows are far lower.[16] In the future, HRSD's nutrient waste load allocations are likely to be ratcheted down again, although it is not clear when, or by how much.

2.2.2. EPA Consent Decree

HRSD is under an EPA consent decree to reduce its wet weather sanitary sewer overflows.[17] The decree requires significant financial investments in the coming years in order to reduce the incidence of overflows and the pollutants they introduce into Virginia's surface waters. To prepare for those expenses, HRSD developed a financial plan that includes a new rate structure to support about $2.5 billion in capital improvements over the next 10 years.[18] According to HRSD, more than 80% of this planned investment is directly tied to meeting its responsibilities under the consent decree or to meeting nutrient reductions required under the Chesapeake Bay TMDL.[19]

2.3. *Regional Groundwater Overdraft*

Virginia's 13,000 square-mile Coastal Plain physiographic province (Figure 2) is part of the broader Northern Atlantic Coastal Plain. This gently sloping terrain is underlain by a wedge of sediments that dips and thickens toward the east.[20] The wedge contains a series of more permeable units, including the primary source of groundwater in the region, the Potomac Aquifer System,[21] punctuated by less permeable confining units (Figure 2).[22] An ancient impact crater near the mouth of the Chesapeake Bay disrupts the Coastal Plain sediments, creating a major barrier to regional groundwater flow (see Figures 2 and 3).[23]

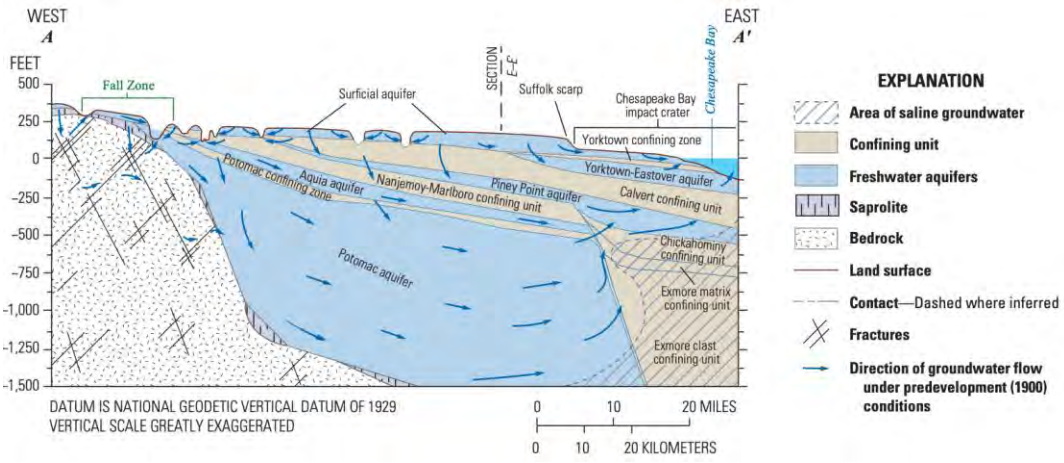


Figure 3. Cross section through the Northern Atlantic Coastal Plain in Virginia along the line A–A' shown in Figure 1. Modified from Masterson et al. (2016).[24]

The Coastal Plain region receives an average of more than 40 inches of precipitation per year[25] and experiences warm, humid summers and moderate winters.[26] Although surface water is abundant in Virginia and accounts for approximately 90% of reported water withdrawals statewide,[27] groundwater is heavily used in the Coastal Plain region. Groundwater extraction increased steadily over the past century, outpacing natural recharge and causing more than 200 feet of drawdown in some parts of the Potomac Aquifer System by 2003.[28] With net groundwater extraction exceeding sustainable levels, sediments in the coastal aquifer system are undergoing compaction, reducing the space available for groundwater storage and causing land subsidence that is compounding the effects of global sea-level rise.[29] Pumping has changed groundwater flow patterns in the region in complex ways, increasing the likelihood that "upconing" and lateral intrusion of saltwater will affect production wells.[30] Currently, water users extract groundwater from the Potomac Aquifer System at a rate of more than 100 MGD.[31]

2.4. *State Groundwater Regulation*

In response to concerns about groundwater quality, access, and long-term sustainability in the Coastal Plain,[33] the State Water Control Board has designated, and the VDEQ administers, two Groundwater Management Areas (see Figure 4).[34] In these areas, water users must have a permit to extract 300,000 or more gallons of groundwater per month.[35] As of June 11, 2019, there were 334 active groundwater withdrawal permits for these large water users.[36] The vast majority of groundwater withdrawn by permittees is for industrial or public water supply use (~52% and

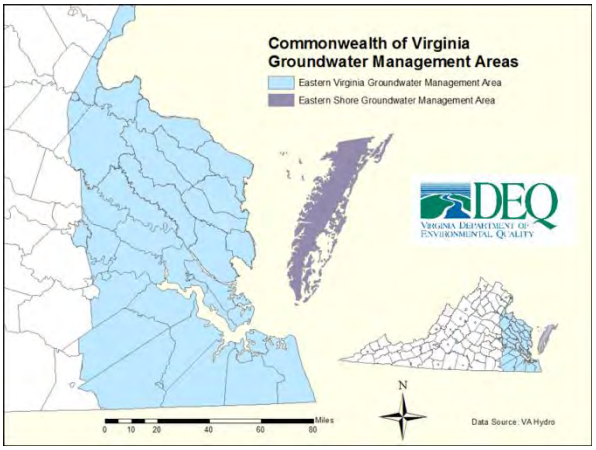


Figure 4. Groundwater Management Areas in Virginia. From VDEQ (2018).[32]

~40% by volume, respectively, in 2017).[37] While other groundwater users do not need withdrawal permits, those extracting more than 10,000 gallons per day in any single month must report their withdrawals annually.[38] This leaves large numbers of smaller users out, however, and VDEQ has highlighted the need to gain a better understanding of unreported groundwater withdrawals.[39] A 2015 requirement for submitting well completion reports when new private wells are constructed within Virginia's Groundwater Management Areas[40] is providing a new source of information that can improve estimates[41] of unreported groundwater use. An estimated 275,000 to 300,000 households rely on private domestic wells in the Eastern Virginia Ground Water Management Area alone.[42] To begin to address groundwater overuse in the Area, VDEQ negotiated permit reductions for the 14 permittees that are collectively responsible for approximately 80% of permitted groundwater withdrawals.[43] Additionally, permit applications for new or increased withdrawals require an impact and sustainability analysis as well as impact mitigation.[44] However, additional groundwater demand management and concerted efforts to increase groundwater recharge will be integral to achieving sustainable groundwater use in the region.[45]

2.5. *Regulation of Underground Injection in Virginia*

Recharge by underground injection is regulated under the federal Safe Drinking Water Act's Underground Injection Control (UIC) program. Recharge wells are considered Class V wells.[46] Those wishing to use this type of well must submit certain information to the UIC program and comply with requirements designed to protect underground sources of drinking water.[47] A permit is necessary if the injection activity would "allow the movement of fluid containing any contaminant into" an underground source of drinking water, "if the presence of that contaminant may cause a violation of the primary drinking water standards under 40 CFR part 141, other health based standards, or may otherwise adversely affect the health of persons."[48] While many states implement their own UIC programs, Virginia does not. Instead, EPA Region 3 directly implements the UIC program in Virginia.[49]

3. Origin and Development of SWIFT

HRSD began exploring the possibility of preemptively treating its wastewater effluent to a very high level to insulate itself from uncertainty surrounding future water quality standards, including its nutrient waste load allocations under the Chesapeake Bay TMDL.[50] Because the Virginia Coastal Plain is already rich in surface water but struggles with unsustainable levels of groundwater use, HRSD recognized the potential of using the highly treated effluent to replenish the overtapped Potomac Aquifer System.

3.1. *Regional groundwater modeling / feasibility studies*

During late 2014 and early 2015, a consultant examined the potential introduction of highly treated effluent into the Potomac Aquifer System near HRSD's wastewater treatment plants and to what extent this would improve groundwater conditions in Virginia's Coastal Plain. Analysis using VDEQ's groundwater model[51] suggested that injecting approximately 120 MGD of highly treated effluent from seven of HRSD's wastewater treatment plants would increase pressure across much of the Potomac Aquifer System (Figure 5), helping to stave off coastal saltwater intrusion, reduce future compaction, subsidence, and related relative sea level rise, and sustainably support existing and projected groundwater withdrawals in the region at an estimated cost of approximately $1 billion. With the feasibility study results in hand, HRSD reached out to the governor, the secretary of natural resources, the VDEQ, the Virginia Department of Health (VDH), the United States Geological Survey (USGS), the Hampton Roads Planning District Commission, and others with a potential stake in the multi-benefit project to gather input and seek support for moving forward. HRSD would eventually name the project SWIFT.[52]

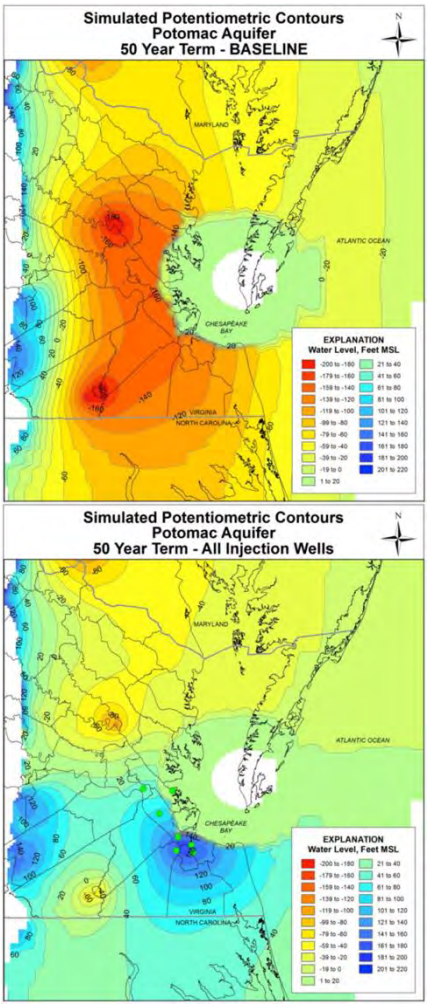


Figure 5. Modeled Potomac Aquifer well levels without SWIFT (top) and with SWIFT facilities at 7 HRSD wastewater treatment plants injecting ~120 MGD (bottom). From Bott and Heisig-Mitchell (2017).[53]

3.2. *Small-scale piloting of advanced water treatment processes*

After initial research to examine treatment options, HRSD ran side-by-side small-scale pilots at its York River Wastewater Treatment Plant in Seaford, Virginia, in 2016.[54] The pilots subjected plant effluent to two different treatment processes (1) a membrane-based reverse osmosis process and (2) a carbon-based advanced treatment process.[55] Testing demonstrated that both processes produce effluent that meets all primary (human health-based) drinking water standards.[56] HRSD decided to use the carbon-based process because it has several advantages over reverse osmosis, including using less energy, generating less waste, and creating effluent that is projected to be more chemically compatible[57] with native groundwater and aquifer materials.

3.3. *Large-scale demonstration facility: The SWIFT Research Center*

As a next step, HRSD is demonstrating "at a meaningful scale" that the advanced treatment process it has chosen produces water that both (1) meets primary drinking water standards and (2) is chemically compatible with the native groundwater and sediments of the Potomac Aquifer System.[58] The SWIFT Research Center, constructed at HRSD's Nansemond Wastewater

Treatment Plant in Suffolk, Virginia, is a $25 million design-build demonstration facility capable of treating and injecting approximately 1 MGD.[59] The facility began replenishing the Potomac Aquifer System with SWIFT Water in May of 2018.[60]

3.4. *Moving towards full implementation*

In parallel with continuing to learn from the SWIFT Research Center, HRSD is currently laying the groundwork for full-scale implementation of SWIFT at five of its wastewater treatment plants (Figure 6).

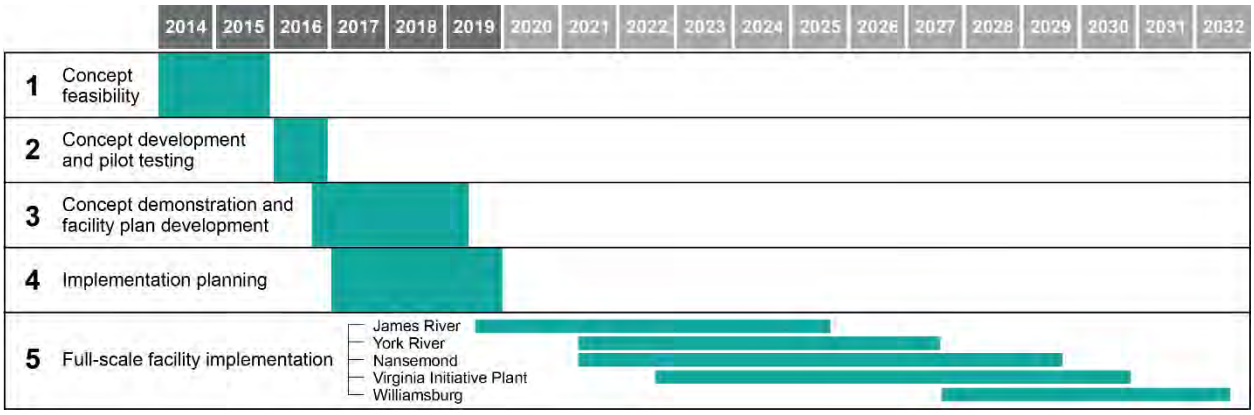


Figure 6. Time line of SWIFT development and projected full-scale implementation

HRSD plans to construct SWIFT facilities at five of its wastewater treatment plants: James River, York River, Nansemond, Virginia Initiative, and Williamsburg.[61] However, as Figure 1 shows, seven wastewater treatment plants will be involved. HRSD will construct a new pump station and transmission force main to convey untreated service flows from its Boat Harbor plant to a combined SWIFT facility located at the Nansemond plant.[62] It will also construct a new pump station and force main to convey secondary-treated effluent from its Army Base plant to a combined SWIFT facility located at the Virginia Initiative plant.[63] HRSD hopes to secure all required approvals for and begin construction on the first full-scale SWIFT facility by 2020 and to have all five facilities up and running by 2032.[64] At full implementation, HRSD expects to recharge approximately 100 MGD into the Potomac Aquifer System via the five SWIFT facilities.[65]

4. Managed Aquifer Recharge Through SWIFT

Designs for the five full-scale SWIFT facilities and their associated monitoring systems will be based on knowledge gained from operating the SWIFT Research Center as well as the site-specific conditions at each location.[66] Therefore, this section draws heavily from HRSD's experience to date at the SWIFT Research Center.

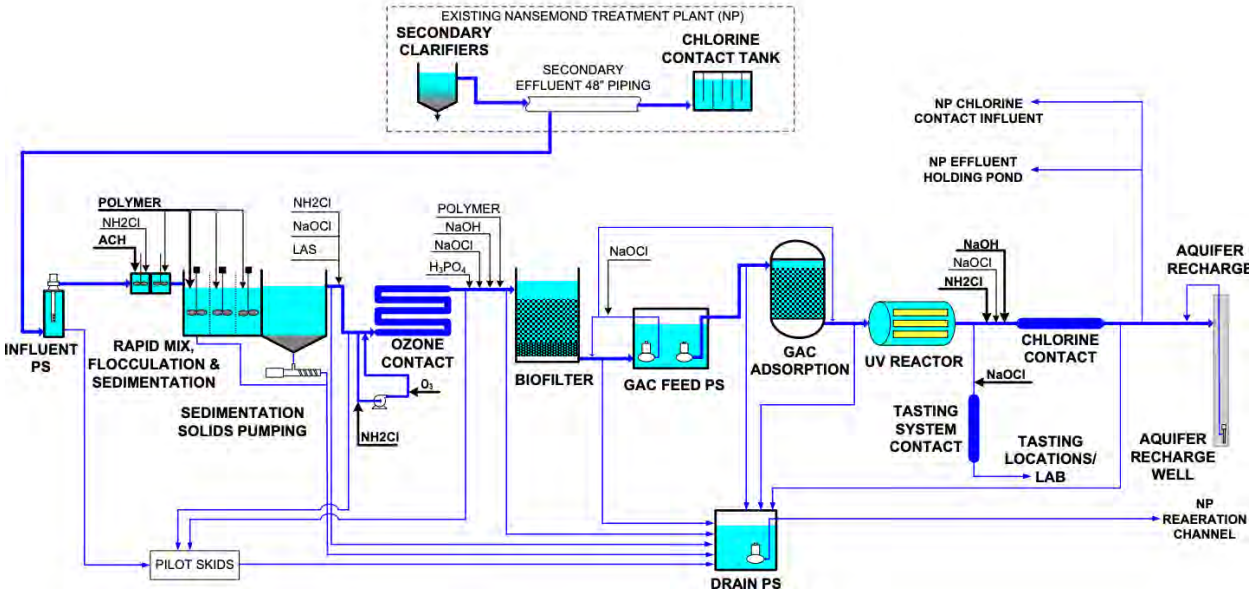


Figure 7. SWIFT Research Center Process Flow Diagram. From HRSD (2018).[67]

4.1. *The Recharge Process*

Before it gets to a SWIFT facility, wastewater will be collected in HRSD's sanitary sewer system, conveyed to one of its wastewater treatment plants, and subjected to at least secondary treatment. Within the SWIFT facility, the treated effluent will receive further treatment. At the SWIFT Research Center, secondary effluent from HRSD's Nansemond plant goes through a treatment train that includes coagulation, flocculation, sedimentation, ozonation, biological filtration, granular activated carbon, and ultraviolet disinfection (Figure 7).[68] When advanced treatment is complete, the "SWIFT Water" is injected into a 1,410-foot-deep, 12-inch-diameter test recharge well with 11 separate screened intervals that intersect different parts of the Potomac Aquifer System.[69]

The SWIFT Research Center is helping HRSD gain critical operational experience, build knowledge, and identify and address potential issues with the scaled-up treatment process, injection infrastructure and processes, and groundwater quality and flow monitoring. For example, in the Center's first few months of operation, HRSD discovered that an estimated 4.8 million gallons of recharged water exceeded the maximum contaminant level for nitrite because the biological filters in the treatment system were not yet fully functional.[70] Staff established new procedures for identifying and addressing contaminant exceedances and

installed a continuous nitrite monitoring analyzer as a critical control point.[71] To ensure that it "cleared" the high nitrite water, HRSD pumped about 20 million gallons of water out of the aquifer system before resuming normal recharge operations.[72] Similarly, in late 2018, HRSD suspended Research Center operations to address corrosion on process equipment, including the Center's stainless steel flocculation and sedimentation tanks.[73] HRSD has noted that it plans to use concrete tanks for full-scale SWIFT facilities.[74] Following warranty repairs, the Research Center was restarted in early April 2019, with injection beginning again later that month.[75]

4.2. *Accounting*

HRSD is keeping close track of how much water it recharges (and, as described in the previous section, pumps out) at the SWIFT Research Center. It is also tracking the impacts of recharge. In late May 2019, HRSD announced that the SWIFT Research Center had successfully introduced a net total of 100 million gallons of SWIFT Water into the Potomac Aquifer System.[76] Although this represents a tiny fraction of the amount of water HRSD plans to recharge at full-scale implementation, USGS researchers were able to see "a signal of expansion of the aquifer by a third of a millimeter over the course of two months" in an area that has been experiencing estimated compaction rates of 1.5 to 3.7 mm per year.[77]

Four monitoring wells are helping HRSD track the progress and impacts of water recharged at the SWIFT Research Center.[78] Three conventional monitoring wells—each screened in the upper, middle, and lower portions of the aquifer—are located 400 to 500 feet from the injection well.[79] Additionally, a special monitoring well 50 feet from the injection well uses a Flexible Liner Underground Technology (FLUTe) sampling system to collect samples from each of the 11 injection well screens.[80] The monitoring data collected so far suggest that the movement of recharged water varies significantly over time and across space—for example, the rate of recharge flow appears to be much higher from certain screened intervals.[81]

To track any water quality changes that occur, HRSD will monitor the recharge front as it migrates outward from the SWIFT facility. Because water recharged at the SWIFT Research Center is not expected to reach the closest private well for about 50 years, if a contamination problem begins to develop, there should be ample time for HRSD to detect it and mount an appropriate response.[82]

4.3. *Recovery*

HRSD does not plan to recover the water it recharges. Instead the goals of SWIFT recharge are to increase regional aquifer pressures and reduce aquifer compaction, land subsidence, and saltwater intrusion. Recharged water will be available to Potomac Aquifer users, subject to permitting or other regulation under state law.

5. Management

5.1. *Institutional Structure: Creating a New State Oversight Body*

The SWIFT Research Center is currently operating under EPA authorization by rule for underground injection. The full-scale SWIFT facilities will likely require UIC permits, and HRSD will need to demonstrate that its injection wells will not adversely impact sources of drinking water, including the Potomac Aquifer System.

