TENTATIVE AGENDA
STATE WATER CONTROL BOARD MEETING

WEDNESDAY, APRIL 14, 2021

ELECTRONIC COMMUNICATION MEETING

To attend and/or speak at the Board meeting you must register at:
https://attendee.gotowebinar.com/register/7486964314449221389

See Page 3 for Additional Information

Persons Wishing To Speak During The Meeting Must Register By April 12, 2021

Any Updates To The Details/Final Arrangements Or The Addition Of An In-Person Location To Be Announced On The Virginia Regulatory Town Hall

Convene – 10:00 a.m.

Agenda Item	Presenter	Tab
Minutes (December 9, 2020 & February 26, 2021)		A
Regulations		
• Regulations Governing the Discharge of Sewage and Other Wastes from Boats [9VAC25-71] Final Exempt No-Discharge Zone Designation - Sarah Creek and Perrin River	Williams	B
• Water Quality Management Planning Regulation [9VAC25-720] - Final Exempt Amendment	Rourke	C
Permits		
• Cranston's Mill Pond, LLC Virginia Water Protection Permit Application No. 16-1937 - Denial	Kudlas	
Board Memorandum (includes summary of comments and response)		D
Attachments A, B and C		E
December 22, 2020 Comments from Andrea Wortzel (includes public hearing transcript)		F
December 7, 2020 Comments from Andrea Wortzel		G
Other Public Comments		H
Significant Noncompliance Report and Chesapeake Bay Preservation Act Program Notices of Violations	Sadtler	I
Other Business		
• Future Meetings		
• Division Director's Report	Schneider/Davenport	
• Public Forum (time not to exceed 45 minutes)		

ADJOURN

NOTE: The Board reserves the right to revise this agenda without notice unless prohibited by law. Revisions to the agenda include, but are not limited to, scheduling changes, additions or deletions. Questions on the latest status of the agenda should be directed to Cindy M. Berndt at (804) 698-4378.

PUBLIC COMMENTS AT STATE WATER CONTROL BOARD MEETINGS: The Board encourages public participation in the performance of its duties and responsibilities. To this end, the Board has adopted public participation procedures for regulatory action and for case decisions. These procedures establish the times for the public to provide appropriate comment to the Board for its consideration.

For REGULATORY ACTIONS (adoption, amendment or repeal of regulations), public participation is governed by the Administrative Process Act and the Board's Public Participation Guidelines. Public comment is accepted during the Notice of Intended Regulatory Action phase (minimum 30-day comment period) and during the Notice of Public Comment Period on Proposed Regulatory Action (minimum 60-day comment period). Notice of these comment periods is announced in the Virginia Register, by posting to the Department of Environmental Quality and Virginia Regulatory Town Hall web sites and by mail to those on the Regulatory Development Mailing List. The comments received during the announced public comment periods are summarized for the Board and considered by the Board when making a decision on the regulatory action.

For CASE DECISIONS (issuance and amendment of permits), the Board adopts public participation procedures in the individual regulations which establish the permit programs. As a general rule, public comment is accepted on a draft permit for a period of 30 days. In some cases a public hearing is held at the conclusion of the public comment period on a draft permit. In other cases there may an additional comment period during which a public hearing is held. In light of these established procedures, the Board accepts public comment on regulatory actions and case decisions, as well as general comments, at Board meetings in accordance with the following:

REGULATORY ACTIONS: Comments on regulatory actions are allowed only when the staff initially presents a regulatory action to the Board for final adoption. At that time, those persons who commented during the public comment period on the proposal are allowed up to 3 minutes to respond to the summary of the comments presented to the Board. Adoption of an emergency regulation is a final adoption for the purposes of this policy. Persons are allowed up to 3 minutes to address the Board on the emergency regulation under consideration.

CASE DECISIONS: Comments on pending case decisions at Board meetings are accepted only when the staff initially presents the pending case decision to the Board for final action. At that time the Board will allow up to 5 minutes for the applicant/owner to make his complete presentation on the pending decision, unless the applicant/owner objects to specific conditions of the decision. In that case, the applicant/owner will be allowed up to 15 minutes to make his complete presentation. The Board will then allow others who commented at the public hearing or during the public comment period up to 3 minutes to exercise their rights to respond to the summary of the prior public comment period presented to the Board. No public comment is allowed on case decisions when a FORMAL HEARING is being held.

POOLING MINUTES: Those persons who commented during the public hearing or public comment period and attend the Board meeting may pool their minutes to allow for a single presentation to the Board that does not exceed the time limitation of 3 minutes times the number of persons pooling minutes, or 15 minutes, whichever is less.

NEW INFORMATION will not be accepted at the meeting. The Board expects comments and information on a regulatory action or pending case decision to be submitted during the established public comment periods. However, the Board recognizes that in rare instances new information may become available after the close of the public comment period. To provide for consideration of and ensure the appropriate review of this new information, persons who commented during the prior public comment period shall submit the new information to the Department of Environmental Quality (Department) staff contact listed below at least 10 days prior to the Board meeting. The Board's decision will be based on the Department-developed official file and discussions at the Board meeting. In the case of a regulatory action, should the Board or Department decide that the new information was not reasonably available during the prior public comment period, is significant to the Board's decision and should be included in the official file, the Department may announce an additional public comment period in order for all interested persons to have an opportunity to participate.

PUBLIC FORUM: The Board schedules a public forum at each regular meeting to provide an opportunity for citizens to address the Board on matters other than those on the agenda, pending regulatory actions or pending case decisions. Those persons wishing to address the Board during this time should indicate their desire on the sign-in cards/sheet and limit their presentations to 3 minutes or less.

The Board reserves the right to alter the time limitations set forth in this policy without notice and to ensure comments presented at the meeting conform to this policy.

Department of Environmental Quality Staff Contact: Cindy M. Berndt, Director, Regulatory Affairs, Department of Environmental Quality, 1111 East Main Street, Suite 1400, P.O. Box 1105, Richmond, Virginia 23218, phone (804) 698-4378, e-mail: cindy.berndt@deq.virginia.gov.

Additional Information on Virtual Meeting

Mode of Participation	Ability to make public comment if authorized by public comment policy?	Instructions
Watch and Speak Mode - GoToWebinar	YES	• Prior to hearing, register at • Participants can join the meeting starting at 9:30 a.m. on April 14, 2021. • To join the meeting access the website by using the link https://attendee.gotowebinar.com/register/7486964314449221389, telephone number, access code and audio pin provided with the meeting confirmation. • For audio, it is recommended that you call-in to the webinar. Join the webinar first, select phone audio then dial the phone number and enter the access number and PIN. • If joining from a mobile device, it is recommended you download the app prior to the meeting. • All participants will be automatically muted upon joining the meeting. • If authorized to speak under the public comment policy, when you are called on, you will be un-muted and will be able to provide comments.
Watch Only Mode - GoToWebinar	NO	• Register at:https://www.gotomeeting.com/webinar Participants can join the meeting starting at 9:30 a.m. on December 9, 2020. • To join the meeting access the website by using the link, telephone number, access code and audio pin provided with the meeting confirmation Or Access the website https://www.gotomeeting.com/webinar, click "Join" and then enter Webinar ID 344-284-179.

		• If joining from a mobile device, it is recommended you download the app prior to the meeting.
Listen Only Mode	NO	If you prefer to attend the meeting by telephone and do not plan to speak, contact Debra Harris at 804-698-4209 or debra.harris@deq.virginia.gov to obtain a telephone number.

Additional Meeting Information:

- Attendees are not entitled to be disorderly or disrupt the meeting from proceeding in an orderly, efficient, and effective fashion. Disruptive behavior may result in a recess or removal from the meeting.
- Possession or use of any device that may disrupt the conduct of business is prohibited, including but not limited to: voice-amplification equipment; bullhorns; blow horns; sirens, or other noise-producing devices; as well as signs on sticks, poles or stakes; or helium-filled balloons.
- All attendees are asked to be respectful of all speakers.
- Rules will be enforced fairly and impartially not only to ensure the efficient and effective conduct of business, but also to ensure no interference with the business of the hotel, its employees and guests.
- All violators are subject to removal.

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Secretary of Natural Resources

David K. Paylor
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MEMORANDUM

TO: Members of the State Water Control Board

FROM: Cindy M. Berndt Cindy Berndt

DATE: March 22, 2021

SUBJECT: Minutes

Attached are the minutes from your meetings on December 9, 2020, and February 26, 2021. Staff will seek your approval of the minutes at your next regular meeting.

If you have any questions, please contact Cindy M. Berndt at (804) 698-4378 or cindy.berndt@deq.virginia.gov.

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STATE WATER CONTROL BOARD MEETING

WEDNESDAY, DECEMBER 9, 2020

ELECTRONIC COMMUNICATION MEETING

Board Members Present:

Heather L. Wood, Chair (joined at 10:44 a.m.)
Lou Ann Jessee-Wallace, Vice-Chair (left at 4:20 p.m.)
Timothy G. Hayes
James A. Lofton
Paula H. Jasinski (recused and left meeting during VPA Regulation and General Permit for Poultry Waste Management item)
Jillian Cohen
Ryan Seiger

Board Members Absent: None

Department of Environmental Quality:

David K. Paylor, Director
Debra A. Harris
Jutta Schneider
Karen Doran
Cindy M. Berndt
Melanie D. Davenport
Kristen Sadtler
John McCutcheon

Attorney General's Office:

David C. Grandis, Assistant Attorney General

1) The attached minutes summarize activities that took place at this Board Meeting.

2) The meeting was convened at 10:16 a.m., recessed at 11:54 a.m., reconvened at 12:35 p.m., recessed at 3:06 p.m., reconvened at 3:20 p.m., and adjourned at 6:47 p.m.

3) The Board convened the meeting electronically, consistent with Governor Ralph Northam's Executive Order No. 51 (2020), Item 4-0.01 g of Chapter 1289 of the 2020 Acts of Assembly and the applicable provisions of § 2.2-3708.2 of the Freedom of Information Act. The meeting was necessary for the Board to discharge its lawful purposes, duties, and responsibility; but it is impracticable or unsafe for the Board to assemble in a single location due to the declaration of a state of emergency for COVID-19. A roll call vote was performed for all votes taken during the meeting.

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 1 - Minutes

The Board, by unanimous roll call vote, approved the minutes of the meeting on September 24, 2020. (6 to 0 - Ms. Wood was not in attendance at the time of the vote).

Cindy M. Berndt

Cindy M. Berndt

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING OF DECEMBER 9, 2020

MINUTE NO. 2 – Policy for the Potomac River Embayments (9VAC25-415) Amendments - Adoption

Melissa Porterfield presented the State Water Control Board (Board) with a final exempt amendment to the Policy for the Potomac River Embayments (9VAC25-415) regulation. This regulation is being modified to correct the names of the Virginia Pollutant Discharge Elimination System Permit Regulation and the Virginia Pollutant Discharge Elimination System General Permit for Domestic Sewage Discharges of Less than or Equal to 1,000 Gallons Per Day regulation referenced in § 30.

Board Decision

Based on the briefing materials and the staff presentation, the Board voted by a roll call vote of 6 (Lofton, Hayes, Jasinski, Cohen, Wallace, Seiger) to 0 (Ms. Wood did not vote) to approve the staff recommendation to:

- Adopt the amendment to the Policy for the Potomac River Embayments (9VAC25-415) regulation as presented and directed the agency to make the regulation effective as soon as possible; and

- Affirm that the Board will receive, consider and respond to petitions by any interested person at any time with respect to reconsideration or revision.

Melissa Porterfield

Melissa Porterfield
Office of Regulatory Affairs

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 3 – Virginia Pollutant Discharge Elimination System General Permit for Seafood Processing Facilities (9VAC25-115)

Prior to the meeting the Board was provided briefing materials which included a revised draft of the subject general permit regulation, the fact sheet for the general permit, the Agency Background Document (TH-09) which included the Technical Advisory Committee membership. There were no public comments received during the Notice of Public Comment and Hearing. Elleanore Daub from the Office of VPDES Permits presented a summary of changes to the proposed regulation.

Board Decision

Based on the briefing material and the staff presentation, a vote was taken by roll call to adopt the amendments to the Virginia Pollutant Discharge Elimination System General Permit for Seafood Processing Facilities (9VAC25-115). The Board also affirmed that they will receive, consider and respond to petitions by any person at any time with respect to reconsideration or revision of the regulations, as provided by the Administrative Process Act. The vote was six (6) to zero (0), with Ms. Wood not voting.

Melanie D. Davenport

Melanie D. Davenport
Director, Water Permitting Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 4 - Virginia Pollutant Discharge Elimination System General Permit Regulation for Discharges of Domestic Sewage of Less Than or Equal to 1,000 Gallons Per Day (9VAC25-110)

Prior to the meeting the Board was provided materials including a briefing memo to the Board, which included a list of the technical advisory committee membership, the regulation showing final amendments, and the town hall agency background document. Peter Sherman, from the Office of VPDES Permits, presented a summary of the significant changes to the regulation.

Board Decision

Based on the briefing material and the staff presentation, a vote was taken by roll call and the Board approved the staff recommendations to authorize the amendments and reissue the VPDES Domestic Sewage General Permit (9VAC25-110). The Board also affirmed that they will receive, consider and respond to petitions by any person at any time with respect to reconsideration or revision of the regulations, as provided by the Administrative Process Act. The Board's vote was six to zero, with Ms. Wood not voting.

Melanie D. Davenport

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Director, Water Permitting Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON December 9, 2020

MINUTE NO. 5 – Actions on the final amendments to the Virginia Pollution Abatement Regulation and General Permit for Poultry Waste Management

Betsy Bowles, the State Animal Feeding Operations Program Coordinator with the Office of Land Application Programs presented the final amendments to the Virginia Pollution Abatement (VPA) Regulation and General Permit for Poultry Waste Management, 9VAC25-630 et seq. Ms. Bowles explained that this amendment would allow the existing Regulation and General Permit for Poultry Waste Management to be reissued for another 10 year term. The VPA Regulation and General Permit governs the management of poultry feeding operations which confine 200 or more animal units (20,000 chickens or 11,000 turkeys), and establishes utilization, storage, tracking and accounting requirements related to poultry waste, including that transferred from poultry feeding operations.

Ms. Jillian Cohen asked if staff would have included the litter amendment reporting in the regulation in light of the research project. Staff responded that the project was created to gain knowledge of actual animal numbers confined on the farms rather than the current model which uses the agriculture census data that is not accurate and five years old as well as data related to litter amendments, among other farm information. Staff stated that they believed that this information would be better sought through this research project, since the project was created to inform the Chesapeake Bay Model. Staff reiterated if there is a future need to report or verify the information that the agency could explore a method to assist with that task.

Mr. James Lofton made a statement that the proposal was complex and an important update to the regulation. He further stated that staff had spent hundreds of hours on this proposal and that he thought the changes made to Section 70 was a good alternative.

Mr. Timothy Hayes asked how would the reporting occur, would the farmer just need to send the agency a copy of the records. Staff responded that he was correct and that the agency had a computer database project underway that is scheduled to be completed in the summer of 2021 and the agency project included an external portal that would allow users to submit the records. Mr. Hayes stated that he wanted to make sure that before the reporting requirements were adopted that staff were make the reporting as simple as possible to avoid adding more burdens to the farmers.

Board Decision

The subsequent vote was taken by a roll call of the members of the Board. Ms. Jasinski recused herself from the discussion and vote.

Based upon the Board book briefing material and information provided by staff, the Board, on the motion by Mr. James Lofton and seconded by Mr. Timothy Hayes, voted 6-0, with Ms. Paula Hill Jasinski recusing herself, to accept the staff recommendation to:

> Approve the final amendments to the Virginia Pollution Abatement Regulation and General Permit for Poultry Waste Management as presented.

Melanie D. Davenport

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Director, Water Permitting Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 6 - Regulations - Water Quality Standards- Fast-Track Amendments to Designate Four Public Water Supplies (9VAC25-260)

David Whitehurst, a staff member of the Water Quality Standards program, summarized proposed amendments to the Water Quality Standards regulation to designate four waterbody segments as Public Water Supplies (PWS).

Mr. Whitehurst informed the Board that three of the four subject drinking water supply intakes are either currently under construction or planned to be in the immediate future and one is currently active with all withdrawal structures in use. None of the intakes are in waters designated as PWS. A PWS designation provides protection for the public water supply use through application of human health criteria which may require more stringent effluent limits for discharges from permitted facilities within a five-mile protection distance beyond the intake.

Mr. Whitehurst told the Board that it has been determined that none of the four proposed public water supply locations currently have any permitted facilities within that five-mile protection distance and, as a result, the amendments are assumed to be non-controversial and suitable for fast track rule-making.

Board Decision:

Based on the briefing material and the staff presentation, the Board unanimously approved the following actions:

1. That the Board authorize the Department to promulgate the proposed amendments to **9 VAC 25-260-400, 420, 440, and 510** for public comment using the fast-track process established in § 2.2-4012.1 of the Administrative Process Act for regulations expected to be non-controversial.

2. That the Board's authorization should also be understood to constitute its adoption of the regulation at the end of the public comment period provided that (i) no objection to use of the fast-track process is received from 10 or more persons, or any member of the applicable standing committee of either house of the General Assembly or of the Joint Commission on Administrative Rules, and (ii) the Department does not find it necessary, based on public comments or for any other reason, to make any changes to the proposal.

3. That the Board authorize the Department to set an effective date 15 days after close of the 30-day public comment period provided (i) the proposal completes the fast-track rulemaking process as provided in § 2.2-4012.1 of the Administrative Process Act and (ii) the Department does not find it necessary to make any changes to the proposal.

Jutta Schneider

Jutta Schneider
Director, Water Planning Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE 7 – Chesapeake Bay Preservation Area Designation and Management Regulation - 9VAC25-830 - Proposed Amendment - Coastal Resilience and Adaptation to Sea-level Rise and Climate Change Criteria

Justin Williams, Office of Watershed and Local Government Assistance Programs, presented information to the Board regarding a proposed regulatory action related to amendments to the Chesapeake Bay Preservation Area (CBPA) Designation and Management Regulation. The proposed regulatory change was required by Chapter 1207 of the 2020 Acts of Assembly (Act). The Act~~, which~~ added "coastal resilience and adaptation to sea-level rise and climate change" to the criteria to be used by local governments and required that the Board adopt regulations to implement the provision. Mr. Williams presented a summary of the proposed changes to the regulation, including the addition ~~the~~of climate adaptation to measures allowed in CBPA Areas, the requirement that localities ~~to~~ consider climate change impacts in proposed land development, and ~~the~~ conditions for climate adaptation measures in Resource Protection Areas. ~~directed the State Water Control Board to adopt regulations to . Mr. Williams presented a summary of the proposed changes to the regulation, including~~ _____.

Board Decision:

Based on the Board Book materials and the staff presentation, the Board voted unanimously (7-0 by roll call; Hayes, Jasinski, Cohen, Lofton, Seiger, Wallace, and Wood in favor, none opposed) to:

1. Authorize staff to present the proposed regulation for public comment;
2. Direct staff to hold a 90-day public comment period;
3. Direct staff to hold at least one meeting with a stakeholder group after the end of the 2021 general assembly session; and
4. Direct staff to present the amendments for final consideration by the Board at the June 2021 meeting.

Jutta Schneider

Jutta Schneider
Director, Water Planning Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE 8 – Chesapeake Bay Preservation Area Designation and Management Regulation - 9VAC25-830 - Proposed Amendment - Preservation of Mature Trees and Replanting of Trees

Justin Williams, Office of Watershed and Local Government Assistance Programs, presented information to the Board regarding a proposed regulatory action related to amendments to the Chesapeake Bay Preservation Area (CBPA) Designation and Management Regulation (Regulation). The proposed regulatory change was required by Chapter 1207 of the 2020 Acts of Assembly (Act). The Act added "preservation of mature trees or planting of trees as a water quality protection tool and as a means of providing other natural resource benefits" to the criteria to be used by local governments and required that the Board adopt regulations to implement the provision. Mr. Williams presented a summary of the proposed changes to the regulation, including the addition of preserving mature trees in existing vegetation preservation requirements and the planting of trees in existing vegetation establishment requirements in the Regulation.

Board Decision:

Based on the Board Book materials and the staff presentation, the Board voted unanimously (7-0 by roll call; Hayes, Jasinski, Cohen, Lofton, Seiger, Wallace, and Wood in favor, none opposed) to:

1. Authorize staff to present the proposed regulation for public comment;
2. Direct staff to hold a 90-day public comment period;
3. Direct staff to hold at least one meeting with a stakeholder group after the end of the 2021 general assembly session; and
4. Direct staff to present the amendments for final consideration by the Board at the June 2021 meeting.

Jutta Schneider

Jutta Schneider
Director, Water Planning Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2021

MINUTE NO. 9 General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820)

Allan Brockenbrough of the Office of VPDES Permits presented to the Board proposed amendments to the General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) and recommended that the Board authorize a notice of public comment period and public hearing on the proposed regulation. The most significant proposed amendments to the regulation included (1) eliminating outdated provisions on compliance plan submittals, (2) amending the provision addressing facility consolidations to clarify that resulting effluent limitations are applied as "end-of-pipe" limits rather than "delivered" limits, (3) eliminating previously completed schedule of compliance provisions, (4) updating prices for purchase of credits from the Nutrient Offset Fund and (5) adding an e-reporting requirement for filing Notices of Intent. The staff also recommended that the Board authorize the staff to serve as hearing officer at the public hearings.

Board Decision

Based on the briefing material and the staff presentation, the Board voted unanimously to authorize a notice of public comment period and to hold a public hearing for the General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820). The Board also voted unanimously to authorize the staff to serve as hearing officer at the public hearing.

Melanie D. Davenport

Melanie D. Davenport
Director, Water Permitting Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATERCONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2021

MINUTE NO. 10 Proposed Amendments to the Water Quality Management Planning Regulation (9VAC25-720) and the General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820)

Allan Brockenbrough of the Office of VPDES Permits and John Kennedy of the Office of Ecology presented to the Board proposed amendments to the Water Quality Management Planning Regulation (9VAC25-720) and the General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) and recommended that the Board authorize a notice of public comment period and public hearing on the proposed regulation. The most significant proposed amendments to the regulations included (1) establishing of Total Phosphorus wasteload allocations (WLAs) necessary to meet chlorophyll-a water quality criteria in the tidal James River; (2) reassigning unneeded Total Nitrogen and Total Phosphorus WLAs from industries that have either closed, or otherwise eliminated their need for a WLA, to the Nutrient Offset Fund for future use; (3) implementing Initiative No. 52 from Virginia's Chesapeake Bay TMDL Phase III Watershed Implementation Plan by establishing "floating" WLAs for 36 significant munipal dischargers; and (4) revising the General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) as necessary to implement the above amendments.

Board Decision

Based on the briefing material and the staff presentation, the Board voted unanimously to (1) authorize staff to proceed to public comment with proposed amendments to the Water Quality Management Planning Regulation (9VAC25-720) and the General VPDES Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820), and (2) convene a public hearing on the proposed amendments with a Board member serving as hearing officer.

Melanie D. Davenport

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 11: GENERAL PERMIT FOR USE OF SURFICIAL AQUIFER ON THE EASTERN SHORE - 9VAC25-910 AND GROUNDWATER WITHDRAWAL REGULATIONS - 9VAC25-610 - PROPOSED

Scott Kudlas, Office of Water Supply, presented information to the Board regarding two proposed regulatory actions related to implementation of legislation passed by the General Assembly in 2019. The General Assembly directed the State Water Control Board to adopt regulations to provide incentives for use of the surficial or water table aquifer rather than the deep confined aquifer. The two actions are required to establish a general permit on the Eastern Shore. Mr. Kudlas indicated that the first action was to amend the existing Groundwater Withdrawal Permit Regulation to authorize development of general permits. This was necessary because the program had never had a general permit. The second action is creating a new general permit in regulation. He noted that general permits were the primary way that DEQ provides an accelerated and less costly permit process to incentivize applicant behavior.

Mr. Kudlas stated that the Notice of Intended Regulatory Action was published on November 11, 2019 and that a Regulatory Advisory Panel was formed with broad representation. The panel met four times and completed their work on October 9, 2020. Mr. Kudlas then provided details on the changes to the existing regulation 9VAC25-610. These included adding three new definitions and a new section, 9VAC25-610-95, authorizing the creation of general permits for groundwater withdrawals under certain conditions. He then reviewed the new 9VAC25-910 general permit and its specific requirements. Mr. Kudlas noted that changes in numbering of the text and to the regulatory language had been made that were not included in the Board Book. He noted the places where the numbering changed and provided the new referenced numbers. He also noted some regulatory language changes made to address comments provided by the Office of the Attorney General. These language changes were made to sections 60, 70, and 90 of 9VAC25-910. Mr. Kudlas reviewed each change and provided final language for each revised section. Mr. Kudlas reviewed the regulatory streamlining provided under the proposed general permit including reduced reporting frequency, simplified water conservation and management monitoring, highly discounted permit fees, elimination of public notice fees and accelerated

processing and automation of modeling. He concluded by stating that the Attorney General's certification was provided on December 7. 2020 based on the changes presented by staff.

BOARD DECISION

Based on the Board Book materials and additional information provided in the staff presentation, the Board authorized the Director to initiate a public comment period and schedule a public hearing for proposed amendments to the Groundwater Withdrawal Permitting Regulation (9VAC25-610) and the proposed General Permit for Use of Surficial Aquifer on the Eastern Shore (9VAC25-910), including the changes presented during the staff presentation. The Board further authorized staff to serve as the hearing officer at the public hearing. The Board voted 7-0 by roll call vote.

Jutta Schneider

Jutta Schneider, Director
Water Planning Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 12 – Significant Noncompliance Report and Chesapeake Bay Preservation Act Program Notices of Violation

Kristen Sadtler, Water Enforcement Program Manager, informed the Board that there were two new facilities reported to EPA on the Quarterly Noncompliance Report as being in significant noncompliance for the quarter ending June 30, 2020. The permittees reported were:

1. Western Virginia Water Authority for the WVWA Water Pollution Control Plant
2. Henrico County for the Henrico County Water Reclamation Facility

Additionally, Kristen informed the Board that DEQ issued a Notice of Violation to Lancaster County on October 15, 2020 for its Chesapeake Bay Preservation Act Program (Program). DEQ anticipates entering into a Corrective Action Agreement with the County describing the Program's deficiency, corrective action, and a timeframe for completing corrective action.

The Board accepted the reports.

Kristen Sadtler

Kristen Sadtler
Water Enforcement Program Manager
Division of Enforcement

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 13 – VPDES Program Consent Special Order

Kristen Sadtler, Water Enforcement Program Manager, presented to the Board the Consent Order for the City of Winchester. The Board took a vote by roll call and unanimously approved the Order by a vote of 7-0 and further authorized the Department's Director to execute the Order on the Board's behalf and refer violations of the Order to the Office of the Attorney General for appropriate legal action.

Kristen Sadtler

Kristen Sadtler
Water Enforcement Program Manager
Division of Enforcement

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 14 – VWPP Program Consent Special Order

Kristen Sadtler, Water Enforcement Program Manager, presented to the Board the Consent Order for the United States General Services Administration, M.A. Mortenson Co., and Hensel Phelps Construction Co. The Board took a vote by roll call and unanimously approved the Order by a vote of 7-0 and further authorized the Department's Director to execute the Order on the Board's behalf and refer violations of the Order to the Office of the Attorney General for appropriate legal action.

Kristen Sadtler

Kristen Sadtler
Water Enforcement Program Manager
Division of Enforcement

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE 15 – FY 2021 VCWRLF Loan Authorizations

Ms. Karen Doran, Program Manager of the Department's Clean Water Financing and Assistance Program (the Program), made a presentation to the Board based on a memorandum dated November 6, 2020. The memorandum identified the loan amounts, terms, and interest rates for 14 projects being recommended by staff for FY 2021 Virginia Clean Water Revolving Loan Fund (the Fund) assistance.

Ms. Doran began her presentation by summarizing the FY 2021 application process for 14 projects targeted for a total of $205,314,095 in assistance from the Fund. She explained that she had met with all of the potential FY 2021 loan recipients to verify the schedules and financial data used to evaluate the local impact and that staff had completed its user charge impact analyses for the targeted recipients in order to establish the interest rates in accordance with Board guidelines. She stated that a public meeting on the proposed funding list was held on October 30, 2020 and no comments were received.

Ms. Doran explained that all the interest rate analyses have been finalized in accordance with the Board approved guidelines and the resulting recommendations were included in the memorandum to the Board. In order to attract and accommodate a larger number of localities and projects to the Program, and, as approved by the Board in previous years, staff recommended revisions to the ceiling rates and term options offered to borrowers whose project type and impact to user rates resulted in a ceiling rate based on the Board's Guidelines. Based on consultation with the Virginia Resources Authority (VRA), she stated that the staff was recommending that the ceiling rate calculation vary depending on the term of the loan.

Board Decision: Authorize the execution of loan agreements for the projects, loan amounts, interest rates and terms listed above, and that 20-year ceiling loan rates are set at 1.5% (150 basis points) below market, 25-year ceiling loan rates are 1.25% (125 basis points) below market, and 30-year ceiling loan rates are 1% (100 basis points) below market, based on VRA's evaluation of the market conditions that exist about a month prior to each loan closing or the actual leveraged bond issue to fund ceiling rate loans. The minimum interest rate will be 1% for all loans that do not qualify for the hardship interest rate of 0.5%. Loan closings will be subject to receipt of a favorable financial capability analysis report and supporting recommendation from VRA for each loan recipient.

FY 2021 Proposed Interest Rates and Loan Authorizations

	Locality		*Loan Amount*	*Rates and Loan Terms*
1	Town of Coeburn	$	2,070,845	0.5%, up to 30 years
2	City of Norfolk	$	6,000,000	0.5%, up to 30 years
3	Town of Exmore	$	17,255,000	0.5%, up to 30 years
4	Town of Front Royal	$	8,000,000	CR*, up to 25 years
5	Bedford Regional Water Authority	$	12,520,000	0.5%, up to 25 years
6	Nelson County Service Authority	$	14,328,000	0.5%, up to 25 years
7	City of Richmond	$	24,871,250	0.5%, up to 20 years
8	Town of Marion	$	428,300	0.5%, up to 25 years
9	Town of Bridgewater	$	230,000	CR*, up to 30 years
10	Prince William County	$	85,443,000	CR*, up to 25 years
11	Middlesex County	$	1,550,000	CR*, up to 30 years
12	City of Norfolk	$	1,567,700	0.5%, up to 20 years
13	Fairfax County	$	30,500,000	CR-1%*, up to 20 years
14	Westmoreland County	$	550,000	0.5%, up to 20 years
	TOTAL	$	205,314,095	

CR = Ceiling Rate *minimum 1%

Valerie Thomson
Director of Administration

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE 16 – Agricultural Best Management Practice Loan Program Guidelines Revisions

Ms. Karen Doran, Program Manager of the Department's Clean Water Financing and Assistance Program, made a presentation to the Board based on a memorandum dated November 6, 2020. The memorandum discussed the staff determination of the need to revise the Agricultural Best Management Practice (BMP) Loan Program Guidelines.

Ms. Doran explained that during the drafting of the revisions to the guidelines, DEQ provided a draft version of the Guidelines to the agricultural conservation stakeholder group which included Virginia Farm Bureau, Natural Resources Conservation Service, Virginia Dairyman's Association, Virginia Cattleman's Association, Virginia Association of Soil and Water Conservation Districts, Agribusiness Council, Grain Producers Association, Poultry Federation, Farm Service Agency, and the Virginia Cooperative Extension. Stakeholder comments were discussed and resolved during a stakeholder meeting held on September 16, 2020. DEQ incorporated stakeholder input and made final revisions to the guidelines.

Ms. Doran explained to the Board that the revised guidelines were presented to the public for a 30-day public comment period from September 30 to October 30, 2020 and no comments were received. Ms. Doran provided a summary of guidelines revisions to the Board and recommended the Board approve the revised guidelines.

Board Decision: The Board voted unanimously to approve the revised Agricultural BMP Loan Program Guidelines.

Valerie Thomson
Director of Administration

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 17 - Future Meetings

The Board confirmed April 14, June 29, September 28 and December 14, 2021, as the dates of their regular meetings for 2021 and set a tentative date of January 22, 2021 for a special Board meeting.

Cindy M. Berndt

Cindy M. Berndt

Commonwealth of Virginia

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 18 – Water Planning Division Director's Report

Ms. Jutta Schneider provided an update on the status of numeric turbidity criteria in Virginia. She stated that the Notice of Intended Regulatory Action for numeric turbidity criteria had been drafted, and she provided an overview of the standard regulatory process. Ms. Schneider also presented information about Virginia's efforts in nutrient control and management, including a number of numeric criteria and thresholds.

Jutta Schneider
Director, Water Planning Division

Commonwealth of Virginia

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 18\- Water Permitting Division Director's Report

Ms. Melanie D. Davenport provided an update on the Mountain Valley Pipeline project. She provided updates on (i) the construction status of the project and (ii) litigation related to the project. She also reviewed the results three inspections conducted at Yellow Finch Lane and three inspection at Green Hollow Road. She provided compliance monitoring statistics, reported common areas of concern observed by the inspectors, and provided complaint statistics. She showed photographs of current conditions along the right of way and provided a summary of engineering staff's analysis of the hydrologic conditions used for erosion and sediment control analysis and post construction stormwater analysis.

Ms. Davenport also provided background, history and information regarding how DEQ ensures that water permits and certifications enforce water quality criteria and how DEQ enforces Virginia's narrative water quality criteria.

Melanie D. Davenport

Melanie D. Davenport
Director, Water Permitting Division

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EXCERPT FROM THE PROCEEDINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON DECEMBER 9, 2020

MINUTE NO. 19 - Public Forum

The following persons appeared during the public forum to present concerns, complaints, and requests regarding certification of U.S. Army Corps of Engineers nationwide permits, requests to change public comment policies and continued concerns and complaints regarding the Mountain Valley Pipeline project: Kirk Bowers, Nan Gray, Freeda Cathcart, Ann Rogers, Whitney Katchmark, Gregory Buppert, Christine Camper, Jessica Sims, Desiree Shelley, Reb Denham, Joshua Vana, Mara Robbins and Kay Ferguson..

Cindy M. Berndt

Cindy M. Berndt

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STATE WATER CONTROL BOARD MEETING

FRIDAY, FEBRUARY 26, 2021

ELECTRONIC COMMUNICATION MEETING

Board Members Present:
Heather L. Wood, Chair
Lou Ann Jessee-Wallace, Vice-Chair
Timothy G. Hayes
James A. Lofton
Paula H. Jasinski
Jillian Cohen
Ryan Seiger

Board Members Absent: None

Department of Environmental Quality:
David K. Paylor, Director
Debra A. Harris
Jaime Robb
Cindy M. Berndt
Melanie D. Davenport

Attorney General's Office:
David C. Grandis, Assistant Attorney General

1) The attached minutes summarize activities that took place at this Board Meeting.

2) The meeting was convened at 10:00 a.m., recessed at 12:00 p.m., reconvened at 12:10 p.m., recessed at 1:26 p.m., reconvened at 2:05 p.m., and adjourned at 7:32 p.m.

3) The Board convened the meeting electronically, consistent with Governor Ralph Northam's Executive Order No. 51 (2020), Item 4-0.01 g of Chapter 1289 of the 2020 Acts of Assembly and the applicable provisions of § 2.2-3708.2 of the Freedom of Information Act. The meeting was necessary for the Board to discharge its lawful purposes, duties, and responsibility; but it is impracticable or unsafe for the Board to assemble in a single location due to the declaration of a state of emergency for COVID-19. A roll call vote was performed for all votes taken during the meeting.

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Director

James Golden
Regional Director

EXCERPT FROM THE PROCEEDSINGS OF THE STATE WATER CONTROL BOARD AT ITS MEETING ON FEBRUARY 26, 2021

Minute No. 1 – Virginia Water Protection Individual Permit No. 19-2036, Wegmans Distribution Center, Wegmans Food Markets, Inc.

At the commencement of the meeting, Melanie Davenport, Water Permitting Division Director, made a presentation on statutory and regulatory requirements of the Virginia Water Protection (VWP) Permit Program.

Following the program presentation, DEQ staff made a presentation for the issuance of the Virginia Water Protection (VWP) Individual Permit for the Wegmans Distribution Center project (VWP Permit No. 19-2036). The project consists of constructing a grocery distribution center with associated support facilities on a 219 acre parcel in Hanover County, Virginia. The permit authorizes the total impact of 14.85 acres of surface waters, consisting of 14.82 acres of permanent impacts and 0.03 acres of temporary impacts.

Staff briefed the Board on the proposed permitting action and provided a summary of the most pertinent areas of concern received during the public hearing and public comment period and staff responses to comments.

After staff's presentation, the Board heard from the following individuals:

- John Lain and Dan Aken (representing the applicant)
- Todd Miller and Tom Walker (US Army Corps of Engineers)
- Delegate Elizabeth Guzman
- Sara Blose
- Chris French
- Rod Morgan
- Brett Blose
- Weedon Cloe
- Jonathan Gendzier
- Kathy Woodcock
- Charles Morris
- Pat Jordan
- Diane Drake
- Deshanda Artis
- Atanya Lewis
- Bonnica Cotman
- Renada Harris
- Jeff Hetzer

- Shanda Miller
- Gustavo Angeles
- Michael Fenster
- Melvinia Wilson
- Mary Jones
- Lakshmi Fjord
- Lisa Eget
- John DuMont
- Fionnuala Fisk
- Erica Yalowitz
- Ankur Bhaskar
- Rashad Pearson
- Brian Buniva

Following comments of the individuals noted above, the applicant's representatives responded to several questions from the Board. Staff then made the following recommendation:

Based on the (i) Board book material, (ii) public comments made available to the Board and any explanation of comments previously received during the public comment period made at the Board meeting, (iii) public comments made at the Board meeting, (iv) staff presentation, (v) Board discussions, and (vi) agency files on the draft permit:

1. Find that:
   a. The permit has been prepared in conformance with all applicable statutes, regulations, and agency practices;
   b. The proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses;
   c. The proposed permit addresses avoidance and minimization of surface water impacts to the maximum extent practicable;
   d. The effect of the impact, together with other existing or proposed impacts to surface waters, will not cause or contribute to significant impairment of state waters or fish and wildlife resources;
   e. The proposed permit conditions are sufficient to achieve no net loss of wetland acreage and function through compensatory mitigation; and
   f. The permit is designed to prevent unpermitted impacts.
2. Approve the permit and conditions as contained in the Board book.
3. Authorize the Director to issue the permit as approved by the Board.

After hearing the staff recommendation, a motion was made and seconded to approve staff recommendations.

Board Decision

The Board, based on the Board book material and presentation at the meeting, voted 4-3 in favor of staff's recommendation. Results of the roll call vote were: Wood, Wallace, Hayes and Seiger voted Aye; Lofton, Jasinski and Cohen voted Nay.

James Golden
Director, Piedmont Regional Office

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MEMORANDUM

TO: State Water Control Board Members

From: Jutta Schneider, Director, Water Planning Division

DATE: March 18, 2021

RE: Final Exempt Action – Propose amendment to 9 VAC 25-71 to add Sarah Creek and Perrin River to Virginia's list of designated No Discharge Zones

Executive Summary
Staff will ask the Board to amend 9 VAC 25-71 to add two No Discharge Zones (NDZs) in Gloucester County to the list of Virginia NDZs. The designation of an NDZ requires a written application to EPA and, if approved, prohibits the discharge of all vessel sewage, whether treated or not, into the designated NDZ. DEQ provided notification to the State Water Control Board ("the Board") at its December 2016 meeting that the Sarah Creek and Perrin River NDZ application would be submitted to EPA through the Virginia Secretary of Natural Resources' office. The EPA Administrator published an affirmative final determination in the September 23, 2020 Federal Register establishing the Sarah Creek and Perrin River NDZs. Amending 9 VAC 25-71 will update Virginia regulations to conform with federal regulations.

I. Background

Federal law prohibits the discharge of untreated sewage from all vessels into navigable waters of the U.S. Federal standards for vessel discharge of treated sewage were established by EPA regulations at 40 CFR Part 140 that were promulgated pursuant to the Clean Water Act §312. Further, the federal Clean Water Act provides:

> "[I]f any State determines that the protection and enhancement of the quality of some or all of the waters within such State require greater environmental protection, such State may completely prohibit the discharge from all vessels of any sewage, whether treated or not, into such waters, except that no such prohibition shall apply until the Administrator determines that adequate facilities

for the safe and sanitary removal and treatment of sewage from all vessels are reasonably available for such water to which such prohibition would apply."

An NDZ creates the area in a waterbody where no discharge of sewage is permitted; vessels would instead use pumpout facilities (often located at marinas) or travel outside of the NDZ to discharge treated sewage.

DEQ is the coordinator of NDZ designation requests in Virginia and has developed a procedure that includes public involvement, coordination with other state agencies, consultation with EPA, and development and transmittal of an application for Executive signature.

The Code of Virginia at § 62.1-44.33 directs the Board to adopt regulations regarding NDZs, and defines an NDZ as an area approved by EPA where EPA makes an affirmative determination that adequate pump-out facilities exist. The Board has adopted a regulation that lists existing NDZs and applicable requirements within them at 9 VAC 25-71 et seq., *Regulations Governing the Discharge of Sewage and Other Wastes from Boats.*

DEQ Guidance Memo 08-2003 (Procedure for Designation of Vessel No Discharge Zones) issued February 2008, describes the process for submitting an NDZ application to EPA. According to this guidance, once EPA has established a new NDZ by publishing its affirmative determination in the Federal Register, DEQ will propose an amendment to 9 VAC 25-71 to add the new NDZ to Virginia's list of designated NDZs (see Attachment I). Attachment II contains the rationale for this action to be exempt under the Administrative Process Act's Subsection (A)(4)(c) of § 2.2-4006. Attachment III contains several background documents, including the Federal Register notice of EPA's affirmative determination and a map of the NDZ areas.

II. Public Participation During the Application Process

Beginning in 2014, an application for the two NDZs was developed in accordance with EPA Guidance 842-B-94-004 (Protecting Coastal Waters from Vessel and Marina Discharges: a Guide for State and Local Officials). The application was also subject to the public participation process contained in DEQ's Guidance Memo 08-2003 (Procedure for Designation of Vessel No Discharge Zones). Written comments provided by stakeholders were submitted to EPA together with the NDZ application. These comments, as well as the NDZ application itself, are available on DEQ's web site at https://www.deq.virginia.gov/water/water-quality/implementation/no-discharge-zone-program.

The application for NDZs was published in the Virginia Register, presented during a public meeting, and opened to a public comment period subsequent to the public meeting. Public participation activities are itemized below. DEQ staff received a total of 25 written public comments on the application, which are summarized in Attachment III.D.

Virginia Register Notification	*July 11, 2016*
Public Meeting	*July 27, 2016*
Public Comment Period	*July 28, 2016 to August 26, 2016*

Once EPA had reviewed the application and published its affirmative determination in the Federal Register (September 23, 2020), EPA held a 30-day public comment period. EPA received no comments.

III. Proposed Action

As described in DEQ Guidance Memo 08-2003, staff will be asking the Board to amend 9 VAC 25-71 to add the Sarah Creek and Perrin River NDZs to Virginia's list of designated NDZs as a final exempt action under § 2.2-4006(A)(4)(c) of the Administrative Process Act. The specific NDZ boundaries are provided in Attachment III.B.

Section 2.2-4006(A)(4)(c) of the Code of Virginia allows the Board to adopt this regulatory amendment to 9 VAC 25-71 as the changes are necessary to conform to changes in the federal regulations. This regulatory amendment will be effective 30 days after publication in the *Virginia Register*.

Although it is not required for final exempt actions, DEQ published a notice in the Virginia Register (Vol. 37, Iss. 13, February 15, 2021) and sought comments on the amendments. The comment period was from February 16, 2021 to March 18, 2021. No comments were received.

At your Board meeting on April 14, 2021, staff will request that the Board add Sarah Creek and Perrin River NDZs to Virginia's list of designated NDZs under Section 70 of 9 VAC 25-71, authorize its publication, and affirm that the Board will receive, consider and respond to requests by any interested person at any time with respect to reconsideration or revision.

IV. Attachments

- **Attachment I** –Amended Regulations Governing the Discharge of Sewage and Other Wastes from Boats for Board adoption
- **Attachment II** –Virginia Regulatory Town Hall
- **Attachment III** – Background Materials
  - **Attachment III.A** Maps depicting Gloucester County and the two No Discharge Zones
  - **Attachment III.B** Description of No Discharge Zone areas in the No Discharge Zone application
  - **Attachment III.C** EPA's Final Determination published in Federal Register
  - **Attachment III.D** Summary of public comments pertaining to the 2016 No Discharge Zone application

Attachment I – Amended Regulations Governing the Discharge of Sewage and Other Wastes from Boats for Board Adoption

9 VAC 25-71-70 Listing of designated no discharge zones in the Commonwealth of Virginia

9VAC25-71-70 Listing of designated no discharge zones in the Commonwealth of Virginia.

The following are designated no discharge zones:

1. Smith Mountain Lake in the counties of Bedford, Franklin and Pittsylvania, Virginia, from Smith Mountain Dam (Gap of Smith Mountain) upstream to the 795.0 foot contour (normal pool elevation) in all tributaries, including waters to above the confluence with Back Creek in the Roanoke River arm, and to the Brooks Mill Bridge (Route 834) on the Blackwater River arm.

2. The Lynnhaven River Watershed in the City of Virginia Beach, Virginia, including all contiguous waters south of the Lesner Bridge at Lynnhaven Inlet (latitude 36°54'27.90" N and longitude 76°05'30.90" W) and north of the watershed break point at the intersection of West Neck Creek and Dam Neck Road (latitude 36°47'17.60" N and longitude 76°04'14.62" W).

3. Broad Creek, Jackson Creek, and Fishing Bay Watersheds in lower Middlesex County, Virginia: the Broad Creek Watershed No Discharge Zone is defined as all contiguous waters south of the line formed between the points formed by latitude 37°33'46.3" N and longitude -76°18'45.9" W and north to latitude 37°33'47.4" N and longitude -76°19'24.7" W. The Jackson Creek Watershed No Discharge Zone is defined as all contiguous waters west of the of the line formed between the points formed by latitude 37°32'40" N and longitude -76°19'40.6" W at Stove Point Neck and latitude 37°32'46.8" N and longitude -76°19'15.6" W at the western point of the entrance to the eastern prong of Jackson Creek. The Fishing Bay Watershed No Discharge Zone is defined as all contiguous waters north of the line formed between the points formed by latitude 37°32'01.9" N and longitude -76°21'43.5" W at the southernmost tip of Bland Point and latitude 37°31'29.4" N and longitude -76°19'53.6" W at the southernmost tip of Stove Point. This area includes all of Fishing Bay and encompasses Moore Creek and Porpoise Cove.

4. Sarah Creek in Gloucester County, Virginia including all contiguous waters north of the line formed between the point formed by latitude 37°14'58.34" N and longitude 76°29'39.17" W and east to latitude 37°15'00.81" N and longitude 76°28'37.84" W.

5. Perrin River in Gloucester County, Virginia including all contiguous waters north of the line formed between the point formed by latitude 37 ° 15'43.52" N and longitude 76 ° 25'25.71" W and east to latitude 37 ° 15'50.63" N and longitude 76 ° 25'11.84" W.

Attachment II – Virginia Regulatory Town Hall

townhall.virginia.gov

Exempt Action: Final Regulation
Agency Background Document

Agency name	State Water Control Board
Virginia Administrative Code (VAC) Chapter citation(s)	9 VAC 25-71
VAC Chapter title(s)	Regulations Governing the Discharge of Sewage and Other Wastes from Boats
Action title	Amendment to add two No Discharge Zone (NDZ) designations
Final agency action date	April 14, 2021
Date this document prepared	March 15, 2021

Although a regulatory action may be exempt from executive branch review pursuant to § 2.2-4002 or § 2.2-4006 of the *Code of Virginia*, the agency is still encouraged to provide information to the public on the Regulatory Town Hall using this form. However, the agency may still be required to comply with the Virginia Register Act, Executive Order 14 (as amended, July 16, 2018), the Regulations for Filing and Publishing Agency Regulations (1VAC7-10), and the *Form and Style Requirements for the Virginia Register of Regulations and Virginia Administrative Code.*

Brief Summary

Provide a brief summary (preferably no more than 2 or 3 paragraphs) of this regulatory change (i.e., new regulation, amendments to an existing regulation, or repeal of an existing regulation). Alert the reader to all substantive matters. If applicable, generally describe the existing regulation.

The amendments to the state's Regulations Governing the Discharge of Sewage and Other Wastes from Boats (9 VAC 25-71) include adding two new No Discharge Zone (NDZ) designations to the Virginia Administrative Code (9 VAC 25-71-70, Listing of designated no discharge zones in the Commonwealth of Virginia). The Administrative Process Act's Subsection (A)(4)(c) of § 2.2-4006 allows the Board to adopt this regulatory amendment as a final exempt action as the changes are necessary to conform to changes in the federal regulations.

The NDZs were developed in accordance with Clean Water Act Section 312 and § 62.1-44.33 of the Code of Virginia and will be included in Section 70 of 9 VAC 25-71 as a designated NDZ in Virginia. This regulatory action is a final exempt action under the Administrative Process Act (§2.2-4006.A.4.c) as it is necessary to amend the regulations to comport with EPA's approval of the NDZs. The NDZ application was subject to public participation during its development, as described in the Board Memo and in the

Substance section below. Specifically, DEQ convened a public meeting and sought public comment during the application development. EPA then sought public comment on its affirmative determination.

Additionally, DEQ also sought comment on this regulatory action. Although it is not required for final exempt actions, a general notice was published in the Virginia Register (Vol. 37, Iss. 13, February 15, 2021) and sought comments on the amendments. The comment period was from February 16, 2021 to March 18, 2021. No comments were received.

An NDZ creates the area in a waterbody where no discharge of sewage is permitted; vessels would instead use pumpout facilities (often located at marinas) or travel outside of the NDZ to discharge treated sewage. See the Substance section below for more details.

Mandate and Impetus

Identify the mandate for this regulatory change and any other impetus that specifically prompted its initiation (e.g., new or modified mandate, internal staff review, petition for rulemaking, periodic review, or board decision). "Mandate" is defined as "a directive from the General Assembly, the federal government, or a court that requires that a regulation be promulgated, amended, or repealed in whole or part."

On September 23, 2020, EPA published its affirmative determination to establish the two NDZs in the Federal Register (see 85 FR 59796; available in Attachment III.C.). In accordance with that approval, DEQ is requesting the addition of these two NDZs into Virginia administrative code to be in conformance with federal regulations. This regulatory action is a final exempt action under the Administrative Process Act (§2.2-4006.A.4.c).

Acronyms and Definitions

Define all acronyms used in this form, and any technical terms that are not also defined in the "Definitions" section of the regulation.

"No Discharge Zone" (NDZ) means a waterbody or an area of a waterbody into which the discharge of treated sewage from all vessels is completely prohibited. It is illegal to discharge untreated sewage from vessels in all waterbodies of the Commonwealth. In a designated No Discharge Zone, it is also illegal to discharge any treated waste from vessels equipped with Marine Sanitation Devices (MSDs) that grind, treat and discharge human sewage.

"Pumpout facilities" means any device, equipment or method of removing sewage from a marine sanitation device. Also, it shall include any holding tanks either portable, movable or permanently installed, and any sewage treatment method or disposable equipment used to treat, or ultimately dispose of, sewage removed from boats.

"Sewage" means the spent water or wastewater containing human excrement coming from toilets, bathrooms, commodes and holding tanks.

Statement of Final Agency Action

Provide a statement of the final action taken by the agency including: 1) the date the action was taken; 2) the name of the agency taking the action; and 3) the title of the regulation.

At its meeting on April 14, 2021 the State Water Control Board adopted the amendments to Section 70 of the Regulations Governing the Discharge of Sewage and Other Wastes from Boats (9 VAC 25-71) and

affirmed that the Board will receive, consider and respond to requests by any interested person at any time with respect to reconsideration or revision..

Legal Basis

Identify (1) the agency or other promulgating entity, and (2) the state and/or federal legal authority for the regulatory change, including the most relevant citations to the Code of Virginia or Acts of Assembly chapter number(s), if applicable. Your citation must include a specific provision, if any, authorizing the promulgating entity to regulate this specific subject or program, as well as a reference to the agency or promulgating entity's overall regulatory authority.

These regulations are issued under authority of Article 7 (§62.1-44.33) of Chapter 3.1 of Title 62.1 of the Code of Virginia, Waters of the State, Ports and Harbors. This regulatory action is a final exempt action under the Administrative Process Act (§2.2-4006.A.4.c).

Purpose

Explain the need for the regulatory change, including a description of: (1) the rationale or justification, (2) the specific reasons the regulatory change is essential to protect the health, safety or welfare of citizens, and (3) the goals of the regulatory change and the problems it's intended to solve.

The purpose of this regulatory action is to amend 9 VAC 25-71 to incorporate two new No Discharge Zones. On September 23, 2020, EPA published its affirmative determination to establish the two NDZs in the Federal Register (see 85 FR 59796; available in Attachment III.C.). In accordance with EPA's approval, this regulatory action adds these two NDZs into 9 VAC 25-71. This regulatory action is a final exempt action under the Administrative Process Act (§2.2-4006.A.4.c).

Substance

Briefly identify and explain the new substantive provisions, the substantive changes to existing sections, or both. A more detailed discussion is provided in the "Detail of Changes" section below.

An NDZ creates the area in a waterbody where no discharge of sewage is permitted; vessels would instead use pumpout facilities (often located at marinas) or travel outside of the NDZ to discharge treated sewage. (The discharge of untreated sewage is prohibited in all waters.) This will result in improved water quality due to a reduction of bacteria loading, which benefits commercial fishing and shellfishing, recreation, and other uses. A reduction in nutrients and treatment chemicals can also be expected.

At the request of The Go Green Gloucester Advisory Committee of the Gloucester County Board of Supervisors, an application for two NDZs was developed in accordance with EPA Guidance 842-B-94-004 (Protecting Coastal Waters from Vessel and Marina Discharges: a Guide for State and Local Officials). The application was also subject to the public participation process contained in DEQ's Guidance Memo 08-2003 (Procedure for Designation of Vessel No Discharge Zones), issued in February 2008. In 2016, DEQ hosted a public meeting and sought public comment. The application was then submitted to EPA, who reviewed the application and also sought public comment. EPA then established the new NDZs by publishing its affirmative determination in the Federal Register (85 FR 59796; available in Attachment III.C). Attachment III also contains other background information on the application, such as maps of the NDZs, a description of the NDZ coverage, and a summary of public comments on the 2016 application.

This regulatory action amends 9 VAC 25-71 to add the new NDZs to Virginia's list of designated NDZs in conformance with federal regulations.

Issues

Identify the issues associated with the regulatory change, including: 1) the primary advantages and disadvantages to the public, such as individual private citizens or businesses, of implementing the new or amended provisions; 2) the primary advantages and disadvantages to the agency or the Commonwealth; and 3) other pertinent matters of interest to the regulated community, government officials, and the public. If there are no disadvantages to the public or the Commonwealth, include a specific statement to that effect.

The designation of an NDZ prohibits the discharge of all vessel sewage, whether treated or not, into the designated NDZ. The primary advantage is a reduction in the discharge of bacteria to state waters, which will benefit commercial fishing, recreation, and overall water quality. Establishment of an NDZ may disadvantage some vessels who would need to alter their operations (e.g., use pumpout stations), but the application examined these scenarios and concluded that adequate facilities are available to vessels. Also refer to Substance for more information.

Requirements More Restrictive than Federal

Identify and describe any requirement of the regulatory change that is more restrictive than applicable federal requirements. Include a specific citation for each applicable federal requirement, and a rationale for the need for the more restrictive requirements. If there are no applicable federal requirements, or no requirements that exceed applicable federal requirements, include a specific statement to that effect.

This is a conforming change to align our NDZs (as specified in Section 70 of 9 VAC 25-71) with EPA's approved NDZs for Virginia. This regulatory amendment is not more restrictive then applicable federal requirements.

Agencies, Localities, and Other Entities Particularly Affected

Identify any other state agencies, localities, or other entities particularly affected by the regulatory change. "Particularly affected" are those that are likely to bear any identified disproportionate material impact, which would not be experienced by other agencies, localities, or entities. "Locality" can refer to either local governments or the locations in the Commonwealth where the activities relevant to the regulation or regulatory change are most likely to occur. If no agency, locality, or entity is particularly affected, include a specific statement to that effect.

Other State Agencies Particularly Affected:
None

Localities Particularly Affected:
Gloucester County was a proponent of the NDZ application. See the Substance section above for more details.

Other Entities Particularly Affected:
Commercial fishing and shellfishing industry, vessel owners and operators. Generally, the NDZs should improve water quality and the health of fish and shellfish communities, which would benefit those industries. EPA's determination also found that adequate pumpout facilities exist to serve vessel owners and operators.

Detail of All Changes Proposed in this Regulatory Action

*List all changes proposed in this exempt action and the rationale for the changes. Explain the new requirements and what they mean rather than merely quoting the text of the regulation. *Please put an asterisk next to any substantive changes.*

The amendments would adopt two new No Discharge Zones, adding to the three already in the regulations.

Current section number	New section number, if applicable	Current requirement	Change, intent, rationale, and likely impact of new requirements
70		Listing of designated no discharge zones in the Commonwealth of Virginia	Adopting two new NDZs; one for Sarah Creek and one for Perrin River

Regulatory Flexibility Analysis

Pursuant to § 2.2-4007.1B of the Code of Virginia, please describe the agency's analysis of alternative regulatory methods, consistent with health, safety, environmental, and economic welfare, that will accomplish the objectives of applicable law while minimizing the adverse impact on small business. Alternative regulatory methods include, at a minimum: 1) establishing less stringent compliance or reporting requirements; 2) establishing less stringent schedules or deadlines for compliance or reporting requirements; 3) consolidation or simplification of compliance or reporting requirements; 4) establishing performance standards for small businesses to replace design or operational standards required in the proposed regulation; and 5) the exemption of small businesses from all or any part of the requirements contained in the regulatory change.

The regulations under 9 VAC 25-71 apply to all persons, including small business owners, who discharge treated vessel sewage in Virginia waters. EPA approved the NDZ application, thereby establishing the two NDZs. As a result, vessels can no longer discharge treated sewage in these waters. However, as part of the application process, EPA determined that there are adequate pumpout facilities available to vessel operators. This regulatory action is necessary to conform to federal requirements, as EPA has approved these NDZs.

Family Impact

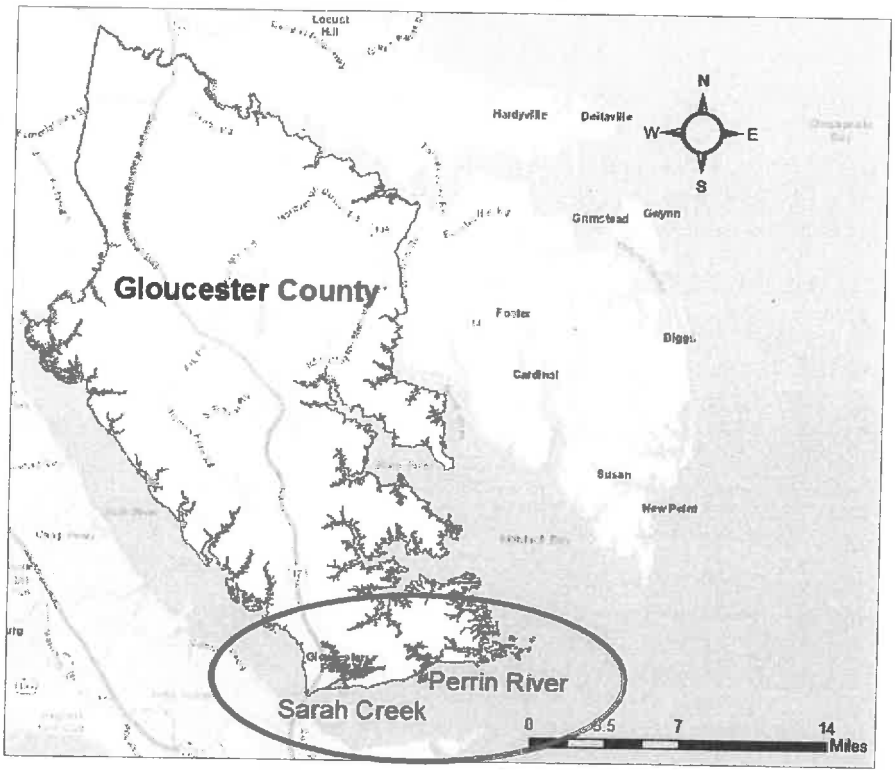
In accordance with § 2.2-606 of the Code of Virginia, please assess the potential impact of the proposed regulatory action on the institution of the family and family stability including to what extent the regulatory action will: 1) strengthen or erode the authority and rights of parents in the education, nurturing, and supervision of their children; 2) encourage or discourage economic self-sufficiency, self-pride, and the assumption of responsibility for oneself, one's spouse, and one's children and/or elderly parents; 3) strengthen or erode the marital commitment; and 4) increase or decrease disposable family income.

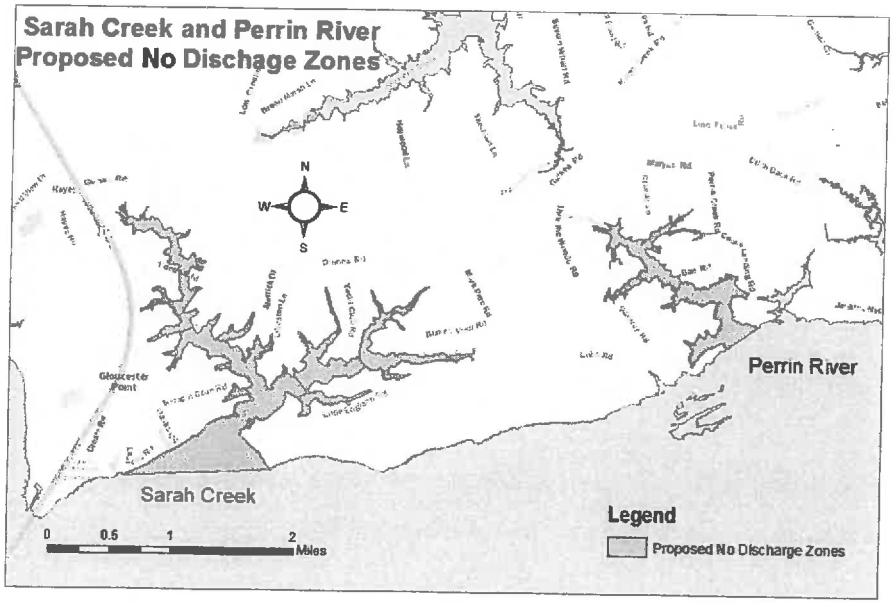
The amendment of the Regulations Governing the Discharge of Sewage and Other Wastes from Boats is for the protection of public health, safety, and welfare and the Board does not anticipate any direct impact on the institution of the family and family stability.

Attachment III – Background Materials

- **Attachment III.A** Maps depicting Gloucester County and the two No Discharge Zones
- **Attachment III.B** Description of No Discharge Zone areas in the No Discharge Zone application
- **Attachment III.C** EPA's Final Determination published in Federal Register
- **Attachment III.D** Summary of public comments pertaining to the 2016 No Discharge Zone application

Attachment III.A Maps depicting Gloucester County and the two No Discharge Zones





Attachment III.B Description of No Discharge Zone areas in the No Discharge Zone application

Following are the NDZ areas that will be submitted to EPA as part of the NDZ application for two water bodies in Gloucester County.

Sarah Creek in Gloucester County, Virginia including all contiguous waters north of the line formed between the point formed by latitude 37°14'58.34" N and longitude 76°29'39.17" W and east to latitude 37°15'00.81" N and longitude 76°28'37.84" W.

Perrin River in Gloucester County, Virginia including all contiguous waters north of the line formed between the point formed by latitude 37°15'43.52" N and longitude 76°25'25.71" W and east to latitude 37°15'50.63" N and longitude 76°25'11.84" W.

Attachment III.C EPA's Final Affirmative Determination as published in the Federal Register (Vol. 85, No. 185 / September 23, 2020)

will be prohibited from selling or distributing the products whose labels include the terminated uses identified in Table 2 of Unit II, except for export consistent with FIFRA section 17 or for proper disposal.

Persons other than the registrant may sell, distribute, or use existing stocks of the canceled products and products whose labels include the terminated uses until supplies are exhausted, provided that such sale, distribution, or use is consistent with the terms of the previously approved labeling on, or that accompanied, the canceled products and terminated uses.

Authority: 7 U.S.C. 136 *et seq.*

Dated: September 17, 2020.

Delores Barber,

Director, Information Technology and Resources Management Division, Office of Pesticide Programs.

[FR Doc. 2020–21004 Filed 9–22–20; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–10013–48–Region 3]

Clean Water Act: Virginia—Sarah Creek and Perrin River Vessel Sewage No-Discharge Zone—Final Affirmative Determination

AGENCY: U.S. Environmental Protection Agency (EPA).

ACTION: Notice—final determination.

SUMMARY: On behalf of the Commonwealth of Virginia (the Commonwealth), the Secretary of the Virginia Department of Natural Resources requested that the Regional Administrator, U.S. Environmental Protection Agency, Region 3 approve a no-discharge zone for Sarah Creek and Perrin River, Gloucester County, Virginia pursuant to the Clean Water Act. After review of Virginia's application, the EPA determined that adequate facilities for the safe and sanitary removal and treatment of sewage from all vessels are reasonably available for the entirety of Sarah Creek and Perrin River. The application is available upon request from the EPA (at the email address below) or at *https://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/NoDischargeZoneDesignations.aspx.*

DATES: This approval is effective upon the date of publication in the **Federal Register.**

FOR FURTHER INFORMATION CONTACT: Matthew A. Konfirst, U.S. Environmental Protection Agency—Region III. Telephone: (215) 814–5801, Fax number: (215) 814–5007; email address: *konfirst.matthew@epa.gov.*

SUPPLEMENTARY INFORMATION: As described in the Commonwealth's application, the extent of the proposed no-discharge zone of Sarah Creek from York River begins at 37°14′58.34″ N, 76°29′39.17″ W and extends to 37°15′00.81″ N, 76°28′37.84″ W. From there it continues north throughout any navigable waters including all tributaries and bays. The delineation of the proposed no-discharge zone of Perrin River from York River begins at 37°15′47.18″ N, 76°25′20.73″ W and extends to 37°15′50.63″ N, 76°25′11.84″ W. From there it continues north throughout any navigable waters including all tributaries and bays.

The Commonwealth certified that there are three stationary and one mobile pumpout facilities at two locations along Sarah Creek and one stationary pumpout facility along the Perrin River. Two of the three locations also have a method to empty portable toilets. Furthermore, the Hampton Roads Sanitation District (HRSD) provides free portable pumpout service in Gloucester County on Fridays, Saturdays, and Sundays during summer months and on Saturdays the rest of the year. HRSD prefers to service marinas but will provide the portable pumpout at a private residence when requested. The Virginia Department of Health (VDH) ensures that proper sanitary facilities are present at marinas, and marina facilities are inspected annually by VDH for compliance with regulations. A list of the facilities, phone numbers, locations, and hours of operation follows.

LIST OF FACILITIES WITH PUMPOUTS IN THE PROPOSED NO-DISCHARGE ZONE

Pumpout facility	Operating hours	Mean low water depth (ft)	Phone No.	Address
York River Yacht Haven (Sarah Creek).	24/7	8	804–642–2156	8109 Yacht Haven Road Gloucester Point, VA 23062.
Dockside Condominiums (Sarah Creek).	24/7 April 1–November 15	6	757–876–1568	Sunset Drive Gloucester Point, VA 23062.
Crown Pointe Marina (Perrin River)	The pumpout is available 24/7 from March 1–November 30 (so it is available even if the other marina services are closed). Dec 1–Feb 28 pumpout is winterized.	5	804–642–6177	9737 Cooks Landing Road Hayes, VA 23072.

The Commonwealth provided documentation indicating that the total vessel population is estimated to be 3,563 vessels (2,115 in Sarah Creek and 1,448 in Perrin River), the majority of which are recreational. The most conservative vessel population estimates provided by the Commonwealth of Virginia suggest that there are 535 vessels less than 16 feet in length, 1,531 vessels between 16 feet and 25 feet in length, 1,263 vessels between 25 feet and 40 feet in length, and 234 vessels greater than 40 feet in length. Commercial traffic on these waterways is limited to 24–30 dead rise workboats, two large fiberglass fishing boats, three charter fishing boats, and a few small tugs that work at the oil refinery on the other side of the York River. Most commercial boats, such as local watermen's boats, generally do not have marine sanitation devices (MSDs) installed and do not require a pumpout. As described in the Commonwealth's application, two large fiberglass fishing boats in the Perrin River have MSDs. Additionally, a few small tugboats use the Perrin River as a staging area. These vessels likely have MSDs onboard, but also use porta-johns located on the barges. Of the three charter fishing boats that are kept in Sarah Creek and operate primarily on the York River and Chesapeake Bay, two have porta-potties, while the third has an existing holding tank. Based on the number and size of vessels and EPA NDZ guidance (*Protecting Coastal Waters from Vessel*

and Marina Discharges: A Guide for State and Local Officials, August 1994), the estimated number of vessels requiring pumpout facilities in Sarah Creek and Perrin River during peak occupancy is 221. For these vessels, EPA guidance recommends at least one pumpout facility each for Sarah Creek and Perrin River.

In the application, the Commonwealth certified that Sarah Creek and Perrin River require greater environmental protection than provided by currently applicable federal regulations. Sarah Creek and Perrin River are tributaries of the York River, which drains into the Chesapeake Bay. All or portions of the proposed waters are listed by the Commonwealth on current or previous Clean Water Act section 303(d) lists of impaired waters as impaired for shellfish harvesting due to fecal coliform. As such, many shellfish beds are restricted or closed. Both waterbodies are also impaired for dissolved oxygen and aquatic plants (macrophytes). Establishing a no-discharge zone will contribute to: (1) Protecting the tidal ecosystem; (2) restoring the restricted and closed shellfish beds in these areas; and (3) preventing further water quality degradation and loss of beneficial uses in these tributaries as well as in the York River.

Sarah Creek and Perrin River are used for a variety of activities, including boating, fishing, shellfish harvesting, oyster gardening, crabbing, water skiing, swimming, and more. There are marinas, private piers, numerous vessel anchorages, public and private boat launch facilities, commercial seafood docks, and a waterside restaurant. Local watermen are interwoven with the unique identity of the Chesapeake Bay, influencing its history, culture, and economy. Furthermore, these waterbodies provide food, spawning grounds, and/or habitat to approximately 33 threatened, endangered, and rare species of plants and animals, including the Atlantic sturgeon, loggerhead sea turtle, and the northern diamond-backed terrapin.

The EPA made a final determination that adequate pumpout facilities are reasonably available in both Sarah Creek and Perrin River and that the use of these facilities imposes minimal costs. In Sarah Creek, there is no charge to use the available pumpout facilities, while in Perrin River there is a $5.00 fee per pumpout for non-slip holders, though the fee is waived with a small purchase at the marina store. Depth at low tide at the pumpout facilities is between five and eight feet, which is comparable to the depths at the entrances to Sarah Creek and Perrin River. Therefore, vessels requiring greater depths than provided at the pumpout station would have difficulty entering Sarah Creek or Perrin River.

Following publication of the Tentative Affirmative Determination in the **Federal Register** on March 11, 2020, a 30-day public comment period was opened (85 FR 14195). The EPA did not receive any comments regarding the EPA's intent to issue an affirmative determination on Virginia's application to designate Sarah Creek and Perrin River as a no-discharge zone.

Based on the information above, the EPA hereby makes a final affirmative determination that adequate facilities for the safe and sanitary removal and treatment of sewage from all vessels are reasonably available for Sarah Creek and Perrin River and its tributaries such that the Commonwealth may establish a vessel sewage no-discharge zone.

Cosmo Servidio,

Regional Administrator, EPA Region III.

[FR Doc. 2020–20956 Filed 9–22–20; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL DEPOSIT INSURANCE CORPORATION

[OMB No. 3064–0083;–0085;–0137;–0148; –0182;–0194]

Agency Information Collection Activities: Proposed Collection Renewal; Comment Request

AGENCY: Federal Deposit Insurance Corporation (FDIC).

ACTION: Notice and request for comment.

SUMMARY: The FDIC, as part of its obligations under the Paperwork Reduction Act of 1995 (PRA), invites the general public and other Federal agencies to take this opportunity to comment on the renewal of the existing information collections described below (OMB Control No. 3064–0083;–0085;–0137;–0148;–0182–0194).

DATES: Comments must be submitted on or before November 23, 2020.

ADDRESSES: Interested parties are invited to submit written comments to the FDIC by any of the following methods:

- *https://www.FDIC.gov/regulations/laws/federal.*
- *Email: comments@fdic.gov.* Include the name and number of the collection in the subject line of the message.
- *Mail:* Manny Cabeza (202–898–3767), Regulatory Counsel, MB–3128, Federal Deposit Insurance Corporation, 550 17th Street NW, Washington, DC 20429.
- *Hand Delivery:* Comments may be hand-delivered to the guard station at the rear of the 17th Street building (located on F Street), on business days between 7:00 a.m. and 5:00 p.m.

All comments should refer to the relevant OMB control number. A copy of the comments may also be submitted to the OMB desk officer for the FDIC: Office of Information and Regulatory Affairs, Office of Management and Budget, New Executive Office Building, Washington, DC 20503.

FOR FURTHER INFORMATION CONTACT: Manny Cabeza, Regulatory Counsel, 202–898–3767, *mcabeza@fdic.gov,* MB–3128, Federal Deposit Insurance Corporation, 550 17th Street NW, Washington, DC 20429.

SUPPLEMENTARY INFORMATION:

Proposal To Renew the Following Currently Approved Collections of Information

1. *Title:* Recordkeeping and Disclosure Requirements in Connection with Regulation M (Consumer Leasing)

OMB Number: 3064–0083.

Form Number: None.

Affected Public: State nonmember banks and state savings associations engaging in consumer leasing.

Burden Estimate:

SUMMARY OF ANNUAL BURDEN

Information collection description	Type of burden	Obligation to respond	Estimated number of respondents	Estimated frequency of responses	Estimated time per response	Estimated annual burden (hours)
Recordkeeping and Disclosure Requirements in Connection with Regulation M (Consumer Leasing).	Record-keeping.	Mandatory	52	On Occasion	0.375	1,950
Recordkeeping and Disclosure Requirements in Connection with Regulation M (Consumer Leasing).	Third-Party Disclosure.	Mandatory	52	On Occasion	0.375	1,950

Appendix III.D Summary of public comments pertaining to the 2016 No Discharge Zone application

During the development of the NDZ application in 2016, DEQ held a public meeting and public comment period. DEQ received 25 public comments pertaining to the application. All of the comments received were in support of designating the Sarah Creek and Perrin River as NDZs. The most common or significant comments supporting the designation of these NDZs included the following:

- Designating these water bodies as NDZs will provide a good tool for use in educating local residents and boaters about the importance of personal actions and impact on water quality.
- NDZ designations will help improve local water quality and could reduce some of the conditions that currently result in these water bodies being closed to shellfish harvest.
- Establishing NDZs will aid in the County's efforts in meeting its requirements under the Chesapeake Bay TMDL.

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
P.O. Box 1105, Richmond, Virginia 23218
(800) 592-5482
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

Memorandum

To: Members of the State Water Control Board

Through: Jutta Schneider, Director
Division of Water Planning

From: Melanie D. Davenport, Director
Water Permitting Division

Date: February 4, 2021

Subject: Water Quality Management Planning Regulation, 9VAC25-720-60, technical error correction

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The attached regulatory amendment is presented to the Board for your consideration to adopt. The final exempt action amends the Water Quality Management Planning Regulation, specifically 9VAC25-720-60, Table B5, Map Location W by correcting an erroneous Virginia Pollutant Discharge Elimination System (VPDES) permit number listed for the Fincastle Sewage Treatment Plant. This amendment will eliminate confusion and ensure that the VPDES permit information in the regulation is correct and consistent with water permit information for the same discharger on file with the Department of Environmental Quality (DEQ).

Section 2.2-4006 A 3 of the Code of Virginia allows the Board to adopt this regulatory amendment to 9VAC25-720-60 as the change is necessary to correct a technical error. This regulatory amendment will be effective 30 days after publication in the *Virginia Register*. A draft Virginia Regulatory Town Hall document (TH-09) is attached for your information.

At your Board meeting on April 14, 2021, the DEQ will request that the Board adopt the above amendment to 9VAC25-720-60, authorize its publication, and affirm that the Board will receive, consider and respond to requests by any interested person at any time with respect to reconsideration or revision.

Cc: Cindy Berndt, DEQ - Office of Regulatory Affairs

ATTACHMENT:

Water Quality Management Planning Regulation - Draft Virginia Regulatory Town Hall Document (TH-09)

townhall.virginia.gov

Exempt Action: Final Regulation
Agency Background Document

Agency name	State Water Control Board
Virginia Administrative Code (VAC) Chapter citation(s)	9VAC25-720
VAC Chapter title(s)	Water Quality Management Planning Regulation
Action title	**Technical error correction to 9VAC25-720-60**
Final agency action date	XXXXX, 2021
Date this document prepared	XXXXX, 2021

Although a regulatory action may be exempt from executive branch review pursuant to § 2.2-4002 or § 2.2-4006 of the *Code of Virginia*, the agency is still encouraged to provide information to the public on the Regulatory Town Hall using this form. However, the agency may still be required to comply with the Virginia Register Act, Executive Order 14 (as amended, July 16, 2018), the Regulations for Filing and Publishing Agency Regulations (1VAC7-10), and the *Form and Style Requirements for the Virginia Register of Regulations and Virginia Administrative Code.*

Brief Summary

Provide a brief summary (preferably no more than 2 or 3 paragraphs) of this regulatory change (i.e., new regulation, amendments to an existing regulation, or repeal of an existing regulation). Alert the reader to all substantive matters. If applicable, generally describe the existing regulation.

Under 9VAC25-720-60, Table B5, Map Location W of the Water Quality Management Planning Regulation, the wrong VPDES permit number for the discharger (Fincastle STP) is shown. This regulatory action involves changing the current erroneous permit number (VA0068233) to the correct permit number (VA0060364) for the discharger. § 2.2-4006 A 3 of the Administrative Process Act allows the Board to adopt a regulatory amendment involving the correction of such a technical error as a final exempt action. This regulatory action is necessary to eliminate confusion and to ensure that VPDES permit information in the regulation is correct and consistent with water permit information for the same discharger on file with DEQ.

Mandate and Impetus

Identify the mandate for this regulatory change and any other impetus that specifically prompted its initiation (e.g., new or modified mandate, internal staff review, petition for rulemaking, periodic review, or

board decision). "Mandate" is defined as "a directive from the General Assembly, the federal government, or a court that requires that a regulation be promulgated, amended, or repealed in whole or part."

There is no mandate from the General Assembly, the federal government or a court requiring the amendment of the regulation described herein. The impetus for the regulatory action, emanating from DEQ staff discovery, is to correct an obvious technical error and to eliminate confusion.

Acronyms and Definitions

Define all acronyms used in this form, and any technical terms that are not also defined in the "Definitions" section of the regulation.

VPDES – Virginia Pollutant Discharge Elimination System
STP – Sewage Treatment Plant
DEQ – Department of Environmental Quality
WQMP – Water Quality Management Planning

Statement of Final Agency Action

Provide a statement of the final action taken by the agency including: 1) the date the action was taken; 2) the name of the agency taking the action; and 3) the title of the regulation.

The State Water Control Board adopted this regulatory amendment to 9VAC25-720-60 on _____, 2021 as a final regulation and affirmed that the Board will receive, consider and respond to requests by any interested person at any time with respect to reconsideration or revision.

Legal Basis

Identify (1) the agency or other promulgating entity, and (2) the state and/or federal legal authority for the regulatory change, including the most relevant citations to the 6 of Virginia or Acts of Assembly chapter number(s), if applicable. Your citation must include a specific provision, if any, authorizing the promulgating entity to regulate this specific subject or program, as well as a reference to the agency or promulgating entity's overall regulatory authority.

The Commonwealth's mandate in the Code of Virginia under § 62.1-44.15(10) provides the legal authority to promulgate the WQMP Regulation and amendments thereof. The promulgating entity is the State Water Control Board.

Purpose

Explain the need for the regulatory change, including a description of: (1) the rationale or justification, (2) the specific reasons the regulatory change is essential to protect the health, safety or welfare of citizens, and (3) the goals of the regulatory change and the problems it's intended to solve.

The purpose of this regulatory action is to amend 9VAC25-720-60 to correct an erroneous VPDES permit number for a discharger listed in Table B5 for Map Location W of the WQMP Regulation. The goals of this regulatory action are to eliminate confusion, particularly for permittees and the general public, and to ensure that VPDES permit information in the regulation is correct and consistent with water permit information for the same discharger on file with DEQ.

Substance

Briefly identify and explain the new substantive provisions, the substantive changes to existing sections, or both. A more detailed discussion is provided in the "Detail of Changes" section below.

This regulatory action involves a single substantive change to 9VAC25-720-60, Table B5, Map Location W, whereby the erroneous VPDES permit number shown for the discharger (Fincastle STP) is to be changed to VA0060364.

Issues

Identify the issues associated with the regulatory change, including: 1) the primary advantages and disadvantages to the public, such as individual private citizens or businesses, of implementing the new or amended provisions; 2) the primary advantages and disadvantages to the agency or the Commonwealth; and 3) other pertinent matters of interest to the regulated community, government officials, and the public. If there are no disadvantages to the public or the Commonwealth, include a specific statement to that effect.

There are no disadvantages to the public or the Commonwealth associated with the proposed regulatory changes.

Detail of All Changes Proposed in this Regulatory Action

*List all changes proposed in this exempt action and the rationale for the changes. Explain the new requirements and what they mean rather than merely quoting the text of the regulation. *Please put an asterisk next to any substantive changes.*

Current section number	New section number, if applicable	Current requirement	Change, intent, rationale, and likely impact of new requirements
9VAC25-720-60		Table B5, Map Location W displays the VPDES permit number for the discharger (Fincastle STP) to be VA0068233.	The VPDES permit number for the discharger is to be changed to VA0060364. This regulatory action is necessary to eliminate confusion, particularly for permittees and the general public, and to ensure that VPDES permit information in the regulation is correct and consistent with water permit information for the same discharger on file with DEQ. This will not change any regulatory or permit requirements for the discharger.

Regulatory Flexibility Analysis

Pursuant to § 2.2-4007.1B of the Code of Virginia, please describe the agency's analysis of alternative regulatory methods, consistent with health, safety, environmental, and economic welfare, that will accomplish the objectives of applicable law while minimizing the adverse impact on small business. Alternative regulatory methods include, at a minimum: 1) establishing less stringent compliance or reporting requirements; 2) establishing less stringent schedules or deadlines for compliance or reporting requirements; 3) consolidation or simplification of compliance or reporting requirements; 4) establishing performance standards for small businesses to replace design or operational standards required in the

proposed regulation; and 5) the exemption of small businesses from all or any part of the requirements contained in the regulatory change.

The regulations under 9VAC25-720 apply to all persons, including small business owners, who have a VPDES permitted discharge to surface waters of the State within specific river basins. The amendments of this regulatory action will result in no change to the objectives of the existing regulation. Alternative regulatory methods, including but not limited to, taking no action to correct the technical error in the regulation could lead to confusion for those permittees affected. This could, in turn, adversely affect environmental and public health benefits derived by the regulation.

Family Impact

In accordance with § 2.2-606 of the Code of Virginia, please assess the potential impact of the proposed regulatory action on the institution of the family and family stability including to what extent the regulatory action will: 1) strengthen or erode the authority and rights of parents in the education, nurturing, and supervision of their children; 2) encourage or discourage economic self-sufficiency, self-pride, and the assumption of responsibility for oneself, one's spouse, and one's children and/or elderly parents; 3) strengthen or erode the marital commitment; and 4) increase or decrease disposable family income.

There is no impact on the institution of the family or family stability associated with this regulatory action.

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

MEMORANDUM

TO: Members of the State Water Control Board

FROM: Jutta Schneider, Director, Water Planning Division

DATE: March 18, 2021

SUBJECT: Denial of Virginia Water Protection Permit Application No. 16-1937

EXECUTIVE SUMMARY

At the next regular meeting of the State Water Control Board (Board), the Board will consider the denial of Virginia Water Protection Permit Application No. 16-1937 for Cranston's Mill Pond, LLC in James City County. This memorandum provides: (i) a background summary of the Virginia Water Protection (VWP) Permit Program for surface water withdrawals, including key statutory and regulatory language applicable to the review of this project and an explanation of the review process for VWP permit applications; (ii) a summary of the project, its review and the consideration of a denial of this VWP permit application; (iii) a summary of public comments received during the public comment period and during the public hearing and staff's response; and (iv) staff's recommendation that the permit application be denied.

I. PROGRAM BACKGROUND

Key Statutory and Regulatory Provisions

§ 62.1-11 A of the Code of Virginia provides that: "Such waters are a natural resource which should be regulated by the Commonwealth."

§ 62.1-11 B of the Code of Virginia provides that: "The regulation, control, development and use of waters for all purposes beneficial to the public are within the jurisdiction of the Commonwealth which in the exercise of its police powers may establish measures to effectuate the proper and comprehensive utilization and protection of such waters."

§ 62.1-11 C of the Code of Virginia provides that: "The changing wants and needs of the people of the Commonwealth may require the water resources of the Commonwealth to be put to uses beneficial to the public to the extent of which they are reasonably capable; the waste or

unreasonable use or unreasonable method of use of water should be prevented; and the conservation of such water is to be exercised with a view to the welfare of the people of the Commonwealth and their interest in the reasonable and beneficial use thereof."

§ 62.1-11 D of the Code of Virginia provides that: "The public welfare and interest of the people of the Commonwealth require the proper development, wise use, conservation and protection of water resources together with protection of land resources, as affected thereby."

§ 62.1-11 E of the Code of Virginia provides that: "The right to the use of water or to the flow of water in or from any natural stream, lake, or other watercourse in this Commonwealth is and shall be limited to such water as may be required for the beneficial use of the public to be served; such right shall not extend to the waste or unreasonable use or unreasonable method of use of such water."

§ 62.1-44.3 of the Code of Virginia provides that: "'Beneficial use' means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife resources and habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. The preservation of instream flows for purposes of the protection of navigation, maintenance of waste assimilation capacity, the protection of fish and wildlife resources and habitat, recreation, cultural and aesthetic values is an instream beneficial use of Virginia's waters. Offstream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural uses, electric power generation, commercial, and industrial uses."

§ 62.1-44.15:20 A of the Code of Virginia states that: "Except in compliance with an individual or general Virginia Water Protection Permit issued in accordance with this article, it shall be unlawful to:

1. Excavate in a wetland;
2. On or after October 1, 2001, conduct the following in a wetland:
    a. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;
    b. Filling or dumping;
    c. Permanent flooding or impounding; or
    d. New activities that cause significant alteration or degradation of existing wetland acreage or functions; or
3. Alter the physical, chemical, or biological properties of state waters and make them detrimental to the public health, animal or aquatic life, or to the uses of such waters for domestic or industrial consumption, or for recreation, or for other uses unless authorized by a certificate issued by the Board."

§ 62.1-44.15:22 A of the Code of Virginia states that: "Conditions contained in a Virginia Water Protection Permit may include but are not limited to the volume of water which may be withdrawn as a part of the permitted activity and conditions necessary to protect beneficial uses. Domestic and other existing beneficial uses shall be considered the highest priority uses."

9VAC25-210-370 D states that: "The board may issue permits for new or expanded surface water withdrawals that are not excluded from the requirements of this chapter by 9VAC25-210-310 based on the following criteria:

1. The amount of the surface water withdrawal is limited to the amount of water that can be put to beneficial use.

2. Based on the size and location of the surface water withdrawal, the withdrawal is not likely to have a detrimental impact on existing instream or offstream uses.

3. Based on an assessment by the board, this withdrawal, whether individually or in combination with other existing or proposed projects, does not cause or contribute to, or may not reasonably be expected to cause or contribute to:

a. A significant impairment of the state waters or fish and wildlife resources;

b. Adverse impacts on other existing beneficial uses; or

c. A violation of water quality standards.

4. In cases where the board's assessment indicates that criteria contained in subdivisions 2 and 3 of this subsection are not met, the board may issue a permit with special conditions necessary to assure these criteria are met."

9VAC25-210-230 A states that: "The board shall make a decision to tentatively deny the VWP permit or variance request if the requirements of this chapter are not met. Basis for denial include, but are not limited to, the following:

1. The project will result in violations of water quality standards or will impair the beneficial uses of state waters.

2. As a result of project implementation, shellfish waters would be condemned in accordance with 9VAC25-260.

3. The project that the applicant proposed fails to adequately avoid and minimize impacts to state waters to the maximum extent practicable.

4. The proposed compensatory mitigation plan is insufficient or unsatisfactory for the proposed impacts and fails to achieve no net loss of existing wetland acreage and function and no net loss of functions in all surface waters.

5. The Department of Wildlife Resources indicates that natural or stockable trout waters would be permanently and negatively impacted by the proposed activity.

6. The proposed activity is prohibited by 9VAC25-210-50.

7. The effect of project impacts, together with other existing or proposed impacts to wetlands, will cause or contribute to a significant impairment of state waters or fish and wildlife resources.

8. Failure to submit the required permit fee in accordance with 9VAC25-210-80 B 1 g or 9VAC25-210-340 C 1 g.

9. The board determines that the applicant for an Emergency Virginia Water Protection Permit has not demonstrated that there is a substantial threat to public health and safety, and that normal Virginia Water Protection Permit procedures, including public comment provisions, should be followed."

9VAC25-210-230 B states that: "The applicant shall be notified by letter of the board's preliminary decision to tentatively deny the VWP permit requested."

9VAC25-210-230 C states that: "Should the applicant withdraw his application, no VWP permit or variance will be issued."

9VAC25-210-230 D states that: "Should the applicant elect to proceed as originally proposed, the board may deny the application and advise the applicant pursuant to § 62.1-44.15:02 of the Code of Virginia of his right to a public hearing to consider the denial."

Process for Review of VWP permits for Surface Water Withdrawals

In accordance with the Board's regulations at 9VAC25-210-360 3 c, an applicant for a surface water withdrawal permit must demonstrate that the proposed withdrawal represents the least environmentally damaging practicable alternative. This begins with a clear articulation of what the purpose and need will be for the surface water to be withdrawn, how the requested amount is reasonable and limited to the need, and taking into consideration other alternative sources of supply available to meet the need.

Chapter 2 of Title 62.1 of the Code of Virginia lays out the Commonwealth's policy regarding how to manage and regulate the use of state waters. The policy is clear that there are intended to be limitations on the right to use these waters and that we are to ensure that state waters are "put to uses beneficial to the public" and that they do not constitute "waste or unreasonable use or unreasonable method of use of water." Further, the policy states "the use of water or to the flow of water in or from any natural stream, lake, or other watercourse in this Commonwealth is and shall be limited to such water as may be required for the beneficial use of the public to be served." Based on this concept, the VWP regulatory program requires DEQ and the Board to assess the amount of water needed based on specific methodologies created for specific types of beneficial end uses for the water. This allows DEQ to determine how much water is reasonable or unreasonable based on the beneficial use. The determination of what the beneficial use to be served is the project's purpose and the need, or amount of water needed, is determined by specific methods laid out in regulation based on beneficial use types.

The regulation, at 9VAC25-210-360, clearly articulates this intent: "The applicant shall demonstrate to the satisfaction of the board that the project meets an established need for water to meet the project purpose." The regulation also requires at 9VAC25-210-340 B 6 that the application include the submission of "Information on the proposed use of and need for the surface water and information on how demand for surface water was determined (e.g., per capita use, population growth rates, new uses, changes to service areas, and if applicable, acreage irrigated and evapotranspiration effects)." There are different accepted methodologies for calculating the amount of water needed, the "demand," that are unique to the type of beneficial

use. Therefore, one method is used for public water supply, another used for industrial, and another for irrigation.

Once a reasonable volume is determined based on the beneficial use identified in the project purpose and need, a review of alternatives available for providing that water is required by the regulation (9VAC25-210-340 B 10). For example, for a public water supply, this would involve evaluating whether the water needed could be supplied by groundwater, contracts with other existing water supplies, or through improved conservation and reuse. Only then does the process move to an evaluation of which of these alternatives is the least environmentally damaging and practicable for the applicant's proposed beneficial use. Based on the potential impacts of each alternative, an alternative is identified that is practicable and has the least impact. During this process, the volume, rate, and timing of the withdrawal is further evaluated to determine if the volume will be further reduced to minimize any impacts associated with other downstream beneficial users, seasonal or time of year windows critical to aquatic life and water quality, and use reduction during drought conditions.

The regulations establish the criteria which must be met in order to approve a new or expanded water withdrawal (9VAC25-210-370 D): "The board may issue permits for new or expanded surface water withdrawals that are not excluded from the requirements of this chapter by 9VAC25-210-310 based on the following criteria:

> 1. The amount of the surface water withdrawal is limited to the amount of water that can be put to beneficial use.
>
> 2. Based on the size and location of the surface water withdrawal, the withdrawal is not likely to have a detrimental impact on existing instream or offstream uses.
>
> 3. Based on an assessment by the board, this withdrawal, whether individually or in combination with other existing or proposed projects, does not cause or contribute to, or may not reasonably be expected to cause or contribute to:
>
> > a. A significant impairment of the state waters or fish and wildlife resources;
> >
> > b. Adverse impacts on other existing beneficial uses; or
> >
> > c. A violation of water quality standards.
>
> 4. In cases where the board's assessment indicates that criteria contained in subdivisions 2 and 3 of this subsection are not met, the board may issue a permit with special conditions necessary to assure these criteria are met."

Accordingly, the criteria outlined in subdivisions 2 and 3 can be addressed through conditions in the permit at the Board's discretion. The criterion outlined in subdivision 1 cannot be modified by permit condition. If these criteria cannot be met, the process for denial is articulated in 9VAC25-210-230 B and D. The process requires providing a letter to the applicant stating the reason for the tentative decision to deny and, if the applicant wishes to proceed with its original proposal, informing the applicant of the option to go to public hearing on the Board's tentative decision to deny.

II. PROJECT BACKGROUND AND VIRGINIA WATER PROTECTION PERMIT APPLICATION REVIEW

Project Description

Cranston's Mill Pond (Pond) is an impoundment of Yarmouth Creek located at or near the junction of the non-tidal portion of the creek with the upper reach of the freshwater tidal portion of the creek. Yarmouth Creek is a tributary to the Chickahominy River in James City County. The dam forming the impoundment was constructed in 1964, according to the most recent Dam Safety Data Sheet obtained from the Virginia Department of Conservation and Recreation (DCR) Division of Dam Safety and Floodplain Management. The Pond has a drainage area of 7.00 square miles and a normal pool area of 46.2 acres (at a normal pool elevation of 8.15 feet). After Hurricane Ernesto breached the original earthen dam in 2006, the dam was reconstructed with a new spillway in 2011. The applicant applied for, and in December 2011, DEQ issued, a certification to operate the Pond as a nutrient credit offset facility. On December 6, 2016, the applicant filed a Joint Permit Application (JPA) that proposed a maximum withdrawal of 26 million gallons per day (mgd) from Cranston's Mill Pond. The pond is not currently part of any existing public or private water supply system and does not have an existing means to withdraw water.

Proposed Project Purpose and Need

On December 6, 2016, the applicant filed a Joint Permit Application (JPA) that proposed a maximum withdrawal of 26 mgd from Cranston's Mill Pond to fill an unspecified beneficial use in the form of a public or private water supply need. The applicant indicated that this request was being made in response to reductions to permitted groundwater withdrawals in the Virginia Coastal Plain.[1] The applicant also stated that it intended to market the pond as a permitted water supply to any potential third party purchaser upon issuance of a VWP permit for the proposed water withdrawal.[2] The application proposed that the water supply from the facility could be

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[1] In 2010, DEQ determined that groundwater withdrawals from the coastal plain aquifer system exceeded the sustainable groundwater withdrawal. During 2013-2017, significant reductions in groundwater withdrawals were made to the 14 largest groundwater withdrawal permittees in the Eastern Virginia Groundwater Management Area to ensure long-term aquifer sustainability in the coastal plain. These cuts generated significant legislative interest, a number of studies were conducted, and advisory committees created. One, the Eastern Virginia Groundwater Management Area Advisory Committee (GWAC), issued a report, which included a recommendation to promote alternative sources of supply. At that time, DEQ thought it was likely that some entity would find the Cranston's Mill Pond a viable supplemental or alternative source to a groundwater withdrawal. At the time that Cranston's Mill Pond submitted its Joint Permit Application, DEQ believed that Cranston's Mill Pond was an option under consideration by James City County. DEQ's understanding changed during the review of the application. Analysis conducted by DEQ, James City County and the County's consultant determined that Cranston's Mill Pond could not meet the County's water need, particularly during summer and early fall. Based on this information, James City County submitted a Joint Permit Application for a surface water withdrawal for a location at the mouth of the Chickahominy River at the confluence with the James River. DEQ issued VWP Permit 16-1533 for this withdrawal on August 25, 2017. Based on information available to DEQ, this permit meets the anticipated need for water presented by James City County.

[2] This is contrary to the State Policy As to Waters established in the Code of Virginia because it would encourage speculative water withdrawal permit applications from private entities seeking to secure rights to state waters, which are a public resource, without a specific end user or beneficial use in place, which permittees would then sell to others for private personal gain, effectively privatizing the public resource. See Va. Code § 62.1-11 E., which provides that: "The right to the use of water or to the flow of water in or from any natural stream, lake or other watercourse in this Commonwealth is and shall be limited to such water as may reasonably be required for the beneficial use of the public to be served; such right shall not extend to the waste or unreasonable use or unreasonable

integrated into another system as a supplemental source and that no withdrawal would occur until a third party purchaser is identified and the proposed beneficial use has been evaluated by DEQ.

To date, the specific beneficial use for the water withdrawal, and related daily, monthly, annual, seasonal, or instantaneous demands, have not been provided by the applicant (as required by Section B 3 of 9VAC25-210-340). The monthly consumptive use volume in million gallons and the average daily return flow in million gallons per day of the proposed project and the location of the return flow, have not been provided (as required by Section B 4 of 9VAC25-210-340). Information on the proposed use of and need for the proposed surface water withdrawal, and if it was established during the local or regional water supply planning process, have not been provided as no locality has identified this source as addressing a water supply need (as required by 9VAC25-210-340 B 6). In response to a request for additional information dated December 22, 2016 requesting that the applicant demonstrate how any amount of water withdrawn will be the minimum amount of water required to supply the proposed beneficial use, including the use of water conservation, the response provided by the applicant dated January 12, 2017 stated:

> *"Our proposed intent for permitting the Cranston's Mill Pond as a water supply is for it to be used as a supplemental source, likely in conjunction with an existing source, to meet a locality or industrial facility's current and future water needs. We envision the permit, and water assets, to be transferred to a third party end user at a future date. For that reason, we request the Cranston's Mill Pond be permitted for the full amount of usable water that it provides."*

The applicant's request for the "full amount of useable water" that the pond provides is not a beneficial use and the request to base the amount of water on what is available rather than that amount of water needed by a specific use or combination of specific uses is inconsistent with the statute, regulations, and past practice implementing this program. Without this information, DEQ is unable to determine whether the water is needed, whether the amount of water is wasteful or unreasonable, and whether the withdrawal is limited to the amount of water that can be put to beneficial use. The first criteria for issuance of this proposed surface water withdrawal cannot be met pursuant to 9VAC25-210-370 D and therefore, the permit cannot be issued.

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method of use of such water." See also Va. Code § 62.1-11 C, which provides that: "The changing wants and needs of the people of the Commonwealth may require the water resources of the Commonwealth to be put to uses beneficial to the public to the extent of which they are reasonably capable; the waste or unreasonable use or unreasonable method of use of water should be prevented; and the conservation of such water is to be exercised with a view to the welfare of the people of the Commonwealth and their interest in the reasonable and beneficial use thereof." Available water supply is a finite resource. Determining the purpose and need for a proposed water withdrawal and an appropriate evaluation of alternatives available to meet the beneficial use allowed is dependent on the end user's specific use and its unique operation. The applicant's approach undermines this foundational VWP program requirement by providing for a permit that would then be modified after the fact based on the identification of an end user. If the approach is accepted, it legitimizes "water grabs" or the creation of "water brokers" who could, in effect, obtain a permit for an amount of water and hold it depriving other potential permittees, who have an end use, from accessing surface water. Furthermore, during the 2020 General Assembly session legislation (HB 1674) was considered that would have authorized the Board to issue a provisional VWP surface withdrawal permit for a withdrawal proposed in the land area encompassed by Eastern Virginia Groundwater Management Area without an identified end user. HB 1674 did not pass both houses of the General Assembly, therefore the legislation was not enacted.