Because the state has not accepted delegation of the UIC program from EPA Region 3, VDEQ and VDH lack direct regulatory authority over HRSD's ability to pursue SWIFT.[83] Nonetheless, recognizing the strong state interest in ensuring safe drinking water, HRSD has worked with these agencies, other entities, and outside experts to enable robust state oversight. HRSD has held workshops, performed outreach, and maintained lines of communication with VDH and VDEQ at both the executive and technical levels throughout the SWIFT planning process,[84] and EPA has solicited input from both agencies regarding proposed regulatory limits for water quality parameters.[85]

This state oversight role was memorialized in legislation passed in February 2019. Virginia Senate Bill 1414 was modeled after an oversight program developed for indirect potable reuse intermediated by Virginia's Occoquan Reservoir.[86] The legislation creates a ten-member advisory board—the Potomac Aquifer Recharge Oversight Committee—and a new monitoring laboratory, co-directed by two university faculty members, to independently monitor SWIFT's effects.[87] The Potomac Aquifer Recharge Oversight Committee will include eight voting members (the State Health Commissioner, the Director of VDEQ, the Executive Director of the Hampton Roads Planning District Commission, both laboratory Co-Directors, the Director of the Occoquan Watershed Monitoring Laboratory, and two Virginia citizens appointed by the Governor) and two nonvoting members (the EPA Region 3 Administrator and the Director of the USGS's Virginia and West Virginia Water Science Center).[88] The legislation also explicitly authorizes the state to direct HRSD to stop injection activities or make needed changes if HRSD fails to comply with EPA permits or authorizations.[89]

5.2. Costs and Financing

User fees for wastewater services are HRSD's primary source of revenue.[90] It issues bonds and uses cash on hand to finance capital projects,[91] as well as pursuing available grant opportunities.[92]

HRSD expects that fully implementing SWIFT will involve approximately $1.1 billion in capital spending.[93] Early estimates of SWIFT's operating costs range from $21 to $43 million per year.[94]

While the costs associated with SWIFT are significant, HRSD plans to meet the program's capital costs without altering its ten-year financial forecast by reprioritizing planned capital improvements.[95] Specifically, based on SWIFT's projected water quality benefits (and numerous co-benefits), HRSD has proposed funding SWIFT construction by reprioritizing $1.1 billion of the capital improvements planned under its Wet Weather Consent Decree.[96] In September 2017, HRSD submitted an Integrated Plan / Regional Wet Weather Management Plan to the EPA that proposes prioritizing full-scale SWIFT implementation and delaying some required overflow reduction work.[97] HRSD believes this reprioritization will produce greater environmental and human health benefits. However, EPA has not yet approved the Integrated Plan.

5.3. Potential Revenue Generation

SWIFT will significantly reduce HRSD's nutrient discharges to the Chesapeake Bay watershed, eliminating an estimated 90% of the nutrient load from each SWIFT-equipped wastewater treatment plant.[98] HRSD expects SWIFT to not only meet HRSD's nutrient reduction responsibilities, but also to generate nutrient credits it can trade to municipal stormwater dischargers to help achieve the Chesapeake Bay TMDL more quickly and cost effectively.[99] Estimates suggest that SWIFT might generate enough credits to enable the eleven counties and cities in the area that have municipal separate storm sewer system (MS4) discharge permits to save up to $2 billion on improvements that would otherwise be needed to meet mandated nutrient reductions.[100] HRSD has already made agreements with all eleven dischargers.[101] These arrangements have the potential to further the surface-water-quality and public health goals of VDEQ, EPA, and VDH while helping to minimize the costs of complying with the Chesapeake Bay TMDL for these cities and counties and the people they serve. Because the primary beneficiaries of the proposed trades will be HRSD ratepayers, who are funding SWIFT (and, therefore, credit generation) through their user fees, HRSD will provide nutrient credits under these agreements at no charge. However, HRSD will also look for opportunities—that do not directly affect its ratepayers—to trade credits to other interested parties at market prices.

6. Analysis and Summary

SWIFT is an innovative program designed to address both nutrient pollution in the Chesapeake Bay watershed and groundwater overdraft in Virginia's Coastal Plain region. When SWIFT is fully implemented, HRSD expects to substantially reduce its wastewater discharges and nutrient loads in the watershed, generating nutrient credits it can trade to other dischargers, and recharge a total of approximately 100 MGD of SWIFT Water into the Potomac Aquifer System at five of its wastewater treatment plants.

6.1. *Key Elements*

One of the key features of SWIFT is that surface water quality regulation is a central driver. Without it, HRSD would have little motivation to pursue recharge, and the broad public benefits it is likely to bring.

Additionally, although HRSD is the primary proponent of and manager for SWIFT, it is a truly multi-benefit program that takes advantage of a confluence of needs and opportunities, and also carries multiple risks. As a result, other public and private entities have significant stakes in SWIFT's successful implementation. For example:

- The reduced nutrient loading enabled by SWIFT will further the surface water quality goals and public health missions of VDEQ, VDH, and EPA and improve conditions for public water systems that use surface water, surface water for recreation, and Chesapeake Bay fisheries.
- The nutrient credits SWIFT is expected to generate will help cities and counties meet required nutrient reductions more cost-effectively and reduce the financial burden on their ratepayers.
- Groundwater users of all types stand to benefit from more reliable and sustainable access to groundwater if SWIFT fulfills its promise. Relatedly, they have a strong interest in robust oversight, monitoring, contingency planning, performance evaluation, and adjustment to ensure SWIFT's success and to identify and appropriately address any problems that arise.
- SWIFT has the potential to reduce future subsidence and related relative sea level rise across the Virginia Coastal Plain, benefitting everyone in the region but especially those living or working in low-lying coastal areas.

Perhaps the program's most distinctive features is HRSD's recognition of and approach to addressing a particular type of regulatory risk—specifically, a lack of direct state regulatory authority over underground injection coupled with a strong state interest in groundwater quality and the state's responsibility and broad general authority to protect public health. Not only has HRSD ensured that key state agencies (VDEQ and VDH) and other important stakeholders and experts have seats at the table during SWIFT development and implementation, HRSD has gone a step further, pursuing state legislation to formalize robust state oversight of SWIFT going forward. HRSD has also identified contingencies for addressing low-probability but high-consequence drinking water contamination, should it arise.

6.2. *Incentives and Benefits*

Among the factors that have motivated SWIFT or contributed to its success to date are the following:

Surface water quality regulation — Although water scarcity is often the primary motivator for reusing treated wastewater in the western United States, SWIFT offers a good example of another key motivator that can come into play even in water-rich areas: surface water quality regulation. The prospect of increasingly stringent nutrient limitations for HRSD's discharges in the Chesapeake Bay watershed led it to explore the idea of treating its wastewater to a very high degree to avoid a cycle of investment in long-term assets that could quickly become outdated if effluent limitations for nutrients (or other pollutants) are ratcheted down in coming years.

Regional groundwater supply, groundwater quality, and sea-level rise mitigation benefits — Rather than discharging SWIFT water into the already water-rich lower reaches of the Chesapeake Bay watershed, where it would have little water supply benefit, or attempting to create stable demand for direct reuse of SWIFT Water, HRSD realized it could instead use the water to address a critical regional need. It could replenish the over-tapped Potomac Aquifer System, increasing aquifer pressures across the region and slowing or preventing further subsidence, related relative sea-level rise, and saltwater intrusion for the short- and long-term benefit of groundwater users and communities across Eastern Virginia.

HRSD's size/geography and SWIFT's scale — HRSD's large geographic footprint will enable it to treat and recharge large volumes of water each day at a number of different locations with high recharge potential. These features will enable SWIFT to significantly improve regional aquifer conditions when fully implemented. Additionally, although site-specific analysis and design will be necessary for each SWIFT facility, the economies of scale associated with planning and constructing multiple large SWIFT facilities are likely to be significant.

HRSD's independent rate-setting authority and large ratepayer base — HRSD has the ability to set its rates for wastewater service and spread costs across its large ratepayer base to achieve its goals. Wastewater service providers that need approval for rate changes and smaller providers that aren't able to spread costs as widely may have a harder time funding a project like SWIFT.

The generation of nutrient credits — The nutrient credits HRSD expects to generate as a result of implementing SWIFT could provide the district with an additional source of revenue to help offset the program's costs. Even where HRSD provides credits at no cost, the expected availability of credits and the savings they represent for potential trading partners and the communities they serve provide economic incentives for increased regional support.

Extensive outreach/engagement — From the beginning, HRSD has made concerted, extensive efforts to engage with EPA, VDEQ, VDH, area municipalities, nonprofit organizations, and other stakeholders about their goals, ideas, and concerns. The SWIFT Research Center has expanded opportunities for direct public engagement and education through, for example, frequent tours by school and community groups. These efforts have helped to build broad support for SWIFT and enabled learning that has made the project better.

6.3. *Challenges and Future Considerations*

The same factors that have so far made SWIFT possible also pose potential implementation challenges. For example, despite SWIFT's explicitly multi-benefit nature, HRSD has been its primary decision maker and proponent to date. HRSD's decisions need to account for the benefits SWIFT might bring and the burdens SWIFT might impose on a range of other parties with sometimes divergent interests and needs. To gain and maintain their support, HRSD has needed to frame SWIFT in terms of these distinct potential benefits and to ensure that SWIFT is

technically constructed and validated to actually produce them. The newly formed Potomac Aquifer Recharge Oversight Committee is likely to change this dynamic by, in effect, distributing formal responsibility for SWIFT among more actors.

As another example, HRSD is proposing to pay for SWIFT largely by reprioritizing funding that was originally intended for capital improvement projects required under its Wet Weather Consent Decree. If EPA does not approve this proposal, HRSD will need to pursue other sources of funding. This would at least complicate and delay SWIFT implementation, but might not pose an insurmountable barrier if other stakeholders that stand to benefit from SWIFT are willing to contribute financially.

Acknowledgements

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Abbreviations

CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FLUTe	Flexible Liner Underground Technology
HRSD	Hampton Roads Sanitation District
MAR	managed aquifer recharge
MGD	million gallons per day
MS4	municipal separate storm sewer system
SWIFT	The Sustainable Water Initiative for Tomorrow
SWIFT Water	municipal wastewater receiving advanced water treatment at a SWIFT facility to meet drinking water standards
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USGS	United States Geological Survey
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health

Endnotes

[1] Figure 2 is modified from: E.R. McFarland, A Conceptual Framework and Monitoring Strategy for Movement of Saltwater in the Coastal Plain Aquifer System of Virginia: U.S. Geological Survey Scientific Investigations Report 2015–5117, at 5 fig.1 (2015), *available at* http://dx.doi.org/10.3133/sir20155117.
[2] *See* Hampton Roads Sanitation District, History, https://www.hrsd.com/history (last visited May 28, 2019).
[3] *See* Hampton Roads Sanitation District, About Us, https://www.hrsd.com/about-us (last visited May 28, 2019).
[4] *See* Hampton Roads Sanitation District, Commission, https://www.hrsd.com/commission (last visited May 28, 2019).
[5] *See* 33 U.S.C. §§ 1311, 1342, 1362; *see also* U.S. Environmental Protection Agency, NPDES Permit Basics, https://www.epa.gov/npdes/npdes-permit-basics (last visited July 19, 2019).
[6] *See* U.S. Environmental Protection Agency, NPDES State Program Information, https://www.epa.gov/npdes/npdes-state-program-information (last visited July 19, 2019) (click "Authority" tab).
[7] *See* U.S. Environmental Protection Agency, Chesapeake Bay TMDL Fact Sheet, https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-fact-sheet (last visited June 12, 2019).
[8] *See* U.S. Environmental Protection Agency, Addressing Nutrient Pollution in the Chesapeake Bay, https://www.epa.gov/nutrient-policy-data/addressing-nutrient-pollution-chesapeake-bay (last visited July 19, 2019).
[9] *See* 9 Va. Admin. Code §§ 25-40-10 to 25-40-70, 25-720-30.
[10] *See* U.S. Environmental Protection Agency, Chesapeake Bay TMDL Fact Sheet, https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-fact-sheet (last visited June 12, 2019); Virginia State Water Control Board, Fact Sheet: Modification of a General VPDES Permit to Discharge to State Waters and State Certification Under the State Water Control Law, at 3 (2012), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VAN00FactSheet2012.pdf.
[11] *See* Code of Virginia § 62.1-44.19:14; 9 Va. Admin. Code §§ 25-820-10 to 25-820-80.
[12] *See* 9 Va. Admin. Code §§ 25-820-70, 25-720-60(C), 25-720-120(C).
[13] *See* 9 Va. Admin. Code § 25-820-70(Part I.J).
[14] *See* U.S. Environmental Protection Agency, *Chesapeake Bay Watershed Implementation Plans (WIPs)*, https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-watershed-implementation-plans-wips (last visited July 18, 2019).
[15] *See* Hampton Roads Sanitation District, Commission Meeting Minutes, Feb. 28, 2017, at 14, *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2017/02-28-17_Final_Commission_Minutes.pdf. HRSD currently finds it more cost effective to buy nutrient credits to meet the nutrient limits that apply to its wastewater treatment plant that discharges to the Rappahannock River. *See id.*
[16] *See* Hampton Roads Sanitation District, Commission Meeting Minutes, Feb. 28, 2017, at 13–14, *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2017/02-28-17_Final_Commission_Minutes.pdf.
[17] *See* Hampton Roads Sanitation District, EPA Wet Weather Consent Decree, https://www.hrsd.com/epa-wet-weather-consent-decree (last visited July 18, 2019).
[18] *See* Hampton Roads Sanitation District, Annual Budget for Fiscal Year 2019 (July 1, 2018–June 30, 2019), at 2 (2018), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/finance/FY2019AnnualBudget.pdf.
[19] *See* Hampton Roads Sanitation District, Annual Budget for Fiscal Year 2019 (July 1, 2018–June 30, 2019), at 2 (2018), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/finance/FY2019AnnualBudget.pdf; *see also generally* Hampton Roads Sanitation District, EPA Wet Weather Consent Decree, https://www.hrsd.com/epa-wet-weather-consent-decree (last visited July 18, 2019); Hampton Roads Sanitation District, Integrated Plan / Regional Wet Weather Management Plan (2017), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/EPA/IntegratedPlan/HRSD_IP_RWWMP_2017_09_28_DIGITAL_FOR_VIEWING.pdf.

[20] *See* C.E. Heywood and J.P. Pope, 2009, Simulation of Groundwater Flow in the Coastal Plain Aquifer System of Virginia, U.S. Geological Survey Scientific Investigations Report 2009–5039, at 6 (2009), *available at* https://pubs.usgs.gov/sir/2009/5039/.

[21] According to USGS researchers, "the Potomac aquifer system is currently considered to be a three-dimensional fluvial-deltaic network of anastomosing sandy river channels and fine-grained overbank deposits composing a single hydrogeologic unit." C.E. Heywood and J.P. Pope, 2009, Simulation of Groundwater Flow in the Coastal Plain Aquifer System of Virginia, U.S. Geological Survey Scientific Investigations Report 2009–5039, at 10 (2009), *available at* https://pubs.usgs.gov/sir/2009/5039/; *see also* E. Randolph McFarland, Sediment Distribution and Hydrologic Conditions of the Potomac Aquifer in Virginia and Parts of Maryland and North Carolina, U.S. Geological Survey Scientific Investigations Report 2013-5116, at 54, 60 (2013), *available at* https://pubs.usgs.gov/sir/2013/5116/.

[22] *See generally* E. Randolph McFarland, Sediment Distribution and Hydrologic Conditions of the Potomac Aquifer in Virginia and Parts of Maryland and North Carolina, U.S. Geological Survey Scientific Investigations Report 2013-5116 (2013), *available at* https://pubs.usgs.gov/sir/2013/5116/; E. Randolph McFarland and T. Scott Bruce, The Virginia Coastal Plain Hydrogeologic Framework, U.S. Geological Survey Professional Paper 1731 (2006), *available at* https://pubs.usgs.gov/pp/2006/1731/PP1731.pdf.

[23] *See* J.W. Horton, Jr., D.S. Powars, and G.S. Gohn, Introduction and Discussion, *in* Studies of the Chesapeake Bay Impact Structure—The USGS-NASA Langley Corehole, Hampton, Virginia, and Related Coreholes and Geophysical Surveys, U.S. Geological Survey Professional Paper 1688, at A1–A2 (Horton, J.W., Jr., Powars, D.S., and Gohn, G.S., eds. 2005), *available at* http://pubs.usgs.gov/pp/2005/1688/ak/. To the west is the igneous and metamorphic bedrock of the Piedmont physiographic province. *See* E.R. McFarland, A Conceptual Framework and Monitoring Strategy for Movement of Saltwater in the Coastal Plain Aquifer System of Virginia: U.S. Geological Survey Scientific Investigations Report 2015–5117, at 5 (2015), *available at* http://dx.doi.org/10.3133/sir20155117. Within a transitional area known as the "Fall Zone," streams cut through the thin edge of the Coastal Plain sediment wedge, exposing the more resistant bedrock and creating rapids and waterfalls. *See* Virginia Department of Conservation and Recreation, Division of Natural Heritage, Overview of the Physiography and Vegetation of Virginia 9 (2016), *available at* https://www.dcr.virginia.gov/natural-heritage/natural-communities/document/ncoverviewphys-veg.pdf.

[24] Figure 3 is modified from: J.P. Masterson, J.P. Pope, M.N. Fienen, Jack Monti, Jr., M.R. Nardi, and J.S. Finkelstein, Assessment of Groundwater Availability in the Northern Atlantic Coastal Plain Aquifer System from Long Island, New York, to North Carolina, U.S. Geological Survey Professional Paper 1829, at 10 fig. 6 (2016), *available at* http://dx.doi.org/10.3133/pp1829.

[25] *See* map at Prism Climate Group, 30-Year Normals (1981–2010), http://www.prism.oregonstate.edu/normals/ (showing average annual precipitation for the period from 1981 to 2010 for the contiguous United States when climate variable "precipitation" and temporal period "annual values" are selected).

[26] *See* Virginia Tourism Corporation, *Virginia Climate*, https://www.virginia.org/climate/ (last visited June 12, 2019); Virginia Department of Conservation and Recreation, Division of Natural Heritage, Overview of the Physiography and Vegetation of Virginia 2 (2016), *available at* https://www.dcr.virginia.gov/natural-heritage/natural-communities/document/ncoverviewphys-veg.pdf.

[27] *See* Virginia Department of Environmental Quality, Status of Virginia's Water Resources VII (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf. This volume excludes withdrawals used for power generation. *Id.*

[28] *See* C.E. Heywood and J.P. Pope, 2009, Simulation of Groundwater Flow in the Coastal Plain Aquifer System of Virginia, U.S. Geological Survey Scientific Investigations Report 2009–5039, at 2–3, 106 (2009), *available at* https://pubs.usgs.gov/sir/2009/5039/.

[29] *See* Jack Eggleston and Jason Pope, Land Subsidence and Relative Sea-Level Rise in the Southern Chesapeake Bay Region, U.S. Geological Survey Circular 1392, at 1, 11, 18, 19 (2013), *available at* https://dx.doi.org/10.3133/cir1392.

[30] *See* E.R. McFarland, A Conceptual Framework and Monitoring Strategy for Movement of Saltwater in the Coastal Plain Aquifer System of Virginia: U.S. Geological Survey Scientific Investigations Report 2015–5117, at 1, 12–13 (2015), *available at* http://dx.doi.org/10.3133/sir20155117.

[31] *See* Eastern Virginia Groundwater Management Advisory Committee, Report to the Virginia Department of Environmental Quality and Virginia General Assembly 19 (2017), *available at*

https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/EVGWAC/FinalReport/GWAC_FinalReport_10.27.17.pdf?ver=2017-10-31-110609-433.

[32] Figure 4 is from: Virginia Department of Environmental Quality, Status of Virginia's Water Resources 5 fig.3 (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf.

[33] *See* Code of Virginia § 62.1-257; 9 Va. Admin. Code § 25-600-20; Virginia Department of Environmental Quality, Citizen Boards, https://www.deq.virginia.gov/LawsRegulations/CitizenBoards.aspx (last visited June 12, 2019).

[34] *See* Virginia Department of Environmental Quality, Status of Virginia's Water Resources 5 (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf.

[35] *See* Code of Virginia §§ 62.1-258, 62.1-259.

[36] This includes 161 for municipal or non-municipal public water supply use, 67 for commercial use, 60 for agricultural use, 37 for industrial use, 6 for irrigation use, 1 for fossil power, 1 for nuclear power, and 1 for an "unknown" use. *See* Virginia Department of Environmental Quality, Spreadsheet: Currently Active Groundwater Withdrawal Permits, https://www.deq.virginia.gov/Portals/0/DEQ/Water/OWS-WWPandC/GWwithdrawal_permit_list2019-06-11.xlsx?ver=2019-06-12-091153-630.

[37] *See* Virginia Department of Environmental Quality, Status of Virginia's Water Resources 21 tbl.3 (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf.

[38] *See* 9 Va. Admin. Code § 25-200-30.

[39] *See* Virginia Department of Environmental Quality, Status of Virginia's Water Resources 20 (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf.

[40] *See* Code of Virginia § 62.1-258; Virginia Department of Environmental Quality, Water Well Registration Overview, https://www.deq.virginia.gov/Programs/Water/WaterSupplyWaterQuantity/WaterWellRegistration.aspx (last visited Aug. 29, 2019).

[41] DEQ has used the methodology from a 2008 USGS study to estimate unpermitted use, but recognizes the need to update this methodology to incorporate data now collected from unpermitted users in association with new well registrations in GWMAs. *See generally* Jason P. Pope, E. Randolph McFarland, and R. Brent Banks, Private Domestic-Well Characteristics and the Distribution of Domestic Withdrawals among Aquifers in the Virginia Coastal Plain, U.S. Geological Survey Scientific Investigations Report 2007-5250 (2008), *available at* https://pubs.usgs.gov/sir/2007/5250/.

[42] *See* Virginia Department of Environmental Quality, Status of Virginia's Water Resources 23 (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf (noting that the Virginia Department of Health estimates that it permits the construction of about 1,500 new private wells each year in this area).

[43] *See* Virginia Department of Environmental Quality, Status of Virginia's Water Resources 6 (2018), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/AWRR_2018-09-30.pdf; Whitney Katchmark, Hampton Roads Planning District Commission, Reduction and Expansion of Groundwater Permits, May 25, 2018, https://www.hrpdcva.gov/news/index/view/id/2029/.

[44] *See* 9 Va. Admin. Code § 25-610-94(2).

[45] *See* Eastern Virginia Groundwater Management Advisory Committee, Report to the Virginia Department of Environmental Quality and Virginia General Assembly 9–12, 15 (2017), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/EVGWAC/FinalReport/GWAC_FinalReport_10.27.17.pdf?ver=2017-10-31-110609-433.

[46] *See* 40 C.F.R. §§ 144.80(e), 144.81(6), (7), (10).

[47] *See* 40 C.F.R. §§ 144.82, 144.83.

[48] 40 C.F.R. §§ 144.82(a), 144.84(b)(1).

[49] *See* U.S. Environmental Protection Agency, Underground Injection Control in EPA Region 3: Primary Enforcement Authority Information, https://www.epa.gov/uic/underground-injection-control-epa-region-3-de-dc-md-pa-va-and-wv#primacy (last visited July 18, 2019).

[50] *See* Eastern Virginia Groundwater Management Advisory Committee, Meeting #3 Notes – Final, at 2, Dec. 14, 2015, *available at* http://townhall.virginia.gov/L/GetFile.cfm?File=meeting%5C53%5C23686%5CMinutes_DEQ_23686_v1.pdf;

Joshua Dill, Hampton Roads' Coastal Aquifer Recharge Program, Municipal Water Leader Magazine, Apr. 25, 2019, http://municipalwaterleader.com/hampton-roads-coastal-aquifer-recharge-program/ (interview with Ted Henifin).

[51] *See* Joshua Dill, Hampton Roads' Coastal Aquifer Recharge Program, Municipal Water Leader Magazine, Apr. 25, 2019, http://municipalwaterleader.com/hampton-roads-coastal-aquifer-recharge-program/ (interview with Ted Henifin).

[52] *See* Hampton Roads Sanitation District, HRSD Launches Sustainable Water Initiative for Tomorrow (SWIFT): Pilot Phase Produces Purified Water (Sept. 15, 2016), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/SWIFT/SWIFT_Launch_Release20160915.pdf.

[53] Figure 5 is from: Charles B. Bott and Jamie Heisig-Mitchell, HRSD's Vision for Managed Aquifer Recharge in Eastern Virginia, Slide 18 (May 17, 2017), *available at* https://www.chesapeakebay.net/channel_files/25148/trading_wg_presentation_051717_towg.pdf.

[54] *See* Ted Henifin, Hampton Roads Sanitation District, One Initiative – Many Benefits, Slide 17 (Aug. 6, 2018), *available at* https://casaweb.org/wp-content/uploads/2015/12/Henifin-SWIFT-presentation.pdf.

[55] *See* Ted Henifin, Hampton Roads Sanitation District, One Initiative – Many Benefits, Slides 17–20 (Aug. 6, 2018), *available at* https://casaweb.org/wp-content/uploads/2015/12/Henifin-SWIFT-presentation.pdf.

[56] *See Ted Henifin, Hampton Roads Sanitation District, One Initiative – Many Benefits, Slides 19–22 (Aug. 6, 2018), available at https://casaweb.org/wp-content/uploads/2015/12/Henifin-SWIFT-presentation.pdf.*

[57] *See, e.g.,* Robert G. Maliva, Anthropogenic Aquifer Recharge: WSP Methods in Water Resources Evaluation Series No. 5, at 103–159 (2020) (describing geochemical reactions and processes involving recharged water, native groundwater, and aquifer materials and impacts on water quality); Monte Morin, Purified Wastewater Triggers Release of Arsenic Within Aquifer, Study Finds, *LA Times*, Sept. 4, 2015, https://www.latimes.com/science/sciencenow/la-sci-sn-arsenic-water-20150904-story.html (describing the interaction of low-mineral purified water with contaminants in aquifer sediments in Orange County, California) (citing Sarah Fakhreddine, Jessica Dittmar, Don Phipps, Jason Dadakis, and Scott Fendorf, Geochemical Triggers of Arsenic Mobilization during Managed Aquifer Recharge, 49 *Environmental Science & Technology* 7802 (2015), *available at* https://pubs.acs.org/doi/pdf/10.1021/acs.est.5b01140). Knowledge gained from previous recharge projects in Virginia informed decision making about SWIFT treatment processes. *See, e.g.,* Donald L. Brown and William D. Silvey, Artificial Recharge to a Freshwater-Sensitive Brackish-Water Sand Aquifer, Norfolk, Virignia, U.S. Geological Survey Professional Paper 939, at 51 (1977), *available at* https://pubs.usgs.gov/pp/0939/report.pdf; Robert G. Maliva, Anthropogenic Aquifer Recharge: WSP Methods in Water Resources Evaluation Series No. 5, at 368 (2020) (describing previous research on manganese leaching associated with the City of Chesapeake's aquifer storage and recovery system).

[58] *See* Tyler Nading, Larry Schimmoller, Dan Holloway, Ted Henifin, J. Dano, Germano Salazar-Benites, Chris Wilson, Charles Bott, and Jamie Mitchell, A 'SWIFT' Approach To Managed Aquifer Recharge, *Water Online*, Jan. 24, 2018, https://www.wateronline.com/doc/a-swift-approach-to-managed-aquifer-recharge-0001.

[59] *See* Ted Henifin, Hampton Roads Sanitation District, One Initiative – Many Benefits, Slide 17 (Aug. 6, 2018), *available at* https://casaweb.org/wp-content/uploads/2015/12/Henifin-SWIFT-presentation.pdf.

[60] *See* Hampton Roads Sanitation District, News Release: HRSD Begins Replenishing Potomac Aquifer, Celebrates Opening of SWIFT Research Center in Suffolk, May 18, 2018, *available at* https://www.hrsd.com/news-release-may-18-2018.

[61] *See* Hampton Roads Sanitation District, SWIFT Program – Project Delivery, James River Treatment Plant Commission Briefing, Slide 5, June 25, 2019, *available at* page 87 of https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2019/06-25-19_DraftCommissionMinutes.pdf.

[62] *See* Hampton Roads Sanitation District, Capital Improvement Program for the Fiscal Years 2020–2029: Boat Harbor Treatment Plant Service Area CIP Projects, at 29–30 (effective July 1, 2019), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/cip/FY2020/07_Boat%20Harbor.pdf ("The SWIFT master planning effort has determined that advanced water treatment and injection at Boat Harbor has significant physical limitations including site availability and resiliency to sea level rise. In addition, a financial analysis indicates there is significant long term cost savings associated with consolidating wastewater treatment and SWIFT facilities at Nansemond Treatment Plant. This project will allow HRSD to further reduce the amount of nutrients contributed to the James River basin. Upgrades to Nansemond Treatment Plant to accommodate the additional flow will be completed under a separate capital project.").

[63] *See* Hampton Roads Sanitation District, Capital Improvement Program for the Fiscal Years 2020–2029: Army Base Treatment Plant Service Area CIP Projects, at 7–8 (effective July 1, 2019), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/cip/FY2020/05_Army%20Base.pdf ("The SWIFT master planning effort has determined that advanced water treatment and aquifer recharge at Army Base has significant physical limitations including site availability. This project would support the capture and further advanced treatment of Army Base secondary clarifier effluent in a consolidated SWIFT treatment facility located adjacent to VIP").

[64] *See* Hampton Roads Sanitation District, News Release: HRSD's SWIFT Research Center Reaches 100 Million Gallon Aquifer Replenishment Milestone, May 23, 2019, *available at* https://www.hrsd.com/news-release-may-23-2019; *See* HRSD, SWIFT Program – Project Delivery, James River Treatment Plant Commission Briefing, Slide 5, June 25, 2019, *available at* page 87 of https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2019/06-25-19_DraftCommissionMinutes.pdf.

[65] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 109 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.

[66] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 119–120 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.

[67] The process diagram in Figure 7 is from: Hampton Roads Sanitation District, Update on the Operation of the SWIFT Research Center, Slide 39 (2018), *available at* page 71 of https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2018/08-28-18_Final_Commission_Minutes.pdf.

[68] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 109 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.

[69] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 109–110 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.

[70] *See* Hampton Roads Sanitation District, News Release: SWIFT Research Center Update, Aug. 6, 2018, *available at* https://www.hrsd.com/news-release-august-6-2018; Hampton Roads Sanitation District, News Release: SWIFT Research Center to Resume Aquifer Replenishment, Aug. 14, 2018, *available at* https://www.hrsd.com/news-release-august-14-2018; *see also* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 115 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011; Hampton Roads Sanitation District, Commission Meeting Minutes, at 20, Aug. 28, 2018, *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2018/08-28-18_Final_Commission_Minutes.pdf; Hampton Roads Sanitation District, Update on the Operation of the SWIFT Research Center, Slide 2 (2018), *available at* page 71 of https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2018/08-28-18_Final_Commission_Minutes.pdf.

[71] *See* Hampton Roads Sanitation District, Commission Meeting Minutes, at 20, Aug. 28, 2018, *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2018/08-28-18_Final_Commission_Minutes.pdf; Hampton Roads Sanitation District, Update on the Operation of the SWIFT Research Center, Slide 9 (2018), *available at* page 71 of https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2018/08-28-18_Final_Commission_Minutes.pdf.

[72] *See* Hampton Roads Sanitation District, News Release: SWIFT Research Center Update, Aug. 6, 2018, available at https://www.hrsd.com/news-release-august-6-2018.
[73] *See* Hampton Roads Sanitation District, News Release: SWIFT Research Center Suspends Aquifer Replenishment for Warranty Repair and Maintenance Activities, Dec. 11, 2018, *available at* https://www.hrsd.com/news-release-december-11-2018; *see also* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 115 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.
[74] *See* Hampton Roads Sanitation District, Commission Meeting Minutes, at 21, Feb. 26, 2019, *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2019/02-26-19_FinalCommissionMinutes.pdf.
[75] *See* Hampton Roads Sanitation District, SWIFT Operations, Research and Regulatory Update, Slide 4 (June 25, 2019), *available at* page 95 of pdf at https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2019/06-25-19_DraftCommissionMinutes.pdf.
[76] *See* Hampton Roads Sanitation District, News Release: SWIFT Research Center Reaches 100 Million Gallon Aquifer Replenishment Milestone, May 23, 2019, *available at* https://www.hrsd.com/news-release-may-23-2019.
[77] *See* Sarah Vogelsong, Hampton Roads Wastewater-to-Aquifer Recharge Project Showing Results, *Bay Journal*, May 8, 2019, *available at* https://www.bayjournal.com/article/hampton_roads_wastewater_to_aquifer_recharge_project_showing_results.
[78] *See* Ted Henifin, Hampton Roads Sanitation District, One Initiative – Many Benefits, Slide 28–31 (Aug. 6, 2018), *available at* https://casaweb.org/wp-content/uploads/2015/12/Henifin-SWIFT-presentation.pdf.
[79] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 110 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.
[80] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 110–111 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011. The system has a flexible liner that matches the screen lengths and depths of the recharge well but allows flow only through sample tubes at each screened interval to keep water from different intervals from mixing in the borehole. *See id.* at 110.
[81] *See* Meredith G. Bullard, Mark Widdowson, Germano Salazar-Benites, Jamie Heisig-Mitchell, Andy Nelson, and Charles Bott, Managed Aquifer Recharge: Transport and Attenuation in a Coastal Plain Aquifer, World Environmental and Water Resources Congress 2019, at 117 (2019), *available at* https://ascelibrary.org/doi/abs/10.1061/9780784482346.011.
[82] For example, if monitoring detects a water quality problem, HRSD could reverse the direction of its recharge pumps to remove the affected water. In the unlikely event that a severe, delayed-onset water quality problem were to develop and could not be addressed in other ways, HRSD could pay to extend public water service to those with affected wells.
[83] *See* Tyler Nading, Larry Schimmoller, Dan Holloway, Ted Henifin, J. Dano, Germano Salazar-Benites, Chris Wilson, Charles Bott, and Jamie Mitchell, A 'SWIFT' Approach To Managed Aquifer Recharge, *Water Online*, Jan. 24, 2018, https://www.wateronline.com/doc/a-swift-approach-to-managed-aquifer-recharge-0001.
[84] *See* Tyler Nading, Larry Schimmoller, Dan Holloway, Ted Henifin, J. Dano, Germano Salazar-Benites, Chris Wilson, Charles Bott, and Jamie Mitchell, A 'SWIFT' Approach To Managed Aquifer Recharge, *Water Online*, Jan. 24, 2018, https://www.wateronline.com/doc/a-swift-approach-to-managed-aquifer-recharge-0001; Alanna Maya, Water Reuse: Building Legitimacy Through Practice, Water World, at 13, Aug. 2018, *available at* http://digital.waterworld.com/waterworld/201808/MobilePagedReplica.action?pm=2&folio=12#pg14.
[85] *See* Tyler Nading, Larry Schimmoller, Dan Holloway, Ted Henifin, J. Dano, Germano Salazar-Benites, Chris Wilson, Charles Bott, and Jamie Mitchell, A 'SWIFT' Approach To Managed Aquifer Recharge, *Water Online*, Jan. 24, 2018, https://www.wateronline.com/doc/a-swift-approach-to-managed-aquifer-recharge-0001.

[86] *See* Hampton Roads Sanitation District, Commission Meeting Minutes, Dec. 18, 2018, at 9–10, *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/Commission_Minutes/2018/12-18-18_Final_Commission_Minutes.pdf; *see also* 9 Va. Admin. Code § 25-410-40.
[87] *See* Code of Virginia §§ 62.1-272 to 62.1-275 (added by Virginia Senate Bill 1414 (2019)).
[88] *See* Code of Virginia §§ 62.1-272 (added by Virginia Senate Bill 1414 (2019)).
[89] *See* Code of Virginia §§ 62.1-275 (added by Virginia Senate Bill 1414 (2019)).
[90] *See* Hampton Roads Sanitation District, Comprehensive Annual Financial Report for the Fiscal Years Ended June 30, 2018 and 2017, at 1, 12–13 (2018), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/finance/FY2018_CAFR.pdf.
[91] *See* Hampton Roads Sanitation District, Annual Budget: Fiscal Year 2019 (July 1, 2018–June 30, 2019), at 3 (2018), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/finance/FY2019AnnualBudget.pdf.
[92] *See* Hampton Roads Sanitation District, Comprehensive Annual Financial Report for the Fiscal Years Ended June 30, 2018 and 2017, at 3 (2018), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/finance/FY2018_CAFR.pdf.
[93] *See* Alex Perry, Cutting the Ribbon on Sustainable Hope, *Suffolk News-Herald*, May 18, 2018, available at https://www.suffolknewsherald.com/2018/05/18/cutting-the-ribbon-on-sustainable-hope/.
[94] *See* Ted Henifin, Jay Bernas, Daniel Holloway, and Ed Snyder, Hampton Roads Sanitation District, Sustainable Water Recycling Aquifer Replenishment System (ARS), Slide 18 (Sept. 2, 2015), *available at* https://www.hrpdcva.gov/uploads/docs/Attachment_01D_SustainableWaterRecycling.pdf.
[95] *See* Hampton Roads Sanitation District, Semi-Annual Report FY 2019, at 8-1 (Apr. 29, 2019), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/EPA/Reporting/HRSD_FY19SemiAnnualRprt20190429.pdf; Hampton Roads Sanitation District, EPA Wet Weather Consent Decree, https://www.hrsd.com/epa-wet-weather-consent-decree (last visited July 18, 2019); Hampton Roads Sanitation District, Integrated Plan / Regional Wet Weather Management Plan 1–2 (2017), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/EPA/IntegratedPlan/HRSD_IP_RWWMP_2017_09_28_DIGITAL_FOR_VIEWING.pdf.
[96] *See* Hampton Roads Sanitation District, Semi-Annual Report FY 2019, at 8-1 (Apr. 29, 2019), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/EPA/Reporting/HRSD_FY19SemiAnnualRprt20190429.pdf; Hampton Roads Sanitation District, EPA Wet Weather Consent Decree, https://www.hrsd.com/epa-wet-weather-consent-decree (last visited July 18, 2019); Hampton Roads Sanitation District, Integrated Plan / Regional Wet Weather Management Plan 1–2 (2017), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/EPA/IntegratedPlan/HRSD_IP_RWWMP_2017_09_28_DIGITAL_FOR_VIEWING.pdf.
[97] Hampton Roads Sanitation District, Integrated Plan / Regional Wet Weather Management Plan 1–1 (2017), *available at* https://www.hrsd.com/sites/default/files/assets/Documents/pdfs/EPA/IntegratedPlan/HRSD_IP_RWWMP_2017_09_28_DIGITAL_FOR_VIEWING.pdf; *see also* 33 U.S.C. § 1319(h) (re integrated plan); 33 U.S.C. § 1342(s) (defining an integrated plan as "a plan developed in accordance with the Integrated Municipal Stormwater and Wastewater Planning Approach Framework, issued by the Environmental Protection Agency and dated June 5, 2012"); U.S. Environmental Protection Agency, Integrated Planning for Municipal Stormwater and Wastewater, https://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater (last visisted May 28, 2019).
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[99] *See* U.S. Environmental Protection Agency, Trading and Offsets in the Chesapeake Bay Watershed, https://www.epa.gov/chesapeake-bay-tmdl/trading-and-offsets-chesapeake-bay-watershed (last visited July 18, 2019); Virginia Nutrient Credit Exchange Association, Exchange Compliance Plan 2019 Annual Update (Feb. 1, 2019), *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/Watershed%20GP/2019%20Exchange%20Compliance%20Plan%20Annual%20Update_Final_website.pdf?ver=2019-03-20-092346-950.

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[101] *See* Sarah Vogelsong, Hampton Roads Wastewater-to-Aquifer Recharge Project Showing Results, *Bay Journal*, May 8, 2019, *available at* https://www.bayjournal.com/article/hampton_roads_wastewater_to_aquifer_recharge_project_showing_results.

TO: General Manager

FROM: Director of Communications

SUBJECT: Monthly Report for September 2019

DATE: October 2, 2019

A. Publicity and Promotion

1. **Should Virginia Beach Buy Out Flood-Prone Properties at Fair Market Value? | September 2, 2019 | Bacon's Rebellion**

2. **National Research Effort Focuses on Side Stream Phosphorus Removal and Recovery Technology | September 3, 2019 | Water Online**

3. **HRSD pump station exterior to be completed later this year | September 4, 2019 | Gloucester-Mathews Gazette-Journal**

4. **Exmore Considers Another Sewage Option | September 12, 2019 | Eastern Shore Post**

5. **Groups work to improve communities on United Way's Day of Caring | September 13, 2019 | WVEC TV 13 News Now**

6. **Sewage District Would Not Inject Treated Water Into Local Aquifers | September 19, 2019 | Eastern Shore Post**

7. **Chesapeake neighbors are asking why their water bills are so high | September 19, 2019 | WVEC TV 13 NewsNOW**

8. **Local historians seek recognition of African-American beach that existed in James City County during segregation era | September 24, 2019 | Daily Press**

B. Social Media and Online Engagement

1. Facebook: 14,367 page impressions; 4,099 post impressions reaching 2,877 users, and Facebook Engagement of 300 (214 reactions, 52 shares and 34 comments)

2. Twitter: 9,161 tweet impressions; 80 profile visits and 30 mentions

3. SWIFTVA.com: 540 new users/visitors and 1,663 page views; 576 total visitors with average time per session at 2:28 minutes.

4. LinkedIn Impressions: 445 page impressions and 0 post impressions

5. YouTube: 1,054 views

6. Blog posts: 0

7. Construction Project Page Visits: 787 total (this number does not include direct visits from home page), broken down as follows:

    a. 324 visits to construction status page
    b. 463 visits to individual project pages

8. Next Door unique impressions: 17,814 views and 1,956 clicks (one post)

B. <u>News Releases, Advisories, Advertisements, Project Notices, Community Meetings and Project Websites</u>

1. News Releases/Traffic Advisories/Construction Notices: 1 (traffic advisory)

2. Advertisements: 0

3. Project Notices: 3 (via door hanging/door knocking and one-on-one visits reaching approximately 77 residents)

4. Project/Community Meetings: 0

5. New Project Web Pages/Blogs/Videos: 0

C. <u>Special Projects and Highlights</u>

1. Director attended the 2019 One Water Summit. This year's theme, 'One Water, one future' covered a variety of topics including workforce development, climate resilience and the future of water management, but its focal topics were largely in equity (of rates and access) and water as a human right. SWIFT Water® was featured at this year's Water Bar, alongside municipal water tastings from Austin, TX and Minneapolis, MN and was also used to toast the opening evening and also was featured and sampled by attendees during an evening reception. Response to SWIFT Water was overwhelmingly positive.

2. Director provided tours of the SWIFT Research Center (SWIFT RC) to the following individuals and/or groups:

    a. Group from WaterJAM conference
    b. Old Dominion University World Resources Class
    c. Frank Spellman, for photographs of the facility for a future book

3. Director joined General Manager and staff at the first SWIFT Monitoring Lab and Oversight meeting at the SWIFT RC.

4. Director and staff participated in the Go Green Expo, held in Newport News at the Brittingham Community Center by staffing an information table. The event was well-attended and very much in line with HRSD's mission and vision. This event will be added to our annual outreach calendar.