Proposed Impacts

Since there is no existing infrastructure at the pond to withdraw water, it is highly likely that a permanent intake structure will need to be built to withdraw any significant volume of water. This infrastructure will result in impacts to state waters. The applicant did not provide information pursuant to 9VAC25-210-340 B 7 describing the intake structure, including the intake screen mesh size and intake velocity. The applicant also did not provide information required by 9VAC25-210-80 B 1 h describing all impacts proposed to surface waters, including the type of activity to be conducted in surface waters and any physical alteration to surface waters. The need for compensation could not be determined and the applicant proposed none. The applicant proposed that a future third party purchaser would submit any plans to construct an intake structure and related appurtenances based on their specific project needs. Therefore, the applicant did not identify any construction impacts to wetlands or surface waters associated with creating the ability to withdraw water as part of the application. DEQ is unaware of any program precedent where the evaluation of proposed impacts was deferred to an unknown future date for an unknown future beneficial use. The applicant's request is inconsistent with the statute, regulations, and past practice implementing this program.

Proposed Alternatives Analysis

Alternative sources of water to supply a proposed beneficial use were not submitted as part of the JPA as required by 9VAC25-210-340 B 10 and 9VAC25-210-360 3 a 2, 3, and 4. DEQ requested additional information to address the absence of this alternatives analysis dated December 22, 2016. The applicant responded January 12, 2017 with incomplete information and stated that it did not address any specific alternatives but suggested the consideration of two generalized alternatives: 1) increased groundwater withdrawal, and 2) a river withdrawal. The applicant did not identify any specific alternatives, locations, or water sources that were associated with the additional withdrawal of groundwater and surface water from a river. In its response, the applicant proposed that the permit should include a condition for the future "end-user" to provide a "supplemental alternatives analysis." The applicant did not present or discuss any conservation measures to minimize demand. DEQ is unaware of any program precedent where the evaluation of alternatives as a means of minimizing the potential water withdrawal was deferred to an unknown future date for an unknown future beneficial use. The applicant's request is inconsistent with the regulations and past practice implementing this program.

The Draft Permit

As indicated in footnote 1 above, DEQ believed that there was the potential for James City County to purchase this facility to address the loss of groundwater scheduled to occur at the end of the County's current Ground Water Withdrawal Permit. DEQ completed issuance of all 14 reduced groundwater permits by the end of 2017. James City County had periodic contact with DEQ staff inquiring about the status of the Cranston's Mill Pond application and the applicant indicated ongoing conversations with the County on the project. These contacts occurred before, during, and after issuance of the VWP permit to James City County for a new surface water withdrawal on the Chickahominy River. DEQ met with the applicant on September 15, 2017, to discuss an informal draft permit prior to providing it formally to the applicant. The applicant indicated an unwillingness to accept the amount of water and other permit conditions being considered by DEQ. The applicant requested additional time to provide more information for agency consideration.

On May 17, 2019, after nearly two years of additional information exchange and review, DEQ provided a formal draft permit to the applicant similar in scope and structure to the one discussed in September 2017. This time, DEQ provided a draft VWP permit for applicant review and advertisement. DEQ significantly reduced the amount of water compared to the applicant's request through use of a high flow-by requirement in response to the uncertainty created by the applicant's inability to provide specific beneficial use information. However, the applicant would not accept that volume. On July 19, 2019, the applicant requested that the May 17, 2019 draft permit be revised, and in particular, stated the 90% flow-by requirement was inapplicable and unnecessary. The applicant did not publish a public notice for the draft permit.

DEQ believed at the time that it provided the draft permit to the applicant that 1) James City County was no longer a viable beneficial user for this water based on the issuance of the County's own permit for a surface water withdrawal; and 2) that permit special conditions necessary to assure all three of criteria for permit issuance in 9VAC25-210-370 D could be used. Upon further review, DEQ has concluded that a prospective special condition addressing 9VAC25-210-370 D 1 is not allowed by regulation. Section D 1 of 9VAC25-210-370 provides that the amount of surface water withdrawal is limited to the amount of water that can be put to beneficial use. Since no beneficial use or third party purchasers has been identified, it is not known what a reasonable volume of water may be, what alternatives may be available to that beneficial use to further minimize this volume, and what impacts to surface waters and compensation may or may not be required. Furthermore, DEQ's efforts to accommodate the applicant's request to evaluate this proposal in a manner that deviates from the norm was determined to be an inappropriate precedent to establish which would interfere with the program's ability to manage the resource effectively.

On September 9, 2019, based on these conclusions and the applicant's rejection of the draft permit, DEQ informed the applicant of its intent to deny their application for a surface water withdrawal (Attachment A). The applicant initiated additional discussions requesting to continue processing the application. On August 3, 2020, DEQ notified the applicant that a public notice was to be published scheduling a public hearing regarding the intent to deny the application (Attachment B).

III. PUBLIC NOTICE, HEARINGS, AND COMMENTS

Public Notice

A public notice to seek public comment and announce a public hearing to consider the denial of Virginia Water Protection Permit Application No. 16-1937 in James City County was originally advertised in the Daily Press on September 18, 2020. The public notice provided the facility name, applicant name, address and application number, the name and location of the water withdrawal, the project description and affected area. The public notice also included instructions on how to comment.

Public Hearing

The hearing was held as an electronic meeting in compliance with Item 4-0.01G of Chapter 1289 of the 2020 Acts of Assembly. Because of the March 12, 2020, Declaration of a State of Emergency due to COVID-19, Executive Order 51 and subsequent orders 53 and 55 and in keeping with Governor Northam's temporary restrictions and directions to stay at home, the public hearing was held via electronic communication through the GoToWebinar platform. The

purpose of the public hearing was to obtain input from the public related to the consideration of the denial of the Virginia Water Protection Permit Application for the State Water Control Board to review. The public hearing was scheduled for Monday, October 19, 2020, at 6:00 pm, with the original public comment period beginning September 18, 2020 and ending November 4, 2020. On October 12, 2020, the applicant requested that the public hearing scheduled for October 19, 2020 be postponed by 30 days. The DEQ Director granted the request.

A second public notice was advertised on November 2, 2020, in the Daily Press for an additional public comment period beginning November 5, 2020, and ending December 22, 2020. The public hearing was rescheduled for Monday, December 7, 2020, at 6:00 pm. Mr. Timothy Hayes presided over the electronic public hearing as the Hearing Officer of the State Water Control Board.

Public Comment

Due to the change in the date of the public hearing, the public comment period was extended from November 5, 2020, until December 22, 2020. All comments received from September 18 through November 4, 2020, were carried forward as part of the official public comment file. During the public hearing, four speakers provided comments. The written comment period concluded on December 22, 2020. Five written comments were received. Attachment C includes a list of individuals and organizations who provided comments during one or more of the draft permit public comment periods or public hearings.

Summary of Comments

A summary of the comments received during the comment period and hearing for the draft VWP permit is included below. Several commenters used a modified form letter to submit written comments. All comments received during the comment periods are part of the record and are available upon request.

"End User" Beneficial Use Requirement

Staff received comments that a specific end user is not a requirement of state law or regulation in order for DEQ to issue a water withdrawal permit. These comments focused on DEQ citing a number of regulatory and statutory provisions in support of its assertion that a permit cannot be issued without an end user. However, none of those provisions requires an end user to be identified.

- *DEQ's September 2019 letter states that pursuant to 9VAC25-210-370, DEQ cannot issue the (water withdrawal) permit because it cannot determine the amount of water that can be withdrawn for beneficial use.*
- *DEQ has indicated that they have policy concerns that issuing this permit would essentially privatize water.*
- *DEQ's positions are contradicted by the VWP permitting framework as well as the policies of the Commonwealth with respect to development of alternative water supply options in the Eastern Virginia groundwater management area.*
- *CMP is somewhat centrally located and available to serve as a raw water option for a number of potential public and commercial users.*
- *9VAC25-210-340, 360, and 370, outline the information to be provided as part of the application for a VWP permit. The information includes the volume of water sought to be withdrawn and the basis for the need for that water. The regulations*

specifically provide that information in local water supply plans can be used to support the application.

Staff Response:
§ 62.1-11 E of the Code of Virginia provides that the right to the use of water or to the flow of water in or from any natural stream, lake, or other watercourse in this Commonwealth is and shall be limited to such water as may reasonably be required for the beneficial use of the public to be served; such right shall not extend to the waste or unreasonable use or unreasonable method of use of such water. The applicant has not provided information sufficient to determine what amount or volume of water may reasonably be required for the beneficial use of the public to be served. To the contrary, the applicant indicated to DEQ that it was requesting all the useable water available from the pond. The VWP regulatory framework is inherently a process of minimization of the volume of water and corresponding impacts to surface waters through the application of specific methodologies to determine the amount of water needed and evaluation of the various alternatives available to the intended beneficial use to conclude the process with an option that represents the minimum withdrawal necessary for the beneficial use proposed. Beneficial use has always been defined based on types of users and the methods developed to determine the water needed by that use type have been developed for the program. While neither statute nor regulations use the term "end user," it is clear that the amount of water that is reasonable is based on the type of end uses for the project. This approach is also the long time practice used in this program and consistent with VWP guidance issued in 2012. Based on information provided by the applicant, DEQ is unable to determine if the proposed beneficial use is unreasonable or constitutes an unreasonable method of use.

9VAC25-210-370 D 1 provides that the Board may issue permits for new or expanded surface water withdrawals if the amount of the surface water withdrawal is limited to the amount of water that can be put to beneficial use. This finding cannot be made without an evaluation of what the purpose and need will be for the surface water to be withdrawn, how the requested amount is reasonable and limited to the need, and taking into consideration other alternative sources of supply available to meet the need. The applicant's clearly stated intent is to do something different from the past practice of the program and ask for all the available water up front and to justify it later. This is not consistent with statutory policy on water management, 9VAC25-210-370 D 1, or long standing DEQ practice.

As defined by § 62.1-44.3 of the Code of Virginia, "Beneficial use" means both instream and offstream uses. Instream beneficial uses include, but are not limited to, the protection of fish and wildlife resources and habitat, maintenance of waste assimilation, recreation, navigation, and cultural and aesthetic values. Offstream beneficial uses include, but are not limited to, domestic (including public water supply), agricultural uses, electric power generation, commercial, and industrial uses.

Although Subdivision D 4 of 9VAC25-210-370 provides that in cases where the Board's assessment indicates the criteria contained in subdivision D 2 (the withdrawal is not likely to have detrimental impact on existing instream or offstream uses) and D 3 (the withdrawal does not cause or contribute to a significant impairment of the state waters or fish and wildlife resources; adverse impacts on other existing beneficial uses; or a violation of water quality standards) of this subsection are not met, the Board may issue a permit with special conditions necessary to ensure that these conditions are met, the regulation does not provide the same

provision for subdivision D 1 (the amount of the surface water withdrawal is limited to the amount of water that can be put to beneficial use).

DEQ is charged specifically with determining the amount of water that is either reasonable or unreasonable based on the beneficial use. While information in local water supply plans can be used to provide projected demands over a minimum 30-year planning period (Subsection 2 of 9VAC25-210-360), subsections 1, 3, and 4 of 9VAC25-210-360 were not satisfied by the applicant as the beneficial use (end user) was not identified, to include whether the beneficial use (and end user) would or would not be a public water supply. Further, no locality has identified Cranston's Mill Pond as a potential source of supply. Specific beneficial use, including the projection of water needed specific to that use type or end user for the water withdrawal, and related daily, monthly, annual, seasonal, or instantaneous demands, were not provided by Cranston's Mill Pond, LLC.

Draft Permit
Staff received comments that issuance of a draft water withdrawal permit was to identify the volume of water to be withdrawn from Cranston's Mill Pond.

- *In March 2018, DEQ and CMP agreed on conditions ensuring that a withdrawal cannot occur until an end user is identified and approved by DEQ.*
- *CMP is prohibited from withdrawing any water until a specific end user is identified and fully vetted by DEQ.*
- *The inclusion of these conditions in the draft permit demonstrates DEQ's understanding that the purpose of the permit is essentially to determine the volume of water that may be withdrawn.*
- *DEQ's proposed 90% flow-by rule would render the reliability of allowable withdrawals so low as to make the project impracticable.*
- *In contrast to the 90% flow-by, the applicant's proposed 300,000 gallons per day minimum target release would allow for a high degree of withdrawal reliability.*
- *Municipalities seek the amount of withdrawal possible based on projections of the amount of water needed to support population growth and economic development prospects. These permits are granted despite a specific end user not being identified.*

Staff Response:
On May 17, 2019, DEQ provided a draft VWP permit for applicant review and advertisement. DEQ believed at the time that while no beneficial use for this water withdrawal had been identified, permit special conditions could assure that all three of the criteria for permit issuance in 9VAC25-210-370 D could be met. However, DEQ has since concluded that a prospective special condition addressing 9VAC25-210-370 D 1 is not allowed by regulation and cannot be used to avoid or postpone the finding that must be made to issue the permit. Section D 1 of 9VAC25-210-370 provides that the amount of surface water withdrawal is limited to the amount of water that can be put to beneficial use. As DEQ noted in the fact sheet, the application did not include detailed demand projections to justify the applicant's withdrawal request, and to date, no specific beneficial use or associated end user has been identified as part of the project purpose. Information on the proposed purpose and need for the requested water withdrawal and information on how the demand is determined is required by 9VAC25-210-340. 9VAC25-210-360 requires that the applicant shall demonstrate to the satisfaction of the Board that the project

meets an established need for water, to include: existing supply sources, yields, and demands; and, projected demands over a minimum 30-year planning period. Without beneficial use details, there is no way to determine through the information submitted in the VWP permit application process if the amount of surface water withdrawal requested is limited to the amount of water that can be put to beneficial use (9VAC25-210-370), a required criteria for issuance of the permit.

On September 9, 2019, based on these conclusions and after the applicant's rejection of the draft permit, DEQ informed the applicant of its intent to deny its application for a surface water withdrawal (Attachment A). The applicant initiated additional discussions requesting to continue processing the application. On August 3, 2020, DEQ notified the applicant that a public notice was to be published scheduling a public hearing regarding the intent to deny the application (Attachment B).

Finally, municipalities have established service areas, identifiable beneficial use types (i.e. residential, commercial, industrial), and water use and projections based on planning and capital budget forecasts. Municipalities can project future need by use type and number of connections existing and through planned development projects. Municipalities are therefore different entities than Cranston's Mill Pond, LLC.

Other Public Comments

The majority of other public comments included comments on maximum salinity increases in Yarmouth Creek, the average daily flow from Cranston's Mill Pond, and fish species present in the project area. Responses to these comments were not included because the comments are not germane to the justification provided by the September 9, 2019 letter issued by DEQ to Cranston's Mill Pond, LLC for a tentative decision to deny the application. These comments do not address the amount of water necessary for a particular beneficial use or uses and the alternatives available to a specific user to meet the water need. Issues related to operational conditions that might be contained in a draft permit are not before the Board.

Four additional public comment letters were submitted expressing general support for the Cranston's Mill Pond, LLC application and noting the project was included as a recommendation of the July 2017 Eastern Virginia Groundwater Management Committee Report. However, this recommendation does not say anything about this project. Recommendation #2 in the report states that "the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships and potential funding for further evaluation and study of short-term and long-term alternative water sources and solutions." Further an economic study contracted by DEQ (An Investigation of the Economic Impacts of Coastal Plain Aquifer Depletion and Actions That May Be Needed to Maintain Long-Term Availability and Productivity), and the Regional Water Supply Plan for the Hampton Roads Planning District found that sufficient quantities of water exists in the Hampton Roads region to meet the needs of the region even with groundwater withdrawal reductions.

IV. STAFF RECOMMENDATION

Staff recommends that the Board deny Virginia Water Protection Permit Application No. 16-1937 submitted by Cranston's Mill Pond, LLC, because the approval of Cranston's Mill Pond, LLC's water withdrawal request without an identified beneficial use and water demand is

inconsistent with the provisions of the Commonwealth's policy regarding use of state waters, the Virginia Water Protection Permit Program Regulation, including Section B 3 of 9VAC25-210-340, Section B 4 of 9VAC25-210-340, Section D 1 of 9VAC25-210-370, and DEQ policy and past practice.

V. PRESENTER CONTACT INFORMATION

Name: Scott Kudlas, Office of Water Supply Manager
Phone: (804) 698-4456
Email: Scott.kudlas@deq.virginia.gov

VI. ATTACHMENTS

Attachment A: Intent to Deny Letter

Attachment B: Request to Publish Public Notice

Attachment C: List of Individuals who provided Public Comments

Attachment D: Public Comments Received (including material submitted by the applicant)

Attachment A

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
P.O. Box 1105, Richmond, Virginia 23218
(800) 592-5482
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

September 9, 2019

Cranston Mill Pond, LLC
c/o Jeff Corbin
5735 S. Laburnum Ave.
Richmond, VA 23231

RE: Intent to process denial of Draft Virginia Water Protection Permit (VWP) #16-1937

Dear Mr. Corbin:

On May 17, 2019, you or your representative received Draft VWP Permit # 16-1937 and a Public Notice Authorization Form. The receipt of the draft permit from DEQ represented the tentative decision to issue the draft permit and prepare for public notice.

On July 19, 2019, DEQ received your response, provided by Andrea Wortzel of Troutman Sanders, disagreeing with the Draft Special Conditions, Draft Permit Fact Sheet, and other accompanying materials provided on May 17, 2019. Furthermore, you requested the draft permit be revised. The Public Notice Authorization Form was not signed and was not returned to DEQ staff.

Pursuant to 9VAC25-210-120, the Board shall make a decision to tentatively issue or deny the VWP permit. If a tentative decision is to deny the application, the board shall do so in accordance with 9VAC25-210-230.

Cranston Mill Pond, LLC, has notified DEQ staff that it does not accept draft VWP permit #16-1937 as provided. As DEQ noted in the Fact Sheet, the application did not include detailed demand projections to justify the applicants withdrawal request, and to date, no specific beneficial end user has been identified as part of the project purpose. Information is required by 9VAC25-210-340 on the proposed use of and need for the requested surface water and information on how the demand was determined. 9VAC25-210-360 provides that the applicant shall demonstrate to the satisfaction of the Board that the project meets an established need for water, to include: existing supply sources, yields, and demands; and, projected demands over a minimum 30-year planning period. Without beneficial end-user details, there is no way to determine through the information submitted in the VWP permit application process if the amount of surface water withdrawal requested is limited to the amount of water that can be put to beneficial use (9VAC25-210-370).

Mr. Jeff Corbin
September 3, 2019

Subsection 62.1-11 E of the Code of Virginia provides that the right to the use of water or to the flow of water in or from any natural stream, lake, or other watercourse in this Commonwealth is and shall be limited to such water as may reasonably be required for the beneficial use of the public to be served; such right shall not extend to the waste or unreasonable use or unreasonable method of use of such water. The approval of the applicant's water withdrawal request without an identified end user and water demand would deviate from the provisions of the Code of Virginia and DEQ policy, in that the conservation of such water is to be exercised with a view to the welfare of the people of the Commonwealth and their interest in the reasonable and beneficial use thereof (§ 62.1-11 C).

Based on the above, the Board is withdrawing the May 17, 2019, tentative decision to issue a VWP permit for the project as proposed and is notifying you of its intent to process denial of the requested VWP permit.

Pursuant to 9VAC25-210-230(B), this letter provides sufficient information to the applicant regarding the rationale for denial. Should the applicant withdraw its application, pursuant to 9VAC25-210-230(C), no VWP permit or variance will be issued. Should the applicant elect to proceed as originally proposed, pursuant to 9VAC25-210-230(D), the Board may deny the application, and the applicant is advised, pursuant to § 62.1-44.15:02 of the Code of Virginia of its right to a public hearing to consider the denial.

We are requesting that you respond by September 23, 2019, as to whether you wish to withdraw your application or proceed as originally proposed. The response should be directed to Mr. Joseph Grist, Water Withdrawal Permitting and Compliance Manager, (804) 698-4031, Joseph.Grist@deq.virginia.gov or at P.O. Box 1105, Richmond, Virginia, 23218. If a response is not received, DEQ will proceed to public notice a tentative denial of the application.

As always, we are available to discuss the above with you or consider additional information.

Sincerely,

David K. Paylor

cc. Jutta Schneider, Director, Division of Water Planning
Jeffery Steers, Director, Central Operations
Scott Kudlas, Office of Water Supply, Director
Joseph Grist, Water Withdrawal Permitting and Compliance Manager
Brian McGurk, Water Withdrawal Permit Writer

Attachment B

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
P.O. Box 1105, Richmond, Virginia 23218
(800) 592-5482
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

August 3, 2020

Andrea W. Wortzel
Troutman Sanders
1001 Haxall Point, Suite 1500
Richmond, VA 23219

Dear Ms. Wortzel,

Thank you for your email dated November 8, 2019 requesting DEQ to continue processing the Draft VWP Permit #16-1937 for Cranston Mill Pond, LLC.

As provided in the September 9, 2019 letter to Mr. Jeff Corbin, Cranston Mill Pond, LLC, the Board has withdrawn the May 17, 2019 tentative decision to issue a VWP permit for the project and issued a tentative decision to deny a permit. Pursuant to 9VAC25-210-230 B, that letter provided information regarding the rationale for the denial.

Pursuant to 9VAC25-210-230 D, should the applicant elect to proceed as originally proposed, the Board may deny the application, and pursuant to § 62.1-44.15:02 of the Code of Virginia the applicant has a right to a public hearing to consider the denial.

In response to your request, on behalf of Cranston Mill Pond, LLC, to continue processing the VWP permit application as proposed, a public hearing will be convened to consider denial of a permit pursuant to § 62.1-44.15:02 F of the Code of Virginia. You will be provided the public notice and instructions to advertise in a newspaper of general circulation in James City County once a hearing date and location is scheduled by DEQ.

If you have further questions concerning the public notice or public hearing process, please contact me at Joseph.Grist@deq.virginia.gov or (804) 698-4031.

Sincerely,

Joseph D. Grist, Manager
Water Withdrawal Permitting and Compliance Program

cc. Jeff Corbin, Cranston Mill Pond, L.L.C.
David K. Paylor, Director
Jeffery Steers, Director, Central Operations
Jutta Schneider, Director, Division of Water Planning
Scott Kudlas, Director, Office of Water Supply
Brian McGurk, Water Withdrawal Permit Writer

ATTACHMENT C: INDIVIDUALS WHO PROVIDED PUBLIC COMMENTS VWP APPLICATION 16-1937 Attachment C

Name	Address
Andrea Wortzel, Jeff Corbin, Paul Peterson, and Greg Garmin presenting on behalf of Cranston's Mill Pond, LLC for Public Hearing	Troutman Pepper Building, 1001 Haxall Point, Richmond, VA 23219
Mark Luckenbach	P.O. Box 1346, 1375 Greate Road, Gloucester Point, VA 23062-1346
Keith Hodges	230 Virginia Street, Urbanna, VA 23175
John J. Aulbach II	2414 Granite Ridge Road, Rockville, VA 23146
Mike Lang	7051 Poindexter Road, New Kent, VA 23124
David Jurgens	306 Cedar Road, Chesapeake VA 23322

Troutman Pepper Hamilton Sanders LLP
Troutman Pepper Building, 1001 Haxall Point
Richmond, VA 23219

troutman.com

troutman pepper

Andrea W. Wortzel
D 804.697.1406
F 804.697.1339
andrea.wortzel@troutman.com

December 22, 2020

BY HAND
BY ELECTRONIC MAIL (WITHOUT ATTACHMENTS)

Joseph Grist
Virginia Department of Environmental Quality
1111 E. Main Street
Richmond, Virginia 23219

Re: Public Comment on Cranston's Mill Pond
Virginia Water Protection Permit Application 16-1937

Dear Mr. Grist:

I am writing to comment on the pending Virginia Water Protection ("VWP") permit application filed by Cranston's Mill Pond LLC ("CMP") in December 2016. CMP opposes the proposed denial of the requested permit, and instead requests that the Board issue the permit to CMP confirming the amount of water that may be withdrawn from the pond for beneficial use, conditioning initiation of such allowable withdrawal upon an end user being subsequently identified and approved by the Department of Environmental Quality ("DEQ") and establishing a minimum target release of 300,000 gallons per day.

Extensive technical support for the requested withdrawal amount demonstrating that such amounts could be withdrawn without adverse impacts to instream beneficial uses has been provided in the permit application, supplements to that application, and at the public hearing that took place on December 7, 2020. Specifically, comprehensive analyses conducted by outside experts in fisheries, hydrography and water quality confirmed that the proposed CMP withdrawal would have no adverse impact on aquatic living resources (e.g. Bridle Shiner) or salinity dynamics within the Yarmouth Creek system.

The basis for DEQ's proposed denial of the permit application is not that the requested withdrawal would adversely impact beneficial uses. Rather, the sole reason given by DEQ at the public hearing for denying the permit is that a specific end user has not been identified. DEQ stated at the hearing that without a specific end user identified, DEQ could not assess alternatives, nor could it evaluate the need for the water. DEQ also stated that it did not have any details on the demand projections for the water.

As explained at the December 7, 2020 public hearing, DEQ's position is contrary to the record for this permit, the statutes and regulations governing the VWP program, and the policy and practice of the Commonwealth established for water withdrawal permitting and water resource

management. Accompanying this letter is a binder of materials that support the presentation made at that hearing. Also accompanying this letter is a transcript of the December 7, 2020 public hearing (**Attachment A**). In addition to those materials, CMP offers the following comments.

Record for this Permit

A detailed chronology of the permitting history for this project is attached (**Attachment B**). This permitting history shows the following:

- The permit application was filed in December 2016. The application clearly stated that no end user had been identified, but the purpose of the permit would be to document the available water withdrawal from CMP so that it could serve as an alternative source of water in the Eastern Virginia Groundwater Management Area. The goal was to demonstrate the surface water available from CMP to reduce the reliance on groundwater in this area of the Commonwealth. The water would ultimately be used by existing beneficial uses, or to meet new water needs resulting from residential growth or economic development. Supporting information from the Hampton Roads Planning District Commission Regional Water Supply Plan, State Water Resources Plan, and Eastern Virginia Groundwater Management Advisory Committee Final Report was provided as support for the need for the project.

- On December 22, 2016, DEQ asked CMP for additional information regarding its permit application (**Attachment C**). That information related to the potential end user, potential conditions in the permit to address evaluation of an end user once identified, and an alternatives analysis. CMP responded to the DEQ questions on January 12, 2017 with the requested information (**Attachment D**). **DEQ did not seek any additional information regarding the end user after this request and CMP's response**. Rather, as documented below, all of the correspondence and information submitted from this point forward related to assessing the potential impacts of the withdrawal on instream beneficial uses.

- DEQ sent CMP a second request for additional information on June 2, 2017 (**Attachment E**). This request focused specifically on analyses of potential instream impacts from the requested withdrawal. CMP responded on June 7, 2017.

- After CMP responded to DEQ's questions and provided the additional analyses requested by DEQ, DEQ issued a draft permit in September 2017. DEQ regulations provide that a draft permit is to be prepared "after evaluation of a complete application," and when "a tentative decision is to issue the VWP permit." 9 VAC 25-210-120. Thus, as of September 2017, DEQ determined it had sufficient information to evaluate and issue the permit.

- The draft permit provided in 2017 included a 90% flow-by requirement, which effectively eliminated the reliability of Cranston's Mill Pond as an alternative water source. CMP met with DEQ to discuss the flow-by requirement. DEQ explained that the flow-by requirement was based on historic (2004) Department of Game and Inland Fisheries

(now Department of Wildlife Resources or "DWR") guidance. When CMP pointed out that the guidance, on its face, states that it does not apply to tidal estuaries, DEQ indicated that it was conservatively being applied because no end user had been identified.

> NOTE: DEQ's position was ***not*** that it had insufficient information to issue the permit or could not issue a permit without a specific end user, but rather its position was that the 90% flow-by requirement was being applied as a conservative measure because an end user had not been specified. However, DEQ's position is directly contradicted by the guidance itself, which states that it does not apply to tidal waters, indicating that the 90% flow-by is not needed to protect instream uses in such water bodies.

- To address DEQ's concerns about ensuring that any end user would employ conservation measures and be limited to the amount of water needed for the specific use, DEQ and CMP agreed upon conditions during a meeting in March 2018 conditioning initiation of allowable CMP withdrawals upon an end user being subsequently identified and approved by DEQ.

  > NOTE: It was understood by DEQ and CMP throughout this process that the purpose of the permit was to document the amount of water available for withdrawal from CMP to be put to beneficial use. CMP would serve as an alternative water source to an existing groundwater user in the Eastern Virginia Groundwater Management Area (a use and volume already determined to be beneficial and appropriate by DEQ) or to enable economic development or population growth to occur, in light of DEQ's determination that additional groundwater withdrawals in Eastern Virginia would not be permitted in order to protect the Coastal Plain aquifer, which was over-allocated.

- With the end user issue resolved, the question became what additional information DEQ would need to remove or reduce the 90% flow-by requirement. DEQ and DWR requested information about the impacts of a larger withdrawal on salinity; on aquatic species and particularly the Bridle Shiner (a state species of concern); and on the hydrograph of the estuary. As described at the hearing on December 7, 2020, in the documentation submitted to DEQ during the permitting process and the binder provided with this letter, significant technical information was provided addressing these issues and demonstrating that the requested withdrawal would not adversely impact instream beneficial uses.

  > NOTE: The Virginia Institute of Marine Science independently confirmed these conclusions in writing twice in 2017, and in 2018, 2019 and 2020.

- DEQ requested additional information on December 18, 2018 (**Attachment F**). All of the information requested related to the modeling and analyses conducted to confirm that the requested withdrawal would not adversely impact instream uses. None of the requested information related to the end user issue. CMP provided a response on January 10, 2019.

troutman pepper

- DEQ requested additional information on February 5, 2019 (**Attachment G**). All of the information requested related to the modeling and analyses conducted to confirm that the requested withdrawal would not adversely impact instream uses. None of the requested information related to the end user issue. CMP provided responses on February 8 and 26, 2019.

- DEQ also asked VIMS for additional information, which VIMS provided on three separate occasions. In order for VIMS to undertake the extensive modeling requested by DEQ, CMP was asked to provide funding support (which it did). Additionally, in order for CMP to respond to DEQ's information requests, it hired its own experts – Arcadis and Dr. Greg Garmin. All of this came at considerable time and expense to CMP – time and expense that would not have been incurred if DEQ had indicated that it still had concerns about identifying a specific end user.

- In May 2019, DEQ issued the second draft VWP permit. Again, such drafts are issued after DEQ determines that a complete application has been received, and has made a tentative decision to issue the permit. 9 VAC 25-210-120. The draft permit included the agreed-upon conditions to prohibit the withdrawal from occurring until an end user is identified and approved by DEQ. Despite including these conditions, and despite the technical support for the requested withdrawal, the draft permit retained the 90% flow-by requirement.

    - NOTE: DEQ did not indicate that the 90% flow-by requirement was included because a specific end user had not been identified. Rather, DEQ cited potential impacts to salinity (in contradiction to the conclusion of VIMS and CMP's outside experts that any changes in salinity resulting from the withdrawal would be within the natural variation already occurring in the watershed and would have no adverse impact).

- CMP informed DEQ that it would defend the technical record, and on July 19, 2019 filed additional technical support confirming that a 90% flow-by was not appropriate. The requested withdrawal would not adversely impact instream uses. CMP was willing to make that case to the State Water Control Board.

After receiving CMP's package, in September 2019 DEQ transmitted a letter to CMP stating that it was withdrawing the May 2019 draft permit. Instead, DEQ opined that a permit could not be issued unless a specific end user was identified. Taking such a position stands in stark contrast to:

- 8 CMP submittals totaling over 500 pages, including data, photos, videos and modeling reports;
- 25 meetings between DEQ and CMP (many with DWR and VIMS participating);
- 10 reports from outside experts;
- 5 field sampling events and calculations;
- 2 draft permits developed and issued by DEQ.

troutman pepper

Since March 2018, all of the meetings, analyses and modeling have been focused on assessing instream impacts resulting from the requested withdrawal. DEQ never raised additional concerns about whether there was a specific end user.

CMP's presentation at the December 7, 2020 public hearing explained that neither the statutes, regulations nor policies of the Commonwealth preclude issuance of a water withdrawal permit if a specific end user has not been identified. Rather, the grounds for denying a VWP permit, as reflected in 9 VAC 25-210-230, all relate to assessing the impacts caused by withdrawal. Again, this is consistent with the modeling and analysis CMP, its experts and, independently, VIMS have undertaken over the past four years. That analysis demonstrates that no adverse impacts will occur as a result of the requested withdrawal.

Moreover, as reflected in the presentation CMP made at the December 7, 2020 public hearing, there is a long history of water users in the Eastern Virginia Groundwater Management Area seeking additional water supplies. DEQ's own documentation demonstrates the need for innovation and public-private partnerships to develop new water sources in this area of the Commonwealth. See also **Attachment H**. It is within this context that CMP is seeking this permit. DEQ's purported concern about having insufficient information to determine the need for the water or a specific end user is inconsistent with the need expressed by the agency itself in public documents such as the annual Water Resources Report and the Virginia Water Resources Plan.

CMP respectfully requests that the Board direct DEQ to issue a VWP permit to Cranston's Mill Pond LLC authorizing the requested withdrawal, removing the 90% flow-by requirement and replacing it with a minimum target release of 300,000 gallons per day, and retaining the provisions conditioning initiation of allowable withdrawals upon an end user being subsequently identified and then approved by DEQ.

Sincerely,

Andrea Wortzel

Thank you for your time and consideration of these comments.

Andrea W. Wortzel

AWW:hmn

Attachments

cc: Jeff Corbin
Paul Peterson
Dr. Greg Garmin

Virginia Department of Environmental Quality Public Hearing Cranston's Mill Pond VWP Permit Application December 7, 2020	
Female	Go ahead, Joe.
Male	Alright, Mr. Hayes, we are recording the hearing.
Tim Hayes	Yes, alright. We'll start the hearing now. Sorry for the delay. It was some kind of a difficulty with Wi-Fi but…Good evening, ladies and gentlemen. My name is Tim Hayes and I'm a member of the State Water Control Board. I will serve as hearing officer for tonight's hearing. I'd like to clarify that the State Water Control Board is a policy-making body of citizens appointed by the governor and empowered by the law to adopt regulations and issue permits. The Department of Environmental Quality is an agency of the State's Executive Branch with the responsibility for administering its relevant laws and the regulations adopted by the Board. I am not a staff member of the Department but an appointed director by the governor. In addition, I would like to point out that the relevant state and federal laws and regulations are the basis for the actions taken by the Board and the Department. Neither has the authority to make changes to the law. Consistent with Governor Northam's Executive Order No. 51 of 2020, Item 4-0.01(g) of Chapter 12.83 of the 2020 Acts of Assembly and the applicable provisions of Section 2.2-37082 of the Freedom of Information Act, the Board is convening today's meeting electronically. This is necessary for the Board to do to discharge it's lawful purposes, duties and responsibilities, but it is impractical or unsafe for the Board to assemble in a single location due to the Declaration of a state of emergency for COVID-19. If during the webinar you or your equipment have or experience technical difficulties, please contact Joseph Grist at (804) 698-4031 or email him at joseph.grist.deq@virginia.gov. This contact information will remain posted on the screen for the majority of this

	hearing. It is suggested that you select phone audio to make comments. Utilizing the phone for comment results in better audio quality, please ensure that your line remains muted at all times when you are not speaking. We will be taping all public testimony to the official record. The hearing file will close once all speakers have had the opportunity to speak. The State Water Control Board is holding this hearing to seek public comment and to consider denial in the Virginia Water Protection Permit Application in James City County, Virginia. This hearing was authorized by the Director of the Department of Environmental Quality. Notice of the hearing was published in the Daily Press on Monday, November 2, 2020. This fact-finding proceeding is held pursuant to Sections 2.2-4019, and Section 62.1-44.15:02 of the Code of Virginia, 9VAC25-210, Virginia Water Protection Permit Program Regulations and 9VAC25-230, Procedural Rule No. 1, public and formal hearing procedures. The State Water Control Board will ultimately decide whether to deny this permit application. There will be no decision made here tonight. It will be made at a future meeting of the Board. The date, time and location of the State Water Control Board meeting for consideration of this denial are yet to be determined. At this time, I would like to introduce Staff President, Eunice Schneider, Water Planning Division Director and Scott Kudlas, Office of Water Supply Director and Joseph Grist, Water Withdrawal Permitting and Compliance Manager. The general procedure for this hearing will be as follows: Scott Kudlas, Office of Water Supply Director for DEQ will make the staff presentation. The applicant will then make a presentation. Once the applicant has spoken, then I will ask if there are any elected state or local officials that would like to speak. Once any elected officials have spoken, then individuals who indicated a desire to speak when registering for the webinar will be called on. Anyone else participating in the webinar wishing to speak, will be

	asked at a later time to use the raise-your-hand function on the go to webinar control bar that appears on the screen. Please do not raise your hand until asked to do so. Once you have raised your hand, please leave your hand raised until you are called on. When called on to give your statement, you will be unmuted and you can begin to speak. Please state your full name, and who you represent prior to making your comments. Please speak slowly and clearly, so that you can be recorded. As hearing officer for this public hearing, I reserve the right to restrict comments on length of time or repetitive content. The applicant has requested and been granted 30 minutes for their presentation. I ask that others making their presentation keep your comments to three minutes apiece. We will be recording all public comments for the official files. As a reminder, written comments may be submitted to DEQ through December 22, 2020. Written comments mailed to DEQ must be received by close of business on December 22, 2020. Email comments must be received by DEQ by 11:59 p.m. on December 22, 2020. At this time, I call on Scott Kudlas to give the staff presentation. Scott?
Scott Kudlas	Thank you, Mr. Hayes. As noted in the [inaudible], my name is Scott Kudlas and I will be providing [inaudible]--
Tim Hayes	Mr. Kudlas, you're getting an echo.
Scott Kudlas	And I don't know why. Do you have a suggestion, Joe?
Joe	Hold on. I'll check my -- try again.
Scott Kudlas	This is Scott Kudlas.
Joe	That's better.
Scott Kudlas	Very good. Next slide, please. This was the slide where I introduced myself. I'll be making a presentation. Alright, thank you. Next slide. There you go. The purpose of this meeting is to receive comment on the proposed denial of a Virginia water protection permit application for a project identified as Cranston Mill Pond Waters [inaudible] Project. The application was filed by Cranston's

	Mill Pond, LLC. Cranston's Mill Pond is located on Cranston's Mill Pond Road, also known as County Route 632, approximately one-half mile south of the intersection of Cranston's Mill Pond Road with Chickahominy Road, which is also known as County Route 631. The application requested authorization to withdraw surface water from Cranston's Mill Pond which is an impoundment on Yarmouth Creek, in James City County, Virginia. The application requests a withdrawal of up to 15 million gallons per day and a maximum annual withdrawal of 3.285 million gallons. The withdraw would affect Yarmouth Creek at tributary to the Chickahominy River and the James River Watershed. DEQ's preliminary decision is to deny the application. Next slide. The applicant has not provided adequate information to the satisfaction of DEQ regarding the proposed beneficial use and the need for the requested surface water as required by 9VAC25-40 and 9VAC 25-360. The applicant did not include detailed demand projections to justify the withdrawal request and to date, no specific beneficial use has been identified as part of the project purpose. Information on the proposed use of and need for the requested surface water and how the amount was determined is required by 9VAC-25- pursuant to 9VAC25-360. The applicant has not demonstrated to DEQ's satisfaction that the project meets an established need for water to meet the project purpose. Without details on the beneficial uses for this water, projected over a minimum 30-year period, it is unclear if there is an established need for the requested surface water, if alternatives exist to meet the need, and if the amount is the minimum necessary for the beneficial use allowed. Next slide. There are two ways to provide comments. The first way is through oral comments, and those can be provided tonight at this public hearing. Mr. Hayes, as the hearing officer, has set the time allowed prior to accepting all comments to 3 minutes with the exception of the applicant is who granted 30 minutes. Next

	slide. The second way to provide comments is through written comments. The State Water Control Board accepts comments by hand delivery, email, fax or postal mail. All comments must be received in writing, will be received by DEQ before the end of the comment period on December 22, 2020. Mr. Hayes indicated that written comments are to be provided by 5:00 p.m. on that date and email comments provided by 11:59 p.m. on that date. Written comments must include the names, mailing addresses and telephone numbers of the person commenting and all people represented by the citizen. Second, a brief informal statement on how the proposal will affect the citizen. Next slide. Public comments, documents, document requests and additional information may be made to Joseph Grist of DEQ. He can be reached at P.O. Box 1105, Richmond, Virginia 33218, by phone at (804) 698-4031, by fax at (804) 698-4178, or by email at joseph.grist@deq.virginia.gov. Mr. Hayes, that concludes the staff presentation.
Tim Hayes	Now I'll call on the applicant to give their presentation. Thank you, Mr. Kudlas. Does the applicant wish to give a presentation?
Joseph Grist	I'm trying to get them on mic, Mr. Hayes.
Tim Hayes	Okay.
Joseph Grist	Ms. Wortzel, we've sent you the audio [inaudible/echo].
	audio problems/crackling
Tim Hayes	Is there some way you could call them and see what's going on?
Joseph Grist	Yes, sir, I'm going to do that right now. I'll be [inaudible].
Tim Hayes	Okay, great.
Joseph Grist	Mr. Hayes, we are speaking with the applicant and we're working on the audio.
Tim Hayes	Okay.
Andrea Wortzel	Can you hear me? Can you hear me?
Tim Hayes	Yes. Hi, Andrea.

Andrea Wortzel	Hello. Sorry about that. Okay, I think we're live now.
Tim Hayes	Yeah, we have problems on this end, too so. Go ahead. You can start your presentation any time.
Andrea Wortzel	Thank you, I think DEQ you've put my presentation up.
Male	Okay, well whenever you're ready.
Andrea Wortzel	Thank you. Good Evening, Mr. Hayes, Mr. Kudlas, Mr. Grist and other members of the DEQ staff participating in this hearing. My name is Andrea Wortzel. I'm an attorney with Troutman Pepper, and I'm representing the applicant, Cranston Mill Pond or CMP. Mr. Hayes, this presentation will demonstrate first that identification of a specific end user is not a requirement of state law or regulation in order for DEQ to issue a water withdrawal permit. Second, DEQ identified the key technical issues associated with the permit and asked CMP to address those issues. And third, CMP did so, confirming through modeling and technical analyses conducted by outside experts as well as the Commonwealth Scientific Advisors at the Virginia Institute of Marine Science that the requested permit will not adversely affect instream beneficial uses such as water quality, or living resources. DEQ stated in its September 2019 email and letter that it was recommending denial of the permit because no specific end user had been identified for the water. DEQ has also indicated that they have policy concerns that issuing this permit would essentially privatize water. But this does not tell the whole story. Next slide. In fact, DEQ's positions are contradicted by the VWP permitting framework as well as the policies of the Commonwealth with respect to development of alternative water supply options in the Eastern Virginia groundwater management area. DEQ's position also contradicts the record for this permit in which DEQ asked the applicant to conduct extensive modeling work in support of the application. As recently as May and June of this year, DEQ was evaluating modeling scenarios for a withdrawal from CMP, a fact

	CMP learned only after filing suit to obtain a copy of the VWP file for this project which DEQ refused to produce in response to a FOIA request. Such analyses would not have been necessary if a permit could not be issued. Next slide. This application was filed in December 2016, but there is important history and context for this project that predates this date. Next slide. In 2014, DEQ announced that the coastal plain aquifer, the primary water source for municipalities and industries in Eastern Virginia, was over allocated. DEQ made a series of presentations explaining that the aquifer was being drawn down at a significant rate. As a result, land subsidence and salt water intrusion were occurring. DEQ plainly stated that it would not be able to issue any new permits for groundwater withdrawals and would be unlikely to issue permits to increase the withdrawal rates for existing localities and businesses. Next slide. In fact, the situation was so significant that DEQ proposed reducing the permitted groundwater withdrawals of the largest 14 withdrawers by 50% or more. DEQ explained that it would be important to identify, protect and develop water sources other than groundwater so that economic development and population growth in Eastern Virginia could be supported. Next Side. The owners of Cranston Mill Pond heard these presentations and realized that their pond could serve as just such an alternative source. I'd like to ask Jeff Corbin to share some of the details and features of Cranston Mill Pond that make it uniquely suited to serve as an alternative water source. Jeff is the project manager for the permit request and represents Restoration Systems, the majority owner of the pond. Jeff?
Jeff Corbin	Thank you, Andrea and thank you, Mr. Hayes for your commitment to serve on the State Water Control Board and your willingness to hear this case this evening. As Andrea said I'm Jeff Corbin, I work for Restoration Systems and I am the Project Manager for the Cranston Mill Pond Water Supply project. The last 25 years of my

	life and career have been dedicated to protecting, restoring and advocating for the Chesapeake Bay and Virginia's natural resources in the non-profit, state, federal and now the private sector. I mean this sincerely, that I never would have put my name of this project or expended the significant effort and resources that we have if I felt that it would be harmful to Virginia waters and natural resources. When we started this permit process more than four years ago, I had no idea and certainly no intention of debating our request before a hearing officer or the State Water Control Board or a judge. We adhered to the process as requested by DEQ, we consulted with them as outside experts, answered to the best of our ability all of the questions asked by DEQ, yet, after three plus years and two draft permits, we were stunned to hear last September that DEQ is reversing course and informed us that a permit could not be issued. I am putting it politely when I use the word "stunned." Next slide, please. As a result of the unique geographical location of Cranston Mill Pond, it captures a relatively large watershed, approximately 7 square miles. As the picture in the slide shows the pond is in a heavily forested and protected area. The surface area of the pond is approximately 50 acres. The pond also incises two shallow groundwater aquifers and produces a surprisingly high flow of water from the pond. The influence of the groundwater flows has been documented by third-party engineering firms. The water is also fresh, meaning that it has no salt content and can be treated by a relatively inexpensive conventional treatment technology. As again, confirmed by a third-party treatment experts. Next slide. We took it upon ourselves to begin collecting highly accurate water outflow measurements beginning in July 2015. We now have five plus year record of flows of which DEQ staff have acknowledged are highly accurate measurements. Over five years, the average daily flow of water from the pond is slightly more than 9 million gallons per day.

	Next slide, please. CMP is somewhat centrally located and available to serve as a raw water option for a number of potential public and commercial users. The pond is located within James City County, the headwaters of Yarmouth Creek, which is part of the larger Chickahominy James River Watershed. I also want to make it clear the CMP is already constructed. Next slide please. The old antiquated dam was breached in 2006 during hurricane Ernesto. Next slide, please. We subsequently purchased the property, rebuilt the dam to meet the very stringent Virginia dam safety regulatory requirements and were awarded the most improved dam in 2013 by Virginia Lakes and Watershed Association. Our dam certification was renewed in 2019 for an additional 6 years. Next slide. As I'm sure you're well aware, newly proposed reservoirs are often controversial due to unavoidable impacts to wetlands and stream habitats. In contrast, CMP is already built. Next slide, please. While the water in the pond is non-tidal and fresh, the water that flows over the spillway enters a large brackish tidal estuarine complex. As such, some water quality experts have referred to the CMP location as the "sweet spot" for water withdrawals. That last stop so to speak before fresh water enters the brackish estuary and becomes much more difficult and expensive to withdraw and treat for potable use. The water below CMP is tidally dominated. We ourselves have verified such visually and mathematically, and those results have been verified independently twice by the Virginia Institute of Marine Science in reports requested by DEQ. The average daily flow from CMP is less than 3% of the downstream tidal volume that ebbs and flows twice daily. The effect of the tides has been documented right up to the foot of the spillway. The pond and property to one foot above the water elevation, is wholly owned by us, CMP LLC. Large portions of the surrounding watershed are already subject to protective covenants for county preferred land use zoning. There are

	currently no existing downstream withdrawals in the Chickahominy Watershed and due to lack of right pairing(?) accessibility, additional downstream withdrawals from Yarmouth Creek are unlikely. Next slide. I had the privilege of presenting the project to bipartisan State Water Commission in 2017 where it received wide support. Over the past 4 years we have engaged VIMS as well as some of the top national experts on water supply, fisheries, water treatment and water hydrodynamics. We knew that our proposal was innovative and we wanted to make sure that we set the bar high and provided ample justification for our permit. Next slide please. The proposed CMP project was recognized by the Eastern Virginia Groundwater Management Advisory Committee as a viable, innovative project to provide an alternative source of surface water. In short, Mr. Hayes, we started this project at our own expense because we heard the call from DEQ and legislators that new, innovative alternative sources for surface water were needed. We feel that we have gone above and beyond to justify our proposed project and we look forward to answering any questions that you may have.
Andrea Wortzel	Next slide please. Based on the location and features of Cranston Mill Pond, initial discussions were held with James City County to see if the pond could be an alternative source to help them in light of the significant cut to their groundwater withdrawal permit proposed by DEQ. James City County has been looking for alternative water sources for years. They were partners in the Ware Creek Reservoir proposal, which failed, and the King William County Reservoir project, which also failed. They currently have a contract with Newport News for treated water but have been hesitant to exercise their option under that contract because of the limited volume of water and the rates Newport News will charge for that water. Also, James City County recently obtained its own surface water permit to withdraw water from the Chickahominy River, but there are concerns

	about the ability of James City County to implement that permit due to the level of treatment needed given the lower water quality in the withdrawal area and concerns about whether the wastewater residuals associated with treating the water can be discharged without creating water quality impacts. James City County heard information about the project at public meetings, including meetings before the Board of Supervisors, met with CMP multiple times and hired consultants to kick the tires on the Cranston Mill Pond as an alternative source. There was just one problem. No one knew exactly how much water could be withdrawn from Cranston Mill Pond. That requires a permit from DEQ. Preliminary calculations were performed by DEQ but DEQ indicated it could not fully assess the volume of withdrawals from the pond outside of the VWP permitting context. And that's why CMP filed it's VWP application. Again, the goal, as understood by all parties, including DEQ, was to obtain a permit that could identify the volume of water available to be withdrawn from the pond without adversely impacting other beneficial uses so that CMP could serve as an alternative water source within the Eastern Virginia groundwater management area. CMP's permit application made this clear. Next slide. In September 2017, DEQ issued the first draft VWP permit to Cranston Mill Pond. Even though the permit included the exact withdrawal amounts that CMP had requested, that draft permit negated those allowable withdrawals by also including a 90% flow-by requirement. Meaning that CMP would only be able to withdraw 10% of the water flowing into the reservoir on any given day. CMP had a series of meetings to discuss the draft permit with DEQ. As part of those discussions, DEQ indicated (1) that the flow-by requirement came from the Virginia Department of Game and Inland Fisheries, now the Department of Wildlife Resources, based on historic agency guidance, as well as concerns about protecting the bridle shiner, which is a state species of concern, and (2) that the

	most conservative flow-by was applied because an end user had not been identified. Next slide. It's important to note here that the Virginia Institute of Marine Science reviewed CMP's application and concluded that there would be no adverse impacts to resources in the area from the requested permit. VGIF agreed but had concerns about issuing the permit given the fact that an end user was not specified. Next slide. In order to address the end user issue, CMP and DEQ met in March of 2018 and agreed upon conditions to ensure that any withdrawal authorized by the permit could not take place until an end user was identified and approved by DEQ. In other words, the permit would serve as confirmation of the volume of water that could be withdrawn without any adverse impact, but would prohibit that withdrawal from taking place until an end user is identified. Thus, the end user issue was resolved at that meeting with the DEQ Water Supply Program Manager. Next slide. With that issue resolved, the parties agreed that they could turn to the technical issues associated with the requested withdrawal. DEQ and DWR identified three areas of concerns. Impacts to salinity, impacts to the hydrograph or the water flow within the estuary over time, and impacts to fish and specifically to bridle shiner. Now, CMP initially proposed to withdraw the total volume of inflow to the pond but, based on technical discussions with DEQ, CMP revised its request to propose that a minimum target flow of 300,000 gallons per day would continue to flow into Yarmouth Creek, but the remainder of the water could be withdrawn. Next slide. To help address the technical questions posed by DEQ, Cranston Mill Pond hired Paul Peterson with Arcadis, and Dr. Greg Garman, an experienced academic fish ecologist with a 30-year research record focused on Virginia tidal waters. Paul and Greg will now explain that the withdrawal requested by CMP will not adversely affect instream beneficial uses. Paul?