D. Internal Communications

1. Director participated in the following internal meetings and events:

   a. Virtual Emergency Operations Center (EOC) meetings ahead of Hurricane Dorian
   b. Meetings with members of the SEA team planning HRSD participation in the "Catch the King Tide" event
   c. Meeting with communications staff to plan HRSD's participation in this year's "Imagine a Day without Water" event
   d. Meeting to review recharge well interpretive graphics for the SWIFT RC
   e. New Employee Orientation meetings
   f. SWIFT QST, QST and Discharge Monitoring Report (DMR) meetings

2. Director conducted bi-weekly communications department status meetings.

E. Metrics

1. Educational and Outreach Activities: 3

   a. 09/07/19 – Go Green Expo, Newport News (300-400 attendees)
   b. 09/12/19 – SWIFT RC tour to group from WaterJAM (30 attendees)
   c. 09/25/19 – SWIFT RC tour to Old Dominion University World Resources class (20 attendees)

2. Number of Community Partners: 4
   a. Virginia Cooperative Extension/Newport News Master Gardeners Association
   b. City of Newport News
   c. Virginia Water Environment Association (VWEA)
   d. Old Dominion University

3. Additional Activities Coordinated by Communications Department: 0

4. Monthly Metrics Summary

Item #	Strategic Planning Measure	Unit	September 2019
M-1.4a	Total Training Hours per Full Time Employee (3) - Current Month	Hours / #FTE	9.17
M-1.4b	Total Training Hours per Full Time Employee (3) - Cumulative Fiscal Year-to-Date	Hours / #FTE	25.87
M-5.2	Educational and Outreach Events	Number	3
M-5.3	Number of Community Partners	Number	4

Respectfully,

Leila Rice, APR
Director of Communications

TO: General Manager

FROM: Director of Engineering

SUBJECT: Engineering Monthly Report for September 2019

DATE: October 11, 2019

A. General

1. Capital Improvement Program (CIP) spending for the second month of Fiscal Year (FY) 2020 was slightly lower than the planned spending target.

   CIP Spending ($M):

	Current Period	FYTD
Actual	11.80	16.63
Plan	13.00	25.00

2. Members of the Engineering Department were actively involved in the recent WaterJAM Conference held in Virginia Beach. This meeting is a joint effort between the state American Water Works Association and the Virginia Water Environment Association (VWEA). Members of the Engineering Department presented and/or co-authored 10 technical papers, participated as both moderators and assistant moderators, acted as a judge for a student competition and hosted a facility tour of the SWIFT Research Center for 30 people. HRSD's involvement at this conference is an excellent way to stay current on technical issues, network with others in our industry and to give back to the profession.

B. Asset Management Division

1. Staff continues to draft Asset Management Plans for each treatment plant. Efforts are underway at the following treatment plants: Atlantic, James River, York River and Williamsburg. The steps necessary to create the plans include:

   - Creation of an asset inventory using recently developed data collection tools
   - Conduct condition assessments of critical inventory
   - Determine criticality of assets based on risk criteria
   - Validate each plan
   - Provide training to plant staff

The creation of the plans at each treatment plant will continue through 2020.

2. Emergency planning associated with Hurricane Dorian brought attention to a number of key areas that require further consideration. These areas for improvement include:

   - A Damage Assessment Plan for the treatment plants is needed.
   - Interceptor System damage assessments shall be performed by Interceptor System staff. Engineering and Account Investigator staff will be called upon in the event the emergency requires additional resources.
   - Regional coordination and planning with the localities is needed to ensure that essential services are provided by sharing resources and information (such as fuel supply and emergency power generators).
   - Radio communication issues identified at the repeater station at Big Bethel and two treatment plants have been resolved. Further efforts are needed to ensure that this back-up communication option is available during emergency situations.

C. North Shore, South Shore and SWIFT Design & Construction Divisions

1. The design for the Willard Avenue Pump Station Replacement located in the City of Hampton continues. The Preliminary Engineering Report has been finalized and the final design effort has begun. The property needed for the new pump station has been acquired and an adjacent property is also under consideration for acquisition to assure adequate space for the new pump station and an area large enough to allow for the construction effort. Close coordination with the City of Hampton and the citizens continues to assure that the new pump station will be welcomed into the neighborhood.

2. The design for the Elbow Road Pressure Reducing Station located in the City of Chesapeake is nearing completion. We are awaiting final review by the City prior to advertising this project for construction. This project is needed to allow for the diversion of flow from the Chesapeake-Elizabeth Treatment Plant to the Atlantic Treatment Plant. The project should be advertised for construction in October with an anticipated date to award the construction in January 2020. This project must be substantially complete by June 2021.

3. One important aspect of the SWIFT Program is consultant and contractor involvement. There will be numerous design and construction packages to be awarded and this will require significant participation from the private sector. We plan to conduct annual Contractor Outreach Meetings. These meetings will have three prime focus groups: large general contractors able to deliver these significant projects, mid-size specialty and trade contractors able to assist the general contractors and Small, Woman-Owned and Minority contractors. The first round of meetings is planned for January 2020.

D. Planning & Analysis Division

1. A kick-off meeting has been held for the Climate Change Planning Program. This effort will analyze the impacts of expected climate change on all major infrastructure including treatment plants, pump stations and sewers. One of the first locations to be considered will be the James River Treatment Plant. This location was selected since this will be the first SWIFT facility to be constructed and the large investment at this location must consider the impacts of climate change and sea-level rise.

2. The FY 2019 Management, Operations and Maintenance (MOM) Program metrics have been finalized. All metrics explicitly defined in the Consent Decree that have associated stipulated penalties either met or exceeded FY 2019 targets. One HRSD metric, "Number of Miss Utility No Shows" failed to meet FY 2019 targets. There are a total of 109 metrics included in the MOM Program which are recorded on either a monthly or annual basis. The Planning & Analysis Division has been working with IT staff to make improvements to the MOM SharePoint site to improve our ability to track and report on the efforts underway to assure compliance with the Consent Decree requirement.

E. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 14

   a. 09/01/19 – Staff co-authored an article in the Water Environment Federation (WEF) WE&T magazine entitled, "Programming Your Utility for Sustainable Performance."

   b. 09/10/19 - Staff participated on a panel discussion at the Young Professionals Workshop entitled, "Growing with Industry - Where Can Water Take You," at the WaterJAM Conference.

c. 09/10/19 – Staff made a presentation entitled, “Living in Three Different Worlds: An Owner’s Perspective on Project Delivery for Three Projects Concurrently” at the WaterJAM Conference.

d. 09/10/19 – Staff made a presentation entitled, “An Update on HRSD’s Asset Management Journey” at the WaterJAM Conference.

e. 09/11/19 – Staff participated as a Judge for the Virginia AWWA Student Water Challenge held at the WaterJAM Conference.

f. 09/11/19 – Staff made a presentation entitled, “First of its Kind in Virginia Project: HRSD’s SWIFT Full-Scale Implementation Program Initiative” at the WaterJAM Conference.

g. 09/11/19 - Staff co-authored a presentation entitled, “SWIFT Research Center Preliminary Aquifer Recharge Experience” at the WaterJAM Conference.

h. 09/11/19 - Staff co-authored a presentation entitled, “HRSD Sets the Bar HI: Designing a Fully HI Complaint Sewer Pump Station for HRSD” at the WaterJAM Conference.

i. 09/11/19 - Staff made a presentation entitled, “Envision: The Missing Puzzle Piece to a Sustainable Utility” at the WaterJAM Conference.

j. 09/12/19 – Staff co-authored a presentation entitled, “Using Virtual Reality to Ensure Operator-Friendly Designs” at the WaterJAM Conference.

k. 09/12/19 – Staff made a presentation entitled, “Utility Develops Triple-Bottom Line Decision Matrix to Select Highest Scoring Solution to Critical Sewer System Improvements Needs” at the WaterJAM Conference.

l. 09/12/19 – Staff co-authored a presentation entitled, “It Takes a Village: Collaboration to Import Technology to Virginia for a Cost-Effective Solids Handling Solution” at the WaterJAM Conference.

m. 09/12/19 – Staff coordinated and hosted a “Facility Tour of the SWIFT Research Center” for 30 people as part of the WaterJAM Conference.

n. 09/30/19 - Staff made a presentation to the Virginia Association of Governmental Purchasing Conference (VAGPC) on HRSD’s Design-Build Project Delivery Experiences.

2. Number of Community Partners: 2

   a. WEF

   b. VAGPC

3. Number of Research Partners: 0

4. Metrics Summary:

Item #	Strategic Planning Measure	Unit	September 2019
M-1.4a	Total Training Hours per Full Time Employee (44) - Current Month	Hours / #FTE	10.15
M-1.4b	Total Training Hours per Full Time Employee (44) - Cumulative Fiscal Year-to-Date	Hours / #FTE	15.30
M-5.2	Educational and Outreach Events	Number	14
M-5.3	Number of Community Partners	Number	2
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 September 2019

DATE: October 9, 2019

A. General

1. Water consumption is slightly higher than budget, which is driving wastewater revenues higher. Interest income continues to be strong, but is expected to slow down as the Federal Reserve cut rates in September and is expected to cut rates again soon. Facility charge revenue, at 29 percent, is slightly higher than budget due to increased construction activity during the summer months and generally consistent with the prior year. Personal services and fringe benefit expenses are slightly above budget at 27 percent and 26 percent, respectively, with each of these expenses consistent with the prior year. Since HRSD has 26 bi-weekly pay periods, expenses are higher during months like August, which had three pay periods. We anticipate that as we return to months when there are two pay periods the cumulative expense percentages will be back in line with budget. Most other expenses are below budget, generally consistent with the prior year. Major repairs and capital assets expenses are significantly lower than budget at this time, since many purchases during FY-2020 have related to prior year encumbrances. Miscellaneous expense is higher than budget at 32 percent, but can vary during the year and we do not expect it to exceed budget in total.

2. In anticipation of the cash defeasance closing on October 2 and with declining interest rates (bond prices vary inversely to interest rates), staff moved $66 million from the 1 to 3-year fund into the Liquidity Pool on September 16. Staff intends to maximize interest earnings until the funds are transferred at closing.

B. Interim Financial Report

1. Operating Budget for the Period Ended September 30, 2019

	Amended Budget	Current YTD	Current YTD as % of Budget (25% Budget to Date)	Prior YTD as % of Prior Year Budget
Operating Revenues				
Wastewater	$ 316,217,000	$ 84,698,292	27%	26%
Surcharge	1,500,000	455,516	30%	28%
Indirect Discharge	2,750,000	839,879	31%	17%
Fees	2,858,000	745,765	26%	24%
Municipal Assistance	725,000	162,594	22%	17%
Miscellaneous	600,000	76,665	13%	14%
Total Operating Revenue	324,650,000	86,978,711	27%	26%
Non Operating Revenues				
Facility Charge	6,160,000	1,764,850	29%	27%
Interest Income	4,000,000	1,676,726	42%	48%
Build America Bond Subsidy	2,400,000	1,121,298	47%	0%
Other	595,000	128,918	22%	0%
Total Non Operating Revenue	13,155,000	4,691,792	36%	24%
Total Revenues	337,805,000	91,670,503	27%	26%
Transfers from Reserves	10,857,750	2,714,438	25%	25%
Total Revenues and Transfers	$ 348,662,750	$ 94,384,941	27%	26%
Operating Expenses				
Personal Services	$ 57,346,225	$ 15,648,569	27%	27%
Fringe Benefits	24,232,400	6,202,021	26%	25%
Materials & Supplies	8,838,801	1,522,722	17%	22%
Transportation	1,579,921	277,305	18%	20%
Utilities	12,774,299	2,552,505	20%	22%
Chemical Purchases	10,979,218	2,143,236	20%	19%
Contractual Services	46,373,753	7,429,711	16%	16%
Major Repairs	10,847,604	1,106,565	10%	8%
Capital Assets	458,825	-	0%	9%
Miscellaneous Expense	3,085,523	975,611	32%	23%
Total Operating Expenses	176,516,569	37,858,245	21%	21%
Debt Service and Transfers				
Debt Service	63,544,841	22,555,134	35%	35%
Transfer to CIP	108,341,340	27,085,335	25%	25%
Transfer to Risk management	260,000	65,001	25%	25%
Total Debt Service and Transfers	172,146,181	49,705,470	29%	29%
Total Expenses and Transfers	$ 348,662,750	$ 87,563,715	25%	25%

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 September 30, 2019

HRSD - RESERVE AND CAPITAL ACTIVITY September 30, 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	89,274,031					-
Capital Grants					-	
VRA Draws					8,582,774	
Bond Proceeds (includes interest)						36,364
Transfers In	-		65,001		27,085,335	
Sources of Funds	89,274,031	-	65,001	-	35,668,109	36,364
Total Funds Available	**$ 268,211,185**	**$ 28,553,343**	**$ 3,564,536**	**$ 15,266,324**	**$ 121,947,918**	**$ 14,370,917**
Current Year Uses of Funds						
Cash Disbursements	66,789,611				16,515,400	14,370,917
Transfers Out	27,150,336					-
Uses of Funds	93,939,947	-	-	-	16,515,400	14,370,917
End of Period - September 30, 2019	**$ 174,271,238**	**$ 28,553,343**	**$ 3,564,536**	**$ 15,266,324**	**$ 105,432,518**	**$ -**

Unrestricted Funds **$ 298,534,616**

4. Capital Improvements Budget and Activity Summary for Active Projects for the Period Ended September 30, 2019

Classification/ Treatment Service Area	Budget	Expenditures prior to 6/30/2018	Year to Date FY 2019 Expenditure	Total Expenditures	Outstanding Encumbrances	Available Balance
Administration	$ 74,586,023	$ 43,226,275	$ 921,340	$ 44,147,615	$ 17,146,242	$ 13,292,166
Army Base	158,584,000	125,110,560	19,064	125,129,624	2,588,366	30,866,010
Atlantic	127,883,059	88,977,629	4,314,902	93,292,531	15,137,475	19,453,053
Boat Harbor	136,850,842	60,512,133	792,546	61,304,679	18,553,629	56,992,534
Ches-Eliz	186,982,583	21,557,919	6,339,874	27,897,793	63,276,053	95,808,737
James River	286,313,687	58,557,889	129,046	58,686,935	8,287,143	219,339,609
Middle Peninsula	88,315,297	10,996,758	235,028	11,231,786	7,781,300	69,302,211
Nansemond	90,309,879	42,439,857	442,564	42,882,421	5,129,183	42,298,275
Surry	45,747,598	1,905,064	118,884	2,023,948	8,058,165	35,665,485
VIP	300,368,424	259,851,080	536,453	260,387,533	1,398,969	38,581,922
Williamsburg	32,901,493	12,215,243	939,079	13,154,322	1,808,562	17,938,609
York River	51,754,404	44,185,737	283,000	44,468,737	2,024,109	5,261,558
General	686,544,402	233,236,782	1,468,224	234,705,006	30,170,207	421,669,189
	$2,267,141,691	$ 1,002,772,926	$ 16,540,004	$ 1,019,312,930	$ 181,359,403	$ 1,066,469,358

5. Debt Management Overview

HRSD - Debt Outstanding ($000's) September 30, 2019

	Principal Aug 2019	Principal Payments	Principal Draws	Principal Sep 2019	Interest Payments
Fixed Rate					
Senior	$ 307,410	$ (2,580)	$ -	$ 304,830	$ (858)
Subordinate	465,094	(1,136)	2,764	466,722	(776)
Variable Rate					
Subordinate	50,000	-	-	50,000	(61)
Line of Credit					
Total	$ 822,504	$ (3,716)	$ 2,764	$ 821,552	$ (1,695)

HRSD- Series 2016VR Bond Analysis September 27, 2019

	SIFMA Index	HRSD	Spread to SIFMA
Maximum	2.30%	2.25%	-0.05%
Average	0.53%	0.52%	-0.01%
Minimum	0.01%	0.01%	0.00%
As of 9/27/19	1.58%	1.60%	0.02%

* Since October 20, 2011 HRSD has averaged 52 basis points on Variable Rate Debt

6. Financial Performance Metrics for the Period Ended September 30, 2019

HRSD - UNRESTRICTED CASH — September 30, 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	**$**	**298,534,616**		**617**
Risk Management Reserve	$	(3,564,536)	(7)	610
Reserve	$	(15,266,324)	(32)	578
Capital (PAYGO only)	$	(105,432,518)	(218)	360
Net Unassigned Cash	**$**	**174,271,238**		**360**

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 — September 30, 2019

Primary Source	Beginning Market Value July 1, 2019	YTD Contributions	YTD Withdrawals	YTD Income Earned	Ending Market Value September 30, 2019	Allocation of Funds	Credit Quality	Current Mo Avg Yield
BAML Corp Disbursement Account	7,755,006	183,901,054	118,773,077	23,955	72,906,938	28.9%	N/A	0.70%
VIP Stable NAV Liquidity Pool	163,658,801	91,355,162	76,355,162	1,029,123	179,687,924	71.1%	AAAm	2.20%
Total Primary Source	**$ 171,413,807**	**$ 275,256,216**	**$ 195,128,239**	**$ 1,053,078**	**$ 252,594,862**	100.0%		

Secondary Source	Beginning Market Value July 1, 2019	YTD Contributions	YTD Withdrawals	YTD Income Earned & Realized G/L	Ending Market Value September 30, 2019	Ending Cost	YTD Mkt Adj	Yield to Maturity at Market
VIP 1-3 Year High Quality Bond Fund	128,529,607	-	66,361,643	709,139	62,744,350	62,877,103	(132,753)	
Total Secondary Source	**$ 128,529,607**	**$ -**	**$ 66,361,643**	**$ 709,139**	**$ 62,744,350**	**$ 62,877,103**	**$ (132,753)**	

	Total	Fund Alloc
Total Primary Source	**$ 252,594,862**	**80.1%**
Total Secondary Source	**$ 62,744,350**	**19.9%**

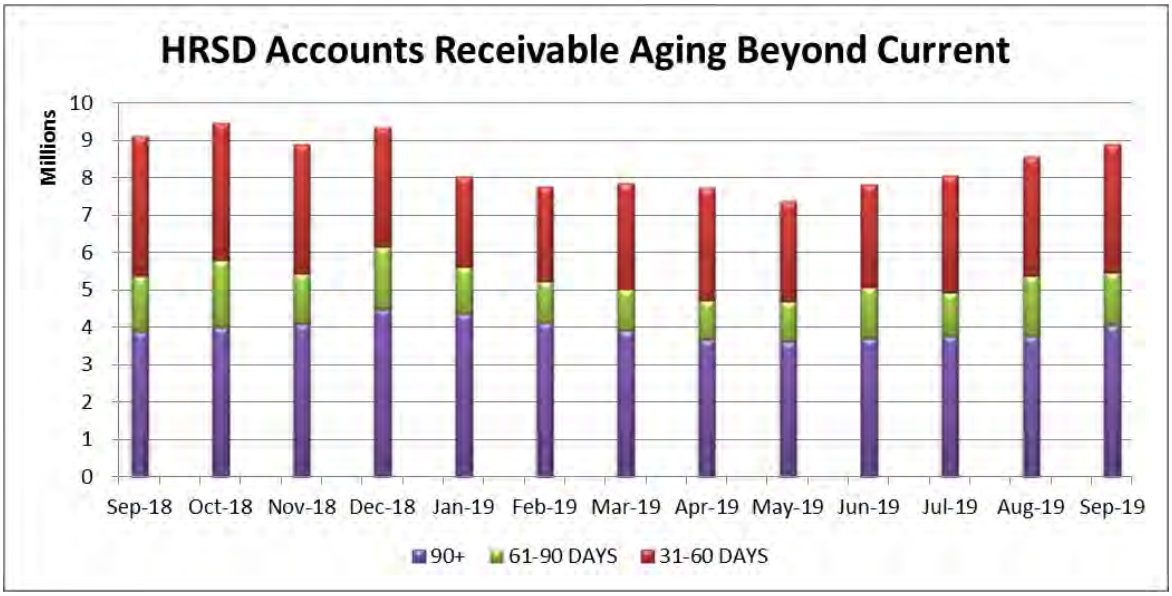
7. Summary of Billed Consumption

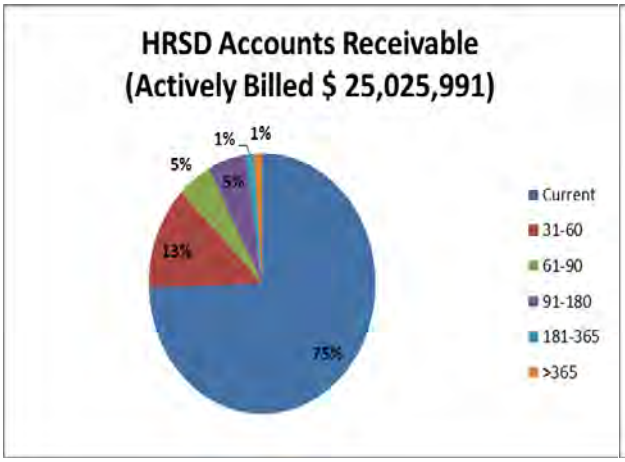
Summary of Billed Consumption (,000s ccf)

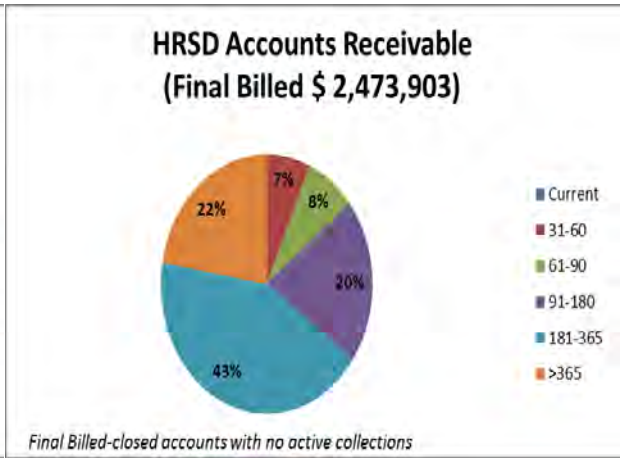
Month	*FY2020 Cumulative Budget Estimate*	*FY2020 Cumulative Actual*	*% Difference From Budget*	*Cumulative FY2019 Actual*	*% Difference From FY2019*	*Cumulative 3 Year Average*	*% Difference From 3 Year Average*
July	4,845	5,135	6.0%	5,175	-0.8%	4,940	4.0%
Aug	9,649	10,009	3.7%	10,233	-2.2%	9,815	2.0%
Sept	14,488	14,571	0.6%	14,294	1.9%	14,384	1.3%
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

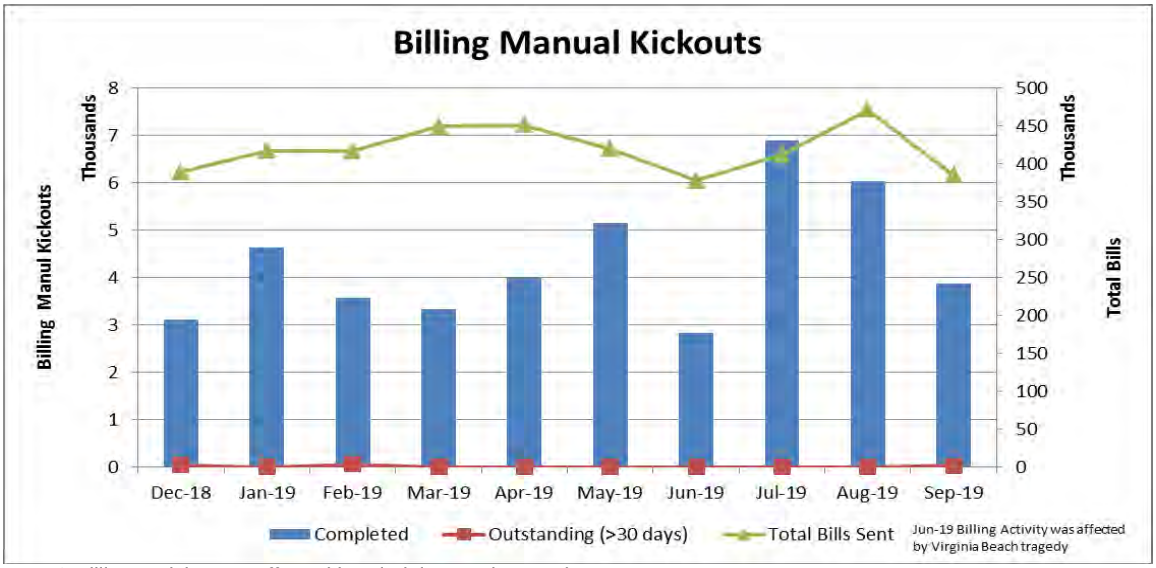
1. Accounts Receivable Overview



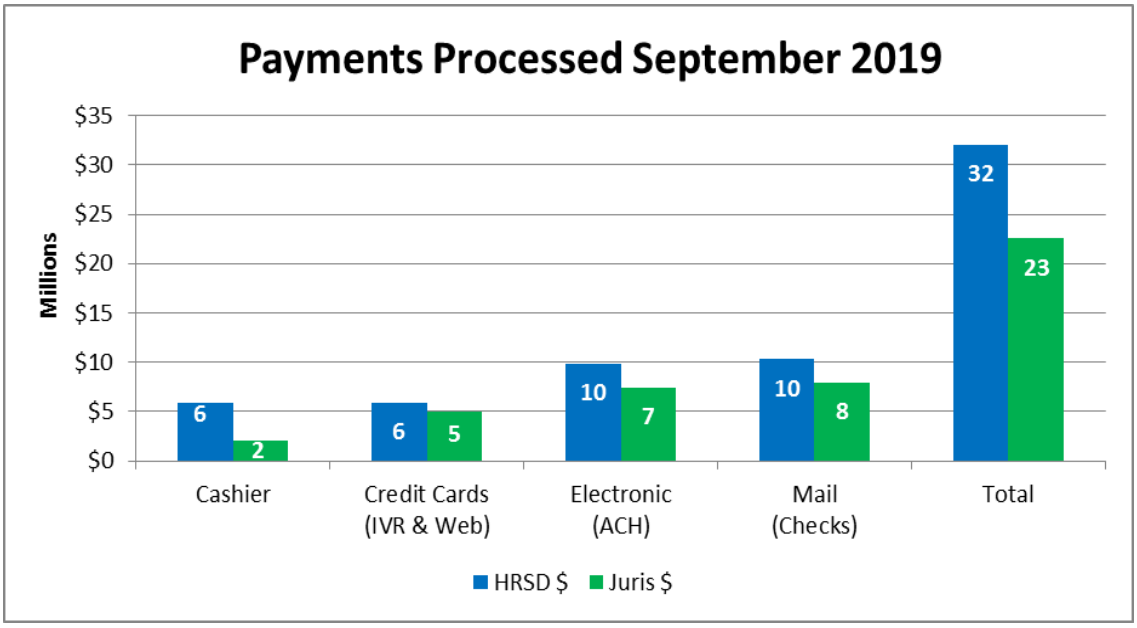


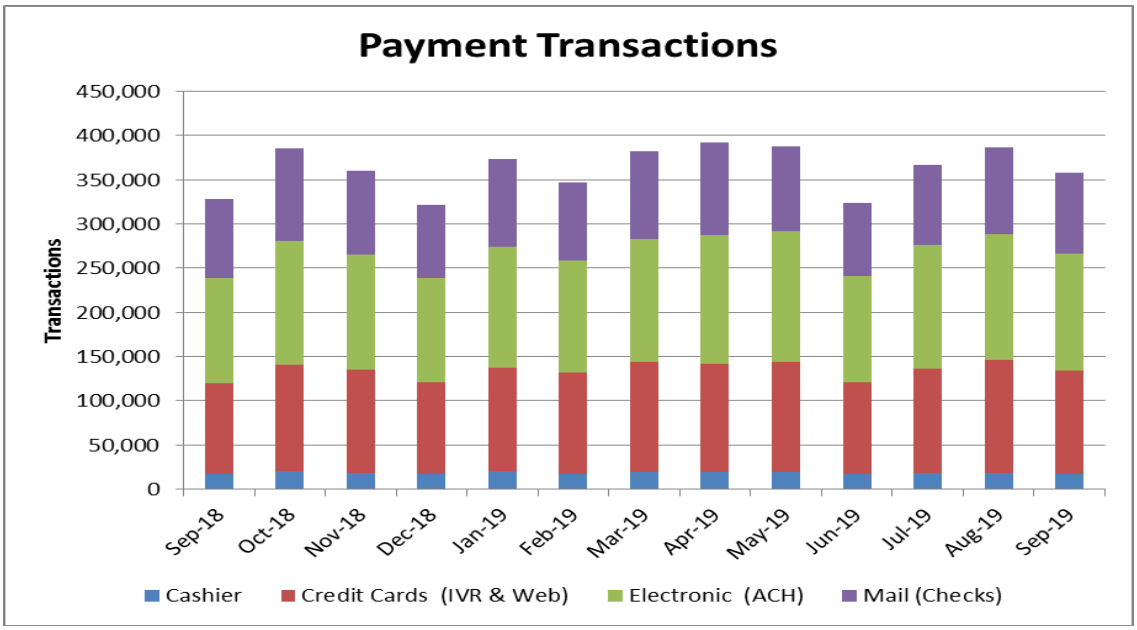


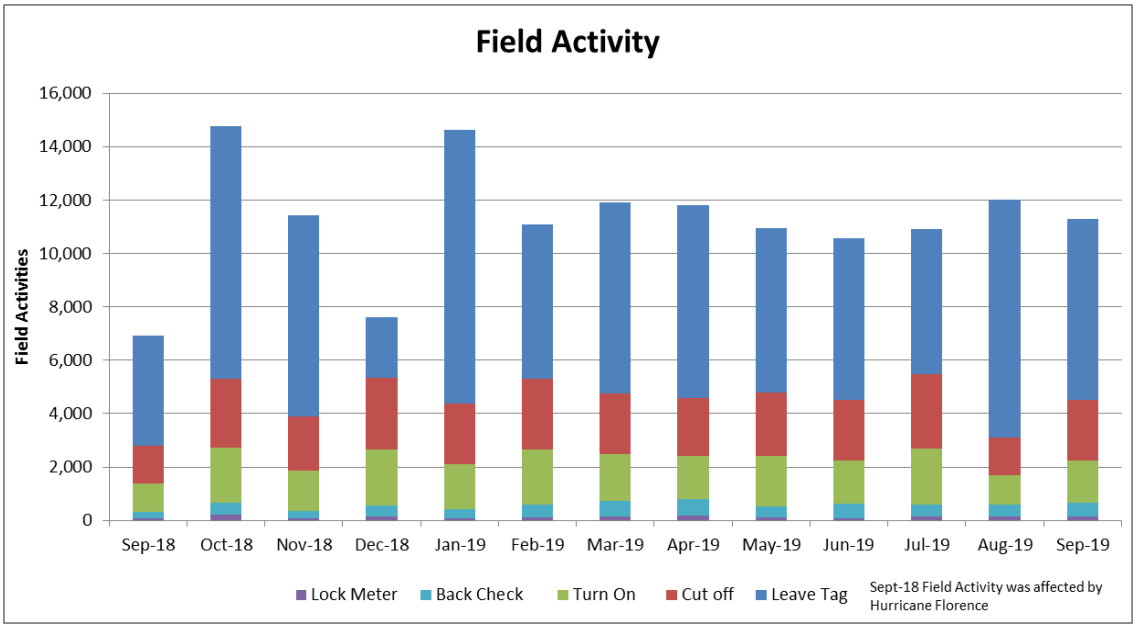
2. Customer Care Center Statistics

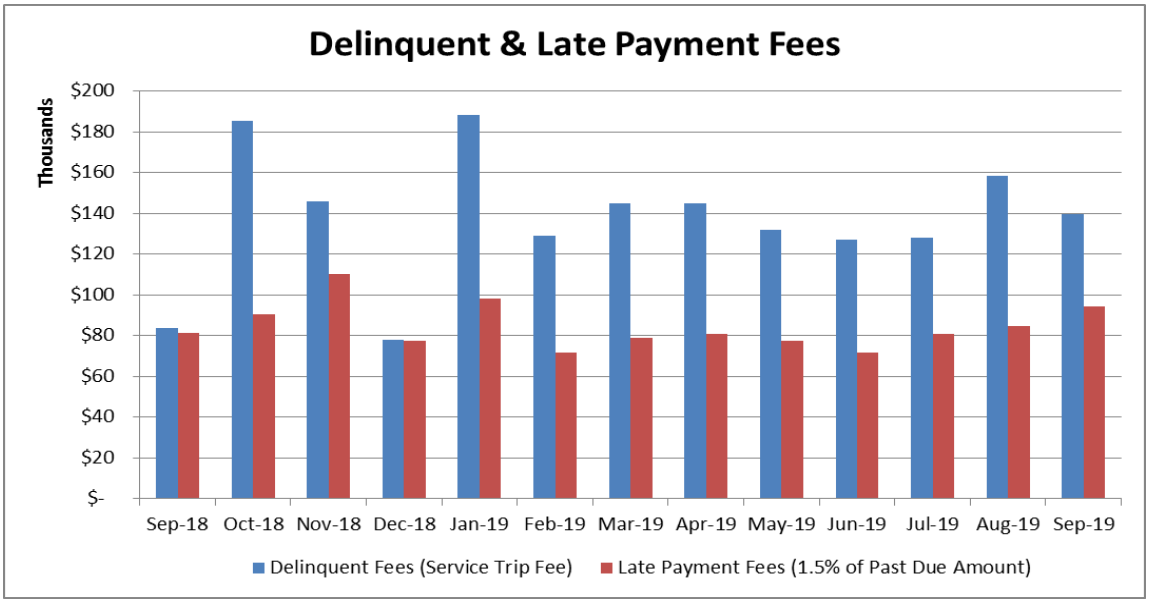


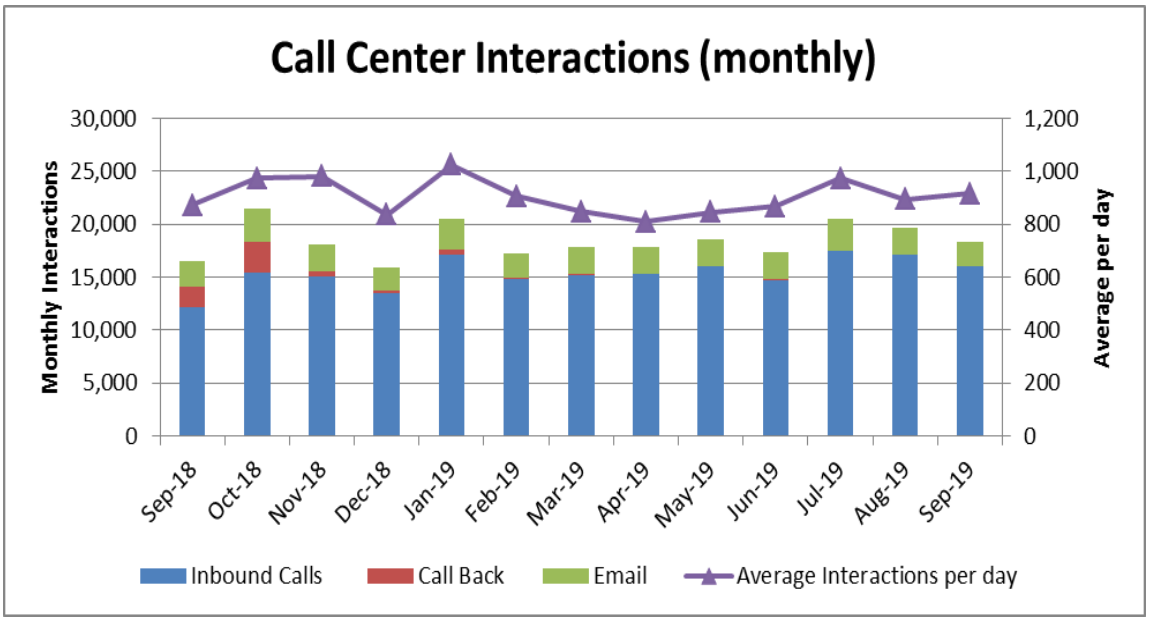
Jun-19 Billing Activity was affected by Virginia Beach tragedy.
Jul-19 A formatting change caused an increase in manual kickouts. We expect the levels to normalize in the next few months.

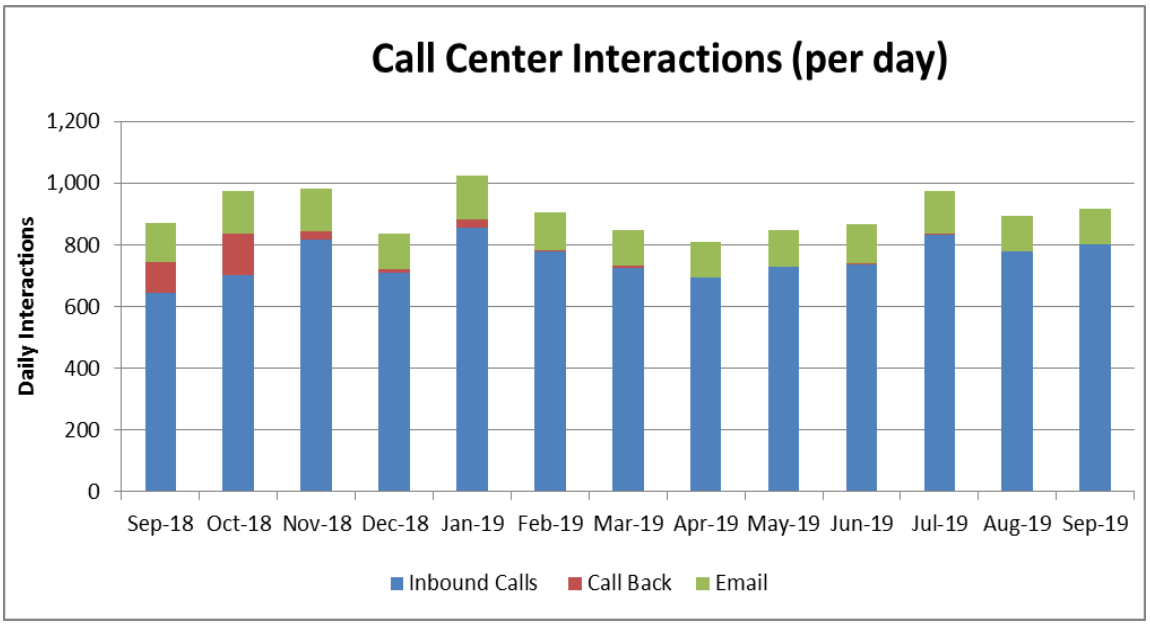

Payments Processed September 2019
$35
$30
$25
$20
$15
$10
$5
$0
Millions
6
2
6
5
10
7
10
8
32
23
Cashier
Credit Cards (IVR & Web)
Electronic (ACH)
Mail (Checks)
Total
HRSD $
Juris $


Payment Transactions
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Transactions
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Cashier
Credit Cards (IVR & Web)
Electronic (ACH)
Mail (Checks)


Field Activity
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Field Activities
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Lock Meter
Back Check
Turn On
Cut off
Leave Tag
Sept-18 Field Activity was affected by Hurricane Florence


Delinquent & Late Payment Fees
Thousands
$200
$180
$160
$140
$120
$100
$80
$60
$40
$20
$-
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Delinquent Fees (Service Trip Fee)
Late Payment Fees (1.5% of Past Due Amount)


Call Center Interactions (monthly)
Monthly Interactions
30,000
25,000
20,000
15,000
10,000
5,000
0
1,200
1,000
800
600
400
200
0
Average per day
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Inbound Calls
Call Back
Email
Average Interactions per day

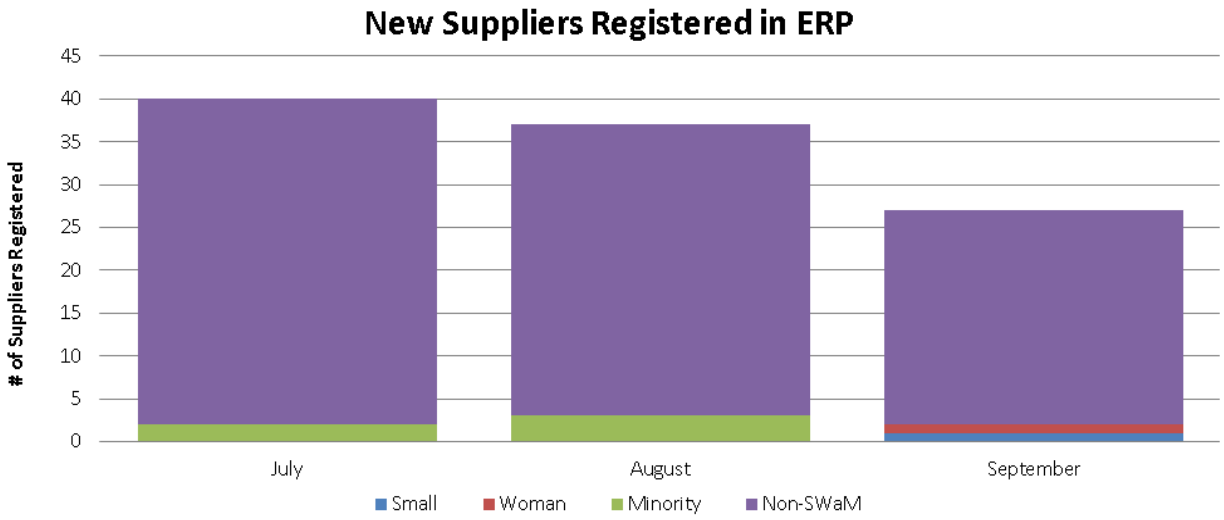

Call Center Interactions (per day)
Daily Interactions
1,200
1,000
800
600
400
200
0
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Inbound Calls
Call Back
Email

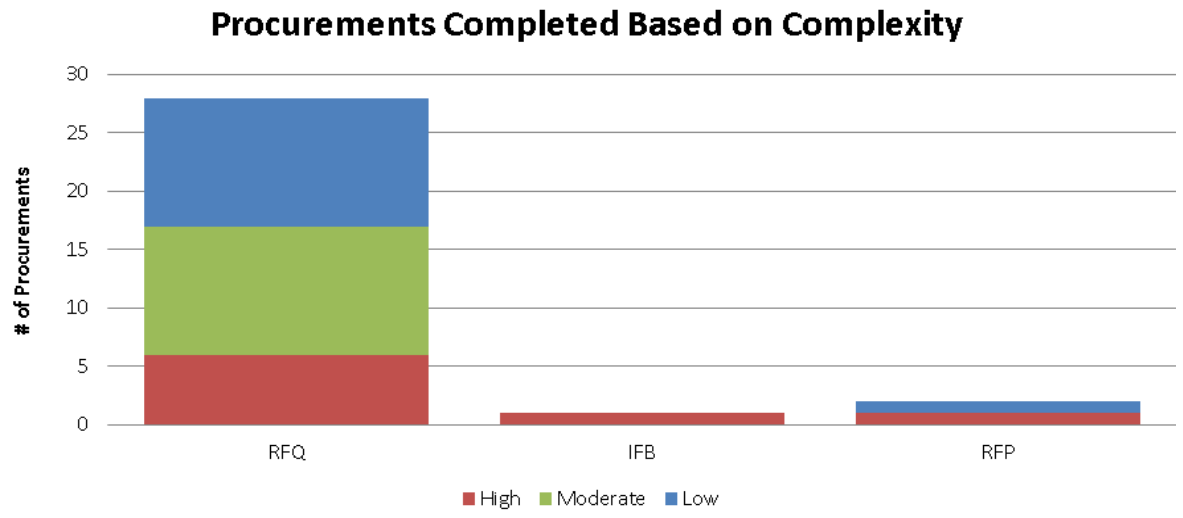
Customer Interaction Statistics	Apr	May	Jun	Jul	Aug	Sep
Calls Answered within 3 minutes	96%	96%	94%	89%	94%	81%
Average Wait Time (seconds)	0:26	0:29	0:40	0:64	0:63	0:81
Calls Abandoned	3%	3%	4%	7%	5%	7%