Paul Peterson	Thank you, Andrea. My name is Paul Peterson and I work for the engineering firm Arcadis and I'm representing the Cranston's Mill Pond permit applicants. Next slide. Arcadis' efforts have focused on assessing water supply reliability of the projects and evaluating potential water quality impacts in the estuary as a result of the withdrawal. In order to be viable as a water supply, the project must have high reliability for end users. Average withdrawal amounts don't tell the story that really matters to water users. They want to know the frequency that a given supply amount is available. To perform in Cranston's Mill Pond water balance time series simulations, we determined that DEQ's proposed 90% flow-by rule would render the reliability of allowable withdrawals so low as to make the project impractical. If we had no other scientific information, it's understandable how it presents a standard like 90% flow-by could be recommended. However, that's not the case in this situation. Detailed physical and biological monitoring and modeling has been performed to determine site-specific conditions on which to base a realistic operating rule. In contrast to 90% flow-by, the applicants proposed 300,000 gallon per day minimum target release, would allow for a high degree of withdrawal reliability, that would be attractive to end users while still protecting the tidal environment. Next slide. Tidal conditions below the dam at Cranston's Mill Pond maintain water levels in Yarmouth Creek. And the daily volume of ebb and flood flows dwarf Cranston's Mill Pond outflows and proposed withdrawal levels. According to the applicants' calculations, average flow from Cranston's Mill Pond is only 2 to 3% of the daily tidal flows entering the upper segment of Yarmouth Creek. Next slide. In addition, VIMS independently determined that the mean flow from Cranston's Mill Pond is less than 2.3% of the mean Yarmouth Creek tidal prism volume from its confluence with the Chickahominy River to upstream, below Cranston's Mill Pond.

	Next slide. In June 2017, modeling work was conducted by VIMS as requested by DEQ and focused on salinity in Yarmouth Creek. In November 2018, again at the request of DEQ, VIMS further refined their model and analysis. This map highlights VIMS' modeling stations in upper Yarmouth Creek, which are labeled as output locations 2, 3 and 4. Next slide. The results from both VIMS analyses were that predicted salinity change was minimal under the proposed withdrawal scenario as compared to baseline conditions. Minor salinity changes due to simulated withdrawals from the small reservoir were over shadowed by the range and frequency of salinity levels already established by the much larger tidal volume of the downstream estuary. These minor changes can be seen in the range of absolute salinity shown here under withdrawal conditions as compared to baseline conditions. Next slide. The minor salinity changes can also be seen in the percentages of time that Yarmouth Creek model output stations would be in various salinity regimes, as shown here under withdrawal conditions as compared to baseline conditions. In addition, the applicants performed a detailed controlled flow release field study which concluded that at a wide range of flows from Cranston's Mill Pond, the low tides aquatic habitat conditions were essentially identical in extent. Arcadis, Benz and Dr. Garman agreed with and endorsed the field study's conclusions. Next slide. Arcadis concluded that the proposed withdrawal would not adversely impact salinity levels in the watershed because the withdrawal would have little, if any, impact on the existing salinity regime resulting from tidal influence. VIMS reached a similar conclusion. Greg?
Greg Garman	Thank you, Paul and good evening Mr. Hayes. My name is Greg Garman. I am presenting tonight as an outside fisheries expert for the applicant. Next slide, please. Mr. John Kauffman was, until his retirement, the Virginia Department of Game and Inland Fisheries

	Instream Flow expert. And in the early 2000s, he developed permit guidance encouraging a 90% flow-by instreams to maintain instream fish habitat. The guidance was developed for non-tidal, fresh, free flowing streams and this guidance, if you look at the arrow there, specifically states that the 90% rule is not applicable to coastal plain, tidal creeks and estuaries. In fact, there's simply no reasonable way to accurately apply the 90% rule to a tidally dynamic system such as Yarmouth Creek. Next slide, please. Cranston Mill Pond, i.e., Yarmouth Creek, discharges to a large coastal tidal estuary. As the Kauffman guidance states, the 90% flow-by recommendation cannot be applied to tidally dynamic systems like Yarmouth Creek below Cranston Mill Pond, because of the significant natural, temporal and spatial variability, in stream volume, direction of flow, salinity and temperature that is intrinsic to these systems. Next slide. In order to assess potential impacts to species downstream, I developed and implemented detailed monitoring, field work and synthesis of historical data. Specifically, a crew of three experienced fish biologists used bode electric fishing and EPA-approved standard operating procedures to quantitatively sample fish communities at 5 tidal locations in the project area during the Fall of 2017. We included sites immediately downstream of Cranston Mill Pond and other representative habitats and tidal reaches of the watershed over several days. This was the most comprehensive sampling of the Yarmouth Creek system on record and was more than adequate to characterize resident and migratory fish assemblages. No fish species of concern were present in the project area. Virginia Department of Game and Inland Fisheries now, Department of Wildlife Resources, had originally indicated that the bridle shiner, a state species of concern, may be present in the project area based on some earlier sampling, that our comprehensive work in 2017 confirmed that the bridle shiner is not present in the system. Next

	slide, please. The native aquatic living resources present in the project area are unlikely to be adversely affected by the project because they are already adapted to a tidal estuary and so are accustomed to natural daily and seasonal changes in stream flow and salinity. Next slide, please. In addition, salinity criteria used by DEQ by evaluate then-salinity model are not applicable to resident and migratory species and are not supported by the scientific literature. Next slide. The bottom line from Fisheries is that the species present in the project area will not be impacted by minor withdrawal-driven changes in salinity which are well within the natural dynamic range already present in this system. Application of the historic Kauffman guidance regarding a 90% flow-by rule for non-tidal fresh water streams is simply not defensible in this instance and should not be applied here.
Andrea Wortzel	Next slide. CMP's experts are not the only ones that concluded that the requested withdrawal would not have any adverse impacts. VIMS also reviewed this project and concluded on multiple occasions that given its location, the tidal nature of the estuary and the range of salinity already occurring within Yarmouth Creek, the requested withdrawal would not have an adverse impact on instream uses. Even as recently as October of 2020, VIMS explained that the minor salinity changes that would result from the proposed withdrawals are unlikely to adversely impact the vegetation or fish in Yarmouth Creek. All of the technical information collected and performed by the applicant, then an outside expert, was compiled and submitted to DEQ as a 200-page supplemental information addendum on November 30, 2018. All of this information was compiled to address DEQ's request that CMP address the three technical issues DEQ identified in March of 2018. Next slide. So, when DEQ issued its second draft VWP permit in May 2019, CMP was surprised and dismayed to find that DEQ retained the 90% flow-

	by requirement. CMP made it clear to DEQ that it was prepared to defend the technical case supporting the requested withdrawal. Next slide. CMP was further surprised – I believe Mr. Corbin said he was stunned – when in September 2019 DEQ reversed course and indicated that the permit could not be issued unless an end user was identified. CMP had discussions with James City County again, but James City County again stated that it could not assess the viability of CMP as an alternative water source without knowing how much could be withdrawn. For this reason, CMP asked DEQ to continue processing the permit so that this question could be answered. Turning now to the end user issue. Next slide. As noted earlier, in March 2018, DEQ and CMP agreed on conditions ensuring that a withdrawal cannot occur until an end user is identified and approved by DEQ. Those conditions are reflected in the May 2019 draft permit. This point warrants restating. CMP is prohibited from withdrawing any water until a specific end user is identified and fully vetted by DEQ. The inclusion of these conditions in the draft permit demonstrates DEQ's understanding that the purpose of the permit is essentially to determine the volume of water that may be withdrawn. In other words, the permit will demonstrate the viability of CMP as an alternative source for water users in the Eastern Virginia Groundwater Management area. Identifying such alternative sources is something recognized and supported by them, the Eastern Virginia Groundwater Management Advisory Committee, and DEQ itself. In fact, DEQ's annual water resources report, just issued in October 2020, states that DEQ continues to focus on identifying alternative sources of water and to investigate innovative ways to increase supplies in Eastern Virginia. In its letter to CMP regarding its tentative decision to deny the permit, DEQ cites a number of regulatory and statutory provisions in support of its assertion that a permit cannot be issued without an end user. However, none of those

	provisions require an end user to be identified. Next slide. Taking a look at these provisions, 9VAC25-210-340, 360 and 370, outline the information to be provided as part of the application for a VWP permit. That information includes the volume of water sought to be withdrawn and the basis for the need for that water. The regulations specifically provide that information in local water supply plans can be used to support the application. And that is what CMP did here. They relied on information in the local supply plan for the Hampton Roads region regarding expected water needs in the future and insufficient supplies to meet those needs. They also relied on DEQ's own statements and the report of the Eastern Virginia Groundwater Management Advisory Committee highlighting the need for alternative sources in Eastern Virginia. Notably, DEQ's September 2019 letter states that pursuant to 9VAC25-210-370, DEQ cannot issue the permit because it cannot determine the amount of water that can be withdrawn for beneficial use. But DEQ misreads this provision. The regulations, when read in full, outline a process for DEQ to evaluate the amount of water that can be withdrawn for a beneficial use without causing adverse impacts to instream uses. And that's exactly the case CMP has presented here. And they are looking for a determination from DEQ as to the amount of water than can be withdrawn for a beneficial use to meet the DEQ articulated need for alternative water sources in Eastern Virginia without harming instream uses. The information provided by CMP in its submittal and Benz' review confirm that the full amount requested by CMP can be withdrawn without adverse consequences. Next slide. Although 9VAC25-210-230 as not cited by DEQ, it is relevant because it outlines the reasons that the Board would deny a VWP permit. As you can see, none of these reasons applies here. And nowhere does it say that if a specific end user is not identified a permit cannot be issued. Next slide. DEQ also cited several sections

	of the Virginia Code regarding the state policy as to waters. Again, these provisions essentially outline the goals of Virginia's Water Resource Management which is to protect and preserve waters of the state for beneficial uses. That is exactly what CMP is attempting to do here. Next slide. What CMP has requested is the ability to document the availability of the pond to ensure the proper development and wise use of Virginia's resources. The very purpose of the VWP permit they are seeking is to identify the amount of water available for beneficial use in Eastern Virginia. Next slide. The State Water Control Law which governs VWP issuance has a different statement of policy and purpose but with regard to this purpose the theme is the same. The purpose of the State Water Control Law is to protect and preserve state waters for reasonable public uses. Again, that's the very purpose of the VWP permit CMP is seeking. Next slide. And the VWP statute reiterates this. VWP permits are to be issued if they are protective of instream beneficial uses. Which Benz, Arcadis and Dr. Garman have confirmed is the case and are consistent with the State Water Supply plan. That plan highlights the need to identify and promote alternative water supplies in Eastern Virginia and to be innovative including promoting public-private partnerships in order to do so. Next slide. The language included in VWP permits including in the two draft permits issued to CMP reiterates that the goal is protection of instream uses. This permit meets that goal. Issuing a VWP permit to CMP is also consistent with Virginia policy. Next slide. Municipalities seek the amount of withdrawal possible based on projections of the amount of water needed to support population growth and economic development prospects. These permits are granted despite a specific end user not being identified. Rather, these permits, like the CMP permit, are based on assertions that the water will be put to a beneficial use in the future. And if you look at the number of

	purchase contracts that are in place in Eastern Virginia, there's a robust water market in place already. Any concerns about this permit creating a private water market are unfounded because one already exists. Next slide. In summary, nothing in the Virginia Code or regulations precludes the issuance of this permit. Cranston Mill Pond made a significant investment to obtain the technical support for the requested withdrawals sought by DEQ. All of it concluding that the requested withdrawal will not adversely impact instream uses. The requested permit is entirely consistent with the Commonwealth's stated policy and cited need for the development of innovative alternative water sources in Eastern Virginia in order to protect the groundwater aquifer. It is also consistent with DEQ's historic water withdrawal permitting practices. For all of these reasons CMP requests that the Board direct DEQ to issue the permit to CMP. Next slide. More specifically, CMP requests that the Board direct DEQ to issue the permit with the requested withdrawal amount, removing the 90% flow-by requirement and replacing it with the requirement to ensure a minimum target release of 300,000 gallons per day or a similar permit condition that would require no greater than a 10% flow-by. The permit should also include the agreed upon end user provisions. There are other administrative details to be resolved between DEQ and CMP, but these are the two issues on which clear direction is needed from the Board. Additionally, given the extensive permitting history here, CMP respectfully requests that the Board direct DEQ to revise the permit in time for it to be considered at the Board's next meeting. Thank you very much for your time and attention. We'd be happy to answer any questions. And, I would also just note that we provided a binder with supporting materials for this presentation.
Tim Hayes	Thank you, Ms. Wortzel. An excellent presentation. Very informational. And I'm sure the Board's gonna be taking it very

	seriously. Next, if there are any elected state or local officials on line who wish to speak, please use the raise-your-hand function on the go to webinar control bar that appears on your screen now so I may call upon you. Please be sure to state your full name and state or local office.
Male	Mr. Hayes, I see none.
Tim Hayes	Alright. Now I'd like to call on those individuals who wish to speak. Please use the raise-your-hand function on the go to webinar control panel that appears on your screen. Once you've raised your hand, please leave your hand raised until you're called on. Your hand will then be lowered on the webinar control panel so that we can accurately follow who has spoken and who wishes to speak. Is there anybody that wants to speak?
Male	Mr. Hayes, I have two individuals who have – wish to speak.
Tim Hayes	Alright. If we could just have them identify themselves and they each have three minutes to make their comments.
Male	First, [inaudible] to speak is Mr. John Friar. Mr. Friar, you are self muted.
John Friar	I'm sorry. I did not wish to speak.
Male	Thank you, sir.
John Friar	Also listed on wishing to speak is Mr. George Howard. Looking to see if Mr. George Howard is here, but I do not see him listed.
Tim Hayes	Okay.
John Friar	Mr. Hayes, I do not have any other people listed who've registered to speak. I also do not have any hands raised. Hold on, sir, let me get your mic fixed. Alright, Mr. Hayes. You're just self muted currently. Here you go.
Tim Hayes	Alright. Good. If there's no one else that wishes to speak, Ms. Wortzel, your presentation was very thorough. I don't have any questions. I think I understood it very well. I've got your briefing

	materials that you had sent over earlier today and obviously those will all go into the record and the Board will have an opportunity to look at them. So, really, I've got nothing to follow up with. I think I understand your case pretty well. Do you have anything else that you wish to say in about a minute before we close the hearing?
Andrea Wortzel	No, sir. Thank you for consideration.
Tim Hayes	Alright. Thanks for your excellent presentation. If there are no further speakers and no one else wants to comment, then the public hearing is adjourned. Thank you for participating.
END OF TRANSCRIPT	

Timeline of CMP Significant Deliverables

• Installed Instrument and Began Collection of On-Site Real-Time Flow Measurements	July 31, 2015
• Finalization of Greeley & Hansen Water Flow Report - "Cranston's Mill Pond Surface Water Balance Evaluation"	March 9, 2016
• Delivery of JPA Permit Application Package to DEQ	December 8, 2016
• DEQ 1st Request for Additional Information	December 22, 2016
• CMP Detailed Response to DEQ's 1st Request for Additional Information	January 12, 2017
• Delivery of Additional CMP/Yarmouth Creek Data Package to DEQ, Including Salinity Data, Flushing Calculations and Site Photos	March 2, 2017
• DEQ 2nd Request for Additional Information	June 2, 2017
• CMP Response to DEQ's 2nd Request for Additional Information Including Additional Data Package	June 7, 2017
• VIMS Response to DEQ Request for Additional Information – Report Titled "Evaluation of Withdrawal of Freshwater in the Yarmouth Creek Watershed and its Impact on the Change of Salinity in Yarmouth Creek, Shen and Sisson, June 28, 2017	June 28, 2017
• Cornwell Engineering Group Report, "Phase I Evaluation of Cranston's Pond as a Potential Drinking Water Source"	August 4, 2017
• Began Contract with ARCADIS (Paul Peterson)	November 2, 2017
• Began Contract with Fisheries Expert (Greg Garman, PhD)	November 10, 2017
• Greg Garman, PhD Report "Fish Community Assessment for Tidal Yarmouth Creek, Virginia"	December 7, 2017
• Meeting with DEQ to Clarify Additional Modeling Efforts	January 22, 2018
• DEQ Permit Progress Meeting (including CMP, DGIF, VIMS, Arcadis, and Greg Garman)	March 12, 2018
• CMP Conducts Controlled Flow Release Field Study	March 19-27, 2018
• Finalized Contract for VIMS to Perform Additional Water Quality Simulations	August 20, 2018
• VIMS Response to DEQ Request for Additional Information – Report Titled "Simulation of changes of salinity in Yarmouth Creek due to reduced freshwater inflow from Cranston's Mill Pond", Shen and Sisson, November 26, 2018	November 26, 2018
• Delivery to DEQ of 200-Page Cranston's Mill Pond Supplemental Information	November 29, 2018
• DEQ 3rd Request for Additional Information	December 18, 2018
• Submittal to DEQ of Additional Information in Response to December 18 Request for Additional Information Including Information from VIMS and Additional Outside Expects in Marsh Ecology	January 10, 2019
• DEQ 4th request for Additional Information	February 5, 2019
• Submittal to DEQ of Additional Information in Response to February 5 Request for Additional Information	February 8, 2019
• CMP Coordinates with VIMS and Provides Additional Information to DEQ	February 26, 2019
• DEQ and VIMS Email Communications - Additional Clarity on VIMS Generated Modelling Results	March 15-18, 2019
• CMP Submits Detailed Comments and Rebuttal (with Extensive Input from VIMS, Arcadis and Dr. Garman) to May 17 Draft Permit and Materials	July 19, 2019

COMMONWEALTH of VIRGINIA

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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4020
1-800-592-5482

December 22, 2016

Cranston Mill Pond, LLC
Attn: Jeff Corbin
5735 S. Laburnum Ave
Richmond, VA 23231

SENT VIA EMAIL

RE: Joint Permit Application (JPA) Number 16-1937
Cranston's Mill Pond Raw Water Supply, James City County, Virginia
Request for Additional Information

Dear Mr. Corbin:

The Virginia Department of Environmental Quality (DEQ) received your application for the above-referenced project on December 8, 2016. Based upon our review of your application, this project qualifies for a Virginia Water Protection (VWP) individual permit in accordance with 9VAC 25-210 et seq. DEQ has evaluated your application against the requirements for a complete application found in the VWP Permit Regulation at 9VAC 25-210 et seq.; however; additional information is needed for our review of your application. A summary of the information requested is provided below:

Section 9: Impact Information:

A. It is assumed that the installation of an intake structure and transmission mains will be required for any potential end user to withdraw water. With no current design plans, it is not possible to determine that avoidance and minimization opportunities have been identified and applied to any potential structure impacting state waters, that practicable alternatives, including design alternatives, have been evaluated for any potential structure impacting state waters, and that the potential installation of any structure in state waters, in terms of impacts to water quality and fish and wildlife resources, is the least environmentally damaging practicable alternative. An alternatives analysis of design configurations for any structure impacting state waters will be required for the agency to evaluate these criteria.

Section 26: Intakes, outfalls, and water control structures (9VAC25-210-80.B.1 and 9VAC25-210-340.B)

A. To guard resident aquatic species from impingement and entrainment, the Department of Game and Inland Fisheries (DGIF) typically recommends that the intake be fitted with a 1 millimeter (mm) mesh screen and that the flow through intake velocity not exceed 0.25 feet per second

B. (fps). The current proposal states that the intake design will be determined by the end user. DEQ anticipates including a condition in any draft permit requiring that the intake is fitted with a 1 mm mesh screen and that the intake velocity shall not exceed 0.25 fps.

C. The proposed intake is located in a tidal reach of Yarmouth Creek, indicating that withdrawals during periods of low freshwater inflow from upstream could potentially affect the movement of brackish or saline water during tidal cycles. Provide an assessment of the potential impacts of the proposed withdrawal upon downstream beneficial uses with respect to salinity impacts. This assessment should address the potential for withdrawals from Cranston's Mill Pond to cause or exacerbate increases in salinity along the tidal reach of Yarmouth Creek. In particular, analysis of this data should concentrate on the following specific questions:
   i. Are the proposed withdrawals projected to cause increases in the magnitude and duration of spikes in salinity at locations downstream of the Cranston's Mill Pond?
   ii. Could the proposed withdrawals cause a significant increase in the upstream movement of the salinity gradient within the tidal Yarmouth Creek and/or Chickahominy River during low flow periods that could negatively affect existing instream and offstream beneficial uses?
   iii. It is anticipated that the proposed Cranston's Mill Pond Raw Water Supply would assist in relieving the ongoing stress to the Coastal Plain aquifer system by reducing the need for additional groundwater withdrawals. However, it is also possible that during periods of low freshwater inflow, the Cranston's Mill Pond water supply system may work best in a conjunctive manner, with groundwater being used by the end user as the backup supply source. Is it feasible for Cranston's Mill Pond to operationalize this type of conjunctive use system? If so, what will be the specific metrics used to determine when the Cranston's Mill Pond cannot be used and groundwater must be relied upon?

D. The applicant should contact the Virginia Institute of Marine Sciences (VIMS) to discuss the potential use of its existing tools for modeling salinity within the waters downstream of the project site. Determination of a specific salinity change metric or metrics may depend upon the uncertainty range(s) of the chosen modeling tool or tools. Therefore, DEQ recommends that the applicant schedule a meeting in the near future with VIMS representatives to determine the appropriate tool and salinity change metric(s) and to arrange for VIMS assistance in addressing this issue. DEQ staff will be available to attend the meeting and collaborate in the determination of appropriate metrics.

Section 27: Water Withdrawal Use, Need, and Alternatives

A. Please provide a proposal for a means to determine and report authorized withdrawals from real in-field measurements that will be transparent and enforceable for DEQ.

B. Without a current end user, please demonstrate how any amount of water withdrawn will be the minimum amount of water required to supply the proposed beneficial use and that water conservation will be applied.

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C. Please provide water conservation and drought response measures that will be utilized as a means to reduce demand during a drought and conditions that will trigger their implementation.

D. Please provide an analysis of alternatives to the proposed activity. While this project has been identified as an alternative source itself, that fact does not preclude other potentially less environmentally damaging sources of water from fulfilling the same supply need.

Appendix D – Drawings

A. Provide Profile and Cross-Sectional Construction Drawings for each impact site and for structures which potentially impact surface waters. These drawings should include the maximum extent of construction impact areas and their relation to surface water areas, design details for the proposed intake structure and associated raw water infrastructure, plans to restore temporary impact areas, and other pertinent details of construction activities including elevations of proposed structures in graphical scale. As this project has no current end user, it is understood that many of these details may not be presently available, but this information is necessary for DEQ to determine that impacts have been avoided and minimized to the maximum extent practicable. Since it is the applicant's desire to move forward without an end user in place, please provide a means for detailed plans and sketches to be completed and approved.

Comment [RG1]: So are they required to provide the detailed plans now or a proposal for providing them later? A little unclear.

Site Inspection

A site inspection will be required as part of the application process. Advise on the best time to conduct the inspection in order to understand the withdrawal system and facility as a whole.

Please submit the information within **60 calendar days** of the date of this letter so DEQ can continue to process your application. Your application is not considered to be complete until the permit application fee has been received by DEQ. Please note that upon receipt of the requested information, additional

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information may still be required.

In addition to the requested information, a permit application fee is required for the proposed activity. A draft permit cannot be issued prior to the deposit of the permit application fee. As the applicable fee is determined through the application process, the designated fee will be required within 30 calendar days of the date of this future notification.

Please contact me at 804-698-4078 or matthew.link@deq.virginia.gov if you have any questions regarding this request. Thank you for your cooperation in this matter.

Respectfully,

Matthew Link

Matthew Link
Office of Water Supply
Water Withdrawal Permit Writer
Matthew.Link@deq.virginia.gov
804-698-4078

cc: Scott Reed, Restoration Systems – VIA EMAIL
Matt Wicks, U. S. Army Corps of Engineers – VIA EMAIL
Mark Eversole, Virginia Marine Resources Commission – VIA EMAIL

January 12, 2017

Matthew Link
Virginia Department of Environmental Quality
Office of Water Supply
P.O. Box 1105
Richmond, Virginia 23218

SENT VIA EMAIL

RE: Joint Permit Application (JPA) Number 16-1937
Cranston's Mill Pond Raw Water Supply, James City County, Virginia
Response to Request for Additional Information, Date December 22, 2016

Matthew,

Cranston's Mill Pond, LLC is in receipt of your request, dated December 22, 2016, for additional and clarifying information pertaining to our Joint Permit Application for Cranston's Mill Pond. Please see our responses below and attached.

We recognize that this permit request is probably the first of its kind. As discussed in our application, the primary purpose of this permit request is to obtain authorization for a certain withdrawal volume that can then be used to meet the needs of current or future users in lieu of, or in addition to, groundwater. We are open to considering permit language that requires the submittal and review of additional information prior to any withdrawal occurring, or when an end user is identified, so that additional analyses can be conducted by DEQ specific to that use. We are not seeking approval for a specific intake structure, or for impacts to state waters associated with installation of such a structure, at this point in time.

At your earliest convenience, I would like to schedule a meeting with you and other relevant agency staff to further discuss this response in person.

In the meantime, please don't hesitate to contact me directly if you need any further clarification.

Sincerely,

Jeff Corbin
Restoration Systems
jcorbin@restorationsystems.com
(804 389-4226

cc: John Preyer, Restoration Systems – VIA EMAIL
Scott Reed, Chesapeake Bay Nutrient Land Trust – VIA EMAIL
Brent Fults, Chesapeake Bay Nutrient Land Trust – VIA EMAIL

Attachment: CMP Alternatives Analysis

Response to DEQ Request for Additional Information, dated December 22, 2016

Section 9: Impact Information:

A. It is assumed that the installation of an intake structure and transmission mains will be required for any potential end user to withdraw water. With no current design plans, it is not possible to determine that avoidance and minimization opportunities have been identified and applied to any potential structure impacting state waters, that practicable alternatives, including design alternatives, have been evaluated for any potential structure impacting state waters, and that the potential installation of any structure in state waters, in terms of impacts to water quality and fish and wildlife resources, is the least environmentally damaging practicable alternative. An alternatives analysis of design configurations for any structure impacting state waters will be required for the agency to evaluate these criteria.

Response: We understand and support the requirement that the design, placement and operation of a water intake structure must minimize any impacts to water quality and living resources. However, this application is for approval for a volume of withdrawal. All decisions on the water intake will be made by the party that ultimately uses the water from the impoundment ("end user" as defined in our application). We ask that a condition be placed within the permit that requires the end user to submit the information requested above, prior to any physical activities related to the intake structure are undertaken, for review and approval by the applicable state agencies.

Section 26: Intakes, outfalls, and water control structures (9VAC25-210-80.B.1 and 9VAC25-210-340.B)

A. To guard resident aquatic species from impingement and entrainment, the Department of Game and Inland Fisheries (DGIF) typically recommends that the intake be fitted with a 1 millimeter (mm) mesh screen and that the flow through intake velocity not exceed 0.25 feet per second

B. (fps). The current proposal states that the intake design will be determined by the end user. DEQ anticipates including a condition in any draft permit requiring that the intake is fitted with a 1 mm mesh screen and that the intake velocity shall not exceed 0.25 fps.

Response: We agree with the inclusion of such a condition in the permit.

C. The proposed intake is located in a tidal reach of Yarmouth Creek, indicating that withdrawals during periods of low freshwater inflow from upstream could potentially affect the movement of brackish or saline water during tidal cycles. Provide an assessment of the potential impacts of the proposed withdrawal upon downstream beneficial uses with respect to salinity impacts. This assessment should address the potential for withdrawals from Cranston's Mill Pond to cause or exacerbate increases in salinity along the tidal reach of Yarmouth Creek. In particular, analysis of this data should concentrate on the following specific questions:

i. Are the proposed withdrawals projected to cause increases in the magnitude and duration of spikes in salinity at locations downstream of the Cranston's Mill Pond?

ii. Could the proposed withdrawals cause a significant increase in the upstream movement of the salinity gradient within the tidal Yarmouth Creek and/or Chickahominy River during low flow periods that could negatively affect existing instream and off-stream beneficial uses?

Response: Based upon our preliminary observations (approximately 4 mile-long tidal reach survey of Yarmouth Creek from the confluence of the Chickahominy River to Cranston's Mill Pond Road), measurements (tidal range, salinity, flow) and calculations (total volume of fresh water exchanged on each tidal cycle) we believe that even maximum withdrawals from Cranston's Mill Pond will have negligible, if not immeasurable, alterations to the natural salinity characteristics of the water of Yarmouth Creek. It is well documented (and substantiated by our own data collection efforts) that the waters of Yarmouth Creek are classified as tidal fresh.

See response to Item D below regarding our past discussions with VIMS and our planned efforts to work closely with them to further quantify our findings.

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iii. It is anticipated that the proposed Cranston's Mill Pond Raw Water Supply would assist in relieving the ongoing stress to the Coastal Plain aquifer system by reducing the need for additional groundwater withdrawals. However, it is also

possible that during periods of low freshwater inflow, the Cranston's Mill Pond water supply system may work best in a conjunctive manner, with groundwater being used by the end user as the backup supply source. Is it feasible for Cranston's Mill Pond to operationalize this type of conjunctive use system? If so, what will be the specific metrics used to determine when the Cranston's Mill Pond cannot be used and groundwater must be relied upon?

Response: Yes, it is feasible to operationalize a conjunctive use system for Cranston's Mill Pond. As you are aware, the agency has previously permitted conjunctive use systems in the Tidewater region of the Commonwealth.

We agree that withdrawal and use of water from Cranston's Mill Pond could relieve stress on the Coastal Plain aquifer system and is the sole purpose for our application to withdrawal water from this source. It also our premise, as stated in our application (cover letter, application section 27, and attachments 1, 11, 12, and 13) that if used for municipal purposes, withdrawals from the Cranston's Mill Pond would likely be used in conjunction with existing groundwater infrastructure and permitted withdrawals (Note – as stated in Section 27 of our application, it's possible that it could provide a stand-alone supply for a private entity or public/private partnership). Not only would such an approach afford a municipality to continue utilizing the financial investment it has made in its groundwater withdrawal, treatment, and transport infrastructure, but it would also afford the municipality to maximize groundwater withdrawals if the Cranston's Mill Pond was used as the primary water source. If groundwater withdrawals are minimized for significant periods of time while water from Cranston's Mill Pond was being used, then much greater amounts of groundwater could be withdrawn during times of low water availability from the Cranston's Mill Pond and still remain under the permitted monthly and annual groundwater withdrawal limitations.

In the future, when an end-user is identified for the water source, we envision that operational guidelines would be required by the agency that trigger when withdrawal from Cranston's Mill Pond would be curtailed, or prohibited, and when groundwater withdrawal, or other sources, would be supplemented. We suggest that the metric should be based upon CFS or MGD flow over the spillway and could be measured in real-time (we currently do this on-site every 15 minutes, see response to DEQ Section 27 (A) request below for further description) and reporting requirements to the agency could be a condition of the permit. Attachment 14 of our application presented a third-party surface

water balance evaluation conducted by Greeley & Hansen. That report concluded that the minimum calculated total daily outflow during the record of data was 1.86 MGD. We suggest that 1.86 MGD be set as the trigger at which the end user would begin taking precautionary actions, as necessary, to prepare for potential withdrawal curtailment in the event that low flow conditions persist. In addition, a much lower threshold would be set at which point any withdrawal would be prohibited.

D. The applicant should contact the Virginia Institute of Marine Sciences (VIMS) to discuss the potential use of its existing tools for modeling salinity within the waters downstream of the project site. Determination of a specific salinity change metric or metrics may depend upon the uncertainty range(s) of the chosen modeling tool or tools. Therefore, DEQ recommends that the applicant schedule a meeting in the near future with VIMS representatives to determine the appropriate tool and salinity change metric(s) and to arrange for VIMS assistance in addressing this issue. DEQ staff will be available to attend the meeting and collaborate in the determination of appropriate metrics.

Response: We have engaged scientists at VIMS over the past several months, prior to our application submittal, and had productive discussions. Much of the data we have collected was at the recommendation of VIMS scientists. On January 5th, we submitted a data package for review to VIMS that includes salinity data collected in July along a 4-mile transect from the confluence of Yarmouth Creek and the Chickahominy River to uppermost reach of Yarmouth Creek. In addition, using County GIS data and historical tidal fluctuation levels, we calculated the daily tidal flushing volume for the upper reach of Yarmouth Creek. We have already scheduled additional meetings with VIMS to discuss our data package and will directly convey the issues of concern raised in section D of your letter. We appreciate the willingness of DEQ staff to participate in future discussions with VIMS.

Section 27: Water Withdrawal Use, Need, and Alternatives

A. Please provide a proposal for a means to determine and report authorized withdrawals from real in-field measurements that will be transparent and enforceable for DEQ.

Response: We currently collect on-site real-time data via a Lasso device as described on page 2 of Attachment 12 of our application. All of the data collected is accessible on-line and we have previously made access to that data, via a password-protected account on the Lasso website, to outside parties for evaluation. A similar approach can be used to transmit withdrawal data to the agency on a predetermined interval or allow agency staff to access the data themselves as needed.

B. Without a current end user, please demonstrate how any amount of water withdrawn will be the minimum amount of water required to supply the proposed beneficial use and that water conservation will be applied.

Response: If the water from Cranston's Mill Pond is ultimately used to supplement an existing permitted groundwater withdrawal, then such demonstrations will already have been made previously by the permitted entity. In the case that the water is used for a new water user, then we envision that at such time when an end user is identified, the permit would require submittal of additional information to address beneficial uses and water conservation measures, with a subsequent permit modification to clarify the conditions for the withdrawal and any limitations associated therein.

C. Please provide water conservation and drought response measures that will be utilized as a means to reduce demand during a drought and conditions that will trigger their implementation.

Response: As with our response to Item B above, if the water from Cranston's Mill Pond is ultimately used to supplement an existing permitted groundwater withdrawal, then a drought response demonstration will already have been made previously by the permitted entity. In the case that the water is used for a new water user, then we envision that at such time when an end user is identified, the permit would require submittal of additional information to address water conservation and drought response measures, with a subsequent permit modification to clarify the conditions for the withdrawal and any limitations associated therein.

D. Please provide an analysis of alternatives to the proposed activity. While this project has been identified as an alternative source itself, that fact does not preclude other potentially less environmentally damaging sources of water from fulfilling the same supply need.

Response: Please see attached table of alternatives considered.

In addition, we would welcome agency staff, or anyone else, to offer an additional alternative that is less onerous to construct and permit, or is more environmentally protective, than Cranston's Mill Pond. In the cover letter to our application, as well as other sections of the application, we explain why the anticipated environmental impacts are minimal and the proposal presents an immediately available alternative to assist in meeting both near and long-term water supply needs for the region (completed construction, numerous permits previously acquired, outflow is directly to tidal fresh waters, etc.)

As our application explains in detail in Attachment 11, Virginia state agencies, the legislature, and multiple stakeholder groups have been debating alternatives and options for reducing the demands on groundwater withdrawals in the Eastern Virginia Groundwater Management Area for more than two years. Myself and members of my team have personally participated in many of those discussions and offered comment and suggestions. While those discussions continue today, with the exception of the HRSD SWIFT proposal, which will take greater than twenty years to fully implement (if it is implemented at all and operates as intended) Cranston's Mill Pond is the only concrete alternative that has been put forward. The recent report released by the Joint Legislative Audit and Review Commission only further emphasizes the need to use existing water supplies prudently and explore innovative solutions to meet future increased water supply needs.

One option that may be warranted is to include a provision in the permit for the future end-user to provide a supplemental alternatives analysis.

I welcome the opportunity to further discuss this issue in person with appropriate staff and agency leadership.

Appendix D – Drawings

A. Provide Profile and Cross-Sectional Construction Drawings for each impact site and for structures which potentially impact surface waters. These drawings should include the maximum extent of construction impact areas and their relation to surface water areas, design details for the proposed intake structure and associated raw water infrastructure, plans to restore temporary impact areas, and other pertinent details of construction activities including elevations of proposed structures in graphical scale. As this project has no current end user, it is understood that many of these details may not be presently available, but this information is necessary for DEQ to determine that impacts have been avoided and minimized to the maximum extent practicable. Since it is the applicant's desire to move forward without an end user in place, please provide a means for detailed plans and sketches to be completed and approved.

Response: We agree that such information will be critical at the time that a future identified end user is considering various intake structures and associated infrastructure. We anticipate that the permit will include conditions for the ultimate end user to submit the requisite information.

Site Inspection
A site inspection will be required as part of the application process. Advise on the best time to conduct the inspection in order to understand the withdrawal system and facility as a whole.

Response: As we have expressed during previous meetings with DEQ and other agency staff, we would welcome the opportunity for a site visit. Myself and members of my team will make ourselves available to accommodate the schedules of agency staff. In preparation, agency staff may wish to view the additional information we have made available, including photographs and aerial drone footage, at our public permit application website found at http://cranstonsmillpond.com/.

Cranston's Mill Pond Alternatives Analysis 1-12-17

Option	Usable Water	Timing Considerations	Permitting Considerations
Increased/New Groundwater Withdrawal	Unless DEQ position is revised, usable water = 0	• Any discussion intended to persuade DEQ to allow additional/new groundwater withdrawals would be lengthy and likely unproductive	• DEQ has determined that the aquifer is already over-allocated. New/expanded withdrawals are unlikely to be permitted.
River Water Withdrawal (e.g., James, Chickahominy, York, Pamunkey Rivers, etc.)	Permitted withdrawal would need to be considerably larger than the usable amount due to salinity content	• Permitting process could be delayed due to stakeholder concerns (environmental, site location, property conflicts, etc.) • Numerous permits from multiple state agencies are needed • Marine environment and navigation considerations may slow placement • Reverse Osmosis plants have long study periods for design due to complex operations	• Salinity content creates low treatment efficiency • Location of treatment plant (floodplain avoidance, community acceptance, etc.) • Location of Intake Structure - Potential concerns related to river bottom uncertainties including archeology disturbance, fisheries, shellfish, coast guard navigation, security zones, etc. • Locations of Brine Discharge – Concerns regarding brine discharge from RO treatment process (concerns already raised by VIMS) • Potential public concerns due to greater visibility/public involvement • Fills the gap from DEQ's proposed cut and potentially eliminates groundwater use altogether • Source water susceptible to drought/contamination • Multiple users sharing the resource; concern about cumulative impacts
Cranston's Mill Pond – "As Is" (Used Conjunctively with Remaining Available Groundwater System or as a stand-alone raw water source)	>8 MGD* (conservative estimate, 8 from CMP + additional withdrawal from end-user groundwater) *Final total amount is dependent upon optimizing the operation of the	• Impoundment has been permitted since 2010; dam permitted since 2011 • Existing spillway includes (4) 16" transfer pipes each with 5 mgd capacity (20 mgd total transfer possible) • Only permits needed would be DEQ VWP water withdrawal permit and VDH waterworks permit; permitting process will be much quicker, fewer permits needed • Design of plant will be streamlined because no need for RO; traditional treatment methods allow for standard waste and disposal techniques; handling of waste is simplified	• Fewer stakeholders (existing dam and upland area privately owned by 1 party) • Lessened concerns about discharge because downstream is tidally influenced • No construction-related environmental impacts (impoundment has already been constructed/permitted) • Flexibility in meeting water needs • Can assist in meeting existing permit gaps from DEQ's proposed cuts • Source water less susceptible to drought/contamination due to significant/protected watershed and 60-70% groundwater contribution

	conjunctive use system		• Option of raising the dam/pool elevation could provide significant water storage for state/county • Provides future opportunities to expand o Existing upland area (7 acres) at Cranston's Mill Pond allow staging and sufficient area for raw water mechanical transfer options

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

M. KEITH HODGES
230 VIRGINIA STREET
URBANNA, VIRGINIA 23175

NINETY-EIGHTH DISTRICT

December 18, 2020

COMMITTEE ASSIGNMENTS:
GENERAL LAWS
COUNTIES, CITIES AND TOWNS
HEALTH, WELFARE AND INSTITUTIONS

Mr. Joseph Grist
Virginia Department of Environmental Quality
P.O. Box 1005
Richmond, Virginia 23218

Email: joseph.grist@deq.virginia.gov

RE: Support for issuance of VWP permit for Cranston's Mill Pond

Dear Mr. Grist:

I am writing to oppose DEQ's proposal to deny the Virginia Water Protection Permit for Cranston's Mill Pond and encourage DEQ to issue the permit as requested by Cranston Mill Pond, LLC. I have been very active in water supply issues throughout my legislative carrier and have followed very closely the Cranston Mill Pond project. The project, including the requested withdrawal amount, has been well vetted by experts including VIMS, Arcadis and Greg Garman. CMP has expended considerable private funding to do just what the General Assembly and DEQ has suggested is needed – identify and promote new and innovative water supplies including as alternatives to groundwater. Denial of the proposed permit would be counter to this desire and sets the Commonwealth back in addressing water supply concerns.

I was the patron of legislation that created the Eastern Virginia Groundwater Management Area Advisory Committee. That Committee, after almost 2 years of thoughtful deliberation generated a consensus report in August 2017 that among other things, recommended that "the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships." The report also specifically highlighted the Cranston's Mill Pond project as "an innovative example of an existing privately-owned impoundment that has applied for a water withdrawal permit is Cranston's Mill Pond in James City County. The water from the impoundment may result in much lower, long-term treatment costs compared to treating brackish water from other surface water sources."

DISTRICT: (804) 277-9801 • RICHMOND: (804) 698-1098 • E-MAIL: DELKHODGES@HOUSE.VIRGINIA.GOV

I also served on the State Water Commission when it positively received a presentation on the Cranston's Mill Pond on June 18, 2018. It was abundantly clear at that meeting that this was a unique and innovative project, funded by private dollars, and that an end user would be determined at a later date – after issuance of the permit. We heard no opposition from DEQ or others to the proposed project at that meeting. It was clear to Commission members that this was an opportunity to address growing water supply concerns by identifying a new water source that could be used for new withdrawals to support economic development and/or as an alternate source to groundwater usage.

Given the Commonwealth's needs and the General Assembly members' support I was stunned to learn that after several years of effort and investment, as well as issuance of two draft permits, that DEQ had reversed course and was considering denial of the permit. The draft permits included provisions for addressing the lack of a specific end user for the water. I understand that DEQ has now raised questions, despite its obvious opinion to the contrary documented in the draft permits, as to whether it has the authority to issues the permit. I disagree with those concerns but introduced HB 1674 in the 2020 legislative session to smooth the road. That bill, with near unanimous support, passed the House. Opposition by the Governor's Office was removed by amendments prepared for the Senate Agriculture Committee hearing but unfortunately HB 1674 was carried over to the 2021 Session due to confusion over its impact. Regardless of its fate, there was clear legislative support for this project.

It is clear that if the Commonwealth wants to promote the identification and investment in alternative water sources that the proposed permit should be granted. Granting the permit would provide more certainty to those who seek to develop alternative sources and to those who may wish to use those sources. Denying the permit would not only kill an important surface water alternative, it would signal that others should not search for and invest in innovative approaches.

Thank you for considering these comments.

Sincerely,

M. Keith Hodges

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

June 2, 2017

Cranston Mill Pond, LLC
Attn: Jeff Corbin
5735 S. Laburnum Ave

VIA EMAIL

RE: Joint Permit Application (JPA) Number 16-1937
Cranston's Mill Pond Raw Water Supply, James City County, Virginia
Request for Additional Information

Dear Mr. Corbin:

The Virginia Department of Environmental Quality (DEQ) received your application fee for the above-referenced project on March 9, 2017. DEQ has continued to evaluate your application against the requirements of the VWP Permit Regulation at 9VAC 25-210-10 et seq.; however; further additional information is needed for our review of your application. A summary of the information requested is provided below:

1. Water Withdrawal Use, Need and Alternatives
    a. Preliminary results from hydrologic modeling analyses indicate that Yarmouth Creek above the Little Creek Reservoir receives approximately 70% of its freshwater inflow from the Cranston's Mill Pond Drainage Area. Additionally, during dry years, modeled output indicates that the Chickahominy River at the Confluence of Yarmouth Creek can reach salinities that are characterized as oligohaline (0.5-5.0 practical salinity units). In light of the proposed reduction in freshwater inflow, there exists a risk that Yarmouth Creek will be inundated by water from the Chickahominy River during high tides. Please provide an evaluation of the potential for the intrusion of brackish water to change the water quality regime in Yarmouth Creek. Additionally, provide an assessment of how the tidal freshwater wetland vegetative communities of Yarmouth Creek may be impacted by increases in salinity.
    b. Yarmouth Creek up to Cranston's Mill Pond has been identified as anadromous fish habitat. It is critical to maintain potential spawning habitat for anadromous fishes. Please provide an assessment of changes in low tide stream connectivity, changes in open water surface area during low tide, and changes in channel depth during low tide in Yarmouth Creek in light of the proposed withdrawal.

Cranston Mill Pond, LLC.
JPA No. 16-1937
June 2, 2017

Please submit the requested information as soon as practicable. Once received, DEQ staff will continue reviewing and/or processing your application. Please note that upon receipt of the requested information, additional information may still be required.

Please contact me at 804-698-4078 or matthew.link@deq.virginia.gov if you have any questions regarding this request. Thank you for your cooperation in this matter.

Respectfully,

Matthew Link
Water Withdrawal Permit Writer

cc: Scott Reed, Restoration Systems – VIA EMAIL

Wortzel, Andrea W.

From: Mcgurk, Brian <brian.mcgurk@deq.virginia.gov>
Sent: Tuesday, December 18, 2018 9:06 AM
To: Jeff Corbin
Cc: Green, Ryan (DEQ); Burgholzer Robert faw18626
Subject: Re: VWP 16-1937 - CMP Addendum package

Mr. Corbin

Staff have completed an initial review of the Addendum submitted on November 28, 2018. However, additional information is needed for the Department to complete the evaluation of the Addendum . Comments and/or specific requests for additional information are listed below.

- Tab 7: The data presented are only sufficient to illustrate that the larger tidal system conditions set baseline elevation values around which changes to freshwater inflows may or may not have an impact. Provide water surface reference elevations from the nearest tidal gage during each observation event.
- Tab 8: Provide daily timeseries of salinity model output files, including salinity and flows leaving CMP, for all simulations, including the 0.3 and 0.6 mgd release scenarios
- Tab 8: Provide salinity model input files and hydrodynamic model input and output files required to run the models
- Tab 13: Provide any numerical criteria used regarding the statement: "preserves the general nature of the hydrograph" (page 012).
- Tabs 5, 8 & 14: The report describing previous simulations (Tab 3, page 043) stated that freshwater marsh species biomass was found to decrease significantly when exposed to salinities greater than 1.5. Therefore, it appears that extended exceedance of this salinity value could negatively impact freshwater marsh species. Department reviews of the 2 provided references by Sutter concur with this interpretation. However, figures shown in Tab 14 (pp. 162-163, 168-169, 174-175) show numerous occurrences of Scenario A salinity exceeding 1.5-2.0 psu at times when the Base scenario did not, with increased incidence of exceedance events, and/or increased duration of exceedance events that occur in the Base scenario. The discussion appears to suggest that conclusions are based upon a relative change in salinity of 1.5 psu rather than absolute values. Provide a clarification of the interpretation of the exceedance level of 1.5 psu. Are there numerical thresholds based on temporal (i.e. monthly or seasonal) or durational (e.g., length of time that salinity exceeds 1.5 psu) that are applicable to changes in freshwater tidal species habitat?

If you have any questions, please feel free to contact me.

Brian

On Tue, Dec 11, 2018 at 3:35 PM Jeff Corbin <jcorbin@restorationsystems.com> wrote:

> Thanks Brian. I don't believe that we ever met during my tenure with the Commonwealth or EPA. I look forward to working with you and meeting with the team to discuss and come to closure on our proposal. If there is anything that we need to discuss in the interim, please don't hesitate to contact me. The # below is my cell.

Thanks...jc

Jeff Corbin

Restoration Systems

Senior Vice-President for Water Quality Markets & Mitigation

(804) 389-4226

restorationsystems.com

From: Mcgurk, Brian <brian.mcgurk@deq.virginia.gov>
Sent: Tuesday, December 11, 2018 11:09 AM
To: Jeff Corbin <jcorbin@restorationsystems.com>
Cc: Link Matthew dvj84942 <matthew.link@deq.virginia.gov>; Green, Ryan (DEQ) <ryan.green@deq.virginia.gov>; Kudlas Scott nww60564 <scott.kudlas@deq.virginia.gov>; Schneider, Jutta <jutta.schneider@deq.virginia.gov>
Subject: VWP 16-1937 - CMP Addendum package

Mr. Corbin

The CMP Addendum package has been received and distributed to appropriate staff at DEQ. Matt has changed positions at DEQ and I've been assigned responsibility for the permit application, so I'm your contact person.

Staff are reviewing the addendum now and will let you know when we are ready to discuss it with you. In the meantime, if you have any questions, please let me know.

Brian

--

Brian McGurk, P.G.

Office of Water Supply

VA Dept of Environmental Quality

804-698-4180

brian.mcgurk@deq.virginia.gov

--

Brian McGurk, P.G.
Office of Water Supply
VA Dept of Environmental Quality
804-698-4180
brian.mcgurk@deq.virginia.gov

Wortzel, Andrea W.

From: Mcgurk, Brian <brian.mcgurk@deq.virginia.gov>
Sent: Tuesday, February 5, 2019 3:21 PM
To: Jeff Corbin
Cc: Burgholzer Robert faw18626; Green, Ryan (DEQ); Joseph Grist
Subject: VWP application 16-1937-additional information request

Mr. Corbin

I've learned from DEQ-OWS modeling staff that the January 10, 2019 submittal did not contain all of the modeling files requested in my email of December 18, 2018, so there are additional pieces of information still needed. These are:

- salinity output files (second bullet in list referencing Tab 8) (flow output was received, but not salinity)
- model parameter control files
- model executable files
- bathymetry files
- any other files needed to run the model

Please provide this information by March 5, 2019. Thanks and if you have any questions, please let me know.

Brian

--
Brian McGurk, P.G.
Office of Water Supply
VA Dept of Environmental Quality
804-698-4180
brian.mcgurk@deq.virginia.gov

COMMONWEALTH OF VIRGINIA
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December 18, 2020

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Thank you for considering these comments.

Sincerely,

M. Keith Hodges

Troutman Pepper Hamilton Sanders LLP
Troutman Sanders Building, 1001 Haxall Point
Richmond, VA 23219

troutman.com

troutman pepper

Andrea W. Wortzel
D 804.697.1406
F 804.697.1339
andrea.wortzel@troutman.com

December 7, 2020

BY HAND

Timothy G. Hayes
975 Pea Ridge Road
Bruington, Virginia 23023

Dear Mr. Hayes:

Attached please find a binder of materials supporting the presentation Cranston's Mill Pond will be making at tonight's public hearing.

Thank you for your consideration of these materials.

Sincerely,

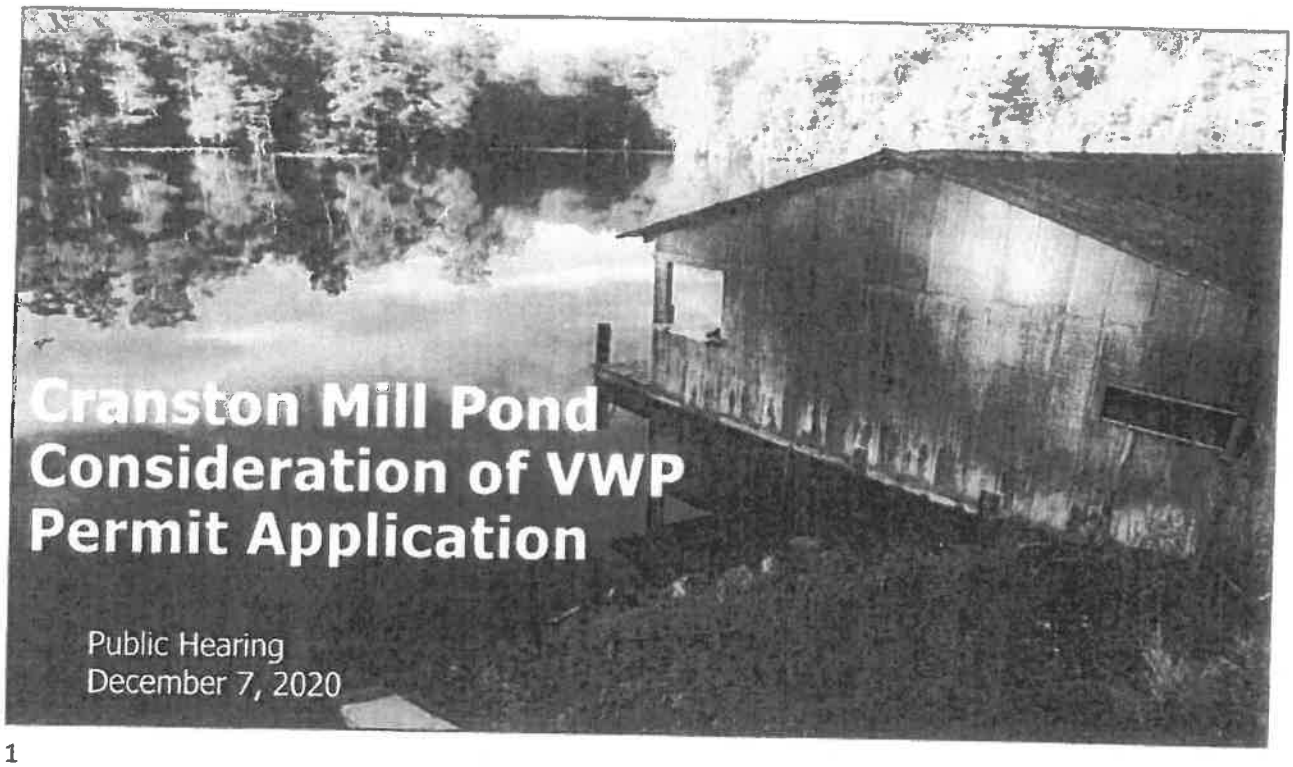
Andrea W. Wortzel

Attachment

cc: Joseph Grist

Cranston Mill Pond
Consideration of VWP Permit Application
Exhibits to Comments Made During December 7, 2020 Public Hearing

1. December 7, 2020 Power Point Presentation
2. DEQ Presentation to the State Water Commission December 2014 pg 25
3. Jeff Corbin Curriculum Vitae pg 45
4. Greeley and Hansen Water Balance Report pg 48
5. Cornwell Engineering Group Phase 1 Evaluation of Cranston's Pond as a Potential Drinking Water Source pg 68
6. Excerpts of Report of Eastern Virginia Groundwater Management Advisory Committee pg 85
7. VIMS January 27, 2017 Letter pg 95
8. DGIF February 17, 2017 Email pg 96
9. May 2019 Draft Permit – Condition I.D.2. pg 97
10. Paul Peterson Curriculum Vitae pg 102
11. Greg Garman Curriculum Vitae pg 105
12. Arcadis September 6, 2018 CMP Inflow Estimation Letter pg 107
13. CMP Tidal Volume Calculations pg 111
14. CMP Nov 2018 Controlled Flow Release Study (without attachments) pg 115
15. VIMS 2018 Salinity Modeling Report pg 123
16. Arcadis Nov 2018 Salinity Evaluation Letter (without attachments) pg 135
17. VIMS June 21, 2019 Letter pg 139
18. Kauffman Oct 2004 Draft Flow Recommendations pg 143
19. Fish Community Assessment for Tidal Yarmouth Creek, Virginia, December 7, 2017 pg 146
20. VIMS October 15, 2020 Letter pg 153
21. Excerpts from DEQ October 2020 Annual Water Resources Report pg 156



1

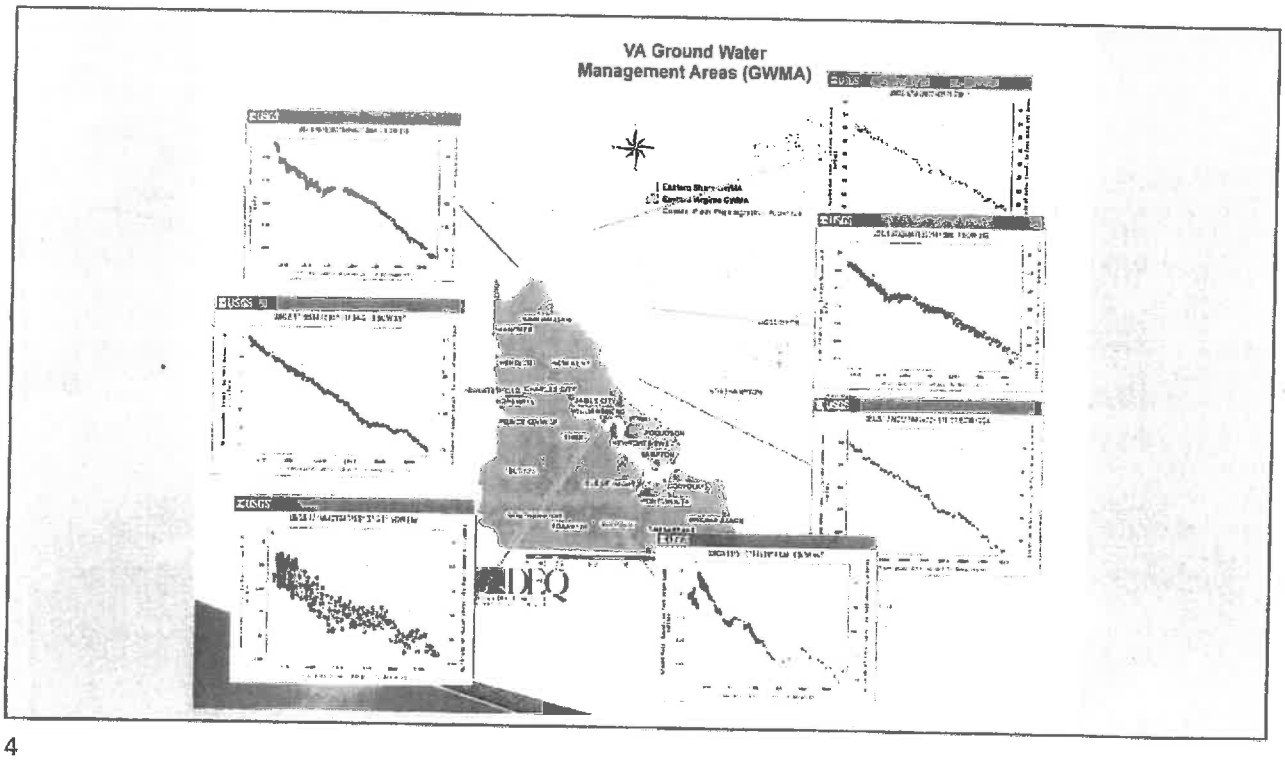
The Whole Story

- Context/Timing of the Permit Application
- VWP Permitting Framework
- Policies of the Commonwealth Regarding Water Supply
- Recommendations of the Eastern Virginia Groundwater Management Advisory Committee
- Record for this Permit

2

Permit Application Filed December 2016

3



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(See Tab 2)

Groundwater Permit information provided by DEQ on October 1, 2014

FACILITY	PERMITTED (MGD)	CURRENT USE (MGD)	DEQ Requested Target/ Range
RockTenn - West Point Mill	23.03	20.09	9.0-10.0
International Paper - Franklin Virginia Mill	20.61 (Based on App)	9.08	10.0-12.0
City of Portsmouth	15.42	2.91	3.48
Chesapeake Northwest River/ Western Branch Systems	11	3.5	3.5
JCSA - Central System	8.83	5.41	3.0 - 4.0
Western Tidewater Water Authority	8.34	3.54	3.5-3.9
Hercules Incorporated (Ashland)	6.67	2.74 7 4	3
Norfolk City of Utilities Four Suffolk Wells	3.74	0.06	3.74
Newport News City of Waterworks Lee Hall	3.44	1.53	1.53
Town of Franklin Water System	2.88	0.93 — 9 3	.093-113
Smithfield Packing Company, Inc.	2.6	1.65	2.6
Portsmouth Genco (Cogentrix)	2.6	0.78	1.0-1.2
Colonial Williamsburg	1.84	1.4	1.2 Wasagreedupon
Smithfield Town of	1.27	0.86	1.27

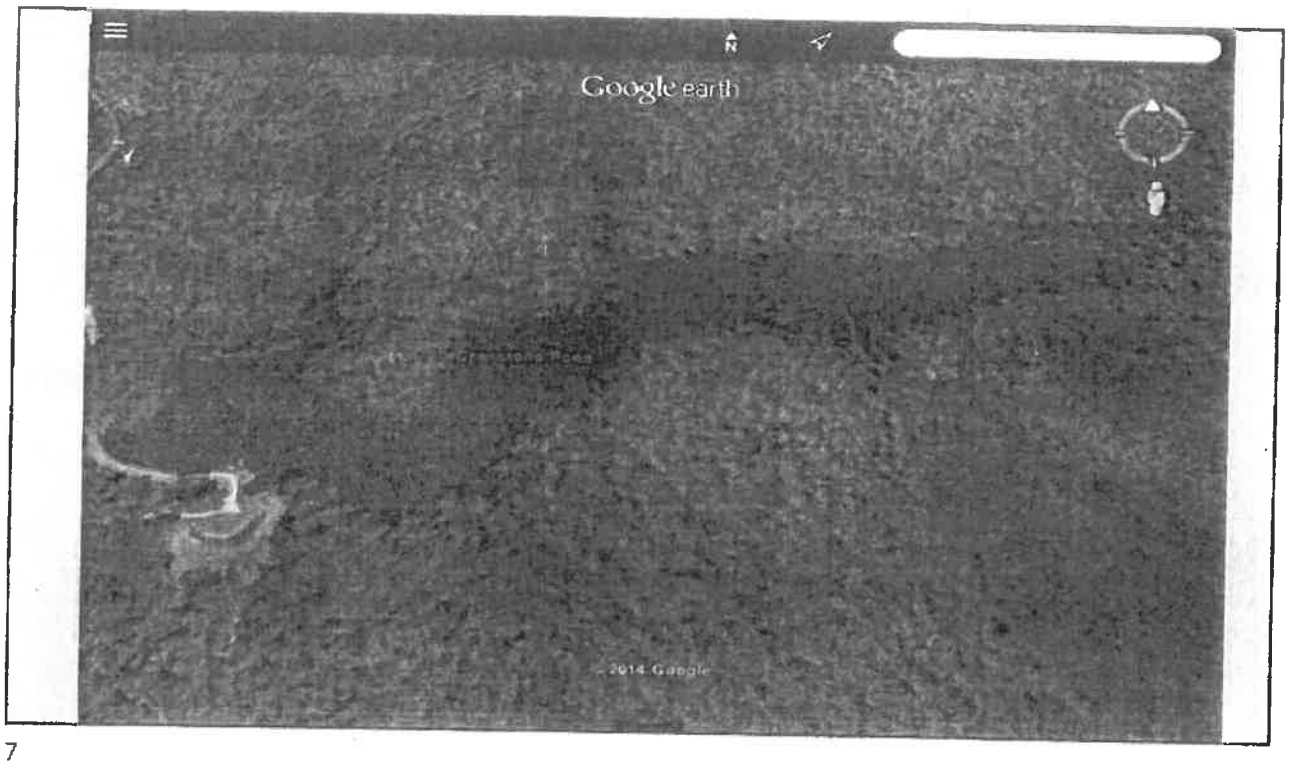
5

Why Did CMP Seek a Permit? DEQ Messaging from 2014:

- Groundwater Supply is Being Severely Depleted
- Permitted Withdrawals are Being Significantly Curtailed
- 14 Large Water Users in the Region Will Need Additional Water
- Additional Water Supply is Critical for Economic Development
- State Agencies and the Legislature are Seeking Innovative Solutions

Cranston's Mill Pond Can be Part of the Solution (Tab 3)

6



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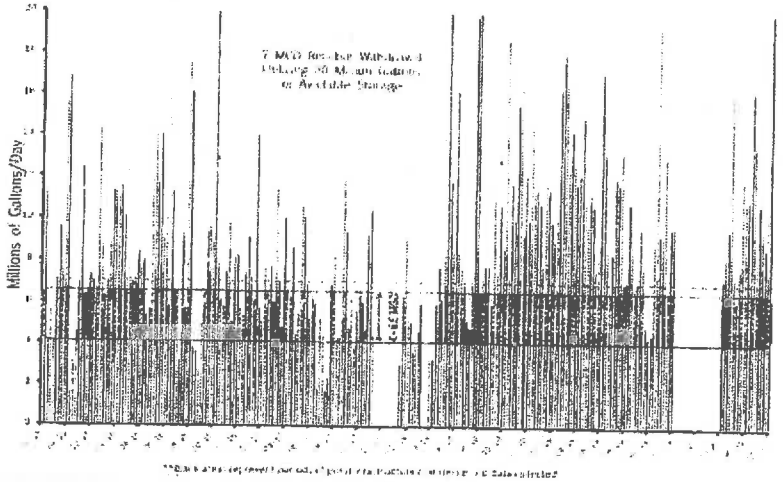
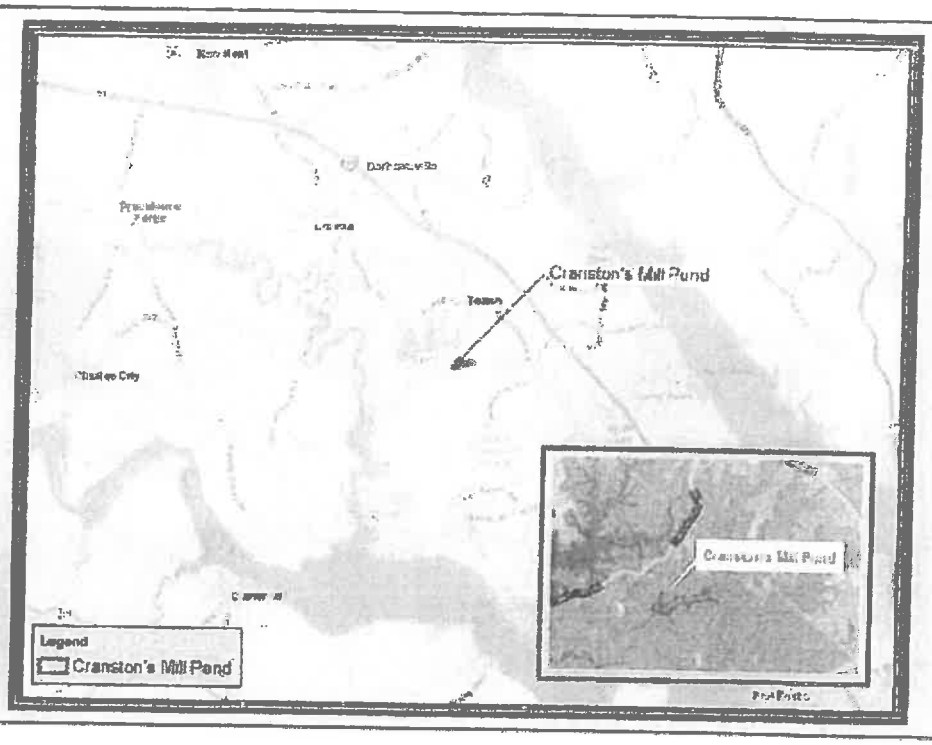
Controlled Flow Release Field Study

Cranston's Mill Pond - Water Flow



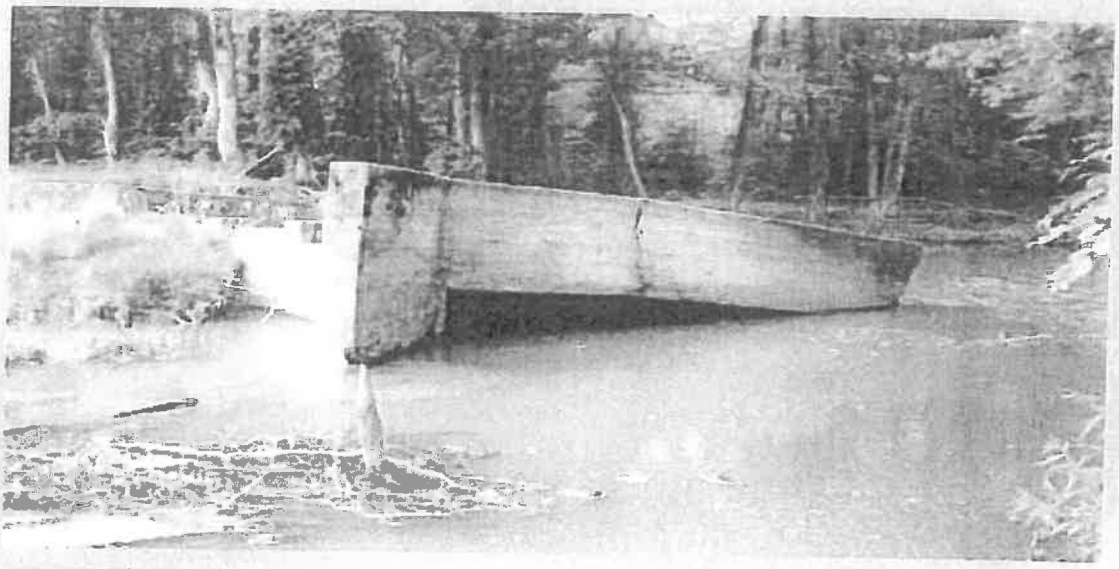
8

Project Location



9

Old Spillway (after dam failure)



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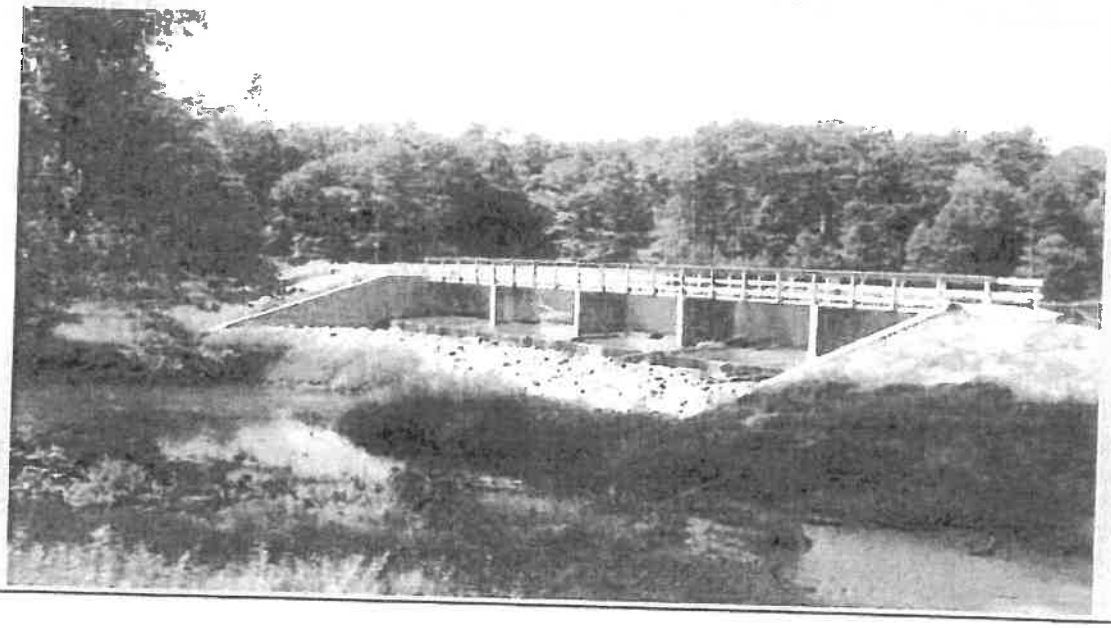
CMP Spillway Today



11

CMP Today

12

CMP Benefits

- Water is Clean and Fresh (i.e., no salt content, less expensive to process)
- Located at the Tidal/Non-Tidal Boundary
- Sourced by Surface Water and 2 Shallow Groundwater Aquifers
- Already Constructed & Permitted
- Negligible Environmental Impacts

13

CMP Benefits

- Diversify – Preservation of Additional Surface Water Source
- Average Water Availability = approx. 9 Million Gallons/Day
- High Flows >20 Million Gallons/Day
- >3 Billion Gallons of Water Flowed Over the Spillway in the Last 12 Months
- All Information Reviewed by 3rd Party Engineers (See Tabs 4 and 5)
- Private Investment & Innovation

14

Eastern Virginia Groundwater Management Advisory Committee Final Report, 2017 (See Tab 6)

Recommendation #2: Committee recommends that the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships and potential funding for further evaluation and study of short-term and long-term alternative water sources and solutions.

Page 21:

- "The use of existing impoundments or converting existing quarries to reservoirs may provide another viable option as an alternative supply of water. Some existing impoundments are not currently being used as water supplies and may be converted to water supply use."
- "The Committee felt that these types of solutions are worthy of further exploration by localities and the private sector to help diversify the available water supply alternatives to groundwater. The benefits to this type of water source include: (1) utilizing the already-existing infrastructure, (2) minimizing environmental impacts, and (3) reducing the demand for groundwater."
- Actions typically needed to move forward with such a project include: (1) applying for a surface water withdrawal permit.
- "Additionally, an innovative example of an existing privately-owned impoundment that has applied for a water withdrawal permit is **Cranston's Mill Pond** in James City County. The water from the impoundment may result in much lower, long-term treatment costs compared to treating brackish water from other surface water sources."

15

James City County

16

September 2017 – Draft Permit #1

Primary Issue:
Restricted Withdrawal to 10% of CMP Inflows

Explanation:
- Based on DGIF Guidance
- Applied Most Conservative Approach Because No End User Identified

17

Agency Input

January 2017 (VIMS) (Tab 7): "Our analyses of these and other available data show that the average daily flows of 8.3 million gallons per day from Cranston's Mill Pond has only minimal influence on the overall hydrology and salinity patterns within Yarmouth Creek. Therefore, the operation of the proposed surface water intake is not expected to result in adverse environmental impacts to estuarine resources."

February 2017 (DGIF) (Tab 8): "Given the pond's location in the watershed, its adjacency to a large tidal marsh complex, and the relatively small size of the requested withdrawal, we essentially concur with the written VIMS opinion that 'operation of the proposed surface water intake is not expected to result in adverse environmental impacts to estuarine resources.'"

- DGIF notes that it has concerns about issuing a permit without an end user specified.

18

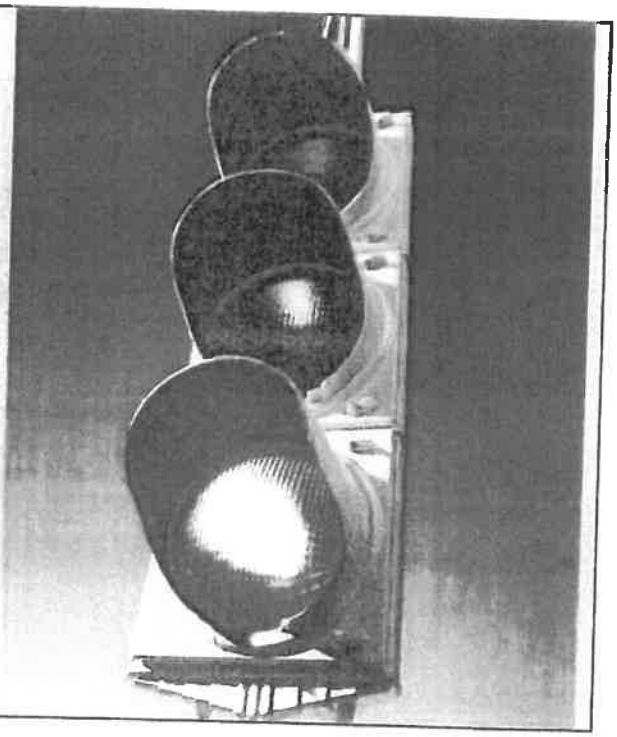
March 2018 – End User Conditions (Tab 9)

- Withdrawal Prohibited Until End User Identified
- Two years prior to withdrawal, must demonstrate:
  - Information on use/need for the water
  - Alternatives Analysis (if for public water supply)
  - Documentation of stage-storage relationship in CMP
  - Plan for intake structure
  - Consult with DCR-DNH and USFWS
- Permit will then be modified, following public participation, to incorporate end user and authorize initiation of withdrawal

19

Green Light: Focus on Technical Issues Associated with the Requested Withdrawal (i.e., the Flow By Issue)

- Salinity
- Hydrography
- Fish



20

March 2018 – Technical Issues

- Withdrawal Reliability / Salinity / Hydrography
  - ✓ Paul Peterson, Arcadis (Tab 10)
- Fish
  - ✓ Greg Garman, Fisheries Biologist (Tab 11)

21

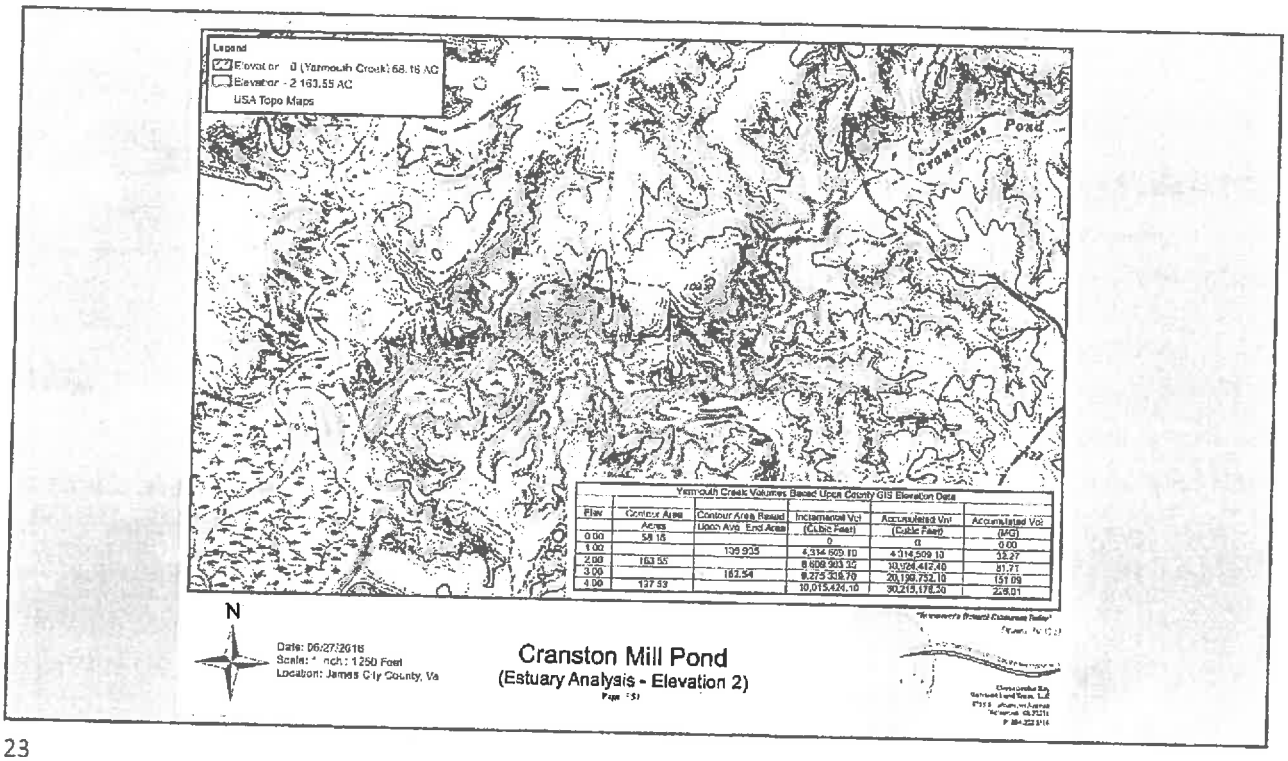
Reliability of CMP Withdrawal Rate

Flowby Rule	Reliability of 4 mgd Withdrawal*
DEQ 10% allowable withdrawal (i.e., 90% flowby)	1%
CMP 0.3 mgd minimum target release	98%

- Statistics based on Cranston's Mill Pond outflows monitored over the period July 31, 2015 to November 16, 2019.
- See Tabs 12, 13 and 14.

To be viable, the project must have high reliability for end users.

22



23

From VIMS November 2018 (Tab 15) Salinity Modeling Report

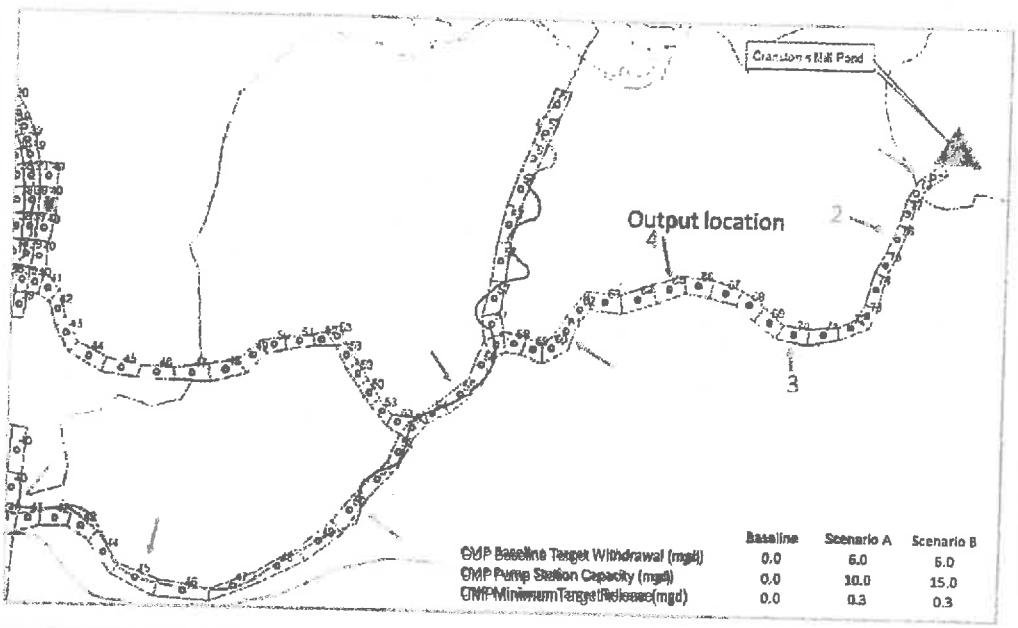
Table 4. Estimated tidal prism[1] and percent of freshwater discharge from Cranston's Mill Pond

Selected Tidal Range (m)	Tidal Prism (m^3/tidal cycle)	Mean discharge from Cranston's Mill Pond (1991-2017) (m^3/tidal cycle)	Percent of volume (per tidal cycle)
0.40	242,939.88	10,192.10	4.2%
0.74	449438.8	10,192.10	2.3%
1.00	607,349.70	10,192.10	1.7%

[1]From the conjunction of Chickahominy River to upstream below CMP.

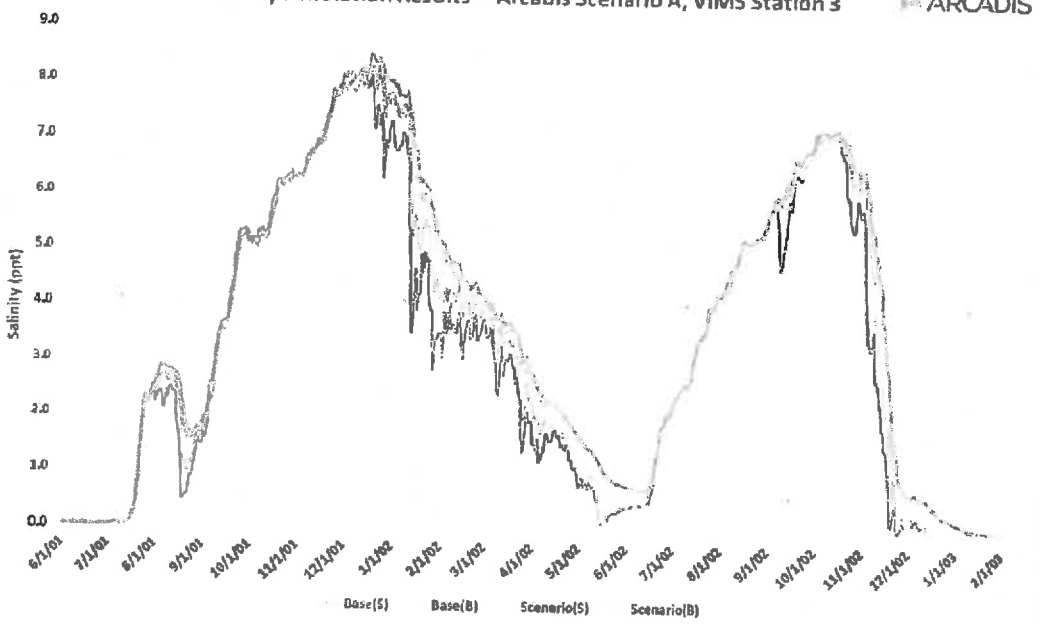
24

VIMS Salinity Modeling Stations



25

Salinity Simulation Results -- Arcadis Scenario A, VIMS Station 3



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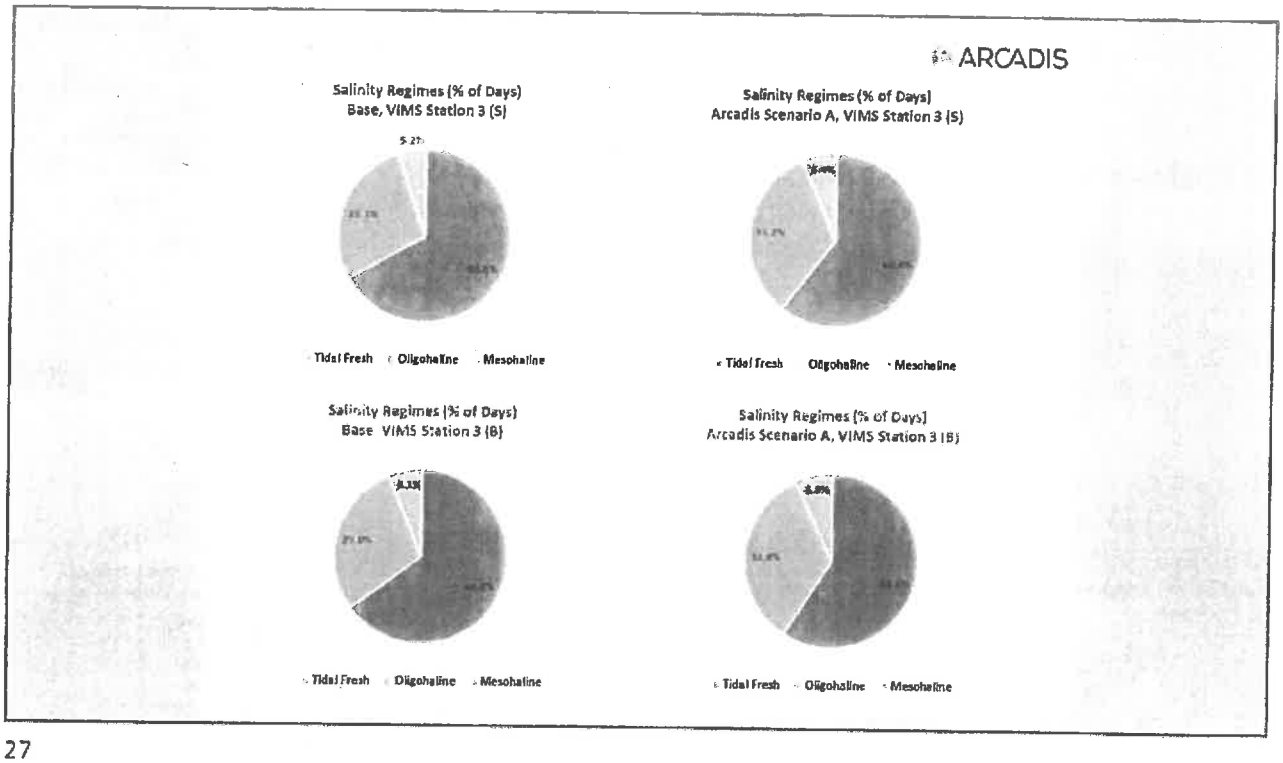


27

Arcadis November 9, 2018 Letter (Tab 16):

"...Arcadis considers the extent of salinity change to be minimal under withdrawal Scenarios A and B as compared to Baseline conditions. The changes are small when viewed in relation to the range and frequency of salinity levels already experienced at the same Yarmouth Creek stations."

"CMP is a very small reservoir when compared to the volume present in the downstream estuary. Consequently, minor salinity changes due to simulated CMP withdrawals are over-shadowed by the larger salinity trends established by the downstream estuary."

VIMS June 21, 2019 Comments on DEQ May 17, 2019 Fact Sheet (Tab 17):

"Our modeling results indicate that the salinity fluctuations in the upper reaches of Yarmouth Creek are driven more by regional factors that vary on inter-daily and season time scales than by outflow from Cranston Mill Pond, thus we did not predict significant ecological alterations associated with the proposed water withdrawals."

28

Historic DGIF Guidance (a.k.a. "The Kauffman Memo") (Tab 18)

Draft flow recommendation standards
John Kauffman
10/19/04

DEQ is charged with facilitating water supply planning and developing a water management plan for the state including water supply. As part of that planning process, DEQ and other agencies need to identify the water necessary for beneficial instream uses. DGIF is responsible for management of fish and wildlife and recommending flows necessary to protect the public trust resource. Very few studies have been conducted in Virginia to document the flows necessary for this resource. In the past, several desktop methods have been used to recommend flows. Studies have been conducted on the James. The Orth and Leonard instream flow study on the upper James as well as study on the middle James for Henrico County was used to develop these recommendations for non-tidally influenced streams. From these studies, some potential guidance criteria for instream resources can be developed that ensure degraded or impaired aquatic resources are not being permitted. All values recommended are based upon development of a monthly exceedence table for the proposed area. These recommendations do not cover coastal streams that are tidally influenced or trout waters, because of the grater importance of winter habitat for eggs and larvae and lack of studies in Eastern streams.

29

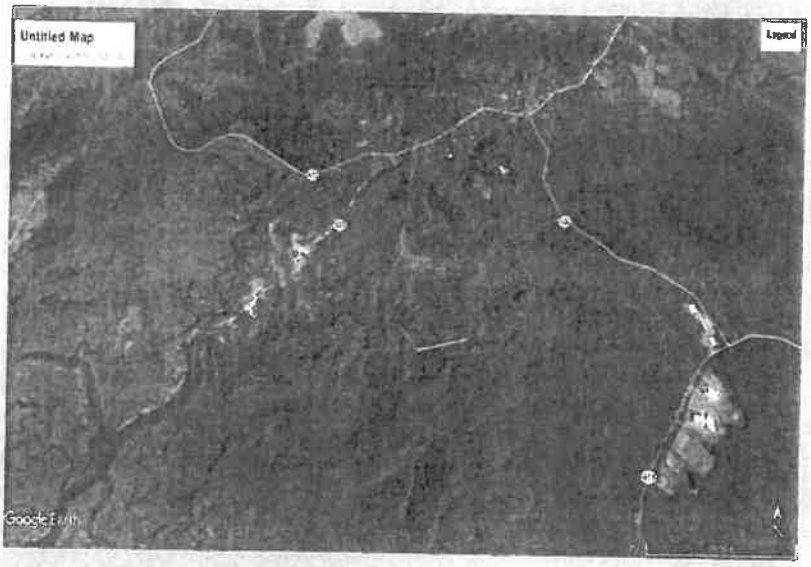
Tidal Freshwaters as Fisheries Habitat

- Tidal fluxes up to 1 meter make tidal freshwater creeks and marshes of the upper Chesapeake Bay estuary among the most dynamic and variable aquatic systems in the region, and distinctly different from *non*tidal (unidirectional) streams
- In tidally-dominated systems, both predictable and unpredictable *natural* changes in salinity, temperature, suspended sediment, flow, depth, and current direction occur across hourly, diurnal, seasonal; and annual time-scales
- Such high natural variability in stream physico-chemical conditions (e.g. salinity) will be greater than potential fish habitat changes attributed to modeled CMP withdrawals

Summary: Because of significant, tidally-driven dynamics, regulatory guidance developed for *non*tidal streams may not be usefully applied to tidally-influenced freshwaters. There is no evidence that modeled CMP withdrawals will exacerbate the natural tidal and seasonal variability in Yarmouth Creek for parameters like salinity

30

2017 Fish Community Sampling Areas



- ✓ Sep 15 (Collection A; Blue, backpack electrofishing)
- ✓ Nov 1 (Collections B & C; Yellow, boat electrofishing)
- ✓ Nov 15 (Collection D; Red, boat electrofishing)

31

Resident Fishes in Tidal Freshwater Yarmouth Creek

- Native fishes documented in Yarmouth Creek below CMP are a mix of freshwater, estuarine, migratory, and even marine species
- Many native species in dynamic tidal systems have evolved physiological and behavioral mechanisms, including movement (local and migratory), life-history adaptations, and moderate salinity tolerance, to cope with significant natural variability in physico-chemical conditions
- Salinity tolerance and instream flow criteria adopted by DEQ are based on an inaccurate application of available published science and regulatory guidance
- The single species of concern (Bridle Shiner) identified by DWR has not been documented recently from the Yarmouth Creek system, in spite of substantial collection efforts

Summary: There is no evidence that modeled withdrawals from CMP will have an adverse ecological impact on the resident or migratory fishes of tidal Yarmouth Creek

32

DEQ's Proposed Salinity Criteria

DEQ Application	Responses from the Experts
Young-of-Year Largemouth Bass (based on 1989 research article): 0.5 and 1.0 psu	Criteria are outdated and not supported by abundant peer-reviewed fisheries research.
Bald Cypress: 0.5 psu threshold for potential impacts	Criteria are inexplicably low, not supported by extensive peer-reviewed scientific research and counter-intuitive to robust bald cypress population that already inhabits brackish estuary.
Freshwater Above-Ground Plant Biomass: 1.5 - 2 psu threshold for decreased biomass	Criteria described by VIMS apply to entire growing season, i.e., long-term exposure, and are not applicable to short-term exposure or even monthly changes.
Sea Level Rise	VIMS concluded that with rising sea level, "it is likely that the influence of overflow from Cranston's Mill Pond on estuarine living resources and salinity will decrease".
Flushing Flows	High flow events will occur with similar periodicity with or without withdrawals. Significant storm events will quickly refill CMP and result in large releases to Yarmouth Creek.

33

Fisheries Conclusions for CMP

- Recent (2017; VCU) fisheries data collected for this project represent the most current and comprehensive fisheries survey of the Yarmouth system with sampling protocols designed specifically for community-level (i.e., all species) assessment. The data support the conclusion (Garman 2017; ***see* Tab 19**) that Bridle Shiner no longer occurs within the project area
- Tidally dominated freshwater streams are unique and naturally dynamic ecosystems; DWR fisheries flow-by guidance (e.g. Kauffman 2004) developed specifically for unidirectional, *non*tidal streams is not applicable to tidal (coastal) aquatic systems. For the same reasons, short-term salinity *change* thresholds (i.e., 0.5 psu) applied by DEQ to this project are not applicable to tidal creeks and marshes with potentially greater natural variability in daily and seasonal salinity regimes
- Agency guidelines and assumptions developed specifically for *non*tidal streams cannot be usefully applied to assess possible fisheries impacts from the CMP project, or in other tidal freshwater habitats of the Commonwealth

34

WILLIAM & MARY
VIMS
VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE

June 2019 (Tab 17): "Our modeling showed that salinity variations in the upper reaches of Yarmouth Creek are driven more by tidal variation and regional rainfall patterns in the James watershed than outflow from Cranston Mill Pond under almost all scenarios. The living resources in this system will be much more affected by these variations than the modest ones resulting from the water withdrawal scenarios that we modeled."

"[I]t is simply the case that proposed withdrawals from Cranston Mill Pond are likely to have very little effect on the regional salinity."

October 15, 2020 (Tab 20): "Faculty and staff with expertise in tidal wetlands, marsh ecology, and fish utilization of habitats like those provided by Yarmouth Creek reviewed the outputs from these model simulations and concluded that this level of salinity change was unlikely to have significant impact on the vegetation or on fish utilization of this creek."

35

May 2019 – Draft Permit #2

- Included agreed-upon end user provisions.
- Retained Restriction of Withdrawal Volume to 10% of CMP Inflows (90% flow-by)

36

September 2019

37

End User

Alternatives to Groundwater Needed and Desired:

VIMS, January 2017 (Tab 7): "As VIMS stated in comments on the draft State Water Resources Plan (May 4, 2015 letter to Scott Kudlas), we have concerns for tidal freshwater areas as future surface water supplies to replace challenged groundwater resources in Virginia's coastal plan. Over-reliance on tidal freshwater will lead to adverse impacts to estuarine vegetative communities and the aquatic fauna that exploit those areas. *Use of existing freshwater supplies such as Cranston's Mill Pond can reduce the risk to tidal freshwater resources and should be considered a viable alternative water supply strategy."*

DEQ, October 2020 (Tab 21): "DEQ continues to work with permitted groundwater withdrawal facilities within the Eastern Virginia and Eastern Shore Groundwater Management Areas to decrease withdrawals, increase system efficiencies, *identify alternate sources of water, and to investigate other innovative ways to increase supplies* in order to maintain groundwater productivity and availability over the next fifty years and beyond."
"It is critical to continue efforts to address these and other unpermitted groundwater withdrawals, *as well as to promote and incentivize alternatives*, including lower quality groundwater from shallow or unconfined aquifers, through a variety of means."

38

End User

9 VAC 25-210-340

B.1. As part of identifying the project purpose, a narrative describing the water supply issues that form the basis of the proposed project purpose.

3, 4. The volume of withdrawal sought

6. Information on the proposed use of and need for the surface water and information on how demand for surface water was determined (e.g., per capita use, population growth rates, new uses, changes to service areas, and if applicable, acreage irrigated and evapotranspiration effects). ***If during the water supply planning process, the need for the withdrawal was established, the applicant may submit the planning process information,*** provided that the submittal addresses all requirements of 9 VAC 25-210-360."

9 VAC 25-210-360

Existing supply sources, yields and demands; projected demands over a 30-year planning period; alternatives analysis. ***CMP relied on the local water supply plan to provide this information.***

9 VAC 25-210-370

Amount of surface water is limited to the amount of water that can be put to beneficial use.