D. Procurement Statistics

Savings	Current Period	FYTD
Competitive Savings[1]	$11,310	$62,612
Negotiated Savings[2]	$1,655	$10,161
Salvage Revenues	$89	$1,093
Corporate VISA Card - Estimated Rebate	$18,375	$62,898

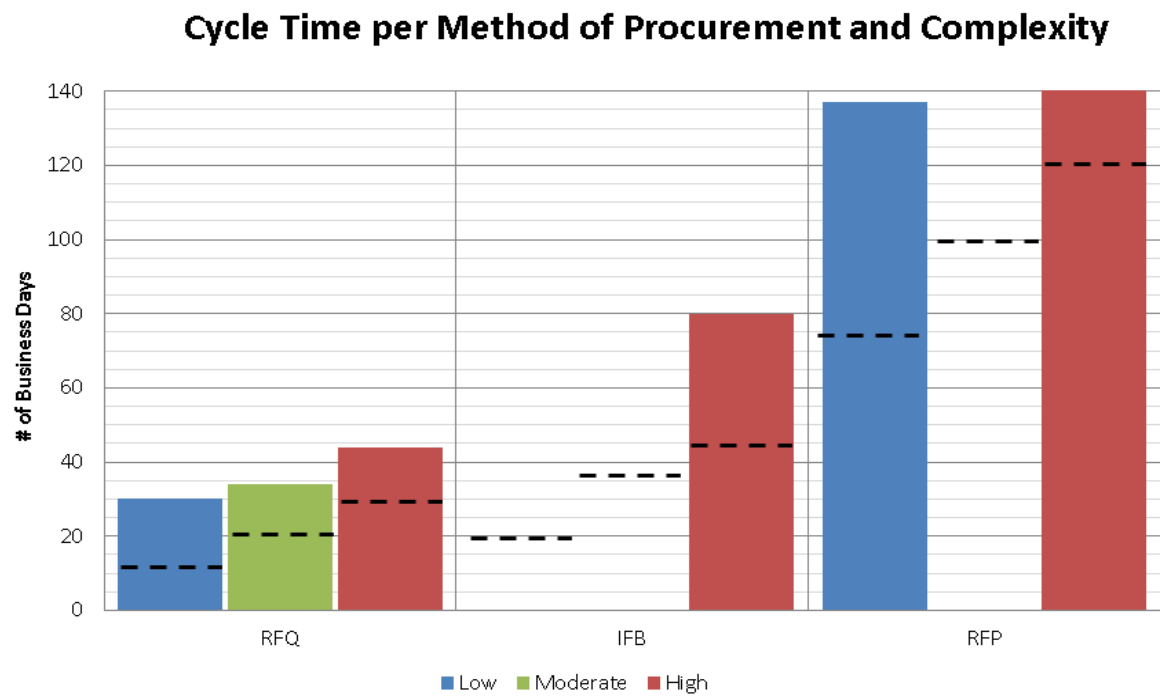
*Increase to FYTD total of $1,792.37 for Competitive Savings not recorded in August monthly totals.





[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.

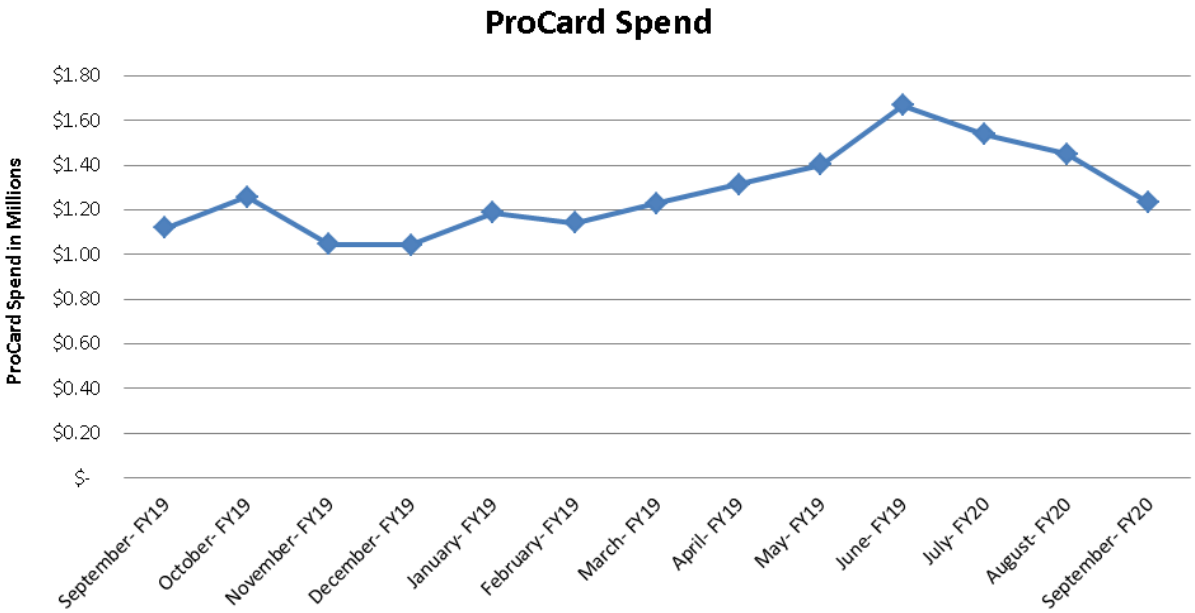
[2] Negotiated savings are savings obtained during a Request for Proposal process, or if all bids received exceed the budgeted amount, or if only one bid is received.

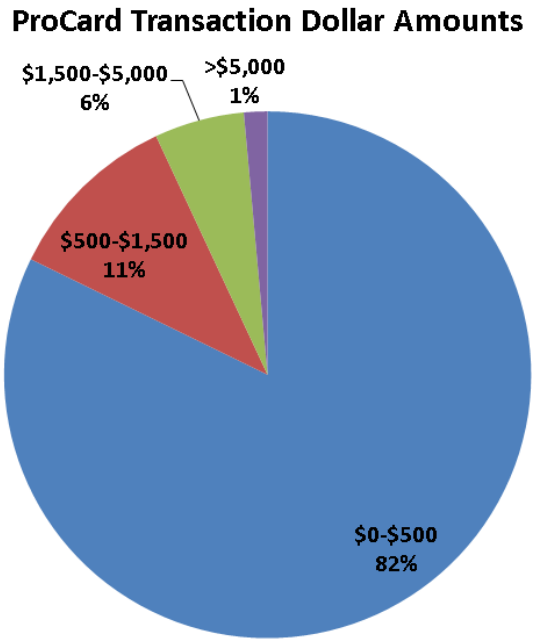


Dashed Line: Target Service Level Cycle Time

	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 Fraud	External Fraud Transactions *	Comments
July	2	Caught by Bank Immediately
August	0	
September	0	
Total	**2**	

*__External Fraud:__ Fraud from outside HRSD (i.e.: a lost or stolen card, phishing, or identity theft)

Procurement Client Training		
	Current Period	**YTD**
ProCard Policy and Process	0	10
Procurement Cycle	1	2
Total	**1**	**12**

E. Business Intelligence – Enterprise Resource Planning (ERP)

1. ERP Helpdesk currently has 125 open work orders in the following statuses:

Escalated	4
In progress	59
On Hold	10
Open	51
Waiting on User	1

2. ERP Helpdesk received 12 work orders in September. In September, 275 work orders were closed and 124 were closed within one hour.

3. Projects

a. Unifier and Oracle Primavera P6 Administrative (Admin) Support

(1) Capitol Program Analyst received 256 Unifier work requests with 96 percent resolved.

(2) Capitol Program Analyst received 14 P6 related work requests with 100 percent resolved.

b. ERP Enhancements

(1) Worked with Vendor and Accounting staff to facilitate implementation of CAFR reporting software.

(2) Began review of vendor responses for reporting software solicitation.

(3) Participated in Annual Planning Day with Business Intelligence and IT staff

(4) Assisted Accounting staff with preparation and reconciliation of Workers' Compensation information for FY-2019 insurance audit

c. 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) P6 Capability transfer continues and will be completed in early October.

(2) Oracle E-Business Suite (EBS)/Unifier interface construction continues. Interface testing is scheduled to begin in October

(3) Panoptra data visualization training was held and is now live for users.

F. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 1

   09/11/19 - 2019 Virginia American Water Works Association/Virginia Water Environment Association (VA AWWA/VWEA) WaterJAM Vendor Expo

2. Community Partners: 2

   a. VA AWWA
   b. VWEA

3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	September 2019
M-1.4a	Training During Work Hours Per Full Time Employee (102) – Current Month	Hours / #FTE	4.21
M-1.4b	Total Training During Work Hours Per Full Time Employee (102) – Cumulative Fiscal Year-to-Date	Hours / #FTE	6.98
M-5.2	Educational and Outreach Events	Number	1
M-5.3	Number of Community Partners	Number	2
	Wastewater Revenue	Percentage of budgeted	108%
	General Reserves	Percentage of Operating Budget less Depreciation	115%
	Liquidity	Days Cash on Hand	633 Days
	Accounts Receivable (HRSD)	Dollars	$27,499,894
	Aging Accounts Receivable	Percentage of receivables greater than 90 days	15%

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		*

*These metrics will be reported upon closeout of fiscal year financials.

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

[3] Median Household Income is based on the American Community Survey (US Census) for Hampton Roads

TO: General Manager

FROM: Director of Information Technology

SUBJECT: Information Technology Department Report for September 2019

DATE: October 10, 2019

A. General

1. As part of an ongoing technology refresh plan, wireless access points have been upgraded and tested at the North Shore Operations facility and the Williamsburg, Atlantic, Nansemond, and York River treatment plants.

2. Staff remains heavily engaged in finalizing the software and hardware configuration profiles for the upcoming deployment of Surface Pro computers.

3. Working with a third party vendor specializing in IT and software training, staff designed a short training class covering the essential differences and features of the Windows 10 operating system. This training will be provided to all employees prior to receiving their new Windows 10 based computers.

4. The HRSD SharePoint governance team conducted its quarterly meeting. Special guest speaker, Steve Pucelik, from the Microsoft Corporation, presented some of the new features and available services offered for SharePoint.

5. Staff continues planning and preparations for upgrading the e-Mail and SharePoint platforms. Once the organization-wide migration to Windows 10 is complete, these upgrades can begin.

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	September 2019
M-1.4a	Training During Work Hours Per Full-Time Employee (50) – Current Month	Total Training Hours / # FTE	10.06
M-1.4b	Total Training During Work Hours Per Full-Time Employee (50) – Cumulative Fiscal Year-to-Date	Total Training Hours / # FTE	18.42
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 September 2019

DATE: October 8, 2019

A. General

The Operations Challenge Team placed 2nd in the Division 2 Maintenance Event and 3rd in the Collections Event at WEFTEC in Chicago this year. They also placed 4th in the overall ranking out of 40 Division 2 teams.

David Wood, Electrical and Instrumentation Specialist was selected as one of the Commonwealth of Virginia's Department of Labor (DOL) 2019 Outstanding Apprentices of the year.

Staff spent significant time preparing for Hurricane Dorian. Fortunately, there was little damage across all work centers.

B. Interceptor Systems

1. North Shore (NS) Interceptor Systems

a. There were six system alarms during the month. Staff was able to resolve all issues and alarms promptly.

b. The Coliseum Pressure Reducing Station (PRS) and offline storage tank programming efforts to level out diurnal flows at York River Treatment Plant (YRTP) continued throughout the month.

c. Staff successfully operated the Patrick Henry Pump Station (PS) using the Supervisory Control and Data Acquisition (SCADA) system this month. For the first time, remote control operation of an unmanned PS facility was achieved. We are now moving forward with an evaluation of the network and communications configuration of the system. After this, we will assess the viability of the entire network architecture and security elements before executing the remaining portions of the project for the entire HRSD system.

d. While installing new gravity infrastructure in the Deep Creek neighborhood, the City of Newport News crews damaged approximately 24 linear feet of HRSD's 12-inch force main along

Barclay Road. Staff responded and evaluated the pipe for damage. Parts were ordered and repair of the force main is scheduled for October. Fortunately, the damage did not puncture the force main and no spill occurred.

2. South Shore (SS) Interceptor Systems

a. There was one Sanitary Sewer Overflow (SSO) reported this month. On September 21, City of Virginia Public Utilities staff reported a force main failure on Virginia Beach Boulevard near North Lynnhaven Road. The line failure leaked approximately 225 gallons into a storm drain leading to a Lynnhaven River tributary. Staff redirected the leak from the storm drain to a sump that staff periodically empties. Due to traffic control complexities, a contractor will repair the 24-inch concrete pipe in early October.

b. There was one odor complaint reported this month. On September 26, City of Suffolk Public Utilities Department received notification of odors near the Suffolk PS. Staff investigated, secured all hatches, and ensured the station was in good working order.

c. There were four interceptor complaints reported this month: two for City of Norfolk Utilities, one for City of Virginia Beach Public Utilities, and one for City of Suffolk Public Utilities.

d. Staff responded to and resolved 12 system alarms this month.

e. Staff took advantage of the Centerville Turnpike Drawbridge closure to repair a broken branch valve.

f. Staff assisted the Nansemond Treatment Plant (NTP) by removing six yards of debris from the Regional Residual Facility (RRF) and assisted the Chesapeake-Elizabeth Treatment Plant (CETP) by removing approximately one eighth of a yard of grease from the septic well. They also cleaned the septic dump pit and the influent pipeline at CETP.

g. Staff operated system valves to assist the City of Virginia Beach in the repair of a city force main on Royal Palm Arch near Little Neck Road.

C. Major Treatment Plant Operations

1. Army Base Treatment Plant (ABTP)

a. A low chlorine residual event occurred when staff was replacing an inoperative valve.

b. One chlorine residual sample was missed when staff suspended sampling due to high wind conditions during Hurricane Dorian.

c. There were three non-potable water (NPW) spills. Staff found a loose hose fitting causing a 2,000 gallon spill. A second spill of 5,000 gallons occurred when a line overflowed while draining an aeration tank (tank was drained too fast and exceeded the drain pipe capacity). The third spill of 1,000 gallons occurred when a contractor tested NPW water hydrants (as opposed to the potable water hydrants) with the water discharged into the storm drains. None of flow from the spills was recovered.

d. A contractor rebuilt the #1 center flow band screen in the Preliminary Treatment Facility.

e. A contractor re-coated a ductile iron pipe in the Nitrification Enhancement Facility (NEF).

f. Staff replaced an odor control recirculation pump. This the second of four obsolete pumps to be replaced.

2. Atlantic Treatment Plant (ATP)

a. Construction of the Thermal Hydrolysis Process (THP) continues. Contractors completed the roof on the pre-dewatering building. Electrical work continues and the cake hopper was set in place. Construction of the catwalk from the pre-dewatering building to the gravity belt thickener room began. Staff is working to replace worn valves in the digester building ahead of the startup of the facility. Startup testing of the steam boiler will being in October.

b. Secondary clarifiers #5 and #6 are currently out of service because of broken bolts on the center drive. Staff is in the process of repairing.

c. The Combined Heat and Power engine (CHP) was shut down this month because of a leak in the digester gas piping. The leaking pipe was replaced. This is the second section of piping that has failed. The

condensate from the digester is very corrosive. Staff is replacing the all of the CHP piping exposed to the condensate with a material that should be more resilient to the corrosive conditions. Staff also repaired the CHP heat exchanger.

3. Boat Harbor Treatment Plant (BHTP)

   a. Staff was updated on the status of the planned closure of the plant within the next five years.

   b. Preparations for Hurricane Dorian revealed some flaws in the emergency shut down procedures for the treatment plant in the event of extreme flooding. As part of the preparations, staff removed the breakers that could be in danger of flooding. By doing this, we discovered that the communications network for 20 North Shore pump stations was also cut. Staff developed an alternative solution that will be implemented next month which allows for the shut-down and abandonment of the plant facilities while still maintaining the North Shore pump stations communications.

   c. Staff installed new draft tubes in secondary clarifier #3.

   d. Contractors replaced deteriorated sections of the #2 diffused air flotation thickener tank support frame. Staff prepared and coated the new steel.

4. CETP

   a. Staff replaced an older polymer blending unit with a new, more efficient unit.

   b. Due to multiple power outages during Hurricane Dorian, a furnace center shaft motor and gear box failed. Staff replaced both.

   c. Staff replaced a burned out breaker in a centrifuge panel.

   d. Staff replaced a blown buss fuse holder on the #2 centrifuge feed pump variable frequency drive.

   e. Staff repaired two hypochlorite line leaks in the manholes.

   f. Staff cleaned and scoured lines for grit removal as a result of Hurricane Dorian.

5. James River Treatment Plant (JRTP)

a. Staff completed several maintenance and repair projects including replacing a secondary treatment air supply valve, rebuilding a caustic recirculation pump and replacing a worn out screw conveyor and bearing on #1 grit classifier.

b. Staff completed installation of stainless steel plates on the wall separating the anaerobic and anoxic zones and modified the Nitrified Recycle (NRCY) pipe at the discharge point in the Integrated Fixed Film Activated (IFAS) tank #5. The plates should help reduce the amount of dissolved oxygen flowing from the anoxic zone to the anaerobic zone. The NRCY pipe modifications involved cutting the pipe and moving the discharge point a little farther from the wall to prevent NRCY from entering the anaerobic zone.

c. NS staff installed a pump and piping to assist moving media from the IFAS tank #3 to the IFAS tank #5. IFAS tank #5 will be tested at a media fill fraction of 65 percent to determine its ability to remove nitrogen under various flow and loading conditions.

d. Staff completed several improvements and repairs to the primary clarifiers. Increasing the size of scum raceway NPW piping to allow more flow to the spray nozzles was one improvement. Staff also replaced spray nozzles and installed hose connections in locations making it easier to hook up hoses and remove scum manually. Repairs included replacing a primary solids and scum pump and replacing a pump motor.

e. Struvite accumulation in equipment and piping is an issue. Staff is cleaning the centrifuges of struvite on almost a weekly basis. Staff descaled the centrate line from the centrifuges to the centrate vault and acid cleaned the centrate line from the centrate vault to the centrate equalization tanks.

f. JRTP staff continued verification and assessment of assets for Asset Management.

6. NTP

a. Staff successfully completed testing the big bubble diffusers in Aeration tank #5.

b. Staff is relocating the chlorine analyzer to an indoor location to better control the external environment of the analyzer. The associated piping system was installed, coated and tested successfully.

c. Staff completed the installation of a carbon analyzer for the plant's influent. The analyzer reads and reports influent carbon. We anticipate that the analyzer will aid staff in controlling the aeration processes. The analyzer will allow staff to observe the upstream carbon loading on the plant, allowing for the proactive adjustment of the supplemental carbon feed, and aeration control.

d. SWIFT Research Center (SWIFT RC)

1. Staff suspended operations at the Research Center (RC) for the duration of Hurricane Dorian affecting the region. Operations were proactively suspended because the RC does not have back up power and will most likely lose power during the storm.

2. Based on Ultra Violet transmittance (UVT) on the combined Granular Activated Carbon (GAC) effluent, staff changed the flow split set point to 70/30. The main reason for this change was to make sure there is enough Nitrosodimethylamine NDMA removal via UV/ photolysis. UV/photolysis is a process in which compounds absorb photons and the energy released drives oxidation processes induced by light.

3. On September 24, after inspecting the UV reactors, staff observed iron fouling on the quartz sleeves, resulting in a low UV dose. Both reactors were disassembled and cleaned and the intensity sensor windows and wipers were replaced. There was a minor coating damage on the upstream pipe that staff repaired. After work was completed the measured UV dose doubled.

7. <u>Virginia Initiative Plant (VIP)</u>

a. Staff started dosing aluminum sulfate for phosphorus removal. Staff removed the second ferric sulfate tank from service to clean, inspect and prepare the tank for aluminum sulfate storage.

b. Staff spent two days removing slag material from the burn zone hearths of incinerator #2. Slag buildup occurs over time because of the high solids loadings and the high burn zone temperatures. The

Slag buildup plugs the drop holes in the furnace restricting airflow throughout and preventing efficient operation. Slag removal is difficult and labor intensive as the slag material bonds to the furnace internal structures. Staff is currently implementing operational strategies to help control slag buildup in the furnace.

c. Staff completed rehabilitation of one primary clarifier.

d. Staff worked with contractors to reinstall a rebuilt electrical transformer. After installation, staff discovered the junction box on the unit leaked oil.. Staff continues to work with contractors to solve problems with the transformer.

e. Staff installed valve controllers on the aeration tank air valves, the Versatile Biological Reactor air valves and the new Preliminary Treatment Facility sluice gates.

f. Staff began planning for the relocation of the CETP Pilot to the second floor of the Solids Handling facility.

8. Williamsburg Treatment Plant (WBTP)

a. The #2 influent screen was taken out of service for rehabilitation.

b. Coatings work on steel and concrete structures on the #1 intermediate clarifier are underway. Much of the steel on the clarifier's rake arm was found too corroded to coat and will need to be replaced before coating.

c. Work began on renovating the control room and laboratory located in the incinerator building. Operators are temporarily working out of the old incinerator control room on the bottom floor of the building until work is completed.

9. YRTP

a. Staff completed preventive maintenance and Annamox bacteria retention improvements to the Deammonification (DEMON) system.

b. Staff continued with nutrient removal improvements to aeration tank #6. Improvements included the reactor walls, an influent flow deflector to prevent short circuiting of flow, air purging mixers and air controls.

c. Staff completed training in preparation for the upcoming asset assessment as part of the Asset Management program.

d. A contractor replaced bearings and races and reassembled the secondary clarifier #3.

e. A contactor completed the replacement of lights with energy efficient LED lighting in the dewatering building.

11. Incinerator Operations Events Summary

a. All five multiple hearth incinerator plants met the Total Hydrocarbon (THC) limits for the month. There was one deviation from the required 129 Sewage Sludge Incineration (SSI) minimum operating parameters and four minor (less than 60 minutes) non-reportable bypass events.

b. Staff at CETP reported the use of the bypass stack for two hours and 42 minutes on September 23 when an electrical breaker in the solids handling control area tripped. Staff replaced the breakers and normal operations were restored.

D. Small Communities (SC)

1. Middle Peninsula Small Communities Treatment and Collections

a. West Point System

A de-ragger unit was installed at Pump Station #4 this month and will be programmed in October. This unit will monitor pump conditions to determine when to stop and back spin pumps in an effort to reduce ragging conditions at that pump station.

b. King William System

(1) The Magnesium Hydroxide pump was replaced with a larger pump. Staff is installing a turbidity meter at the plant. This new meter will be more reliable and eliminate the need for two individual meters in the treatment train control rooms.

(2) On September 4, a utility contractor bored though the HDPE force main during horizontal directional drilling activities installing communications cable in the Kennington Subdivision in King William County. The Miss Utility mark was incorrectly

located approximately 7-10 feet away from the actual force main. The damaged section of the force main pipeline was removed and replaced with new pressure pipe. Approximately 100 gallons of raw wastewater soaked into the ground. The excavation was backfilled, lime was applied, and the line as re-located to update the records. The as-built record drawings were in error and the reason for the miss marking. Staff plans to have a department-wide Miss Utility marking class for staff next month.

(3) During the week of September 22, 2019, the required frequency of the cBOD (Carbonaceous biochemical oxygen demand) sample analysis for the King William Outfall 001 was not met. Staff collected the required cBOD sample on September 26, but the analytical result was flagged with the designation IA1 (quality control data outside of acceptance limits, during the data review). This designation determines the analytical result invalid. Although the result was less than 2 milligrams per liter, well under the permit limit, it was not included in the monthly average calculation. The permit requires one cBOD sample per week. This issue continues to be a challenge with the infrequent use of the King William Outfall which is only used when reclaimed water is not needed by Purina (during plant shutdowns, maintenance operations, etc.)

c. Matthews Systems

The Mathews Vacuum System Pump Station Replacement project continues well. Foundation is complete and masonry walls are under construction. The construction on this project will be complete late summer 2020.

d. Urbanna Treatment Plant (UBTP)

(1) The design efforts for the reliability capital improvement project continues

(2) The rehabilitation work on the Jamison Cove PS began. After talks with the property owner an agreement was reached on color of concrete and a few other items of.

e. Central Middlesex Treatment Plant (CMTP)

A replacement blower was installed this month. The new mechanical bar screen also arrived this month.

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. There was one sanitary sewer overflow (SSO) this month. On September 26, a contractor working on the Dendron water system improvements hit HRSD's 3-inch force main in the town of Dendron. 250 gallons of sewage was lost. SSA had properly marked the force main on September 10, but the marks faded and the flags had been mowed over. HRSD and SSA are working with the contractor to ensure future issues are avoided.

3. Small Communities - Lawnes Point

a. There were five pump and haul operations of the Lawnes Point Treatment Plant.

b. There was a six-day high flow event where flows more than quadrupled at the plant. With the help of Isle of Wight County Public Utilities, staff was able to pinpoint the home responsible for this peak. To date no resolution to this high usage has been determined.

E. Support Systems

1. Automotive

a. Staff performed load bank tests at North Avenue, Woodland Road PS, Kingsmill PS, Bonner Street PS, County Line PS, and Richmond Cresent PS. Staff performed monthly generator tests at the NS and SS Main Operations Complexes. All generators operated as designed and were returned to service.

b. The standby generator at the WBTP failed during the monthly load test when an oil tube that supplies lubrication and cooling to one of the piston/cylinder assemblies was damaged. A replacement assembly was located and installed and the generator was started and tested with plant load.

2. Condition Assessment

a. Staff completed a six-year Closed Circuit Television (CCTV) gravity inspection schedule. HRSD's Management, Operations, and Maintenance (MOM) Program requires CCTV inspection, a non-destructive, proactive approach to evaluate HRSD's gravity infrastructure. The goal of the MOM program is to inspect HRSD's gravity system on a six-year cycle. The NS and SS Consent Decree require 39,600 linear feet (LF) of inspection each year. Seventeen work orders for 23,626 LF of gravity line inspections for the NS service areas were issued to the contractor. The remaining footage to complete the consent decree for the year will be performed on the SS gravity system.

b. Staff continued the restoration of the BHTP secondary clarifiers. Restoration continues on secondary clarifier number one at VIP and is 75 percent complete. WBTP Intermediate #1 and Primary #2 Clarifiers have started using the annual services coating contract.

3. Facilities Maintenance

a. Renovations and redesign of the Lead Operator offices continues at VIP. WBTP Solids Handling Control Room/Lab renovation started and is on schedule to be completed in mid-November. Staff is working on the relocation of the Chesapeake-Elizabeth Pilot to VIP.

b. Staff continued work on the Electrical and Instrumentation division training area at the NS Operations Center. Staff completed the installation of counter and cabinet for battery charging stations for Pretreatment & Pollution Prevention (P3) Division in the Water Quality Department.

c. Staff rebuilt two pumps, one at the NTP and one at ATP. Staff made two aluminum motor plates for a new ozone cabinet. Staff also repaired a check valve at the State Street PS.

F. Energy Management

1. The ABTP solids diversion study and the multi-treatment plant aeration systems study continues. Study results are due next month

2. The installation of the diesel oxidation catalysts on the BHTP generators is complete. The system will undergo final testing in October.

G. Electrical and Instrumentation

1. Staff discovered a main breaker tripped in the generator/blower building that supplied power to Distributive Control System (DCS) Drop 3 and Drop 4 at ATP. The power was off long enough that the uninterrupted power supply (UPS) feeding these drops failed. When power was restored, Drop 4 had numerous issues. Staff determined that Drop 4 must have experienced a spike in power because numerous digital and analog input cards had to be replaced and an Input Output Interface Controller (IOIC) card for the controller on Drop 4 needed to be replaced. A serial connector cable between the I/O branches was also replaced. Once repairs were made, Drop 4 was fully operational.

2. Staff replaced the Variable Frequency Drive (VFD) and circuit breaker for the Returned Activated Sludge (RAS) Pump 2 at ATP. The VFD is part of a newly installed Motor Control Center (MCC) that is still under factory warranty.

3. Electrical and Instrumentation Specialist EIS Team replaced a bad control board and low coolant probe on the Emergency Generator 1 at ATP. The generator was tested and returned to service.

4. Staff built instrumentation panels for dissolved oxygen (DO) probes on the Aeration Tanks #5 and #6 at ATP to enhance process control.

5. Staff responded to a SCADA communication failure BHTP. Staff re-energized the switchgear and restored communications.

6. Staff assisted the Information Technology Department by installing upgraded Wireless Access Points throughout the NS Complex and the YRTP.

7. Staff completed testing and commissioning of the YRTP Demon process modifications. Modifications included upgrading the original Programmable Logic Controller (PLC) to an Allen Bradley PLC, the addition of new instrumentation hardware and DCS software programming.

8. Staff coordinated a power outage with Dominion Energy (DE), to repair the main circuit breaker at the Monroe PS. A loose connection was identified during our annual thermographic inspection (heat scan).

9. Staff coordinated an outage with DE, to stabilize the metering vault cabinet at Mallard Court in Hampton. Repairs included replacing damaged conduits and replacing the concrete housekeeping pad.

10. Staff applied graphics tool software patches to all DCS servers and workstations. This round of patching provided a much-anticipated fix for a graphics tool which allows users the ability to save their graphics configuration. Prior to the fix, users would have to reconfigure all the graphics each time they logged in at the beginning of their shift, which was a time-consuming task.

11. Staff assisted York County with troubleshooting their flow meter at Camp Peary.

12. Staff responded to 11 SCADA communication failures and five 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.

H. Water Technology and Research

One very interesting experience from WEFTEC was participation in a workshop that considered the upgrade of a large treatment plant, from pilot work, to full-scale testing, to design and construction. The workshop approach and many aspects of the plant upgrade will use the organizational and work management techniques that have recently been promoted by the music streaming service, Spotify. This is now being referred to as “Spotify Engineering Culture.” This is certainly not completely relevant to the “engineering” for our industry, but the concepts and approaches that were used in this workshop and will be used moving ahead with the treatment plant project were transformational. This is particularly relevant as we prepare for, design, and construction of a number of very large treatment plant projects. In coming months, I hope to have an opportunity to share what I learned and to discuss and think about how these concepts might be helpful for HRSD.

I. MOM reporting numbers

MOM Reporting #	Measure Name	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
2.7	# of PS Annual PMs Performed (NS)	1	4	8									
2.7	# of PS Annual PMs Performed (SS)	6	5	4									
2.7	# of Backup Generator PMs Performed (Target is 4.6)	10	13	17									
2.8	# of FM Air Release Valve PMs Performed (NS)	209	77	70									
2.8	# of FM Air Release Valve PMs Performed (SS)	311	318	365									
2.9	# of Linear Feet of Gravity Clean (NS) (Target is 2,417 for HRSD)	6,248	2,681	1,426									
2.9	# of Linear Feet of Gravity Clean (SS) (Target is 2,417 for HRSD)	1,064	13,240	1,551									
2.9	# of Linear Feet of Gravity CCTV Inspection (HRSD Target 3,300 LF)	610	0	0									

J. Strategic Measurement Data

1. Education and Outreach Events:

a. 09/04/19 - Tour of SWIFT for SWIFT Oversight Committee – Tour conducted by Ted H.
b. 09/05/19 - Tour of SWIFT for Aurecon South Africa from Cape Town – Tour conducted by Germano S.
c. 09/09/19 - Tour of SWIFT for Jackie Jarrell of Charlotte Water and incoming WEF President – Tour conducted by Charles B.
d. 09/11/19 - Tour of SWIFT for DEQ Leadership Team – Tour conducted by Jaime Mitchell
e. 09/12/19 - Tour of SWIFT for WaterJam – Tour conducted by Chris W. & Lauren Z.
f. 09/13/19 - Electrical Manager and Material Operations Coordinator participated in the United Way Day of Caring
g. 09/16/19 - Tour was provided for a member of the Potomac Aquifer Oversight Committee.
h. 09/18/19 - Tour of SWIFT for Tidewater Crimes Taskforce – Tour conducted by Mike M.
i. 09/25/19 - Tour of SWIFT for ODU World Resources Class – Tour conducted by Leila R. & Michael A.
j. 09/26/19 - Conducted interdepartmental plant tour at ABTP for Logan Wiedner with SS Interceptors. Scott Mattice conducted the tour.
k. 09/27/19 - Tour of SWIFT for Gili Elkin, Israel Colorado Fund – Tour conducted by Germano S.
l. Matt Blair – WEFTEC Podium
m. Meredith Bullard – WEFTEC Podium
n. Cody Campolong – WEFTEC Podium
o. Thomas Dziura– WEFTEC Podium
p. Samantha Hogard– WEFTEC Podium
q. Katie Printz– WEFTEC Podium
r. Ramola Vaidya– WEFTEC Podium
s. Charles Bott – WEFTEC Podium & moderator
t. Kester McCullough – WEFTEC moderator
u. Stephanie Klaus – WEFTEC moderator
v. Chris Wilson – WEFTEC Podium & moderator
w. Thomas Dziura– WaterJAM Podium
x. Samantha Hogard– WaterJAM Podium
y. Katie Printz– WaterJAM Podium
z. Charles Bott – Chesapeake Bay Program Science and Technical Advisory Committee meeting
aa. Charles Bott – PFAS briefing in a congressional session

2. Community Partners:

   a. Chesapeake Bay Foundation – oyster cage maintenance at BHTP for oyster gardening program
   b. VIMS
   c. ODU
   d. Chesapeake Bay Foundation Clean the Bay Day
   e. United Way Day of Caring

3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	September 2019
M-1.4a	Training During Work Hours per Full Time Employee (FTE) (516) – Current Month	Hours / FTE	4.26
M-1.4b	Total Training During Work Hours per FTE (516) – Cumulative Year-to-Date	Hours / FTE	9.20
M-2.3a	Planned Maintenance Total Maintenance Hours	Total Recorded Maintenance Labor Hours	26,888
M-2.3b	Planned Maintenance – Preventive and Condition Based	% of Total Maintenance Hours	57.35%
M-2.3c	Planned Maintenance - Corrective Maintenance	% of Total Maintenance Hours	13.98%
M-2.3d	Planned Maintenance - Projects	% of Total Maintenance Hours	28.67%
M- 4.1a	Energy Use: Treatment *reported for August 2019	kWh/MG	2,610
M-4.1b	Energy Use: Pump Stations *reported for August 2019	kWh/MG	186
M-4.1c	Energy Use: Office Building *reported for August 2019	kWh/MG	116

Item #	Strategic Planning Measure	Unit	September 2019
M-5.2	Educational and Outreach Events	Number	27
M-5.3	Number of Community Partners	Number	5

Respectfully submitted,
Steve de Mik
Director of Operations

TO: General Manager

FROM: Director of Talent Management (TM)

SUBJECT: Monthly Report for September 2019

DATE: October 8, 2019

A. Human Resources (HR)

1. Recruitment Summary

New Recruitment Campaigns	9
Job Offers Accepted – Internal Selections	6
Job Offers Accepted – External Selections	2
Internal Applications	37
External Applications	122
Average Days to Fill Position	56

2. Enterprise Resource Planning (ERP)

a. HRSD worked with the Managed Services consultant on updates to system setup for benefit interfaces.

b. Talent Management, Finance, and Information Technology (IT) staff continued to work with Managed Services consultants on updates to Short Term Disability setup.

c. The Business Analyst worked with IT staff on benefit interface updates.

3. Benefits and Compensation

a. Staff worked with the benefit consultant on Retiree Medical Plan renewal and preparations for open enrollment.

b. Compensation and benefit information was provided to Metro Wastewater Reclamation District of Denver.

4. Wellness

a. Participation Activities

Year Six Participation Activities	Unit	September 2019	Year to Date (March 2019–February 2020)
Biometric Screenings	Number	1	12
Preventive Health Exams	Number	1	39
Preventive Health Assessments	Number	57	192
Coaching Calls	Number	0	0
Online Health Improvement Programs	Number	34	150
Web-MD Online Health Tracking	Number	19	578
Challenges Completed	Number	0	0
Fit-Bit Promotion	Number	6	59

b. Eighty three employees participated in *Going Green - Whole Food Plant-based Eating* presentations at several work centers.

c. The Wellness Specialist provided a Wellness Program Overview and Year 7 requirements to North Shore Interceptor Operations employees.

d. Onsite Boot Camp classes began at Air Rail Avenue with an average of 18 employees participating each week.

5. Workers Compensation

Three new cases were opened with eight cases remaining active.

6. Employee Relations

a. Staff partnered with work center supervisors and employees to support employee relations and address HR issues:

(1) HR and North Shore Interceptor Operations supervisors met to address work center needs. An HR Business Partner participated in several small group meetings, an interview panel

and in work center planning day, which included team building and an Employee Assistance Program (EAP) presentation. HR will continue to work onsite on a regular basis to provide assistance and participate in work center activities.

(2) Assisted with Operations job descriptions.

(3) Continued work with Operations Quality Steering Team (QST) to evaluate shift scheduling options.

(4) Finalized and distributed several HR policies.

b. Work continued with the Training Specialist to develop Social Media Policy training in an e-learning format.

c. HR staff conducted policy and procedure training for new supervisors.

7. General

a. Work continued with North Shore Design and Construction staff to plan a Governors School of Science and Technology student mentorship. A student will job shadow an Engineer during the school year and gather information to complete research requirements.

b. The HR Manager and Business Analyst compiled data for submittal of the 2019 Equal Employment Opportunity Commission State and Local Government EEO4 Report by the required deadline.

c. Staff developed a presentation for an upcoming EPA webinar series, *Creating the Water Workforce of the Future.*

d. The HR Manager continued participation in the SC&H Payroll audit.

e. HR and Accounting staff met to improve HR and payroll processes and develop recommendations related to leave issues.

f. Staff participated in the Water Environment Federation (WEF) Utility Management Leadership and HR/Operations workgroup activities.

f. Staff participated in the following HRSD activities:

(1) Microsoft Surface Pro User Compatibility testing

(2) Facilitated *Your Role in Quality*

(3) United Way Day of Caring

(4) Hurricane Dorian Virtual Emergency Operations Center calls

g. Staff participated in the following training:

(1) Hampton Roads Society of Human Resources Management (HR-SHRM) *Diversity Today- Becoming Inclusive Tomorrow*
(2) Hampton Roads Diversity and Inclusion Consortium - *Belonging*
(3) International Public Management Association (IPMA)'s Annual Training Conference
(4) Onsite *CCure System* training
(5) EAP *Generational Dynamics*
(6) Oracle Learning Management Administrator Training
(7) Water Environment Federation Technical Exhibition and Conference (WEFTEC)

B. Organization Development and Training (OD&T)

1. Training

a. Fiscal Year 2021 Work Center Planning Day meetings continued.

b. Several staff members worked with the Quality Leadership team on revising the Leadership and Management Program (LAMP). The new Learning Management System (LMS) will be used to assist with program administration.

c. OD&T staff continue to train and onboard the OD&T Coordinator.

d. A *Your Role in Quality* half-day session was held.

2. Apprenticeship Program

The LMS project team continued implementation including rollout of the SharePoint page and meetings to discuss exam proctoring.

3. General

a. An introduction meeting was held with the new OD&T consultant and Senior Leaders. A needs assessment will begin in November.

b. The OD&T Manager participated on a WEF Utility Management Committee Workforce Sustainability workgroup conference call.

c. Staff participated in the following training:

(1) WEFTEC Conference
(2) IPMA Annual Training Conference

C. Safety

1. Mishaps and Work Related Injuries

a. HRSD-Wide Injury Mishap Status to Date (OSHA Recordable)

	2018	**2019**
Mishaps	45	27
Lost Time Mishaps	6	6
Numbers subject to change pending HR review of each case.		

b. MOM Program Year Performance Measure Work-Related Injuries

September 2019 Injuries For Operations	**September 2019 Injuries for Other HRSD Departments**	**Total Lost Time Injuries Since July 2019**	**Total HRSD Injuries Since July 2019**
3	0	4	19

c. Follow-up investigations were performed on three reported work-related injuries and one auto/property incident.

2. HRSD Safety Training

Strategic Planning Measure	**Unit**	**September 2019**
Total Safety Training Hours per Full Time Employee (847) All HRSD – September 2019	210.50 Hours / 847 FTE	0.25
Total Safety Training Hours Per Full Time Employee (847) – Cumulative July 2019	1402.95 Hours / 847 FTE	1.66

3. In addition to regularly scheduled safety training and medical monitoring, the following sessions were conducted:

    a. Nine external briefings for contractors working at treatment plants and pump stations

    b. Chemical Hygiene Plan training for new Water Quality and Water Technology and Research employees

    c. Skid Steer Training for North Shore Interceptor Operations employees

    d. Overhead Crane Training for Boat Harbor Treatment Plant (TP) and Electrical and Energy Management (EEM) employees

    e. Aerial Lift Safety Training for South Shore EEM employees

    f. Virginia Department of Transportation Flagging Training for Pretreatment and Pollution Prevention (P3) employees

    g. Confined Space Rescue, Ladder Safety and Scaffold Safety training for Condition Assessment 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
        (5) Pine Tree Pump Station
        (6) Providence Road Pump Station
        (7) Washington Street Pump Station
        (8) Providence Road Offline Storage Facility (Woodstock Park)

    b. Quarterly safety inspections of the following work centers:

        (1) Chesapeake Elizabeth TP
        (2) James River TP
        (3) Lawnes Point TP
        (4) Small Communities TPs and Pump Stations
        (5) South Shore Automotive, Carpentry, Electrical and Machine Shops

(6) South Shore Operations
(7) Surry TPs and Pump Stations
(8) Williamsburg TP

c. Monitoring and testing for the following:

(1) Re-tested multiple pump station dry well ventilation systems
(2) Monthly velocity tests on Central Environmental Lab (CEL), Technical Services Division (TSD), SWIFT Research Center and VIP lab hoods
(3) Inspected Main Office AEDs

5. Safety Programs

a. Industrial Hygienist reviewed North and South Shore Interceptor Operations completed confined space entry permits.

b. Safety staff met with EEM supervisors to discuss and finalize Electrical Safety Program updates to comply with the National Fire Protection Association 70E standard. The Safety Manager began revising training based on updates.

c. Multiple hot work permits were issued for contractors working at Washington Street, Kempsville and Laskin Road pump stations.

e. System backup of the online Material Safety Data Sheet (MSDS) program was performed.

f. Respirator fit testing for Condition Assessment employees was conducted.

g. An Industrial Hygienist continued developing new Manual Elevated Work Platform safety training.