39

End User

But see also 9 VAC 25-210-230. Basis for denial include:

1. The project will result in violations of water quality standards or will impair the beneficial uses of state waters.
2. As a result of project implementation, shellfish waters would be condemned in accordance with 9 VAC 25-260.
3. The project that the applicant proposed fails to adequately avoid and minimize impacts to state waters to the maximum extent practicable.
4. The proposed compensatory mitigation plan is insufficient or unsatisfactory for the proposed impacts and fails to achieve no net loss of existing wetland acreage and function and no net loss of functions in all surface waters.
5. The Department of Game and Inland Fisheries indicates that natural or stockable trout waters would be permanently and negatively impacted by the proposed activity.
6. The proposed activity is prohibited by 9 VAC 25-210-50.
7. The effect of the project impacts, together with other existing or proposed impacts to wetlands, will cause or contributed to a significant impairment of state waters or fish and wildlife resources.
8. Failure to submit the required permit fee.

40

End User

State Policy as to Waters (NOTE: Not Part of State Water Control Act)

Va. Code § 62.1-11.E – The right to the use of water or to the flow of water in or from any natural stream, lake or other watercourse in this Commonwealth is and shall be limited to such water as may reasonable be required for the beneficial use of the public to be served; such right shall not extend to the waste or unreasonable use or unreasonable methods of use of such water.

Va. Code § 62.1-11.C – The changing wants and needs of the people of the Commonwealth may require the water resources of the Commonwealth to be put to uses beneficial to the public to the extent of which they are reasonably capable; the waste or unreasonable use or unreasonable method of use of water should be prevented; and the conservation of such water is to be exercised with a view to the welfare of the people of the Commonwealth and their interest in the reasonable and beneficial use thereof.

41

End User

But see also

Va. Code § 62.1-11.B – The regulation, control, development and use of waters for all purposes beneficial to the public are within the jurisdiction of the Commonwealth which in the exercise of its police powers may establish measures to effectuate the proper and comprehensive utilization and protection of such waters.

Va. Code § 62.1-11.D – The public welfare and interest of the people of the Commonwealth require the proper development, wise use, conservation and protection of water resources together with protection of land resources, as affected thereby.

42

End User

Va. Code § 62.1-44.2 – Policy and purpose of State Water Control Law:

The short title of this chapter is the State Water Control Law. It is the policy of the Commonwealth of Virginia and the purpose of this law to: (1) protect existing high quality state waters and restore all other state waters to such condition of quality that any such waters will permit all reasonable public uses and will support the propagation and growth of all aquatic life, including game fish, which might reasonably be expected to inhabit them; (2) safeguard the clean waters of the Commonwealth from pollution; (3) prevent any increase in pollution; (4) reduce existing pollution; (5) promote and encourage the reclamation and reuse of wastewater in a manner protective of the environment and public health; and (6) promote water resource conservation, management and distribution, and encourage water consumption reduction in order to provide for the health, safety, and welfare of the present and future citizens of the Commonwealth.

43

End User

Va. Code § 62.1-44.15:20

B. The Board shall, after providing an opportunity for public comment, issue a Virginia Water Protection Permit if it has determined that the proposed activity is consistent with the provisions of the Clean Water Act and the State Water Control Law and will protect instream beneficial uses.

C. Prior to the issuance of a Virginia Water Protection Permit, the Board shall consult with and give full consideration to any relevant information contained in the state water supply plan described in subsection A of Section 62.1-44.38:1 as well as to the written recommendations of the following agencies: the Department of Wildlife Resources, the Department of Conservation and Recreation, the Virginia Marine Resources Commission, the Department of Health, the Department of Agriculture and Consumer Services, and any other interested and affected agencies.

44

End User

DEQ VWP Permit Language: "Based on the information provided in the application and in compliance with Section 401 of the Clean Water Act as amended (33 USC §§ 1341 et seq.) and the State Water Control Law and regulations, DEQ has determined that there is a reasonable assurance that the activity authorized by this permit will protect instream beneficial uses, will not violate applicable water quality standards, and will not cause or contribute to significant impairment of state waters or fish and wildlife resources, provided the permittee complies with all permit conditions."

45

End User

Water Contracts

Water Seller	Water Buyer	Receiving Water System	Purchases Occurred(ing)? (Yes / No)
Norfolk	Chesapeake	Northwest River System	Yes
Norfolk	Chesapeake	South Norfolk System	Yes
Norfolk	Norfolk Navy Installations	Norfolk Naval Base	Yes
Norfolk	Virginia Beach	City of Virginia Beach	Yes
Norfolk	Virginia Beach Military Installations (wheeled by Virginia Beach)	US Army - Fort Story, Camp Pendelton	Yes
Norfolk	Portsmouth Navy Installation	US Navy - Little Creek Amphibious Base, NAS Oceana, Dam Neck.	Yes
Norfolk	Western Tidewater Water Authority: Suffolk – 75%, Isle of Wight – 25%	Craney Island (fire suppression)	Yes
Norfolk	Portsmouth	Suffolk Main System, Newport Development Service District, Windsor Development Service District	No water purchases reported to date.
Portsmouth	Chesapeake	City of Portsmouth	Yes
Portsmouth	Norfolk Naval Ship Yard	Western Branch System	Yes
Portsmouth	City of Suffolk	Norfolk Naval Ship Yard – US Navy	Yes
WTWA	Reserved safe yield: Suffolk – 75%, Isle of Wight – 25%	Suffolk Main System	Yes
Franklin	Isle of Wight County	Suffolk Main System	Yes
Smithfield	Isle of Wight County	Camptown Development Service District (Isle of Wight)	Yes
Windsor	Isle of Wight County	Gatling Pointe Subdivision (Isle of Wight)	Yes
NNWW	JCSA	Windsor Development Service District (Isle of Wight)	Yes
NNWW	City of Williamsburg	Central System	No water purchases reported to date.
		Williamsburg, City of (one water system serves the City)	No water purchases reported to date.

46

23

CMP Permit Application

- ✓ Consistent with Virginia Code
- ✓ Consistent with VWP Regulatory Provisions
- ✓ Supported by Technical Analysis (as requested by DEQ)
- ✓ Demonstrates No Adverse Impact to Instream Uses
- ✓ Consistent with Commonwealth's Need for Alternative water Sources in Eastern Virginia
- ✓ Consistent with Virginia Water Resource Policies

47

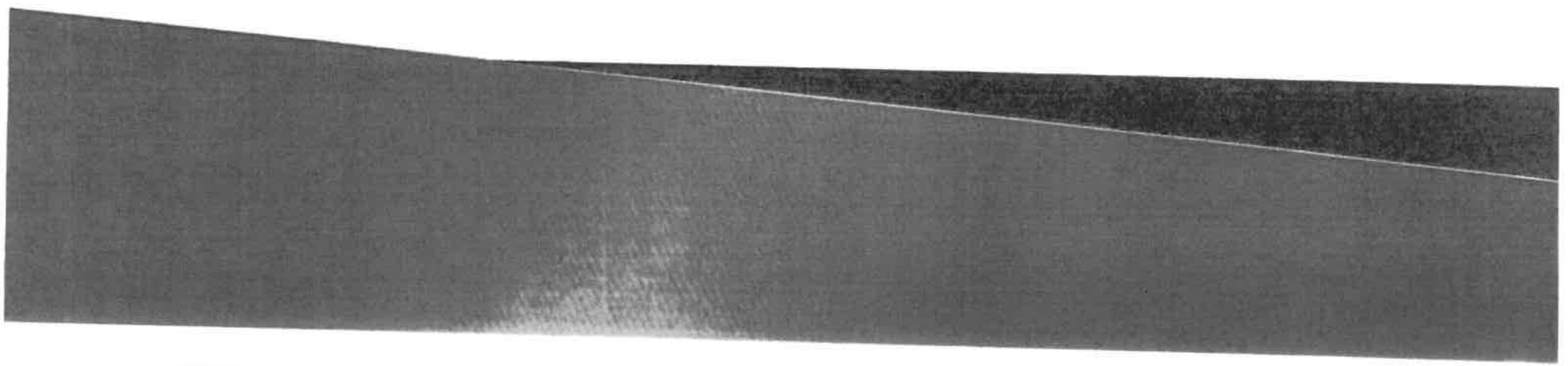
Request

- Direct DEQ to issue a VWP permit to CMP
- Include full amount of requested water withdrawal with a 300,000 gpd flow-by requirement
- Retain conditions regarding the end user
- Remove 90% flow by requirement

48

Management of Groundwater in Eastern Virginia

David K. Paylor
State Water Commission
December 15, 2014



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Ground Water Management Act

- § 62.1-254. Findings and purpose.
  The General Assembly hereby determines and finds that, pursuant to the Groundwater Act of 1973, the continued, unrestricted usage of ground water is contributing and will contribute to pollution and shortage of ground water, thereby jeopardizing the public welfare, safety and health. It is the purpose of this Act to recognize and declare that the right to reasonable control of all ground water resources within this Commonwealth belongs to the public and that in order to conserve, protect and beneficially utilize the ground water of this Commonwealth and to ensure the public welfare, safety and health, provision for management and control of ground water resources is essential.

Ground Water Management Act

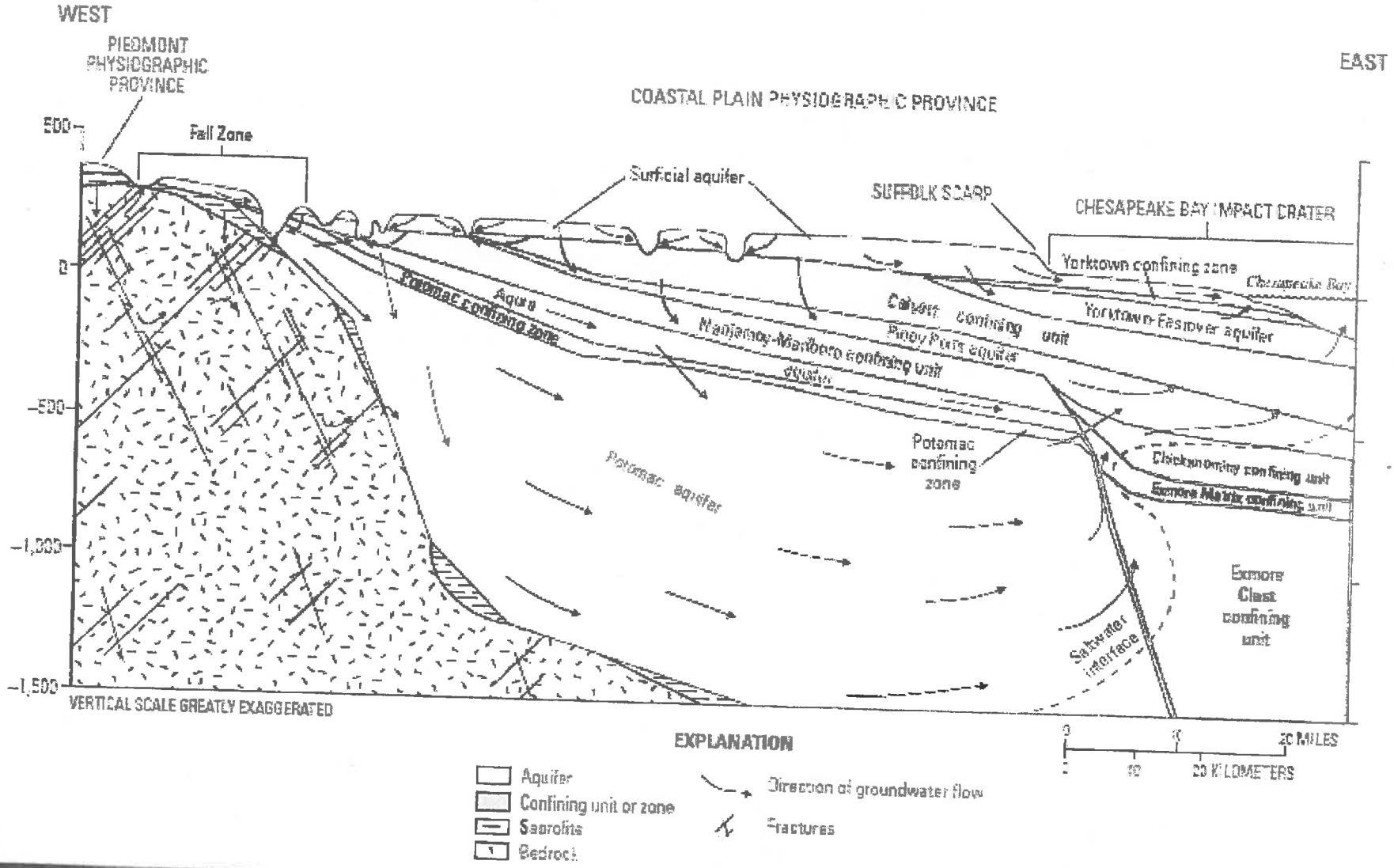
§ 62.1-263 Criteria for issuance of permits.

- In no case shall a permit be issued for more ground water than can be applied to the proposed beneficial use.
- In evaluating permit applications, the Board shall ensure that the maximum possible safe supply of ground water will be preserved and protected for all other beneficial uses.

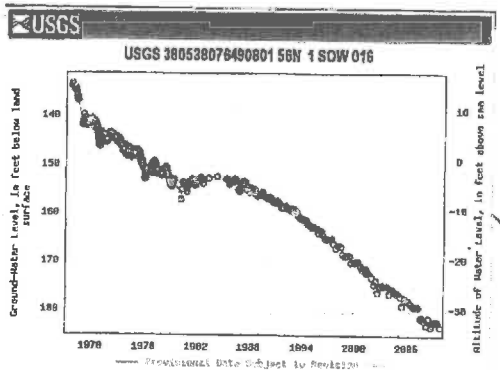
Goal

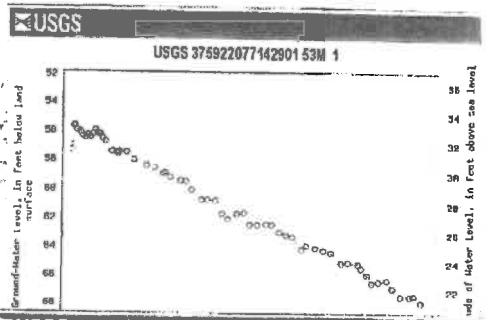
To protect the aquifer and provide for current and future water needs of the public in the Commonwealth

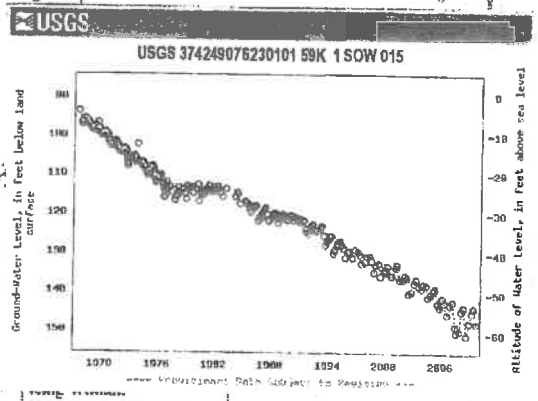
VA Coastal Plain Aquifer Cross-Section

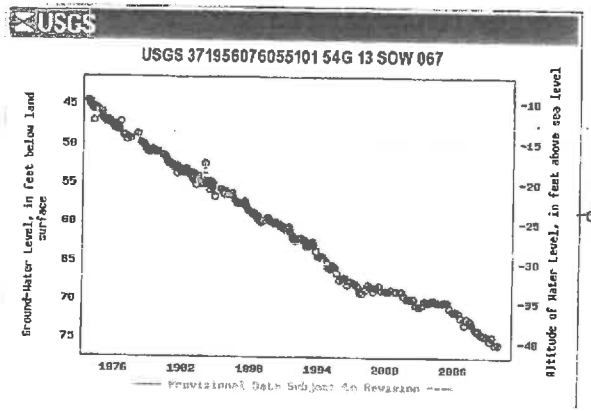


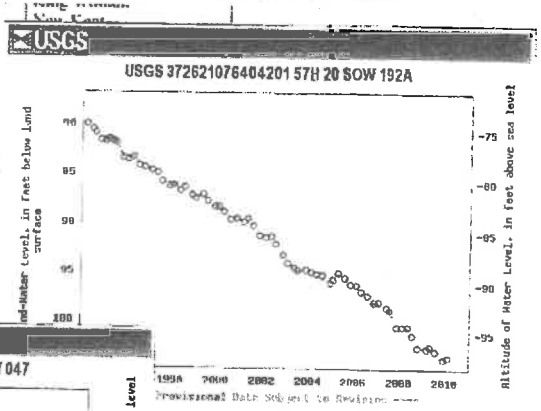
VA Ground Water Management Areas (GWMA)

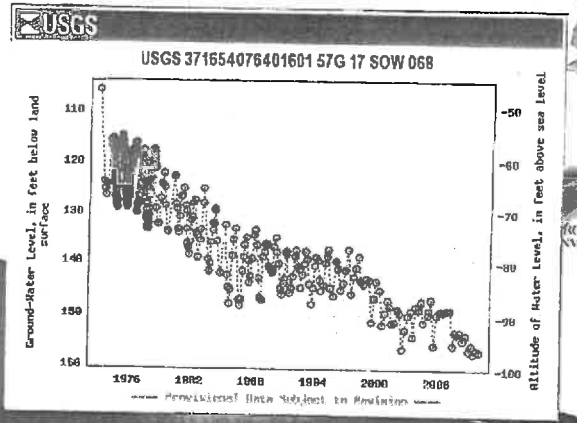


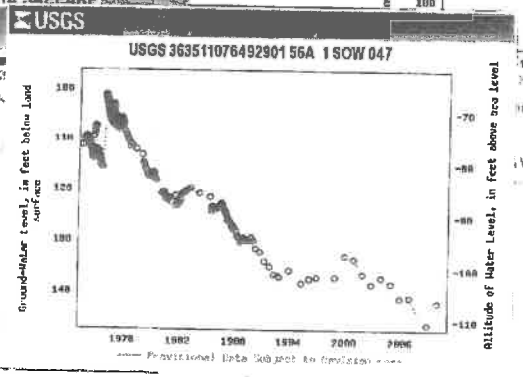


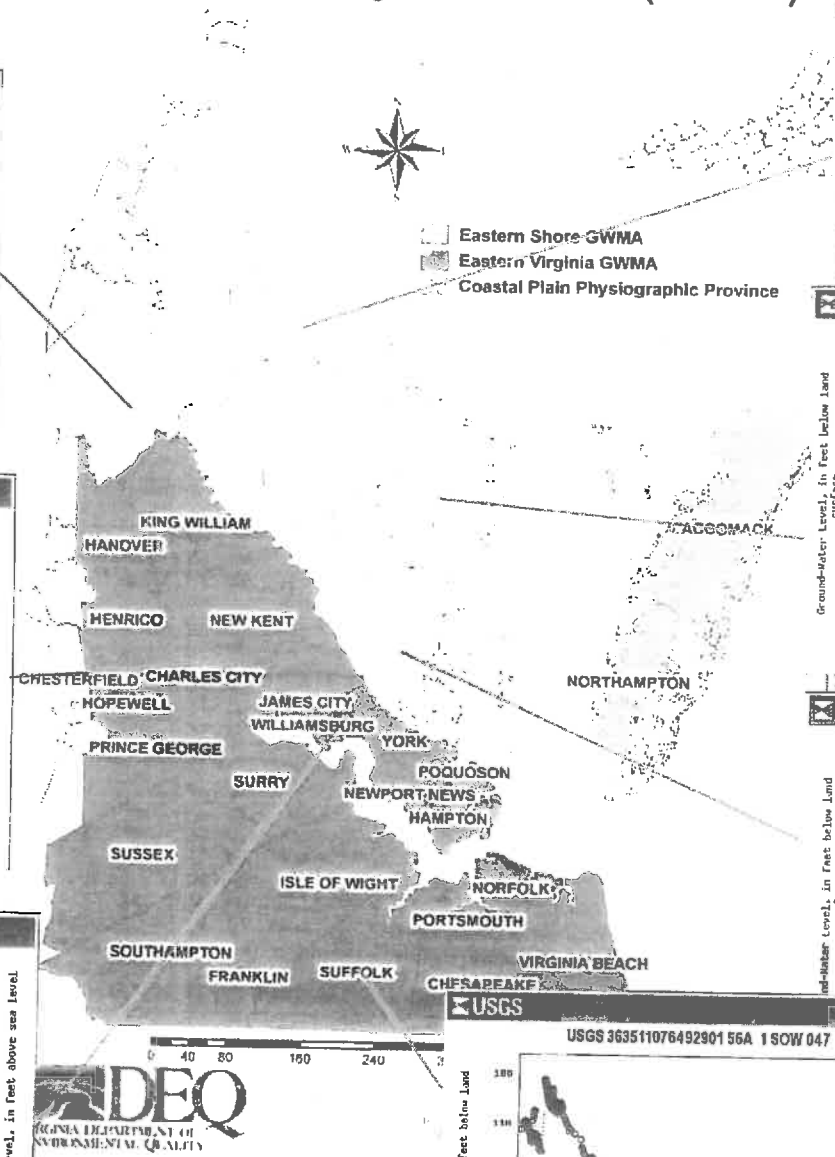












Salinity in the Aquifer System

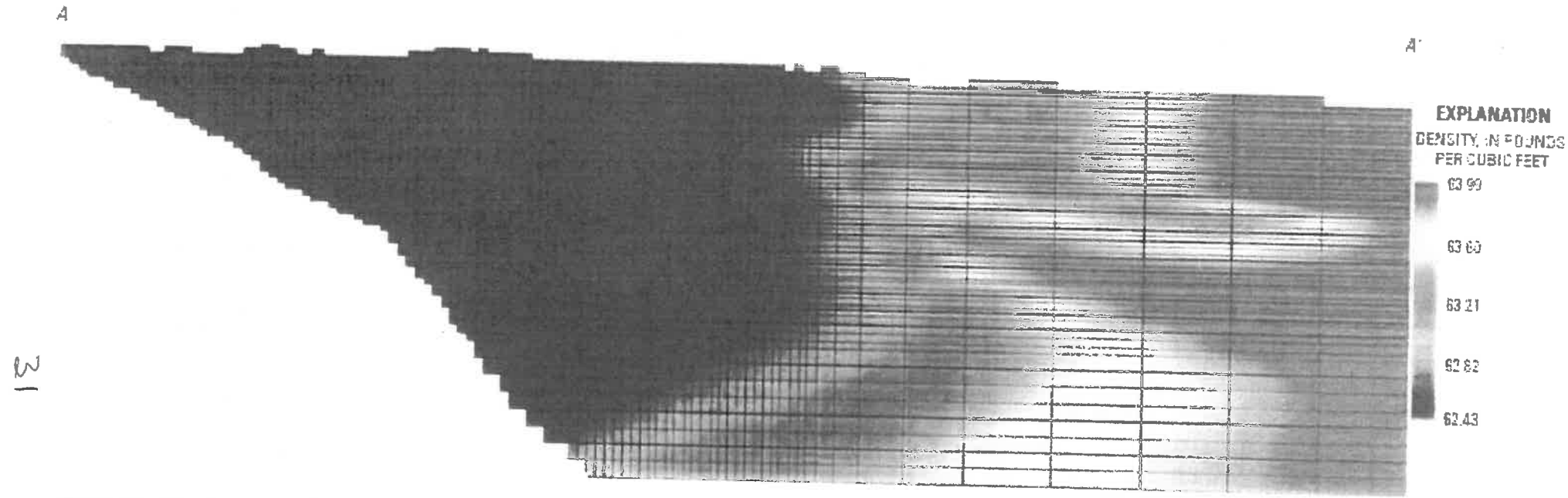
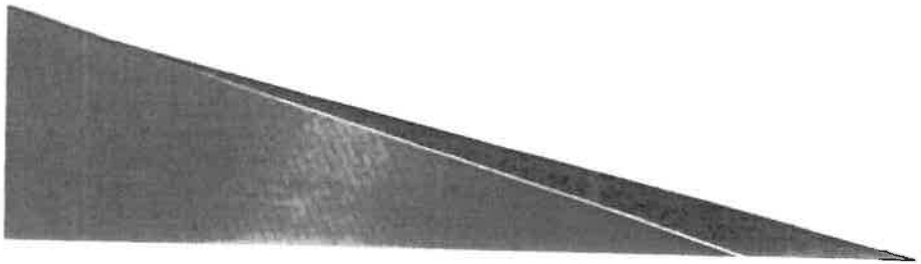
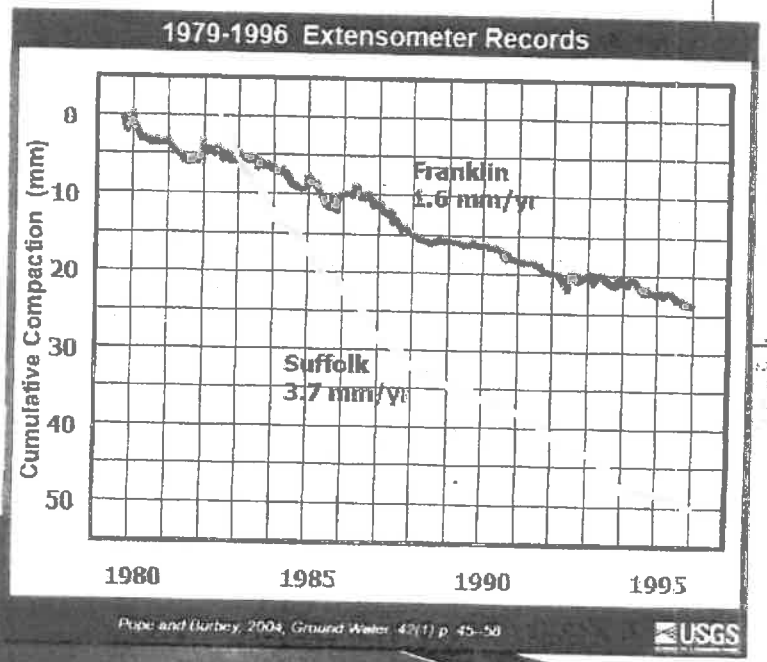
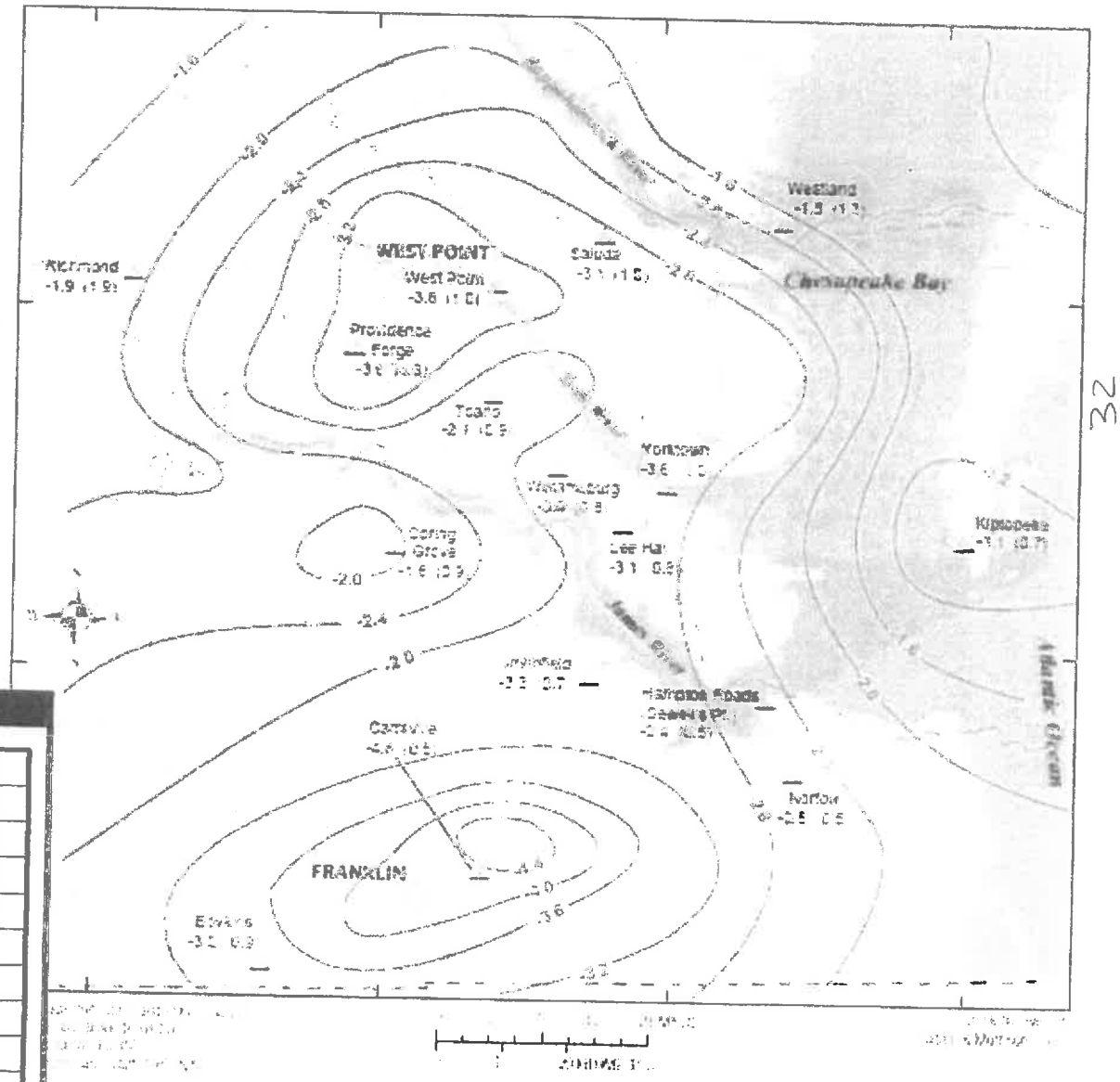


Figure A3. Simulated water density near the saltwater transition zone of the Virginia Coastal Plain. (Location of cross section shown in figure A2.)



Land Subsidence 1940–1970 (mm/yr)

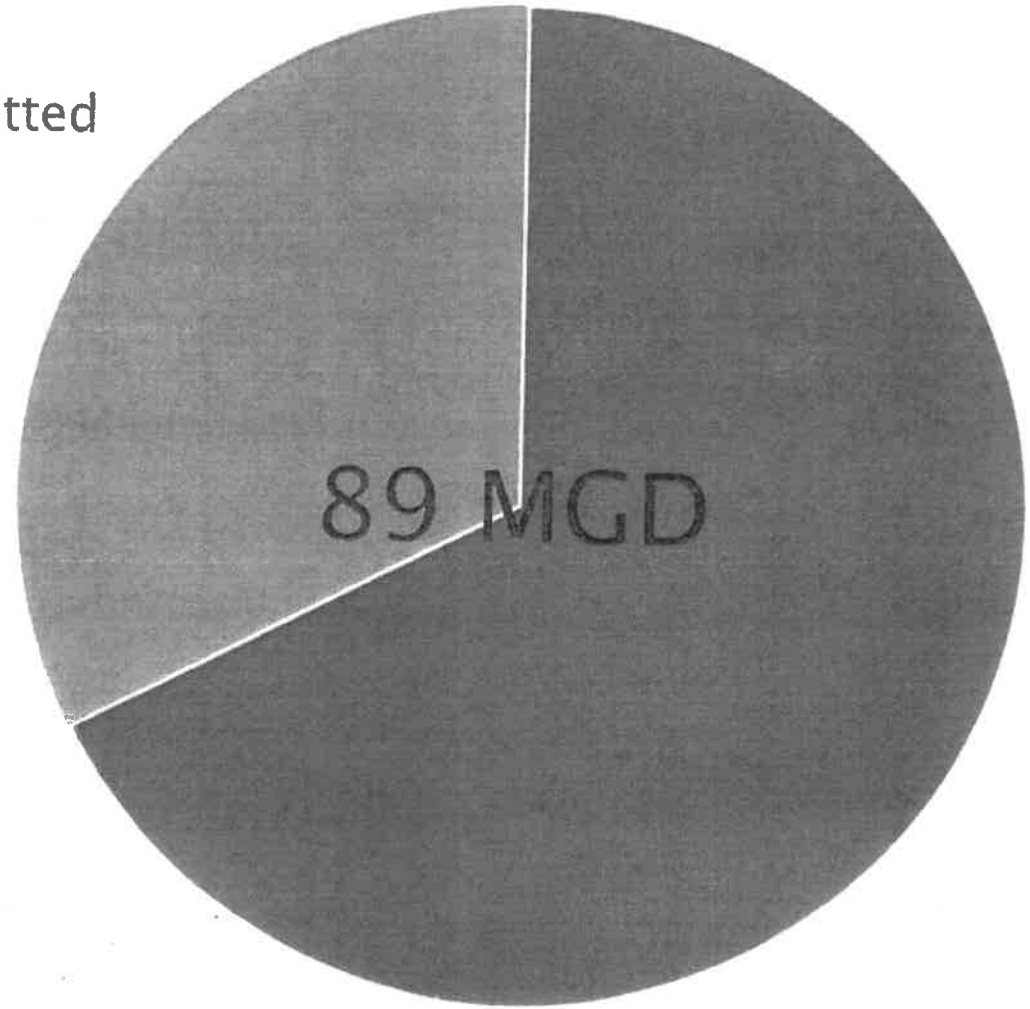




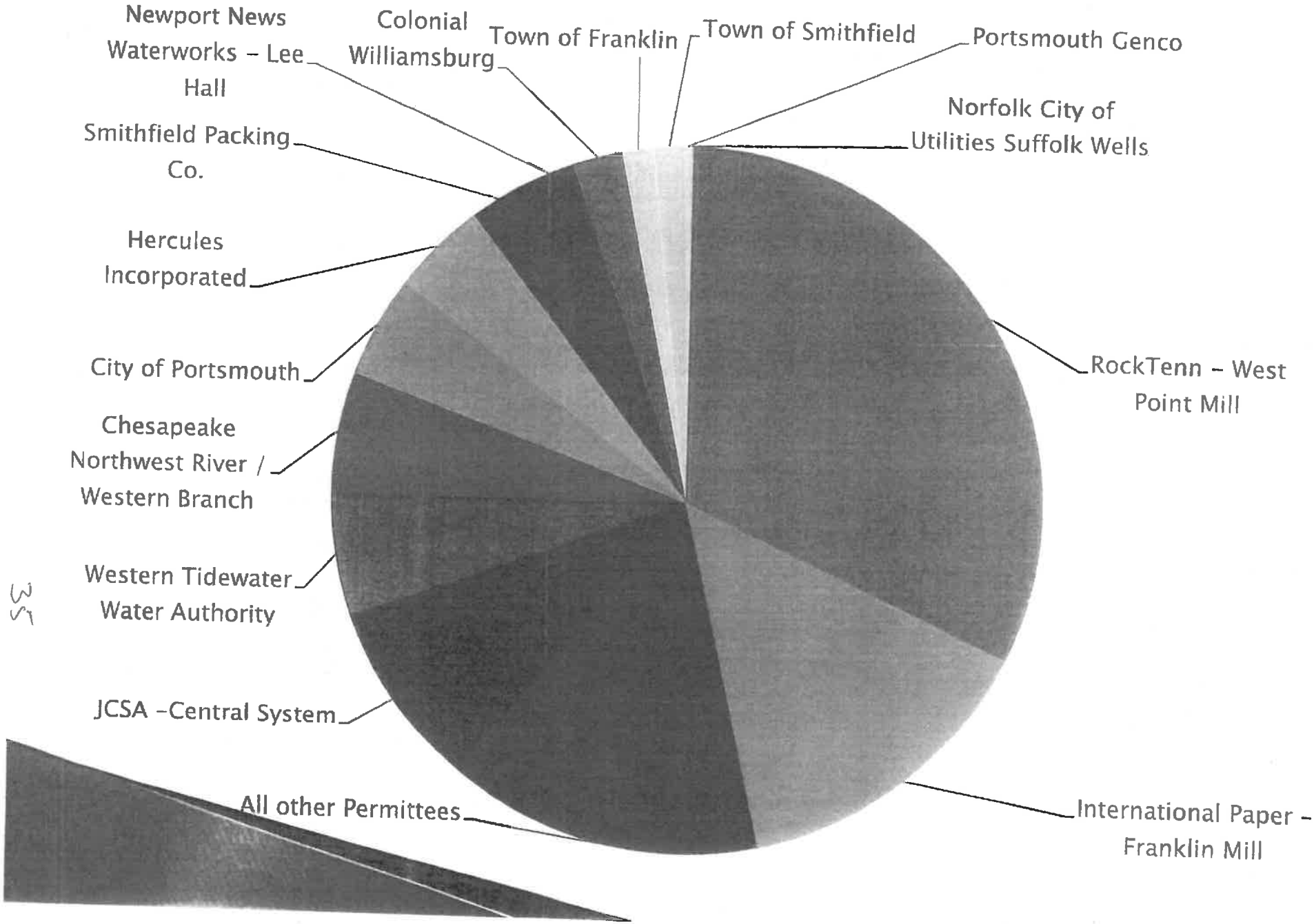
Steps Taken

- DEQ conducted groundwater optimization evaluations
- Conducted Virginia Coastal Plain Groundwater Initiative Meeting with top 14 users
- Investigation of the Economic Impacts of Coastal Plain Aquifer Depletion and Actions that may be needed to Maintain Long-term Availability and Productivity (VT Report)
- DEQ correspondence to Water Commission

Current Use



Percentage of Current Permitted Use



Path Forward

Reduce current permitted use

- Identified potential permitting solutions
  - Reductions expected to stabilize groundwater level declines by 2025
  - 14 users permitted for 87% of withdrawal
  - Impacts actual use of 3 permittees
  - Individual reduction targets discussed with each permittee requested that they provide a 10 year reduction plan for what they can achieve
  - Goal is to issue all remaining permits by end of 2015

Caveats

- Stabilizing the system cannot be achieved without reductions
- Reductions slow declines and lay ground work for long term solutions
- Need comprehensive strategy to provide for future growth and development
- Some present capacity continues to be available in upper aquifers and in the northeastern portion of the coastal plain

Facility Reductions

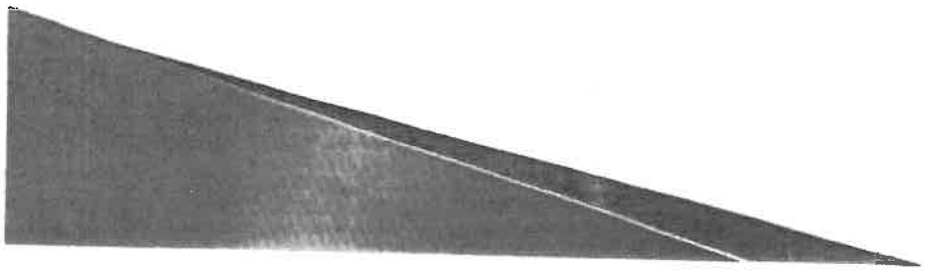
FACILITY	PERMITTED (MGD)	CURRENT USE (MGD)	DEQ Requested Target / Range
RockTenn - West Point Mill	23.03	20.09	9.0 – 10.0
International Paper – Franklin Mill	20.61	9.08	10.0 – 12.0
JCSA -Central System	8.83	5.41	3.8 - 4.0
Western Tidewater Water Authority	8.34	3.51	3.5 – 3.9
Chesapeake Northwest River / Western Branch Systems	11.00	3.50	3.5
City of Portsmouth	15.42	2.91	3.49
Hercules Incorporated	6.67	2.74	3.0

Facility Reductions

FACILITY	PERMITTED (MGD)	CURRENT USE (MGD)	DEQ Requested Target / Range
Smithfield Packing Company, Inc.	2.60	1.65	0
Newport News City of Waterworks Lee Hall	3.44	1.53	1.53
Town of Franklin Water System	2.88	0.93	.093 – 1.3
Colonial Williamsburg	1.84	1.40	1.2
Smithfield Town of	1.27	0.86	0
Portsmouth Genco	2.60	0.18	1.0 – 1.2
Norfolk City of Utilities Four Suffolk Wells	3.74	0.06	0

Expected Results

- Restoration of areas with groundwater levels below regulatory standards
- Permitted withdrawals will be at 40–50 mgd and unregulated withdrawals estimated at 30–40 mgd
- Gains from the reductions will be lost without addressing expected growth in unregulated sector



Results

2013 Total Permitted Use - Piney Point Aquifer Simulated Water Levels Below the Critical Surface and Below the Aquifer Top

The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed

Cells that simulate water levels below the top of the aquifer

Cells that simulate water levels below the Critical Surface

Piney Point Aquifer Model Boundary

0 15 30 60 Miles

Prepared by Aquaveo, LLC for the Virginia DEQ Office of Surface and Ground Water Supply Planning
2 June 2014

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Piney Point Aquifer - Optimization Scenarios - Critical Cells

0 9 18 27 36 Miles

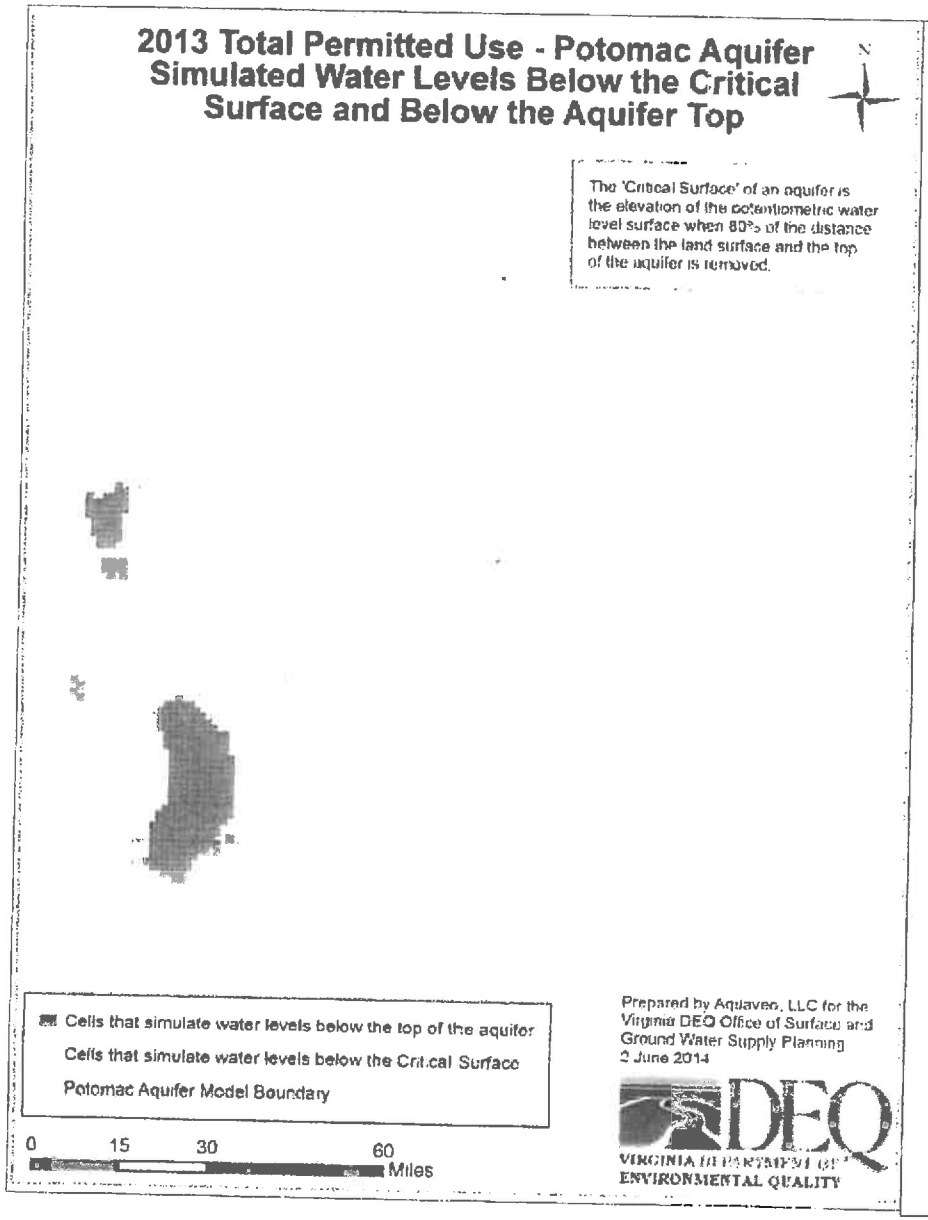
Map by Aquaveo, LLC for the Office of Water Supply
04/02/2014

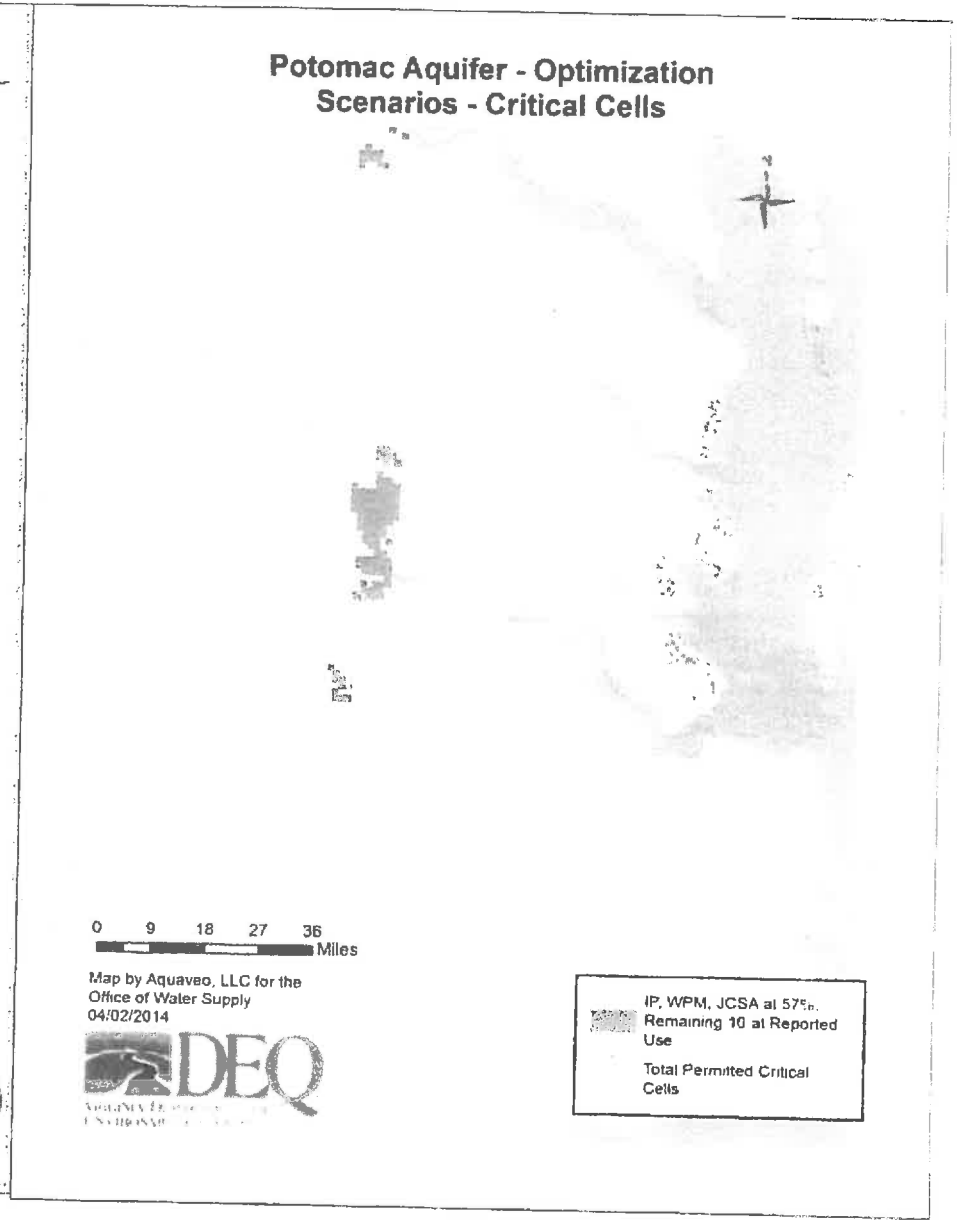
DEQ

IP, WPM JCSA at 57%, Remaining 10 at Reported Use

Total Permitted Critical Cells

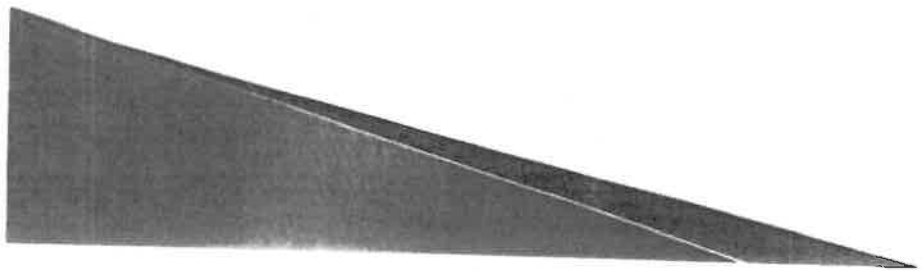
Results


2013 Total Permitted Use - Potomac Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top
N
The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed.
Cells that simulate water levels below the top of the aquifer
Cells that simulate water levels below the Critical Surface
Potomac Aquifer Model Boundary
0 15 30 60
Miles
Prepared by Aquaveo, LLC for the Virginia DEQ Office of Surface and Ground Water Supply Planning
2 June 2014
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY


Potomac Aquifer - Optimization
Scenarios - Critical Cells
0 9 18 27 36
Miles
Map by Aquaveo, LLC for the Office of Water Supply
04/02/2014
DEQ
IP, WPM, JCSA at 57%, Remaining 10 at Reported Use
Total Permitted Critical Cells

Next Steps

- Reduce current permitted use
- Evaluate alternatives
  - Conservation
  - Reuse
  - Desalination
- Legislation



Potential Legislation

- Propose legislation to provide data to define and evaluate unregulated portion of coastal groundwater withdrawal:
  - Propose legislation to eliminate loopholes in current program related to private wells in subdivisions that exceed permit threshold or permit threshold amount
  - Propose legislation to require registration of new private wells

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JEFFREY M. CORBIN

EDUCATIONAL EXPERIENCE

Master of Science (with honors) - 1989
Oceanography, University of Rhode Island, Graduate School of Oceanography, Narragansett, RI

Bachelor of Science (with honors) - 1986
Marine Science, University of South Carolina, Columbia, SC
Outstanding Undergraduate Award in Geological Oceanography – 1986

WORK EXPERIENCE

Restoration Systems, LLC – Raleigh, NC/Richmond, VA
January 2016 – Present
Senior Vice-President for Water Quality Markets & Mitigation

Restoration Systems is a nationally recognized turn-key environmental mitigation company with some of the largest and most successful stream, wetlands, and species mitigation banks in the country. Responsibilities include expanding the company's visibility in water quality markets nationwide.

U.S. Environmental Protection Agency – Headquarters, Washington, DC
March, 2011 – December 2015
Senior Advisor to the Administrator

Appointed in March 2011 by U.S. EPA Administrator Lisa Jackson as her Senior Advisor for the Chesapeake Bay and Anacostia River. Reappointed by Administrator McCarthy in July, 2013. Coordinated all aspects of the agency's Chesapeake Bay restoration efforts and served as the chief liaison among the Office of the Administrator; federal, state and local government partners; and community and nonprofit stakeholders. Participated as a key member of the EPA Senior Leadership Team and represented the Administrator in development of strategy, policy and outreach in the Chesapeake Bay region and nationally.

U.S. Environmental Protection Agency - Region 3 - Philadelphia, Pennsylvania
February 2010 – March, 2011
Senior Advisor to the Regional Administrator

Worked directly with the Regional Administrator and senior management staff in Region 3

and EPA Headquarters on Chesapeake Bay restoration activities. Extensive involvement in the development of the Chesapeake Bay Total Maximum Daly Load, State Watershed Implementation Plans, and all related technical, policy and legal activities. Close interaction with EPA's Chesapeake Bay Program office and Cabinet-level representatives in the seven Bay jurisdictions. Represented EPA before state and federal legislative committees. Frequent interaction with news media and speaking engagements throughout the Bay region.

Commonwealth of Virginia - Richmond, Virginia
January 2006 – January 2010
Assistant Secretary of Natural Resources

Appointed by Governor Kaine in January 2006 as part of his immediate natural resources team. Primary responsibilities included developing policy, regulation and legislation to foster the protection and enhancement of Virginia's natural resources. Areas of focus included water quality, water supply, air, fisheries, wildlife and others. A key member of the Governor's natural resources team that oversaw more than 2200 employees at six different natural resource agencies throughout the Commonwealth with a combined annual budget of over $400 million. Served as point person for all Chesapeake Bay Program interaction including duties related to the Management Board, Principals' Staff Committee and Executive Council. Authored numerous state reports, policy papers and legislative drafts.

Virginia Executive Institute- Summer 2009

Nominated by the Governor's Chief of Staff to attend the Virginia Executive Institute, an intensive two-week professional training course for senior Administration members designed to further develop leadership skills and vision.

Chesapeake Bay Foundation (CBF) - Richmond, Virginia
December 1996 – December 2005
Virginia Deputy Director and Senior Scientist

Management responsibilities including staff supervision, budget preparation, policy and work plan development, and operations oversight. Programmatic management including oversight of CBF's oyster aquaculture facility, Hampton Roads office staff and programs and Virginia-wide land use and water quality issues.

Diverse technical responsibilities for water quality issues including in-depth legislation and policy development, regulatory written review/comment, oral testimony, permit review, technical advisory committee participation, water quality monitoring/sampling, education (field trips), fundraising donor events, CBF spokesperson (media, watershed groups, elected officials, environmental conferences, etc.).

Texas Natural Resource Conservation Commission - Austin, Texas
August 1993 - November 1996
Environmental Geologist/Water Quality Specialist

Enforcement Division - Reviewed enforcement cases and remediation strategies (soil and groundwater contamination) for compliance with state and federal laws and regulations.

Water Quality Standards – Evaluated water chemistry, biological and sediment chemistry data to determine compliance of pollution discharge permits with state water quality standards.

Science Applications International Corporation, Narragansett, Rhode Island
March 1990 - May 1993
Environmental Chemist

Worked on-site with the U.S. EPA involving the collection and contaminant analysis of sediment, water and aquatic organisms. Managed the operation of the trace metal laboratory and performed research on development of federal water and sediment quality standards.

SKILLS

- In-depth knowledge of federal laws, policies, regulations and past regional agreements and commitments relating to Chesapeake Bay restoration efforts and strategies.
- Extensive working knowledge of the Executive and Legislative branches of Virginia government and surrounding Chesapeake area states.
- 15 years of extensive interaction with Virginia's congressional delegation on environmental matters.
- Extensive knowledge of state and federal environmental standards, regulations and laws.
- 20+ years working for, and with, state and federal agencies regarding technical, regulatory, legal and legislative issues.
- 20+ years of experience with environmental sampling, monitoring and analysis techniques.
- 20+ years experience as environmental activist, educating and motivating various stakeholders (local/regional watershed groups, state/federal agencies, concerned citizens) to comprehend environmental issues.
- 20+ years of experience delivering oral presentations to diverse groups including academia, citizen organizations, technical audiences and administration and legislative committees.
- 20+ years of experience compiling detailed, technical written comments and reports to state and federal agencies.
- Representative on numerous technical advisory committees working cooperatively with opponents as well as other environmental groups and concerned parties.

AFFILIATIONS

- Board Member, Green Infrastructure Center
- Member, Chesapeake Bay Foundation Richmond Advisory Council

Chesapeake Bay Nutrient Land Trust, LLC
Cranstons Mill Pond
Surface Water Balance Evaluation
Final Report

Greeley and Hansen
March 9, 2016

A. GENERAL

Chesapeake Bay Nutrient Land Trust (CBNLT) is considering using Cranstons Mill Pond (CMP) as a reservoir for raw water supply. Since July 31, 2015, CBNLT has been collecting the reservoir level data at the spillway using a water level monitor in order to estimate surface water discharge from CMP. This report summarizes the results of a surface water balance evaluation of the CMP flows, including direct precipitation, surface water inflow, groundwater inflow and any other potential inflow sources. A preliminary evaluation of the groundwater inflow was also conducted based on available groundwater information and well data.

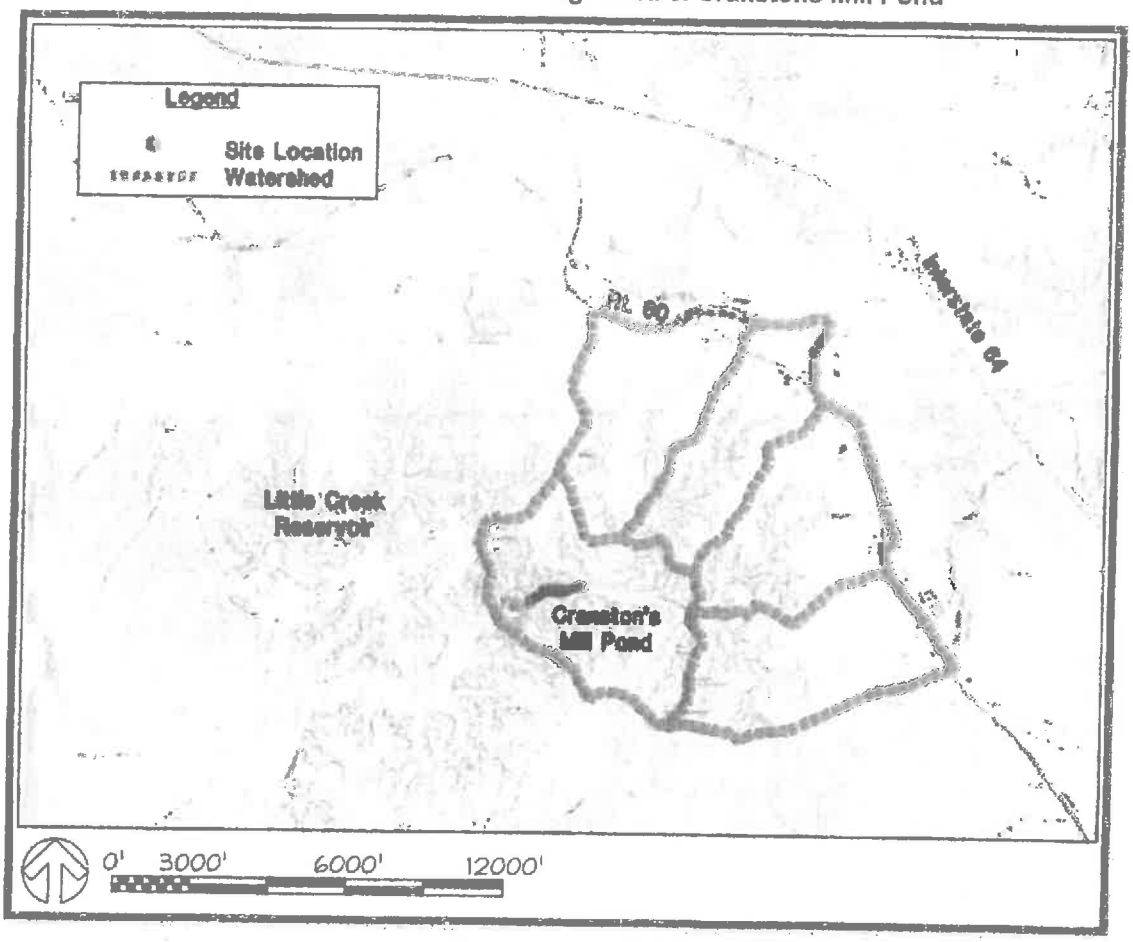
B. EXECUTIVE SUMMARY

1. The water balance evaluation over the 7-month period from July 31, 2015 to February 29, 2016 indicates a daily average CMP outflow of 8.4 million gallons per day (MGD) with estimated average groundwater inflows ranging from 60% to 66% of the total inflow.
2. During the 7-month period, while there were periods of low inflow rates, these periods were infrequent and short, and CMP outflows increased quickly during or following precipitation events.
3. CMP appears to be geographically situated to receive groundwater flows, either directly or indirectly, from two aquifers – the shallow unconfined Quaternary aquifer and the underlying, confined Yorktown-Eastover aquifer.
4. Available long-term groundwater well level data indicates expected fluctuations during periods of low precipitation, with levels in the upper unconfined aquifer decreasing 4-5 feet from the average level while the lower aquifer was impacted minimally.
5. The historical groundwater level data illustrates that both aquifers have recovered quickly following drought periods.

C. CRANSTONS MILL POND DRAINAGE AREA

The location of CMP and its drainage area are shown on **Figure 1** below. CMP has a 100-ft long spillway with the crest at El. 8.15. The bottom of the pond is at approximately El. 1.5. The pond has a water surface area of about 48 acres at the normal pool level of El. 8.27 (average based on the Lasso monitoring data). The total estimated storage volume at El. 8.27 is about 48 MG. The drainage area upstream of the spillway is approximately 7 square miles. The topography of the drainage area is fairly steep with elevations changing from sea level at the bottom of the pond to about El. 100 at high points. The drainage area also has many natural streams that may incise the shallow aquifers to receive groundwater inflow. The upper portion of the CMP drainage area is lightly developed whereas the lower portion is dominated by tracts of forest. The drainage area has a low percentage of impervious cover – approximately 9.3% based on the current GIS data acquired from James City County.

Figure 1 Location and Drainage Area of Cranstons Mill Pond



Based on a review of the USGS topographic maps and information provided by CBNLT, there do not appear to be other inflow sources to CMP than direct precipitation on the pond, overland runoff from its drainage area and groundwater inflows to the streams and pond within the drainage area.

D. DATA COLLECTION

The following data was used for this study:

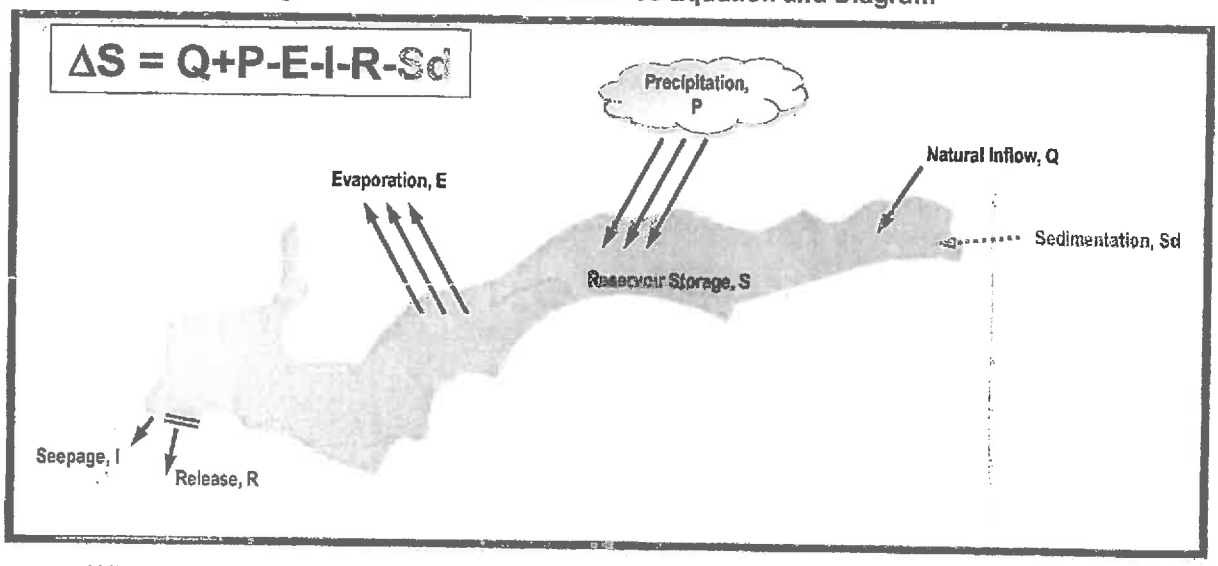
- 15-min CMP monitoring data from July 31, 2015 to February 29, 2016, including the water depth over the spillway, and local air temperature.
- Precipitation data from a private weather station Colonial Heritage KVAWILLI21.
- The drawings of the spillway and derived spillway discharge coefficient provided by McKinney & Company.
- CMP elevation-storage and elevation-area tables provided by CBNLT to estimate storage volume and ponding area at various water levels.
- Historical groundwater well data downloaded from USGS websites.

E. SURFACE WATER BALANCE EVALUATION

The objective of the surface water balance evaluation is to estimate the groundwater component (base flow) in the pond inflow based on the pond level monitoring data at the spillway from July 31, 2015 to February 29, 2016. The evaluation methodology is described as follows.

- Using the reservoir water balance equation to calculate the pond inflows based on the measured outflow data. The reservoir water balance equation is depicted in the diagram below on **Figure 2**.
- Using published and USGS approved approaches to separate the daily pond inflow hydrograph to estimate the base flow (groundwater) quantity during the monitoring period. Three approaches were used and compared: BFlow Digital Filter (Arnold 1995), Recursive Digital Filter (Eckhardt, 2005), and PART (Rutledge 1993).

Figure 2 Reservoir Water Balance Equation and Diagram



Where, **S** is calculated based on the elevation-storage table;
P is precipitation data;
E is estimated using Hargreaves Method which takes inputs of reservoir area data, temperature, etc.
I is unknown and is neglected for this analysis;
R is calculated using the depth over the spillway data and spillway discharge equation with a weir discharge coefficient of 2.85 based on McKinney Company's measurement;
S_d is unknown and neglected for this analysis; and
Q is calculated based on the water balance equation which includes both stormwater runoff and groundwater flow. Note that Q does not include the flow from direct precipitation on the pond surface.

Figure 3 shows the precipitation and hydrographs of CMP total inflow and groundwater flow based on three different approaches for the period of July 31, 2015 through February 29, 2016. Note that the data from October 10 to October 13, 2015 was not used as the pond level dropped below the spillway and the low flow pipes were open. As shown in the figure, there is some discrepancy between different hydrograph separation approaches. **Figure 4** shows the frequency plot of the CMP daily total outflow.

Table 1 summarizes the statistics of the analysis results. Approximately 60-66% of the total inflow to CMP was from groundwater based on 7 months of monitoring data. This is consistent with the James City County wide general water budget number in the USGS report (Figure 15, Page 35, USGS 1980) in which the groundwater seepage to streams is about 65% the total flow to the streams. The daily data for the water balance calculation is shown in **Appendix A**. The weekly flow data is shown in **Appendix B**.

Figure 3 Precipitation and Hydrographs During the Flow Monitoring Period

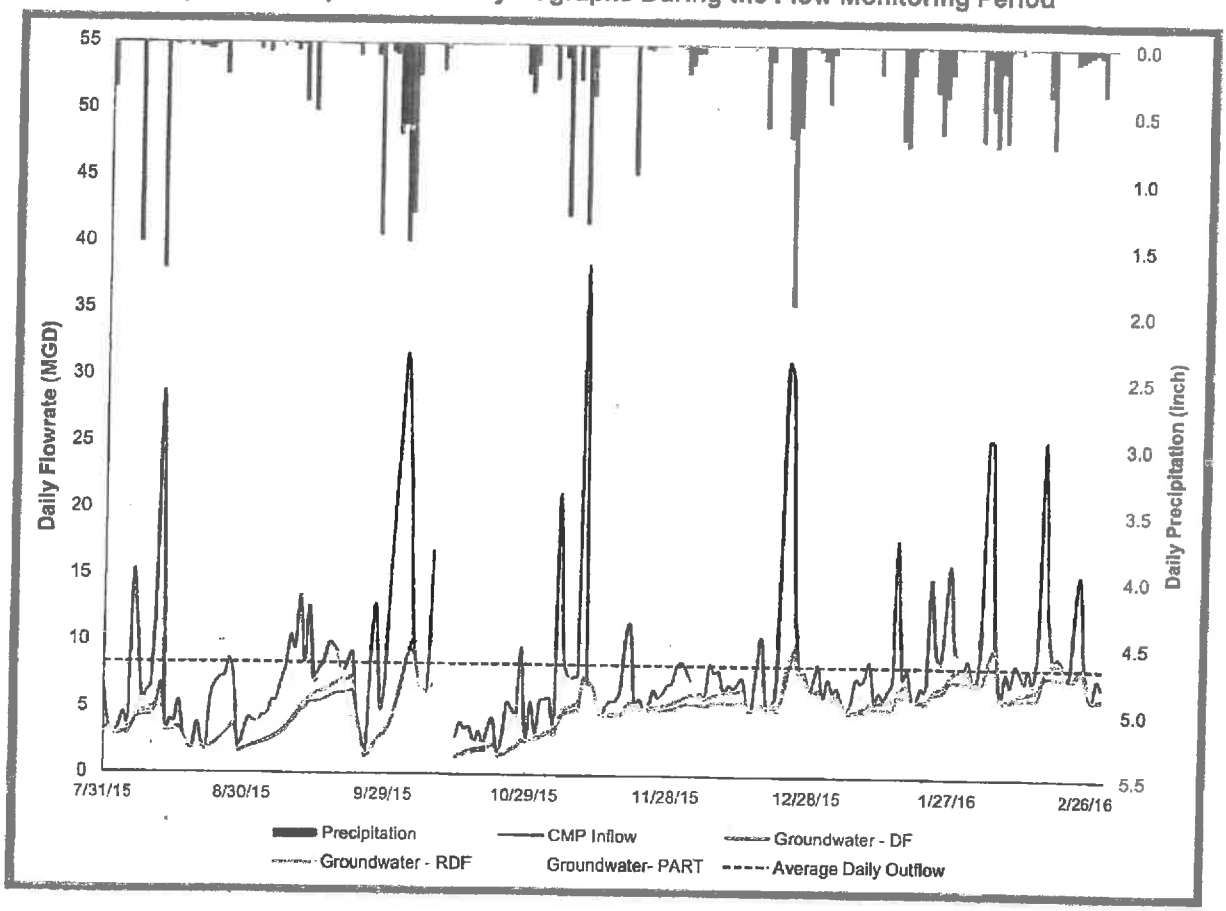


Figure 4 Frequency Plot of Cranstons Mill Pond Daily Total Outflow

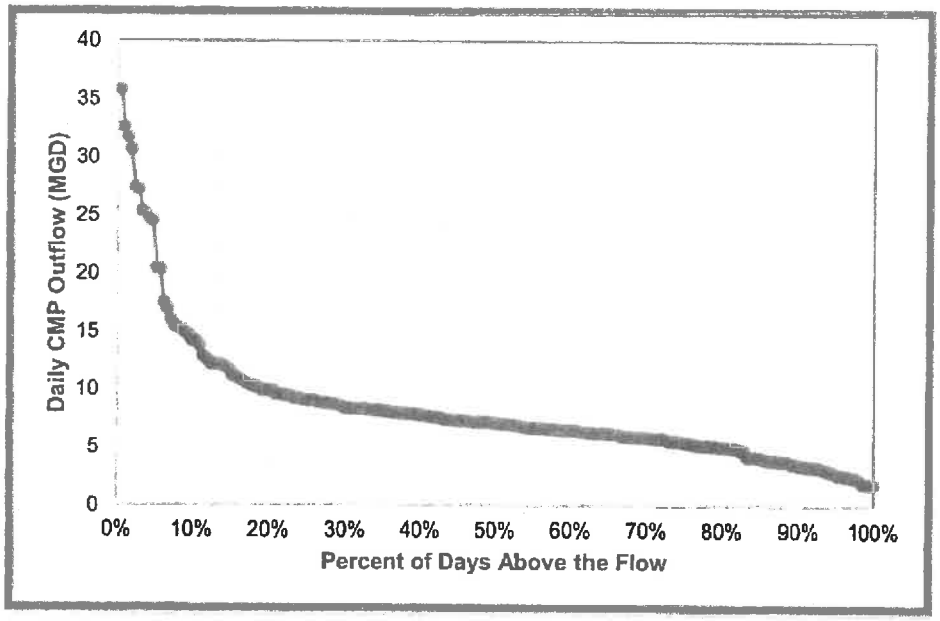


Table 1 Summary of Flow Estimates based on Data from July 31, 2015 through February 29, 2016

Parameter	Daily Total Outflow (MGD)	Daily Total Inflow (MGD) (1)	Daily Groundwater Inflow (MGD)		
			Digital Filter (DF) Method	Recursive Digital Filter (RDF) Method	PART Method
Min	1.86	1.46	1.34	1.34	1.46
Median	7.09	7.04	5.50	5.25	5.77
Max	35.80	38.44	9.97	9.58	9.40
Average	8.36	8.25	5.19	4.98	5.41
Percentage of Groundwater in Total Inflow			63%	60%	66%

(1) Total Inflow does not include direct precipitation on the pond surface.

F. GROUNDWATER

Groundwater inflow to a surface water body is impacted by the hydrologic cycle processes and the characteristics of the aquifer(s) incised by the surface water body. It is also impacted by the groundwater withdrawals (pumping) from the same aquifers. Based on the USGS Groundwater Hydrology of James City County Report (USGS 1980), CMP is expected to receive groundwater inflows from two aquifers: one is the shallow unconfined aquifer called "Quaternary" and the other is the deeper confined Yorktown-Eastover aquifer. Additional information on these two aquifers is included in **Appendix C.**

There are three USGS groundwater wells that are located within 10 miles from CMP and have historical level data available. The locations of the three wells are shown on **Figure 5**. **Table 2** shows the local aquifer and range of the water levels in the wells as compared to the CMP water level. The data review showed expected fluctuations during periods of low precipitation. During the 2002 drought period, the water level in the shallow unconfined aquifer dropped about 4 to 5 feet compared to the most recent level measurements, whereas the level in the underlying confined aquifer dropped only about 2 feet compared

to the most recent level measurements. The historical groundwater level data also illustrates that both aquifers have recovered quickly following drought periods. Additional information on these wells is included in **Appendix C**.

Figure 5 USGS Groundwater Wells near Cranstons Mill Pond

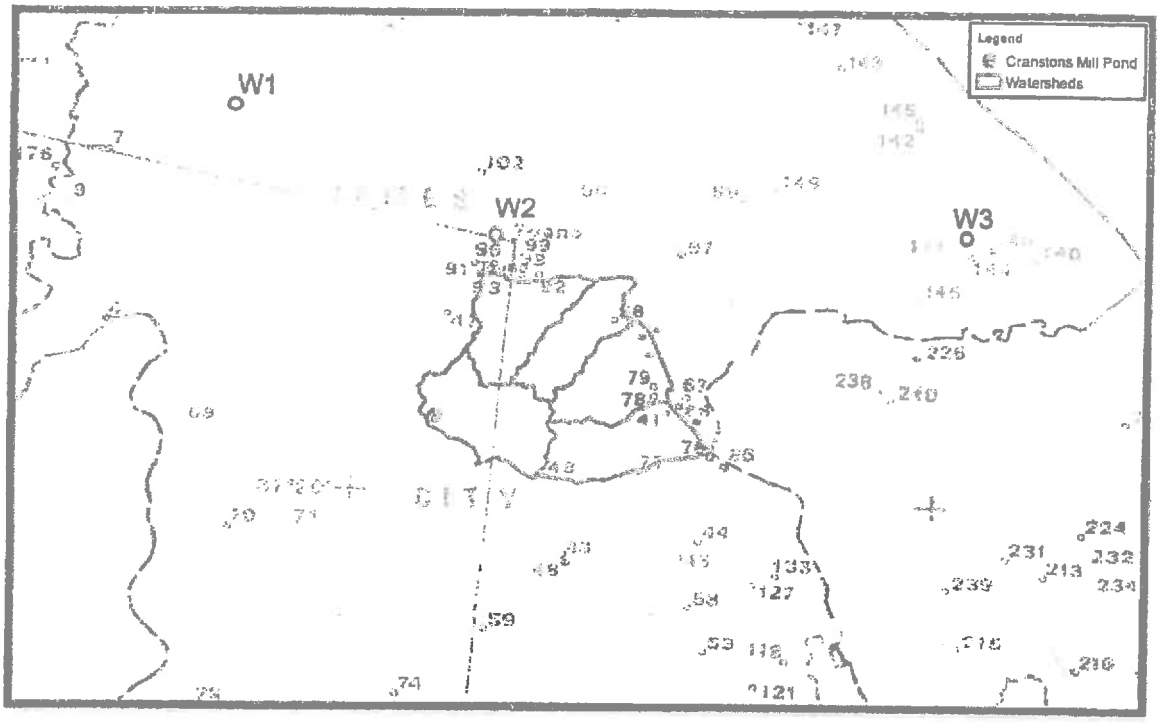


Table 2 Historical Level at USGS Groundwater Wells near Cranstons Mill Pond

Parameter	USGS Groundwater Wells		
	W1	W2	W3
USGS Well Number	56H30SOW177F	56H31 SOW135B	57H 14 SOW095
Land Surface Elevation	103	95	93
Aquifer	Upper Chesapeake Group (121CSPKU) (1)	Quaternary System (110QRNR)	Upper Chesapeake Group (121CSPKU)
Maximum Groundwater Elevation	86	79	48
Minimum Groundwater Elevation	76	70	37
2015/2016 Groundwater Elevation	81	74	39
CMP Water Elevation (Spillway)	8.15	8.15	8.15

(1) Based on USGS publication (USGS 1992, Table 1, Page A8), the upper part of the Chesapeake aquifer west of the bay in Virginia generally refers to the local Yorktown-Eastover aquifer.

REFERENCES

USGS (1980). Groundwater Hydrology of James City County, Virginia. John F. Harsh. Water-Resources Investigations 80-961.

USGS (1990). Conceptualization and Analysis of Ground-Water Flow System in the Coastal Plain of Virginia and Adjacent Parts of Maryland and North Carolina. John F. Harsh and Randell J. Laczniak. U.S. Geological Survey Professional Paper 1404-F.

USGS (2006). Professional Paper 1731. Approximate altitude and configuration of the top of the Yorktown-Eastover aquifer in the Virginia Coastal Plain - Plate 24. Virginia Coastal Plain Hydrogeologic Framework.

USGS (1992). The Regional Aquifer System Underlying the Northern Atlantic Coastal Plain in Parts of North Carolina, Virginia, Maryland, Delaware, New Jersey, and New York Summary. Henry Trapp, Jr., And Harold Meisler. U.S. Geological Survey Professional Paper 1404-A.

Arnold, J.G., P.M. Allen, R. Muttiah, and G. Bernhardt (1995). "Automated Baseflow Separation and Recession Analysis Techniques." Groundwater 33(6): 1010-1018.

Eckhardt, K. (2005). "How to Construct Recursive Digital Filters for Baseflow Separation." Hydrological Processes 19(2): 507-515.

Rutledge, A.T. (1993). "Computer Programs for Describing the Recession of Ground-Water Discharge and for Estimating Mean Ground-Water Recharge and Discharge from Streamflow Records".

Appendix A

Cranstons Mill Pond
Surface Water Balance Calculation

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
7/31/2015	0.34	1.26	8.25	6.58	0.16	47.66	6.58	3.29	3.29	3.08
8/1/2015	0.00	0.87	8.22	3.84	0.16	47.17	3.48	3.42	3.24	3.23
8/2/2015	0.00	0.74	8.21	2.97	0.16	47.00	2.96	2.95	2.95	2.95
8/3/2015	0.00	0.80	8.22	3.34	0.16	47.08	3.58	2.98	2.95	3.17
8/4/2015	0.00	0.96	8.23	4.22	0.16	47.28	4.58	3.06	3.01	3.40
8/5/2015	0.00	0.84	8.22	3.64	0.16	47.13	3.65	3.14	3.01	3.65
8/6/2015	1.50	2.18	8.33	15.20	0.16	48.86	15.11	3.61	3.85	4.23
8/7/2015	0.01	1.84	8.30	11.10	0.20	48.42	10.85	4.31	4.29	4.89
8/8/2015	0.00	1.24	8.25	6.24	0.19	47.65	5.66	4.61	4.32	5.66
8/9/2015	0.00	1.21	8.25	6.02	0.19	47.60	6.16	4.71	4.38	5.08
8/10/2015	0.00	1.28	8.26	6.49	0.19	47.69	6.77	4.83	4.47	4.56
8/11/2015	1.70	2.25	8.34	16.07	0.18	48.95	15.26	5.30	5.18	4.10
8/12/2015	0.01	3.14	8.41	27.24	0.12	50.12	28.51	6.55	6.82	3.68
8/13/2015	0.02	1.17	8.25	5.78	0.12	47.55	3.30	3.30	3.30	3.30
8/14/2015	0.01	0.94	8.23	4.24	0.12	47.26	4.05	3.33	3.30	3.33
8/15/2015	0.00	0.88	8.22	3.88	0.12	47.18	3.93	3.38	3.28	3.39
8/16/2015	0.03	1.07	8.24	5.11	0.13	47.43	5.45	3.48	3.39	2.90
8/17/2015	0.00	0.77	8.21	3.14	0.10	47.04	2.85	2.85	2.85	2.49
8/18/2015	0.03	0.61	8.20	2.31	0.09	46.83	2.15	2.15	2.15	2.15
8/19/2015	0.03	0.53	8.19	1.98	0.09	46.74	1.94	1.94	1.94	1.94
8/20/2015	0.05	0.77	8.21	3.48	0.09	47.04	3.81	2.00	2.04	2.02
8/21/2015	0.05	0.64	8.20	2.46	0.10	46.87	2.32	2.09	2.02	2.11
8/22/2015	0.02	0.53	8.19	1.91	0.10	46.73	1.85	1.85	1.85	1.85
8/23/2015	0.01	1.07	8.24	5.02	0.10	47.43	5.81	2.00	2.11	1.84
8/24/2015	0.24	1.31	8.26	6.70	0.10	47.74	6.80	2.32	2.42	1.83
8/25/2015	0.00	1.35	8.26	7.08	0.10	47.78	7.23	2.67	2.73	1.82
8/26/2015	0.00	1.38	8.26	7.23	0.13	47.82	7.40	3.02	3.02	1.82
8/27/2015	0.00	1.52	8.28	8.33	0.13	48.00	8.64	3.39	3.38	1.81
8/28/2015	0.00	1.36	8.26	7.37	0.11	47.80	7.27	3.74	3.61	1.80
8/29/2015	0.01	0.68	8.21	2.57	0.11	46.93	1.79	1.79	1.79	1.79
8/30/2015	0.00	0.73	8.21	2.82	0.11	46.99	2.99	1.84	1.85	2.26
8/31/2015	0.05	0.91	8.23	3.87	0.09	47.22	4.13	1.96	1.98	2.85
9/1/2015	0.00	0.91	8.23	3.89	0.13	47.21	4.02	2.13	2.09	3.60

A5

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
9/2/2015	0.07	0.89	8.22	3.78	0.13	47.19	3.80	2.26	2.18	3.79
9/3/2015	0.00	0.95	8.23	4.15	0.14	47.27	4.36	2.39	2.31	4.03
9/4/2015	0.00	0.96	8.23	4.21	0.14	47.28	4.36	2.54	2.42	4.29
9/5/2015	0.03	1.11	8.24	5.20	0.14	47.47	5.49	2.72	2.60	4.69
9/6/2015	0.00	1.14	8.24	5.39	0.15	47.51	5.59	2.93	2.77	5.14
9/7/2015	0.01	1.30	8.26	6.59	0.15	47.72	6.94	3.18	3.02	5.67
9/8/2015	0.06	1.43	8.27	7.91	0.15	47.89	8.15	3.51	3.35	6.28
9/9/2015	0.01	1.70	8.29	9.90	0.16	48.23	10.39	3.94	3.81	6.95
9/10/2015	0.44	1.70	8.29	9.94	0.15	48.24	9.52	4.39	4.16	7.71
9/11/2015	0.00	2.02	8.32	12.84	0.15	48.66	13.40	4.92	4.77	7.56
9/12/2015	0.51	1.63	8.29	9.46	0.15	48.15	8.44	5.37	4.95	7.43
9/13/2015	0.00	1.93	8.31	12.03	0.17	48.54	12.59	5.76	5.43	7.22
9/14/2015	0.00	1.42	8.27	7.57	0.16	47.88	7.07	6.06	5.45	7.04
9/15/2015	0.00	1.44	8.27	7.69	0.16	47.90	7.86	6.17	5.53	7.52
9/16/2015	0.00	1.51	8.28	8.29	0.12	47.99	8.51	6.32	5.64	8.03
9/17/2015	0.01	1.67	8.29	9.55	0.12	48.19	9.85	6.53	5.85	8.58
9/18/2015	0.01	1.67	8.29	9.58	0.10	48.20	9.67	6.77	6.02	9.17
9/19/2015	0.01	1.61	8.28	9.05	0.10	48.12	9.06	6.97	6.14	9.06
9/20/2015	0.01	1.47	8.27	7.91	0.09	47.94	7.81	7.08	6.15	7.81
9/21/2015	0.09	1.52	8.28	8.35	0.11	48.01	8.41	7.15	6.20	5.60
9/22/2015	0.00	1.59	8.28	8.93	0.11	48.10	9.13	7.28	6.31	4.02
9/23/2015	0.00	1.07	8.24	5.26	0.10	47.43	4.69	4.69	4.69	2.89
9/24/2015	0.00	0.81	8.22	3.28	0.10	47.09	3.04	3.04	3.04	2.07
9/25/2015	0.09	0.54	8.20	1.86	0.09	46.74	1.49	1.49	1.49	1.49
9/26/2015	1.44	1.63	8.29	9.44	0.07	48.15	9.04	1.77	2.02	1.98
9/27/2015	0.01	1.94	8.31	12.19	0.06	48.54	12.63	2.45	2.77	2.69
9/28/2015	0.06	1.21	8.25	5.92	0.09	47.60	4.99	2.93	2.88	3.70
9/29/2015	0.08	1.34	8.26	6.99	0.09	47.77	7.15	3.16	3.14	4.00
9/30/2015	0.68	2.16	8.33	14.18	0.09	48.84	14.45	3.74	3.92	4.33
10/1/2015	0.61	2.75	8.38	20.32	0.11	49.61	20.39	4.76	5.07	4.69
10/2/2015	1.49	3.28	8.42	27.38	0.12	50.31	26.21	6.15	6.54	5.10
10/3/2015	1.27	3.77	8.46	32.57	0.12	50.97	31.63	7.86	8.28	5.55
10/4/2015	0.24	3.17	8.41	25.13	0.12	50.16	24.12	9.36	9.30	6.06

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
10/5/2015	0.01	1.96	8.31	12.19	0.11	48.57	10.70	9.97	9.23	6.62
10/6/2015	0.01	1.45	8.27	7.82	0.11	47.92	7.26	7.26	7.26	7.26
10/7/2015	0.00	1.29	8.26	6.51	0.08	47.71	6.37	6.37	6.37	6.37
10/8/2015	0.01	1.26	8.26	6.35	0.09	47.67	6.40	6.37	6.26	6.04
10/9/2015	0.20	1.28	8.26	16.95	0.10	47.69	16.81	6.77	6.92	7.33
10/10/2015	0.04									
10/11/2015	0.00									
10/12/2015	0.01				See Note [11]					
10/13/2015	0.00									
10/14/2015	0.00	0.68	8.21	2.69	0.09	46.92	2.69	1.34	1.34	2.69
10/15/2015	0.01	0.85	8.22	3.59	0.09	47.14	3.89	1.49	1.51	2.86
10/16/2015	0.01	0.84	8.22	3.42	0.10	47.13	3.48	1.65	1.62	3.05
10/17/2015	0.00	0.85	8.22	3.49	0.09	47.14	3.59	1.80	1.74	2.73
10/18/2015	0.01	0.68	8.21	2.58	0.10	46.93	2.45	1.89	1.76	2.46
10/19/2015	0.00	0.77	8.21	3.06	0.09	47.04	3.27	1.96	1.84	2.42
10/20/2015	0.00	0.65	8.20	2.46	0.08	46.88	2.38	2.02	1.85	2.38
10/21/2015	0.01	0.79	8.22	3.33	0.08	47.06	3.57	2.09	1.94	2.02
10/22/2015	0.01	0.90	8.22	4.01	0.07	47.20	4.20	2.23	2.07	1.72
10/23/2015	0.00	0.52	8.19	1.87	0.07	46.72	1.46	1.46	1.46	1.46
10/24/2015	0.00	0.69	8.21	2.66	0.07	46.93	2.93	1.52	1.54	2.08
10/25/2015	0.00	1.06	8.24	4.91	0.07	47.41	5.46	1.72	1.80	2.97
10/26/2015	0.00	1.08	8.24	4.97	0.06	47.43	5.04	1.96	2.01	4.27
10/27/2015	0.22	1.04	8.24	4.80	0.05	47.36	4.52	2.19	2.16	4.52
10/28/2015	0.36	1.62	8.29	9.24	0.06	48.14	9.60	2.56	2.67	3.43
10/29/2015	0.15	0.77	8.21	3.81	0.08	47.04	2.60	2.60	2.60	2.60
10/30/2015	0.00	1.07	8.24	5.05	0.07	47.42	5.50	2.71	2.77	2.81
10/31/2015	0.00	0.81	8.22	3.37	0.07	47.08	3.10	2.82	2.74	3.02
11/1/2015	0.01	1.10	8.24	5.17	0.07	47.46	5.61	2.94	2.90	3.19
11/2/2015	0.26	1.18	8.25	5.90	0.07	47.56	5.73	3.15	3.06	3.36
11/3/2015	0.00	1.13	8.24	5.79	0.07	47.50	5.80	3.34	3.21	3.55
11/4/2015	0.09	0.90	8.22	4.10	0.07	47.20	3.74	3.45	3.19	3.74
11/5/2015	1.28	2.70	8.38	20.46	0.07	49.55	21.17	4.12	4.46	5.27
11/6/2015	0.00	1.73	8.29	10.23	0.07	48.28	9.04	4.95	4.71	7.52

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
11/7/2015	0.26	1.47	8.27	7.94	0.06	47.94	7.32	5.19	4.82	7.32
11/8/2015	0.00	1.40	8.27	7.42	0.08	47.85	7.41	5.35	4.92	7.12
11/9/2015	1.34	1.58	8.28	9.06	0.08	48.09	7.62	5.51	5.03	6.92
11/10/2015	0.38	3.02	8.48	35.80	0.08	51.17	38.44	6.83	7.41	6.73
11/11/2015	0.01	1.70	8.29	9.92	0.07	48.24	7.05	7.08	7.08	6.54
11/12/2015	0.01	1.38	8.27	7.22	0.07	47.82	6.86	6.86	6.86	5.94
11/13/2015	0.00	1.17	8.25	5.62	0.05	47.65	5.40	5.40	5.40	5.40
11/14/2015	0.00	1.04	8.24	4.75	0.05	47.39	4.64	4.64	4.64	4.64
11/15/2015	0.00	1.11	8.24	5.22	0.05	47.47	5.35	4.67	4.61	4.72
11/16/2015	0.00	1.15	8.25	5.53	0.05	47.52	5.63	4.72	4.60	4.80
11/17/2015	0.00	1.17	8.25	5.61	0.05	47.55	5.68	4.80	4.59	4.88
11/18/2015	0.00	1.26	8.26	6.31	0.05	47.67	6.48	4.89	4.65	4.96
11/19/2015	0.97	1.79	8.30	10.86	0.05	48.35	10.32	5.16	4.98	5.05
11/20/2015	0.00	1.82	8.30	11.25	0.05	48.40	11.35	5.58	5.33	5.14
11/21/2015	0.02	1.23	8.25	6.16	0.05	47.83	5.42	5.42	5.27	5.23
11/22/2015	0.03	1.20	8.25	5.85	0.06	47.59	5.83	5.44	5.21	5.17
11/23/2015	0.00	1.11	8.24	5.18	0.06	47.47	5.12	5.12	5.11	5.12
11/24/2015	0.00	1.12	8.24	5.25	0.06	47.48	5.35	5.13	5.03	5.32
11/25/2015	0.00	1.25	8.25	6.26	0.06	47.66	6.49	5.19	5.05	5.54
11/26/2015	0.01	1.20	8.25	5.92	0.04	47.59	5.89	5.26	5.02	5.77
11/27/2015	0.01	1.24	8.25	6.16	0.04	47.64	6.24	5.33	5.01	6.02
11/28/2015	0.00	1.32	8.26	6.75	0.04	47.75	6.90	5.42	5.08	6.29
11/29/2015	0.02	1.35	8.26	6.97	0.04	47.79	7.03	5.53	5.11	6.57
11/30/2015	0.22	1.52	8.28	8.33	0.04	48.01	8.30	5.69	5.25	6.86
12/1/2015	0.15	1.57	8.28	8.71	0.04	48.07	8.61	5.90	5.40	7.16
12/2/2015	0.06	1.51	8.28	8.21	0.04	47.99	8.10	6.08	5.51	7.48
12/3/2015	0.06	1.38	8.27	7.23	0.04	47.83	7.03	6.19	5.51	7.03
12/4/2015	0.00	1.26	8.25	6.26	0.04	47.66	6.16	6.16	5.46	6.16
12/5/2015	0.00	1.25	8.25	6.26	0.04	47.66	6.39	6.17	5.42	6.05
12/6/2015	0.01	1.20	8.25	5.98	0.04	47.59	5.94	5.95	5.36	5.95
12/7/2015	0.00	1.49	8.27	8.03	0.04	47.96	8.44	6.04	5.49	6.37
12/8/2015	0.01	1.45	8.27	7.86	0.04	47.93	7.85	6.20	5.58	6.85
12/9/2015	0.01	1.47	8.27	7.94	0.03	47.94	7.97	6.33	5.64	6.42

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
12/10/2015	0.00	1.28	8.26	6.63	0.03	47.70	6.42	6.39	5.59	6.02
12/11/2015	0.00	1.31	8.26	6.85	0.04	47.74	6.93	6.41	5.58	6.05
12/12/2015	0.00	1.31	8.26	6.67	0.04	47.73	6.70	6.44	5.56	6.08
12/13/2015	0.00	1.34	8.26	6.93	0.05	47.78	7.02	6.48	5.57	5.78
12/14/2015	0.02	1.39	8.27	7.32	0.06	47.84	7.41	6.53	5.60	5.49
12/15/2015	0.00	1.16	8.25	5.55	0.06	47.53	5.30	5.30	5.30	5.23
12/16/2015	0.00	1.09	8.24	5.10	0.05	47.45	5.06	5.07	5.07	5.07
12/17/2015	0.61	1.51	8.28	8.38	0.05	48.00	8.18	5.18	5.20	5.14
12/18/2015	0.11	1.74	8.30	10.26	0.06	48.29	10.47	5.49	5.49	5.22
12/19/2015	0.00	1.21	8.25	5.93	0.06	47.60	5.30	5.30	5.30	5.30
12/20/2015	0.00	1.14	8.24	5.41	0.06	47.51	5.37	5.30	5.21	5.37
12/21/2015	0.00	1.21	8.25	5.90	0.05	47.60	6.04	5.33	5.17	5.71
12/22/2015	0.68	2.13	8.33	14.16	0.04	48.80	14.50	5.70	5.77	6.07
12/23/2015	1.94	3.61	8.45	31.73	0.06	50.74	31.10	6.99	7.54	6.44
12/24/2015	0.60	3.63	8.45	30.67	0.06	50.77	29.95	8.75	9.05	6.85
12/25/2015	0.01	2.27	8.34	15.33	0.07	48.98	13.59	9.73	9.22	7.28
12/26/2015	0.00	1.55	8.28	8.61	0.06	48.05	7.74	7.74	7.74	7.74
12/27/2015	0.01	1.48	8.27	7.99	0.06	47.95	7.94	7.74	7.61	7.08
12/28/2015	0.03	1.31	8.26	6.67	0.06	47.74	6.48	6.48	6.48	6.48
12/29/2015	0.10	1.39	8.27	7.30	0.06	47.84	7.34	6.51	6.42	6.30
12/30/2015	0.42	1.57	8.28	8.79	0.06	48.07	8.53	6.62	6.46	6.13
12/31/2015	0.05	1.16	8.25	6.51	0.06	47.53	5.96	5.96	5.96	5.96
1/1/2016	0.00	1.37	8.26	7.09	0.06	47.81	7.42	6.01	5.96	5.98
1/2/2016	0.00	1.29	8.26	6.53	0.06	47.71	6.49	6.08	5.89	6.02
1/3/2016	0.00	1.32	8.26	6.73	0.04	47.74	6.80	6.13	5.84	5.69
1/4/2016	0.00	1.18	8.25	5.76	0.05	47.57	5.63	5.64	5.64	5.38
1/5/2016	0.00	1.08	8.24	5.00	0.05	47.43	4.91	4.91	4.91	4.91
1/6/2016	0.00	1.14	8.25	5.48	0.04	47.52	5.61	4.94	4.87	5.29
1/7/2016	0.01	1.38	8.26	7.16	0.03	47.82	7.47	5.05	4.97	5.71
1/8/2016	0.01	1.38	8.26	7.17	0.03	47.82	7.19	5.23	5.05	6.19
1/9/2016	0.01	1.42	8.27	7.53	0.04	47.88	7.61	5.39	5.14	5.97
1/10/2016	0.20	1.57	8.28	8.75	0.05	48.07	8.73	5.60	5.31	5.78
1/11/2016	0.00	1.26	8.25	6.27	0.05	47.66	5.92	5.73	5.26	5.60

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
1/12/2016	0.00	1.27	8.26	6.40	0.04	47.68	6.46	5.77	5.25	5.64
1/13/2016	0.00	1.22	8.25	5.99	0.05	47.62	5.97	5.80	5.21	5.68
1/14/2016	0.00	1.29	8.26	6.51	0.05	47.70	6.64	5.84	5.22	5.90
1/15/2016	0.69	1.47	8.27	8.02	0.05	47.94	7.40	5.92	5.28	6.14
1/16/2016	0.74	2.46	8.36	17.48	0.05	49.23	17.84	6.42	6.11	6.39
1/17/2016	0.20	1.60	8.28	8.96	0.05	48.10	7.61	6.90	6.14	6.65
1/18/2016	0.01	1.53	8.28	8.40	0.05	48.04	8.34	6.98	6.17	6.20
1/19/2016	0.00	1.25	8.25	6.21	0.05	47.66	5.90	5.89	5.89	5.81
1/20/2016	0.01	1.20	8.25	5.81	0.05	47.59	5.78	5.78	5.78	5.78
1/21/2016	0.00	1.31	8.26	6.66	0.05	47.73	6.85	5.82	5.75	6.15
1/22/2016	0.33	1.34	8.26	6.90	0.05	47.77	6.55	5.89	5.71	6.55
1/23/2016	0.64	2.22	8.33	14.71	0.03	48.91	15.03	6.26	6.29	7.61
1/24/2016	0.37	1.79	8.30	10.71	0.03	48.36	9.71	6.72	6.42	8.85
1/25/2016	0.20	1.61	8.28	9.15	0.04	48.13	8.70	6.90	6.48	8.70
1/26/2016	0.00	1.89	8.31	11.74	0.04	48.49	12.15	7.16	6.77	8.93
1/27/2016	0.01	2.30	8.34	15.48	0.04	49.02	16.04	7.68	7.34	9.16
1/28/2016	0.00	1.77	8.30	10.54	0.04	48.33	9.90	8.08	7.39	9.40
1/29/2016	0.00	1.61	8.28	9.09	0.04	48.12	8.93	8.18	7.37	8.93
1/30/2016	0.00	1.51	8.28	8.26	0.04	47.99	8.17	8.17	7.29	8.17
1/31/2016	0.00	1.57	8.28	8.82	0.05	48.07	8.95	8.20	7.28	7.72
2/1/2016	0.70	1.51	8.28	8.22	0.06	47.98	7.28	7.28	7.14	7.28
2/2/2016	0.07	1.43	8.27	7.62	0.06	47.89	7.50	7.29	7.04	7.04
2/3/2016	0.46	1.89	8.31	12.08	0.07	48.49	12.14	7.48	7.28	6.80
2/4/2016	0.74	3.12	8.41	24.68	0.07	50.10	25.38	8.32	8.49	6.57
2/5/2016	0.18	3.18	8.41	25.39	0.08	50.17	25.29	9.60	9.58	6.35
2/6/2016	0.70	1.95	8.31	12.18	0.08	48.56	9.72	9.73	9.41	6.13
2/7/2016	0.02	1.31	8.26	6.70	0.08	47.73	5.92	5.92	5.92	5.92
2/8/2016	0.00	1.45	8.27	7.73	0.07	47.91	7.98	6.00	5.97	6.31
2/9/2016	0.04	1.34	8.26	7.19	0.07	47.77	7.07	6.11	5.93	6.75
2/10/2016	0.01	1.52	8.28	8.35	0.05	48.01	8.63	6.24	6.02	7.16
2/11/2016	0.00	1.51	8.28	8.23	0.05	47.99	8.25	6.41	6.08	7.61
2/12/2016	0.00	1.39	8.27	7.28	0.05	47.84	7.18	6.51	6.05	7.17
2/13/2016	0.00	1.50	8.28	8.15	0.04	47.98	8.34	6.60	6.11	7.21

Date	Precipitation (in) [1]	Daily Average Water Depth Over Spillway (in) [2]	Daily Average Water Elevation at Spillway [3]	CMP Outflow (MGD) [4]	Daily Evaporation Volume (MG) [5]	Daily Storage Volume (MG) [6]	Estimated Total Inflow (MGD) [7]	Estimated Groundwater Inflow (MGD)		
								BFlow Digital Filter Method [8]	Recursive Digital Filter Method [9]	PART Method [10]
2/14/2016	0.00	1.40	8.27	7.33	0.05	47.85	7.24	6.69	6.08	7.25
2/15/2016	0.35	1.75	8.30	10.40	0.04	48.30	10.44	6.85	6.29	7.66
2/16/2016	0.74	3.11	8.41	24.56	0.06	50.08	25.41	7.68	7.59	8.09
2/17/2016	0.00	2.12	8.33	13.81	0.06	48.79	12.57	8.53	7.81	8.56
2/18/2016	0.00	1.67	8.29	9.57	0.06	48.20	9.04	8.70	7.76	9.04
2/19/2016	0.00	1.63	8.29	9.24	0.06	48.15	9.25	8.73	7.73	8.74
2/20/2016	0.00	1.58	8.28	8.86	0.07	48.08	8.87	8.76	7.67	8.46
2/21/2016	0.11	1.45	8.27	7.77	0.08	47.91	7.54	7.54	7.52	7.54
2/22/2016	0.09	1.50	8.27	8.12	0.06	47.97	8.13	7.56	7.43	7.39
2/23/2016	0.07	2.00	8.32	12.61	0.07	48.62	13.24	7.79	7.72	7.23
2/24/2016	0.05	2.25	8.34	14.94	0.07	48.95	15.27	8.28	8.14	7.08
2/25/2016	0.03	1.70	8.29	9.93	0.07	48.24	9.25	8.58	8.07	6.93
2/26/2016	0.05	1.38	8.26	7.20	0.07	47.82	6.78	6.79	6.79	6.79
2/27/2016	0.34	1.30	8.26	6.56	0.07	47.71	6.08	6.08	6.08	6.08
2/28/2016	0.00	1.40	8.27	7.40	0.08	47.85	7.62	6.13	6.08	6.32
2/29/2016	0.00	1.35	8.26	7.02	0.08	47.79	7.04	6.22	6.04	6.59

(1) Colonial Heritage Station KVAWILLI21
(2) Daily average level calculated based on 15-min Lasso Technologies Water Level Monitor Data
(3) Spillway crest Elevation 8.15 based on record drawings by McKinney Company.
(4) CMP spillway outflow calculated based on discharge coefficient of 2.85, provided by McKinney Company.
(5) Calculated using Hargreaves Method.
(6) Based on elevation-storage data provided by McKinney Company.
(7) Calculated using water balance equation. The inflow does not include the direct precipitation on the pond surface itself.
(8) Arnold, J.G., P.M. Allen, R. Muttiah, and G. Bernhardt (1995). "Automated Baseflow Separation and Recession Analysis Techniques."
(9) Eckhardt, K. (2005). "How to Construct Recursive Digital Filters for Baseflow Separation."
(10) Rutledge, A.T. (1993). "Computer Programs for Describing The Recession Of Ground-Water Discharge And For Estimating Mean Ground-Water Recharge and Discharge from Streamflow Records".
(11) Water level dropped below spillway crest and low flow pipes were open. No accurate level measurement was available.