6. General

a. The Safety Program internal audit was completed with SC&H acceptance of the response and action plan. Staff began updates to the Safety Standard Operating Procedure to address action items.

b. The Safety Manager worked with the Director of Communications on North Shore Operations Center and Air Rail Avenue Complex Visitor Safety Information brochures.

c. Safety staff assisted TSD with a safety training tracking system.

d. Safety staff continued to update safety training rosters in ERP.

e. The Safety Manager continued work with the Directors of Communications and Operations to update facility tour guidelines.

f. Staff provided the following to support Design and Construction:

(1) Attended SWIFT James River Design Review Workshop
(2) Attended meeting to discuss Nansemond TP adjacent property land stabilization and building demolition

g. Safety and HR staff met with Procurement and completed updates to the Request for Proposal for selection of an employee physicals and testing medical provider.

h. Staff participated in the following HRSD activities:

(1) Microsoft Surface Pro User Compatibility Testing
(2) Quarterly SharePoint Governance Team meeting
(3) Virtual Emergency Operations Center for Hurricane Dorian

i. Staff attended the following training:

(1) Applied Labs Annual Asbestos Supervisor Refresher Training
(2) *Common Occupational Health and Safety Pitfalls in the Utilities Sector* webinar

D. Monthly Strategic Planning Metrics Summary

1. Education and Outreach Events: (10)

a. 09/18/19 – City of Norfolk Local Emergency Planning Commission (LEPC) meeting

b. 09/19/19 - A HR Business Partner was elected to the HR-SHRM Board of Directors as the Director of Workforce Development

c. 09/20/19 – Hosted a Hampton Roads Public Works Academy (HRPWA) meeting

d. 09/23/19 –WEFTEC Young Professionals Career Fair

e. 09/24/19 – An Industrial Hygienist judged a WEFTEC Operations Challenge Safety Event

f. 09/25/19 – City of Suffolk LEPC meeting

g. 09/25/29 – Christopher Newport University's Career Fair

h. 09/26/19 – Hampton University's Fall Career Fair

i. 09/26/10 - The OD&T Manager presented the 2019 Benchmarking Survey results at the annual IPMA Training conference

j. 09/27/19 - Tidewater Community College's Fall Career Fair

2. Community Partners: (7)

a. City of Norfolk LEPC

b. HR-SHRM

c. HRPWA

d. City of Suffolk LEPC

e. Christopher Newport University

f. Hampton University

g. Tidewater Community College

3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	September 2019
M-1.1a	Employee Turnover Rate (Total)	Percentage	0.25%
M-1.1b	Employee Turnover due to Service Retirements	Percentage	0%
M-1.4a	Total Training Hours Per Full Time Employee (17) – Current Month	Total Training Hours/ FTE	9.87
M-1.4b	Total Training During Work Hours Per Full Time Employee (17) – Cumulative Fiscal Year-to-Date	Hours / FTE	21.37
M-5.2	Educational and Outreach Events	Number	10
M-5.3	Community Partners	Number	7

Respectfully submitted,
Paula A. Hogg
Director of Talent Management

TO: General Manager

FROM: Director of Water Quality (WQ)

SUBJECT: Monthly Report for September 2019

DATE: October 10, 2019

A. General

1. Pretreatment and Pollution Prevention (P3) division staff assessed one civil penalty this month.

WestRock – West Point

An Enforcement Order was issued to WestRock in September 2019 for an unauthorized discharge that occurred in June of 2019. The Order contained an invoice totaling $12,891.89 which included a $2,500 Civil Penalty and $10,391.89 for expense recovery.

The WestRock paper mill discharged high pH process wastewater through their domestic wastewater pump station. The high pH caused the influent pH at West Point Treatment Plant to become elevated and all influent had to be diverted to the holding pond. Additionally, the discharge from WestRock resulted in HRSD exceeding the permitted effluent pH limitation on June 29 and also the monthly average BOD limitation for July of 2019. WestRock was responsible for the offsite disposal of the wastewater from the holding pond.

A Show Cause meeting was held to discuss measures to prevent recurrence and the associated penalties/expense recovery. WestRock was advised that should HRSD incur any additional expenses from this event additional invoices may be forthcoming. The Enforcement Order was accepted and the Civil Penalty and expense recovery invoices were paid in October of 2019.

2. The Director of Water Quality attended the 2019 WEFTEC conference held in Chicago, Illinois. The Director attended numerous WEF committee meetings including Industrial Wastewater, Water Reuse, Government Affairs (GA), Disinfection and Public Health and Small Community. The WEF GA Member Association Committee allowed for members to share their most significant environmental challenges. Nutrients and per- and polyfluoroalkyl substances (PFAS) were repeating themes for many states.

Virginia's Department of Natural Resources has only recently raised PFAS as a concern. EPA provided a water policy update session that claimed more than half of all states are 18 months late in submitting their respective Total Maximum Daily Load (TMDL) lists. The TMDL list is supposed to be updated every two years. Virginia has kept pace with the requirement to date. EPA's Office of Science and Technology is moving forward to develop a screening tool that can be used to test chemicals for risk to the environment and human health when present in land applied biosolids. This screening tool would be used to identify chemicals that require a more thorough risk assessment and could be regulated. This tool and its reliability will be important to all entities that land apply biosolids. The Water Quality department will closely track and follow the development and implementation of this tool.

B. Quality Improvement and Strategic Activities

1. The Sustainability Environment Advocacy (SEA) Group reported the following activities for the month of September:

   a. The owner of HPC | HamiltonPerkins gave a presentation to SEA on the recycled products business and his perspectives.

   b. The SEA Group is taking the lead on HRSD's Catch the King data gathering. Teams are being assembled to capture flood data for this world's largest environmental survey per the Virginia Institute of Marine Science (VIMS).

   c. Oyster Restoration Program Planning

      Oyster Castles - Representatives met with the Elizabeth River Foundation to discuss lessons learned from previous castles created from molds. A new mold prototype is being developed as well as a procedure on how to create new molds.

      Oyster Shell Recycling - An Oyster Restoration sign has been developed and approved by Communications. The next step is to present to the HRSD Quality Steering Team with recommended pump station locations for the signs.

d. R^3 Support

Results on the second recycling survey, along with the drawing winners, was shared with all HRSD.

Recycling Commercial - The script is complete and HRSD employees are on onboard to support it. Next steps include securing a videographer and scheduling production.

e. Pollinators - Sustainable Landscaping: Representatives are working with the Facilities Maintenance Division to expand and maintain landscaping that promotes pollinators and water quality. Representatives met with experts at Virginia Tech to obtain guidance on the subject.

f. 2020 Earth Day: The 50th Anniversary – Representatives have drafted an HRSD Earth Day 50th Anniversary t-shirt design that will be considered by Communications.

2. The WQ Communication Team continues monitoring and measuring inter-divisional communication issues within the WQ Department.

C. Municipal Assistance

1. HRSD provided sampling and analytical services to New Kent County, Northumberland County, Westmoreland County, and the Town of Lawrenceville to support monitoring required for their respective Virginia Pollution Discharge Elimination System (VPDES) permits.

2. The Municipal Assistance Billed Reimbursements per service collected for the third quarter of the 2019 calendar year are attached.

3. The Municipal Assistance Invoice Summary for the third quarter of the 2019 calendar year is attached.

D. Strategic Planning Metrics Summary

1. Educational and Outreach Events: 2

    a. 09/11/19 – Central Environmental Laboratory (CEL) Chemist Dana Gonzalez provided a presentation at WaterJAM titled “PFAS, Wastewater Treatment, and Indirect Potable Reuse: A Utility's Perspective on the Importance of Source Control.”

    b. 09/11/19 – P3 Supervising Specialist Amanda Albright presented HRSD perspective and experience regarding its boating pump-out education program at the States Organization for Boating Access (SOBA) Conference in Portsmouth.

2. Community Partners: 10

    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. Hampton Roads Planning District Commission
    i. United Way
    j. askHRgreen

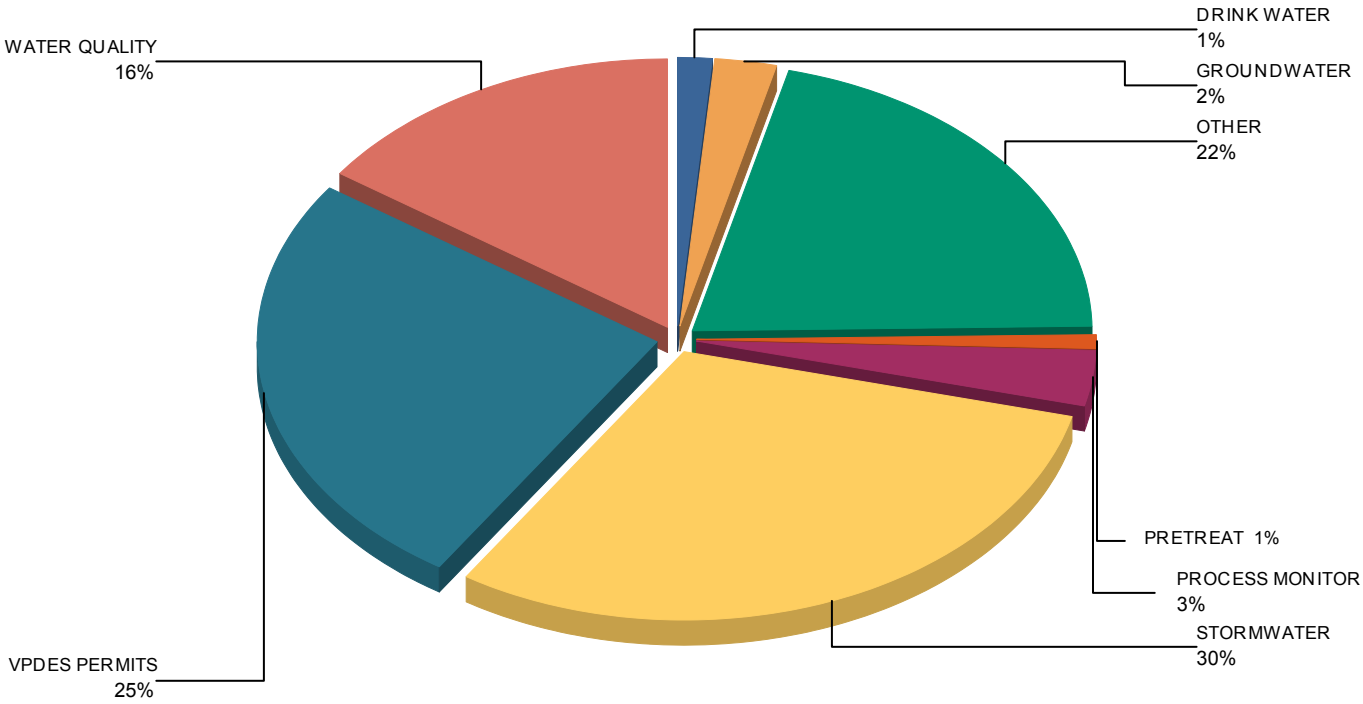
3. Monthly Metrics

Item #	Strategic Planning Measure	Unit	September 2019
M-1.4a	Training During Work Hours Per Full Time Employee (114) (Current Month)	Total Hours / # FTE	5.94
M-1.4b	Total Training During Work Hours Per Full Time Employee (114) (Cumulative Fiscal Year-to-Date)	Total Hours / # FTE	20.08
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	1:55,220
M-3.2	Odor Complaints	#	0
M-3.4	Pollutant Removal	Total Pounds Removed	47,663,562
M-3.5	Pollutant Discharge	% Pounds Discharged/ Pounds Permitted	15%
M-5.2	Educational and Outreach Events	#	2
M-5.3	Community Partners	#	10
	Average Daily Flow	Total MGD for all Treatment Plants	131.60
	Pretreatment Related System Issues	#	0

Respectfully submitted,
James Plotl, PhD
Director of Water Quality

Municipal Assistance Billed Reimbursements per Service
From 07/01/2019 to 09/30/2019

Attachment 1



Notes: Other = Equipment purchase, consultation, validation studies, boater pump-out program, etc.

Municipal Assistance Invoice Summary
From 7/1/2019 - 9/30/2019

Municipality	Reimbursements
Accomack County	$3,975.41
Arlington County DES	$1,475.05
Buckingham County	$617.24
Chesterfield County	$462.72
City of Boise	$835.15
City of Chesapeake	$2,178.33
City of Hampton	$9,151.62
City of Lynchburg	$4,442.70
City of Norfolk	$9,097.01
City of Portsmouth	$8,186.61
City of Roanoke	$3,923.71
City of Suffolk	$7,298.16
City of Virginia Beach	$8,541.84
HRPDC	$49,170.63
Hanover County	$758.28
Hopewell RWTF	$4,320.65
James City County Service Authority	$1,084.20
King George County	$6,755.56
METRO Wastewater Reclaimation District	$103.95
New Kent County	$8,928.26
Northampton County WWTP	$1,679.63
Northumberland Co. - Callao WWTP	$1,623.27
Stafford County	$102.48
Town of Cape Charles	$6,419.35
Town of Lawrenceville	$511.00
Town of Round Hill	$136.30
Upper Occoquan Service Authority	$9,176.74
Virginia Department of Health	$13,284.20
Westmoreland County	$963.76
Total Reimbursements 3rd Quarter	**$165,203.81**

Hampton Roads Sanitation District
Internal Audit Status
September 30, 2019

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 audits, and the status of current management action plan (MAP) monitoring.

I. *Projects in Process*

Safety

- **Tasks Completed (September 2019)**
  - Issued final report dated 9/12/19
- **Upcoming Tasks (October 2019)**
  - The audit has been completed, no additional tasks will be performed

Permitting

- **Tasks Completed (September 2019)**
  - Finalized fieldwork testing procedures
  - Drafted final report
- **Upcoming Tasks (October 2019)**
  - Conduct exit discussion with process owners
  - Complete final report draft and communicate for management review and response

Payroll/ Timekeeping

- **Tasks Completed (September 2019)**
  - Finalized planning documentation
  - Drafted fieldwork objectives and audit program
- **Upcoming Tasks (October 2019)**
  - Perform fieldwork testing procedures
  - Document testing results and confirm understanding with process owners

Business Continuity and Disaster Recovery (Audit Fieldwork Complete/ Management Response in Process)

- **Upcoming Tasks (Q4 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. This listing does not include audits which were determined by HRSD Management and the Commission to include confidential or sensitive information.

			Recommendations		
Audit	**Report Date**	**Next Follow-up**	**Closed**	**Open**	**Total**
D&C: CIP Project Management	5/11/2016	February 2020	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 2020	1	4	5
Procurement/ ProCard	8/23/2017	October 2019	8	3	11
Engineering Procurement	4/20/2018	February 2020	4	4	8
Corporate Governance: Ethics Function*	3/21/18	October 2019	0	5	5
Treatment Plant Operations*	10/15/18	November 2019	0	9	9
Customer Care Division*	7/26/19	August 2020	0	4	4
Safety Division*	9/12/19	September 2020	0	3	3
		Totals	46	35	81

*SC&H has not yet performed formal follow-up procedures for the implementation status of these MAPs. Actual status may vary within the associated process areas and will be updated upon follow-up.

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%	73%	48%	41%	43%	44%	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%	1.8%
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%	117%
M-5.5	Number of Research Partners	Annual Total Number			42	36	31	33	28	35	15	20	26
	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%	72%	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

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	FY-20 Aug-19	FY-20 Sep-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	136.0	131.6
	Industrial Waste Related System Issues	Number	0		3	6	6	6	2	4	7	4	7	0	0
	Wastewater Revenue	Percentage of budgeted	100%		97%	96%	98%	107%	102%	104%	103%	103%	104%	106%	108%
	General Reserves	Percentage of Operating and Improvement Budget	75% - 100%		72%	82%	84%	92%	94%	95%	104%	112%	117%	113%	115%
	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	$27,333,963	$27,499,894
	Aging Accounts Receivable	Percentage of receivables greater than 90 days			21%	20%	18%	19%	21%	20%	18%	18%	17%	14%	15%
M-2.5	Capacity Related Overflows	Number within Level of Service	0		25	1	30	5	11	16	6	10	5	1	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	1:10147	1:55220
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	33,208,441	47,663,562
M-3.5	Pollutant Discharge (% of permitted)	Pounds Discharged/Pounds Removed	< 40%		25%	22%	25%	22%	22%	20%	22%	17%	17%	14%	15%
M-5.2	Educational and Outreach Events	Number			302	184	238	322	334	443	502	432	367	18	50
M-5.3	Number of Community Partners	Number			280	289	286	297	321	354	345	381	293	21	26

EFFLUENT SUMMARY FOR SEPTEMBER 2019

PLANT	FLOW mgd	% of Design	BOD mg/l	TSS mg/l	FC #/UBl	ENTERO #/UBl	TP mg/l	TP CY Avg	TN mg/l	TN CY Avg	TKN mg/l	NH3 mg/l	CONTACT TANK EX
ARMY BASE	10.39	58%	0	2.4	1	<1	0.49	0.49	3.0	3.6	NA	NA	15
ATLANTIC	25.38	47%	15	7.5	3	2	NA	NA	NA	NA	NA	NA	11
BOAT HARBOR	10.54	42%	2	6.5	4	1	0.77	0.68	11	19	NA	NA	27
CENT. MIDDLESEX	0.009	34%	<2	<1.0	<1	<1	NA	NA	NA	NA	NA	NA	NA
CHES-ELIZ	17.21	72%	12	14	15	3	0.90	1.2	34	32	NA	NA	15
JAMES RIVER	10.31	52%	6	2.3	1	<1	0.24	0.30	7.9	6.9	NA	NA	3
KING WILLIAM	0.057	39%	<2	<1.0	NA	<1	0.064	0.059	0.79	1.1	0.49	NA	NA
NANSEMOND	14.72	49%	4	4.5	2	1	0.43	0.97	3.7	4.3	NA	NA	4
SURRY, COUNTY	0.037	79%	1	<1.0	NA	1	NA	NA	NA	NA	<0.50	<0.1	0
SURRY, TOWN	0.042	70%	6	7.0	NA	12	NA	NA	NA	NA	1.5	0.18	NA
URBANNA	0.049	49%	2	13	12	2	7.7	5.9	24	20	NA	0.05	NA
VIP	24.66	62%	<2	1.8	1	1	0.91	0.88	2.9	3.6	NA	NA	1
WEST POINT	0.277	46%	26	17	17	14	3.8	2.5	19	16	NA	NA	0
WILLIAMSBURG	7.17	32%	1	2.2	9	8	0.56	0.55	2.9	3.0	NA	NA	2
YORK RIVER	10.75	72%	0	0.74	1	5	0.35	0.27	4.0	5.2	NA	NA	3
	131.60												

	% of Capacity
North Shore	47%
South Shore	56%
Small Communities	47%

Tributary Summary

	Annual Total Nitrogen			Annual Total Phosphorus		
	Discharged YTD	Operational Projection CY19		Discharged YTD	Operational Projection CY19	
Tributaries	%	Lbs	%	%	Lbs	%
James River	59%	3,659,949	80%	60%	266,933	84%
York River	60%	236,964	82%	54%	14,996	78%
Rappahannock	185%	NA	NA	786%	NA	NA

Permit Exceedances:Total Possible Exceedances, FY20 to Date: 1:15,220
Pounds of Pollutants Removed in FY20 to Date: 47,663,562
Pollutant Lbs Discharged/Permitted Discharge FY20 to Date: 15%

Rainfall (inch)

	North Shore (PHF)	South Shore (ORF)	Small Communities (FYJ)
Month	0.91”	3.63”	0.34”
Normal for Month	4.79”	4.76”	4.51”
Year to Date Total	35.74”	38.25”	35.84”
Normal for YTD	35.15”	36.70”	33.92”

AIR EMISSIONS SUMMARY FOR SEPTEMBER 2019

	No. of Permit Deviations below 129 SSI Rule Minimum Operating Parameters								Part 503e Limits		
MHI PLANT	Temp 12 hr ave (F)	Venturi(s) PD 12 hr ave (in. WC)	Precooler Flow 12 hr ave (GPM)	Spray Flow 12 hr ave (GPM)	Venturi Flow 12 hr ave (GPM)	Tray/PBs Flow 12 hr ave (GPM)	Scrubber pH 3 hr ave	Any Bypass Stack Use	THC Mo. Ave (PPM)	THC DC (%)	BZ Temp Daily Ave Days >Max
ARMY BASE	0	0	0	0	0	0	0	0	26	98	0
BOAT HARBOR	0	0	0	n/a	0	0	0	0	29	100	0
CHES-ELIZ	0	1	0	0	0	0	0	4	28	98.7	0
VIP	0	0	0	n/a	0	0	0	0	50	98	0
WILLIAMSBURG	0	0	0	n/a	0	0	0	1	15	100	0

ALL OPERATIONS

DEQ Reportable Air Incidents:	1
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:	3