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Appendix B

Cranstons Mill Pond
Weekly Flow Data

Week Ending Date	CMP Outflow (MGD)	CMP Inflow (MGD)	Groundwater - DF (MGD)	Groundwater - RDF (MGD)	Groundwater - PART (MGD)
8/6/2015	5.68	5.71	3.21	3.19	3.39
8/13/2015	11.28	10.93	4.80	4.68	4.47
8/20/2015	3.45	3.45	2.73	2.71	2.09
8/27/2015	5.63	5.72	2.48	2.50	1.87
9/3/2015	4.07	4.05	2.30	2.26	2.87
9/10/2015	7.02	7.21	3.32	3.16	5.82
9/17/2015	9.03	9.67	5.88	5.37	7.63
9/24/2015	7.48	7.40	6.14	5.51	5.80
10/1/2015	10.13	10.02	2.90	3.04	3.27
10/8/2015	16.66	16.10	7.62	7.61	6.14
10/15/2015	7.74	7.79	3.20	3.26	4.29
10/22/2015	3.19	3.28	1.95	1.83	2.40
10/29/2015	4.61	4.52	2.00	2.03	3.05
11/5/2015	7.12	7.24	3.22	3.19	3.56
11/12/2015	12.51	11.96	5.97	5.83	6.87
11/19/2015	6.27	6.21	4.90	4.78	4.92
11/26/2015	6.56	6.49	5.31	5.15	5.33
12/3/2015	7.48	7.45	5.73	5.27	6.77
12/10/2015	7.00	7.01	6.18	5.50	6.26
12/17/2015	6.69	6.66	5.92	5.41	5.55
12/24/2015	14.87	14.68	6.12	6.22	5.85
12/31/2015	8.74	8.22	7.25	7.13	6.71
1/7/2016	6.25	6.33	5.54	5.44	5.57
1/14/2016	6.95	6.93	5.62	5.21	5.82
1/21/2016	8.79	8.63	6.24	5.87	6.16
1/28/2016	11.32	11.15	6.95	6.63	6.46
2/4/2016	11.28	11.19	7.85	7.41	7.50
2/11/2016	10.82	10.41	7.14	6.99	6.60
2/18/2016	11.59	11.46	7.37	6.81	7.65
2/25/2016	10.21	10.22	8.18	7.75	7.62
3/3/2016	7.05	6.88	6.30	6.25	6.44

Appendix C

Cranstons Mill Pond
Additional Information on Aquifers and USGS Groundwater Well Data

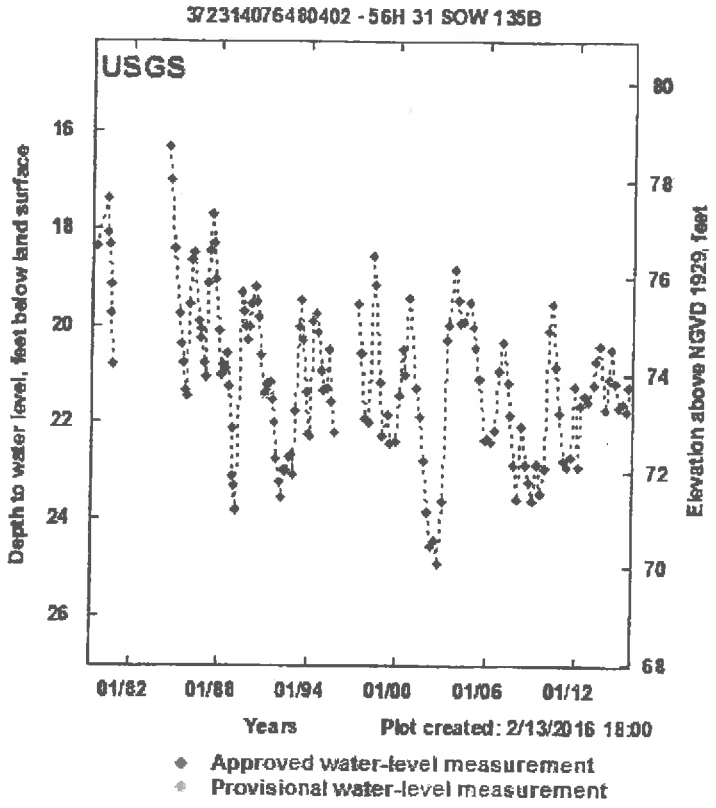
Quaternary Aquifer Data

The Quaternary aquifer consists of the saturated Quaternary sediments that cover most of the James City County. The upper surface of the water table ranges from several feet to as much as 40 feet or below land surface (USGS 1980). The thickness of the Quaternary aquifer near CMP is approximately 40-50 ft based on USGS (Figure 7, USGS 1980). The Quaternary aquifer is recharged directly by precipitation. Water in the aquifer moves from areas of high water levels (generally corresponding to land-surface highs) toward streams, lakes, and swamps (generally corresponding to land-surface lows). The Quaternary aquifer is a source of recharge to the underlying aquifer system.

There is one USGS groundwater well that is located within 5 miles from CMP and has historical data available for the shallow aquifer (see **Figure 5** in the report).

- 372314076480402 - 56H 31 SOW 135B
  - Web link: http://groundwaterwatch.usgs.gov/AWLSites.asp?S=372314076480402&ncd=lln&a=1&d=1
  - The land surface altitude is 95.00feet above NGVD29. The well is 30-ft deep and was completed in "Quaternary System" (110QRNR) local aquifer.
  - Groundwater level data is available from 1979-08-07 through 2015-07-16 with a total of 152 field measurements. See **Figure C-1**.

Figure C-1 Groundwater Level at Well 56H 31 SOW 135B



During the 2002 drought period, the water level at this well reached its lowest point, which was about 4 feet lower compared to the most recent level in 2015/2016.

Yorktown-Eastover Aquifer Data

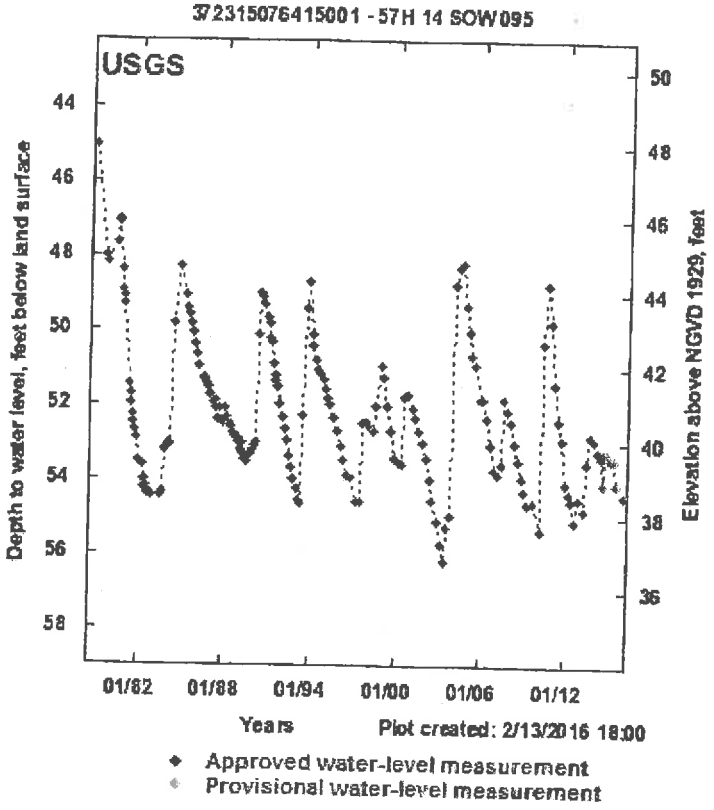
The Yorktown-Eastover aquifer is overlain by the Quaternary aquifer. The estimated thickness ranges from 50-225 feet (USGS 1980). A map prepared by USGS (USGS 2006) shows the top of the Yorktown-Eastover aquifer in the CMP watershed area varies from El. 50 to 75 (NGVD29 datum), which is above the bottom of CMP (about El 1.5) and some segments of the stream beds in the CMP watershed. In a USGS report (USGS 1990), a model simulated potentiometric surface map for prepumping steady-state conditions (Figure 33, Page F42) showed that the water level in the Yorktown-Eastover aquifer could vary from **El 40 to 20** (sea level datum) with decreasing level towards coastal water and major river valleys. In the same report, a model simulated prepumping flow direction map (Figure 41, Page F50) showed that

the groundwater may flow out of the Yorktown confined unit in the vicinity of the CMP watershed. These documents indicate that CMP is likely to receive groundwater inflow from Yorktown-Eastover aquifer.

There are two USGS groundwater wells that are located within 10 miles from CMP and have historical data available (see **Figure 5**). These two wells were identified as completed in the Upper Chesapeake Group (121CSPKU) local aquifer. Based on USGS publication (USGS 1992, Table 1, Page A8), the upper part of the Chesapeake aquifer west of the bay in Virginia generally refers to the local Yorktown-Eastover aquifer.

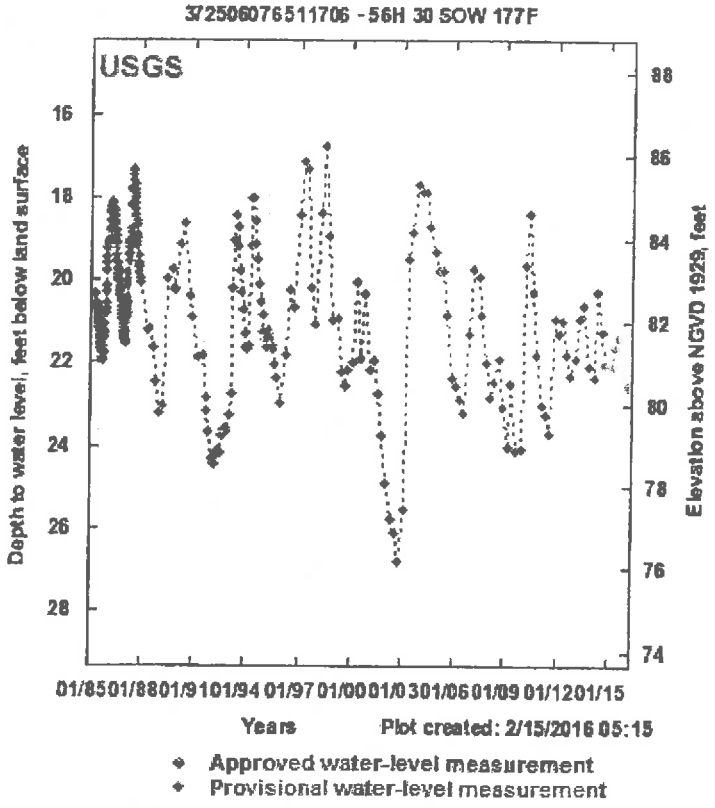
- 372315076415001 - 57H 14 SOW 095
  - Web link: http://groundwaterwatch.usgs.gov/AWLSites.asp?S=372315076415001&ncd
  - The land surface altitude is 93.00 feet above NGVD29. The well is 123-ft deep and was completed in "Upper Chesapeake Group" (121CSPKU) local aquifer.
  - Groundwater level data is available from 1978-09-21 through 2016-02-02 with a total of 189 field measurements. See **Figure C-2**.

Figure C-2 Groundwater Level at Well 57H 14 SOW 095



- 372506076511706 - 56H 30 SOW 177F
  - Web link: http://groundwaterwatch.usgs.gov/AWLSites.asp?S=372506076511706&ncd
  - The land surface altitude is 103.00 feet above NGVD29. The well is 60-ft deep and was completed in "Upper Chesapeake Group" (121CSPKU) local aquifer.
  - Groundwater level data is available from 1985-04-11 through 2015-07-16 with a total of 331 field measurements. See **Figure C-3**.

Figure C-3 Groundwater Level at Well 56H 30 SOW 177F



The USGS well 57H 14 showed 8-10 feet of variations over the 38-year monitoring period. During the 2002 drought period, the level was about 2-ft lower compared to the most recent level measurements. It appears that the water level at this site is less impacted by the precipitation.

The USGS well 56H 30 also showed 8-10 feet of variations over the 30-year monitoring period. During the 2002 drought period, the level was about 5-ft lower compared to the most recent level measurements. Note that the water elevation in this well is higher than the estimated top of the Yorktown-Eastover aquifer described in other USGS reports.

CORNWELL
ENGINEERING GROUP

COMMONWEALTH OF VIRGINIA
DAVID A. CORNWELL
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8/4/17
PROFESSIONAL ENGINEER

August 4, 2017

David A Cornwell, PE

PHASE 1 MEMORANDUM

TO: **Jeff Corbin**

Restoration Services

FROM: **Cornwell Engineering Group**

SUBJECT: **Phase 1 Evaluation of Cranston's Pond as a Potential Drinking Water Source**

This memorandum outlines an evaluation of source water variability within Cranston's Pond and an evaluation of treatability of representative water from the pond using combinations of alum (aluminum sulfate), ferric sulfate, nonionic polymer, and PAC for removal of turbidity and natural organic matter, the latter quantified by measuring total organic carbon (TOC), the dissolved fraction of TOC (DOC), absorbance of ultraviolet (UV) light at 254 nm (UV254), and specific UV absorbance (SUVA). TOC, DOC, and UV254 are measured and SUVA is a calculated value defined as the ratio of UV254 to DOC, typically expressed in units of L/mg-m.

SOURCE WATER EVALUATIONS

In order to understand the variability of spatial source water quality in Cranston's Pond, samples were collected on May 30, 2017 from six different sites along the pond. These samples were then tested for the following parameters: TOC, DOC, UV, SUVA, pH, conductivity, alkalinity, and total dissolved solids (TDS). The Site 1 sample was taken from the water flowing off of the dam, Site 2 was taken from the largest/main basin, Site 3 was from the mid-basin, Site 4 the upper-basin, Site 5 the end basin, and finally Site 6 was sampled from the confluence region that was scattered with multiple trees. These sites are marked below in Figure 1. The data retrieved from each of these locations are recorded in Table 1. Note the dissolved inorganic carbon (DIC) is calculated from pH and alkalinity data.

Figure 2 compares TOC at pond locations 1 through 6. Figures 3 through 9 show similar comparisons for DOC (Figure 3), UV154 (Figure 4), SUVA (Figure 5), pH (Figure 6), alkalinity (Figure 7), conductivity (Figure 8), and TDS (Figure 9). Data in Figure 2 indicates that Site 3 and 4 seem to have lower TOC concentrations although the range is within sample and analysis variability. The TOC data ranges from 5.6 mg/L to 6.8 mg/L, with an average of 6.3 mg/L. For DOC (Figure 3), data ranges from 4.2 mg/L to 5.0 mg/L. The average value is 4.7 mg/L; again all within the range of normal variability In Figure 4, UV254 is lower at Site 5 and 6 than the other four locations. These values range from 0.128/cm to 0.18/cm with an average of 0.16/cm. TOC, DOC, and UV254 indicate the amount of NOM present, but SUVA is an indicator of the characteristics of the NOM present. Source waters with SUVA >4 L/mg-m contain NOM that is typically amenable to removal by alum (or ferric), while SUVA

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<3 L/mg-m contain NOM normally less well removed by alum. NOM with higher SUVA typically are more aromatic (i.e., more hydrophobic). As shown in Figure 5, site 1 has the highest SUVA (NOM most amenable to removal by coagulant), the next three sites are all about 3.5 L/mg-m, and the two locations farthest upgradient are <3.5 L/mg-m. This does indicate that the sites have a high organic content they may be difficult to remove.

The alkalinity decreased from 127 to 101 mg/L as $CaCO_3$ and DIC from 33 to 25 mg/L as C at locations from upgradient points to near then dam (see Figure 6 and Table 1). As with alkalinity and DIC, conductivity (Figure 7) and TDS (Figure 8) decreases at locations closer to the dam. TDS and conductivity are both indicators of total salts present, and these appear to be decreasing as the amount of carbonate anions (as indicated by decreases in alkalinity and DIC, as locations closer to the dam, all of which may be due to more dilution (greater water depth) closer to the dam.

Since there was little variability in water quality among the sites and since site 2 is the best site for construction of an intake, Site 2 water was utilized for subsequent testing.

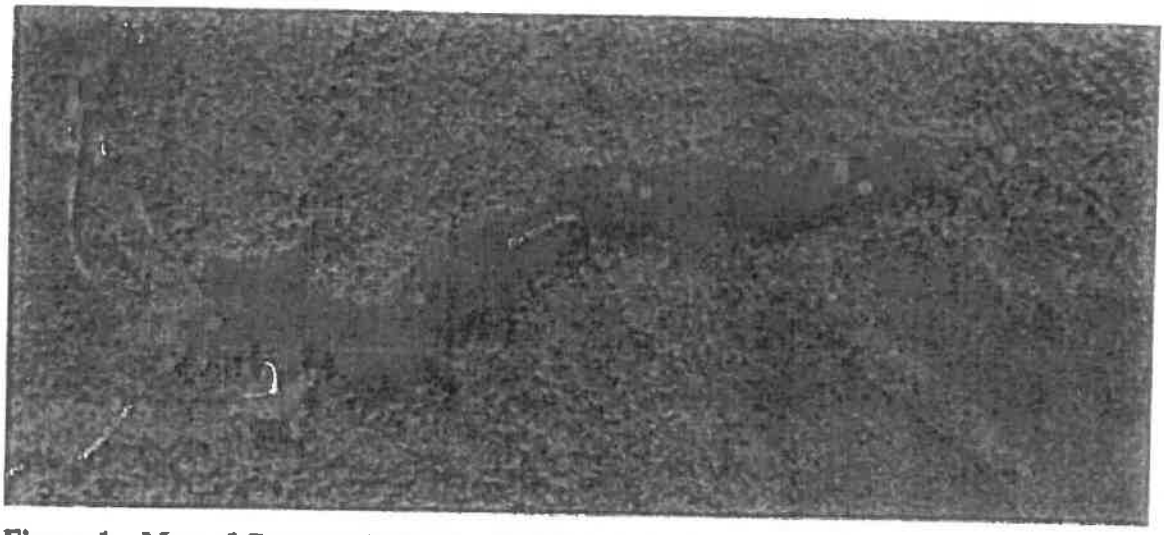

Figure 1 Map of Cranston's Pond with labeled site locations

Table 1
Source water quality in Cranston's Pond

Site	TOC (mg/L)	DOC (mg/L)	UV (cm^{-1})	SUVA† (L/mg-m)	pH	Alkalinity (mg/L as $CaCO_3$)	DIC (mg/L)	Conductivity (µS/cm)	TDS (mg/L)
1	6.8	4.5	0.176	3.9	7.7	101	25.1	232	157
2	6.6	5.0	0.173	3.5	7.6	101	25.3	232	120
3	5.9	5.0	0.169	3.4	7.6	104	26.4	235	153
4	5.6	4.8	0.173	3.6	7.5	112	28.4	255	148
5	6.6	4.7	0.154	3.3	7.5	123	31.5	277	153
6	6.6	4.2	0.128	3.0	7.4	127	33.0	292	158

† example calculations for site 1 $= \frac{0.176}{cm} \times \frac{L}{4.543\ mg\ DOC} \times \frac{100\ cm}{m} = \frac{3.9\ L}{mg\text{-}m}$

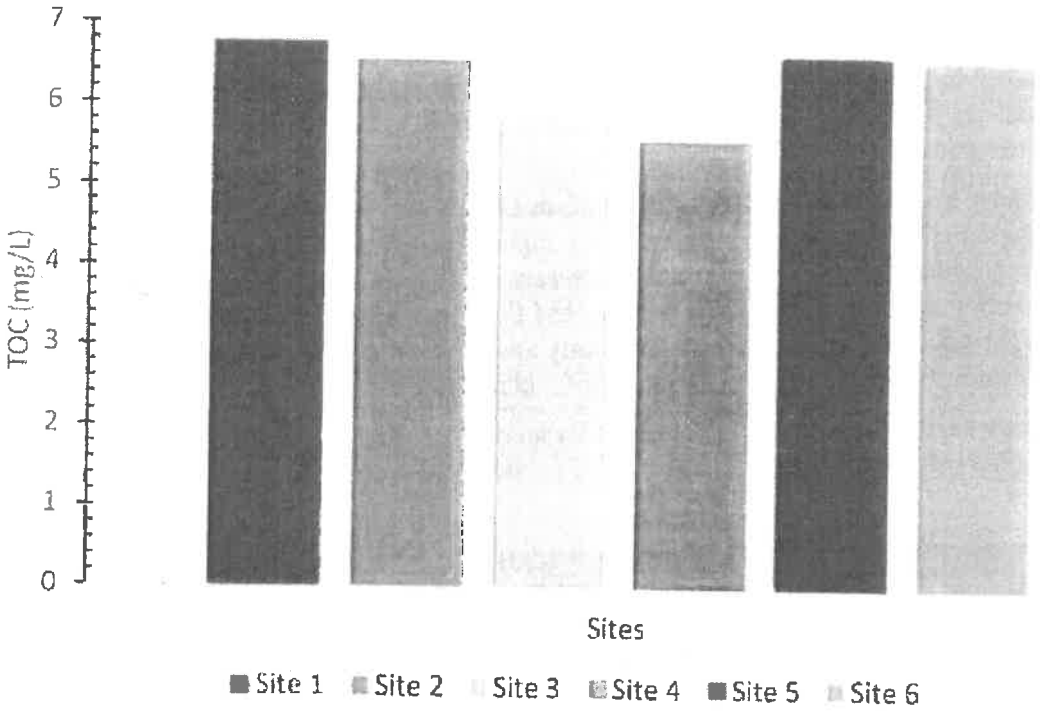

Figure 2 TOC results from the six sample sites

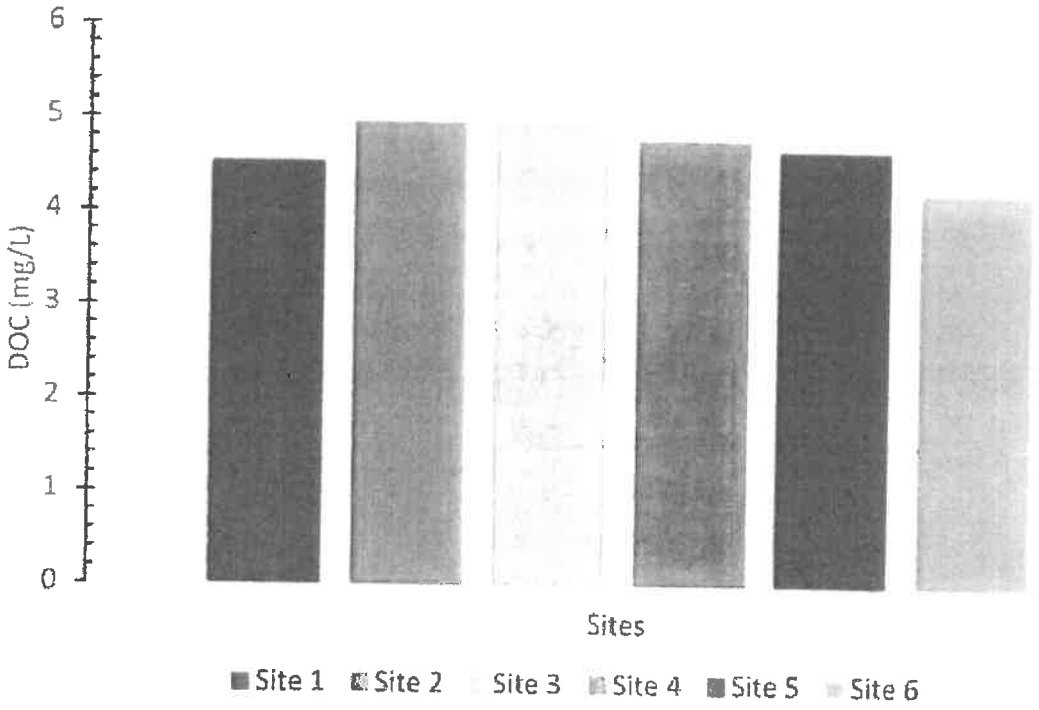

Figure 3 DOC results from the six sample sites

1C

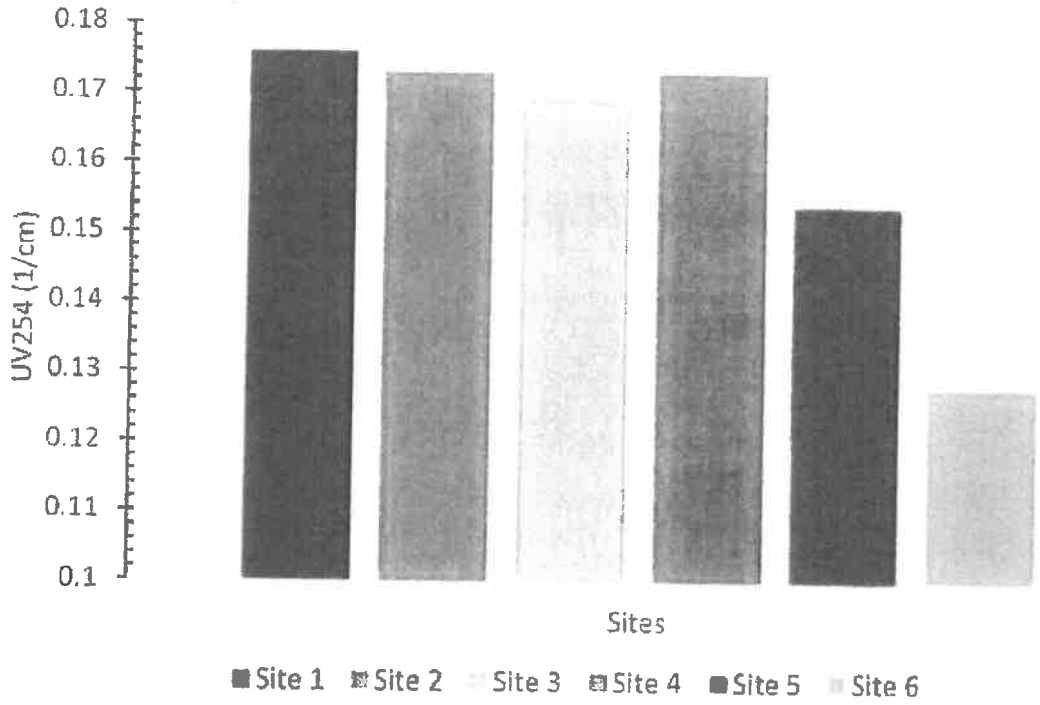

Figure 4 UV254 results from the six sample sites

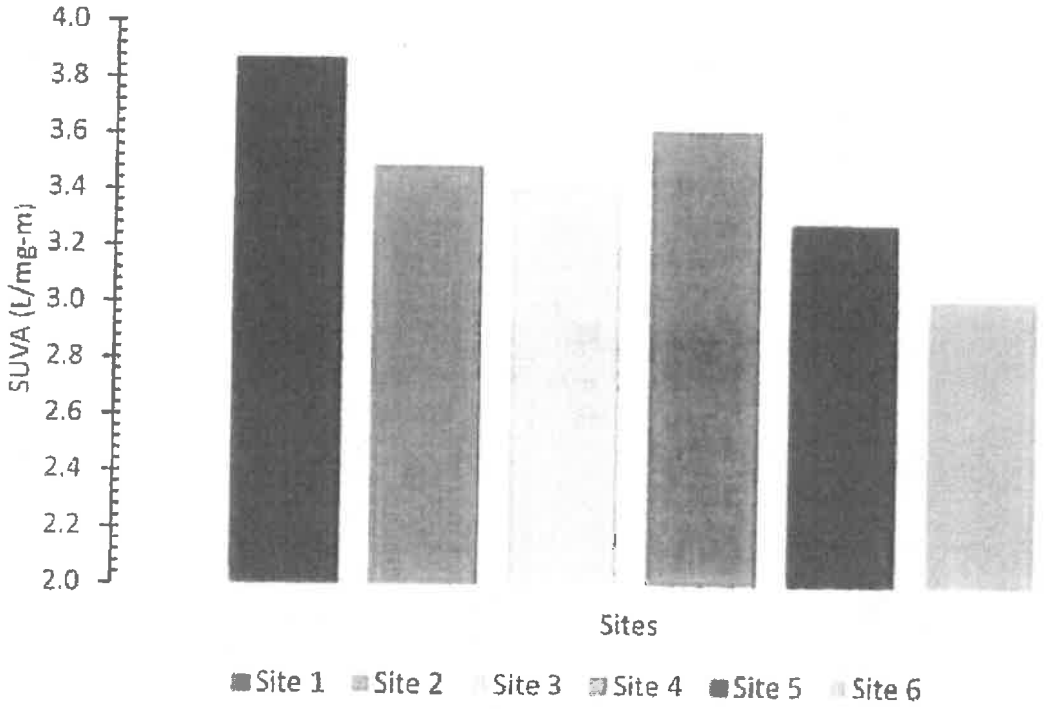

Figure 5 SUVA results from the six sample sites

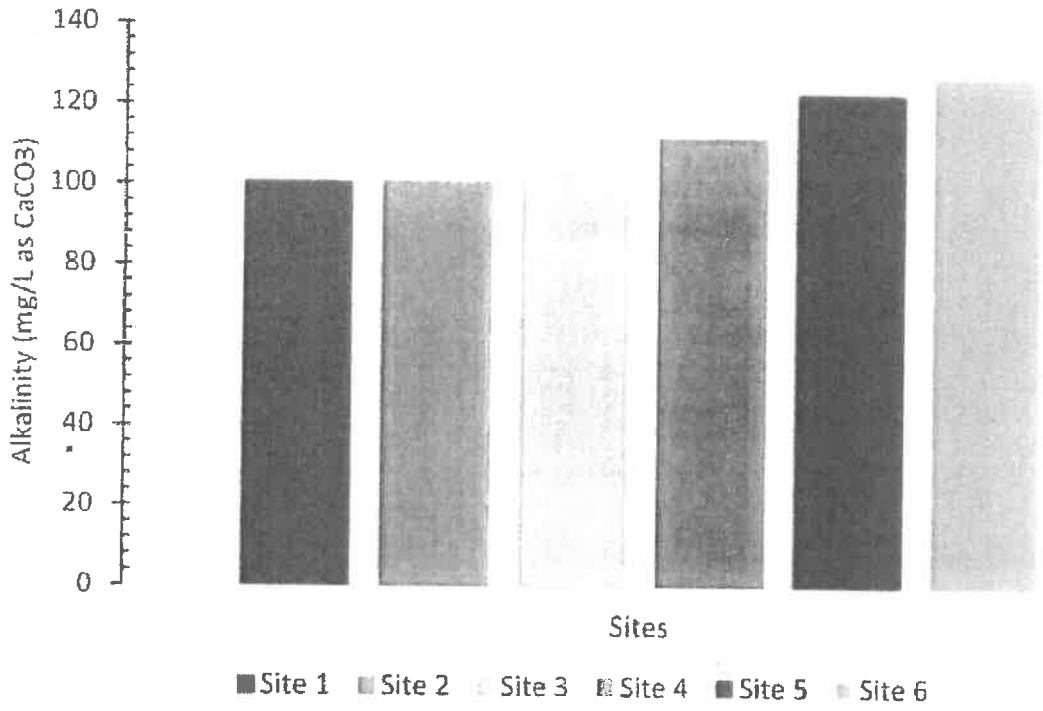

Figure 6 Alkalinity results from the six sample sites

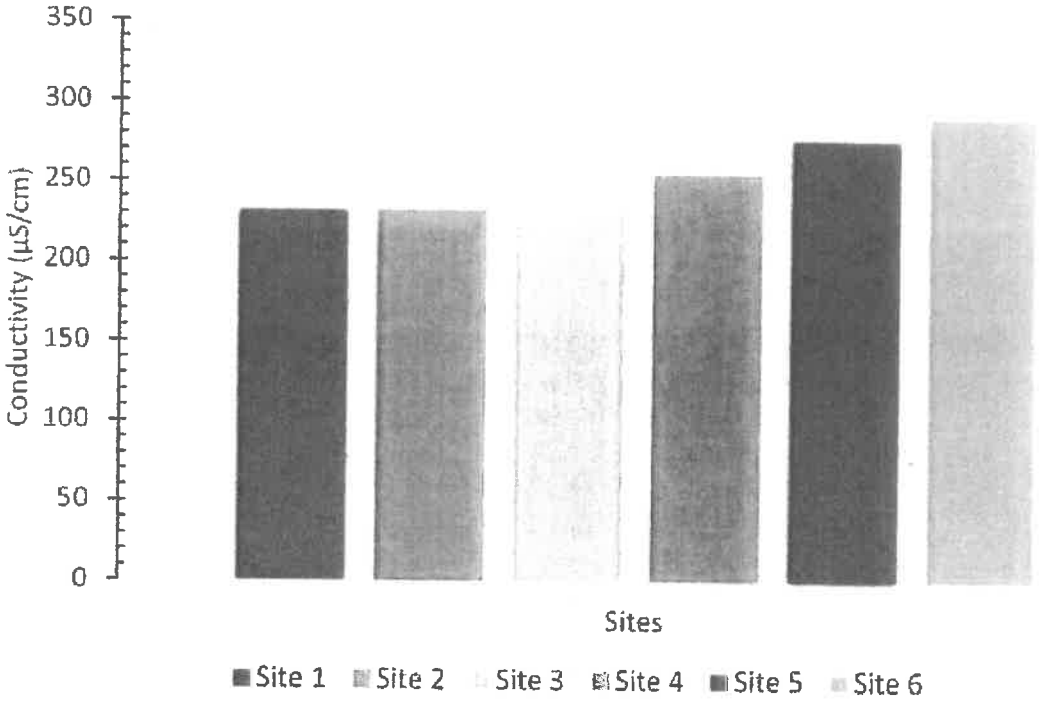

Figure 7 Conductivity results from the six sample sites

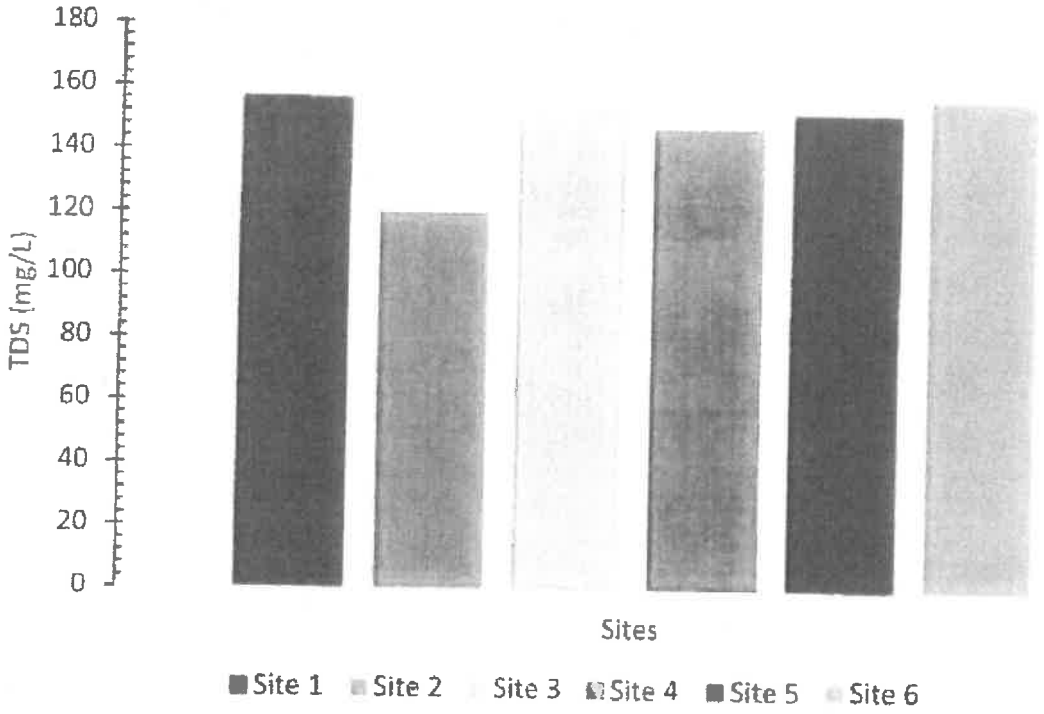

Figure 8 TDS results from the six sample sites

TREATABILITY STUDIES FOR TURBIDITY AND NOM REMOVAL WITH ALUM, FERRIC SULFATE, AND PAC

Sample Collection

Site 2 was chosen as the collection location due to the information provided above, its larger sized basin, and its lower TDS amount. Additionally, this site was the most logical location for optimal flow and depth of the water, and hence the logical choice for placement of a drinking water intake in the pond. Approximately 80 L of raw water was collected at this location on June 16, 2017 by Cornwell staff, assisted by the pond owner. The containers collected from the pond were returned to the Cornwell Laboratory in Newport News and stored in a 50-gal tank. This water was mixed prior to analysis of raw water and prior to collection of samples for use in jar tests.

Testing Procedure

Four 2-liter Gator jars were used for testing water collected from Site 2 of Cranston's Pond. All jars have a sampling spout located 10 cm down from the 2- L mark. Seven sets of four jars, a total of 28 jars, were tested. Different coagulants of various doses were added to the jars and the results were monitored. The coagulants used during these tests were alum and ferric sulfate Tests were also conducted using powdered activated carbon (PAC). The testing procedure included a rapid mix stage as well as three flocculation stages with varying rpms. For each of the jars, the turbidity, pH, and UV-254 were tested. Either total organic carbon (TOC) or dissolved organic carbon (DOC) were tested in each jar, and in several jars (8) both TOC and DOC were measured as indicators of natural organic matter (NOM). When PAC was evaluated, it was added, mixed with water for 10 min, then the coagulant added, followed by rapid mix and flocculation as described above. Table 2 outlines these test conditions.

Table 2
Jar Test Conditions

description	Mixer Time		Mix Conditions		
	minutes	seconds	rpm	target G (1/s)	target Gt
PAC addition	10	0	300		
rapid mix	0	130	300	600	~36,000
floc stage	10	0	65	70	
floc stage	10	0	50	50	
floc stage	10	0	38	30	

Jar Tests without PAC

Alum doses ranging from 40 to 100 mg/L as dry alum were evaluated in jars without PAC. Note that in this report the units for alum are expressed as either mg/L as dry alum or millimoles per L (mM) of trivalent aluminum (Al^{+3}). The latter units are used so that the doses of alum can be compared to doses of ferric sulfate using similar units (mM of Al^{+3} for alum versus mM Fe^{+3} for ferric sulfate). The range of doses for alum in mM as Al^{+3} corresponding to the 40 to 100 mg/L as dry alum doses listed above were 0.135 to 0.337 mM as Al^{+3}.

Table 3 summarizes data for pH, removal of turbidity, and removal of NOM in jar tests with alum and ferric sulfate. Figure 9 summarizes settled turbidity as a function of settling basin overflow rate. The overflow rate calculations for each time a settled turbidity sample was collected and analyzed (4, 6, 10, and 20 min) are similar to the calculations shown below for turbidity results measured after 2 min settling in the jar test (using a 10 cm port):

$$\text{overflow rate} = \frac{10\text{ cm}}{2\text{ min}} \times \frac{\text{m}}{100\text{ cm}} \times \frac{\text{ft}}{0.3048\text{ m}} \times \frac{7.48\text{ gal}}{\text{ft}^3} = \frac{1.23\text{ gpm}}{\text{ft}^2}$$

In separate jars from the above using alum, ferric sulfate was dosed at 40 to 90 mg/L as dry ferric sulfate. These doses correspond to 0.075 to 0.450 mM as Fe^{+3}. Table 3 and Figure 10 summarize data from jar tests with ferric sulfate in the absence of PAC.

Table 3
Jar Test Results with ferric sulfate or alum without PAC

Ferric Sulfate (mg/L)	Alum (mg/L)	Dose (mM Al^{+3} or Fe^{+3})	pH	UV254 (l/cm)	TOC (mg/L)	DOC (mg/L)
		Alum without PAC				
	40	0.135	7.5	0.082	4.9	
	50	0.168	7.4	0.075	4.3	
	60	0.202	7.3	0.068	4.4	
	70	0.236	7.3	0.061	3.8	
	70	0.236	7.1	0.063	4.2	4.3
	80	0.269	7.3	0.059	4.1	4.3
	90	0.303	7.1	0.055	4.0	3.4
	100	0.337	7.1	0.055	4.3	
	100	0.337	6.9	0.051	3.5	3.5
		Ferric Sulfate without PAC				
15		0.075	7.7	0.129	6.0	
25		0.125	7.5	0.121	5.6	
35		0.175	7.4	0.095	5.0	
45		0.225	7.3	0.084	4.1	
45		0.225	7.5	0.082	4.2	3.8
60		0.300	7.3	0.067	4.0	3.6
75		0.375	7.1	0.056	3.6	3.5
90		0.450	7.0	0.050	3.5	2.8

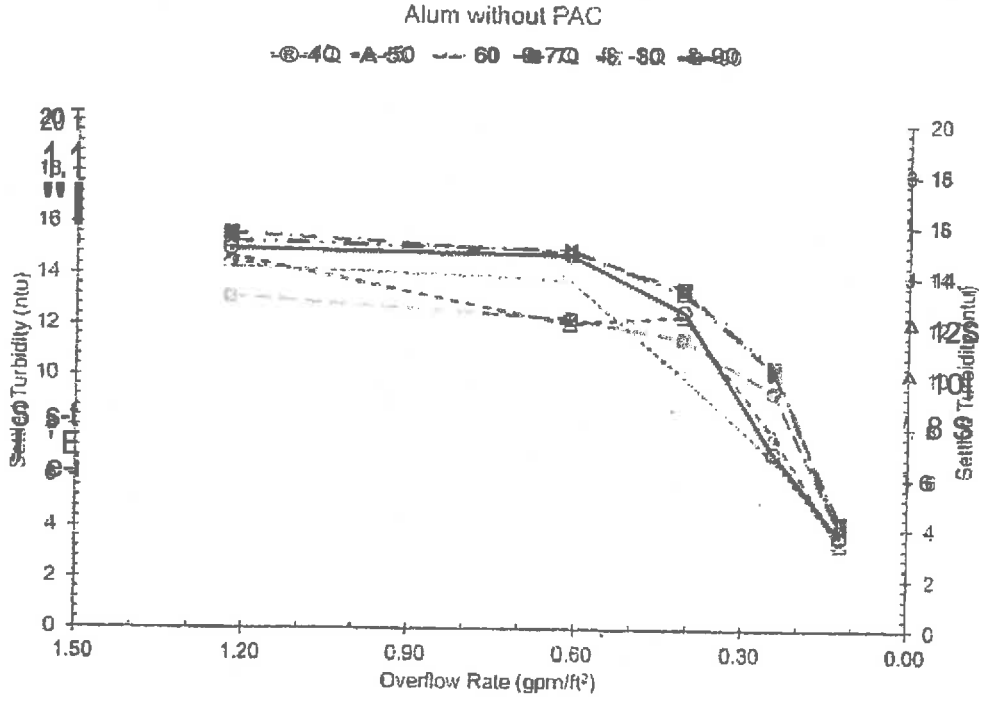

Figure 9 Settled turbidity in jar tests with alum and no added PAC

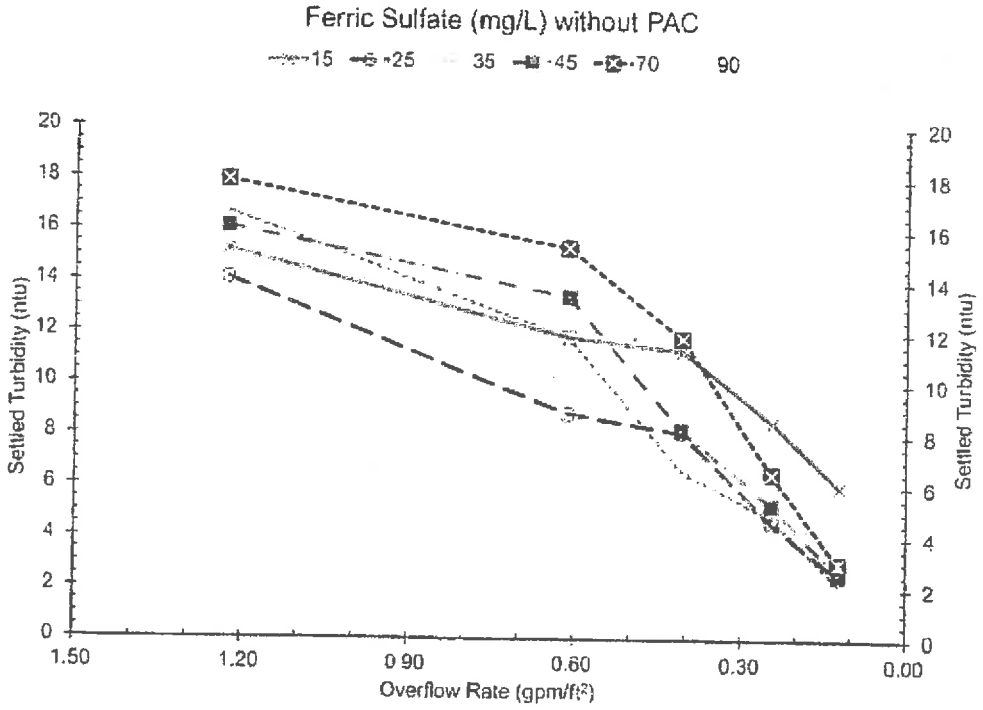

Figure 10 Settled turbidity in jar tests with ferric sulfate and no added PAC

Figure 11 (alum) and 12 (ferric sulfate) summarize coagulant dose versus pH data for jars where TOC was measured. Figure 13 combines the data from Figures 11 and 12. On each of these three graphs, the numerical values on the graph at each data point represent the TOC measured in the jar. These data demonstrate that the pH decreases as the coagulant dose increases. This is expected since each coagulant is acidic. Inspection of the TOC data in each graph reveals that as coagulant dose increases, the TOC decreases along with the pH. Removal of NOM with ferric sulfate or alum is typically best at pH 6.3 or lower. Therefore, at the doses tested, the pH did not drop to the optimal pH with coagulant alone. Therefore, it is possible that use of acid along with coagulants (including alum and ferric products with extra acid in the coagulant) could result in lower pH at the same alum or ferric doses used, and potentially result in better NOM removal. However, a large acid dose would be required and generally water operators prefer not to handle acid. Therefore acid addition was not evaluated.

Figures 14, 15, and 16 are plots of coagulant dose versus TOC for alum (Figure 14), ferric sulfate (Figure 15), and results with either coagulant (Figure 16 combines data from Figures 14 and 15). Figure 17 is analogous to Figure 16, depicting UV254 data.

The combination of turbidity, pH, and NOM results suggest that the optimal dose of alum, without PAC and with additional treatment chemicals to reduce pH, is about 0.28 mM Al^{+3} or about 70 mg/L as dry alum. Similarly, for ferric sulfate the optimal dose appears to be about 0.32 mM Fe^{+3} or about 70 mg/L as ferric sulfate[1]. Generally, ferric sulfate produced slightly lower treated TOC values at the higher doses whereas alum performance appeared to level off.

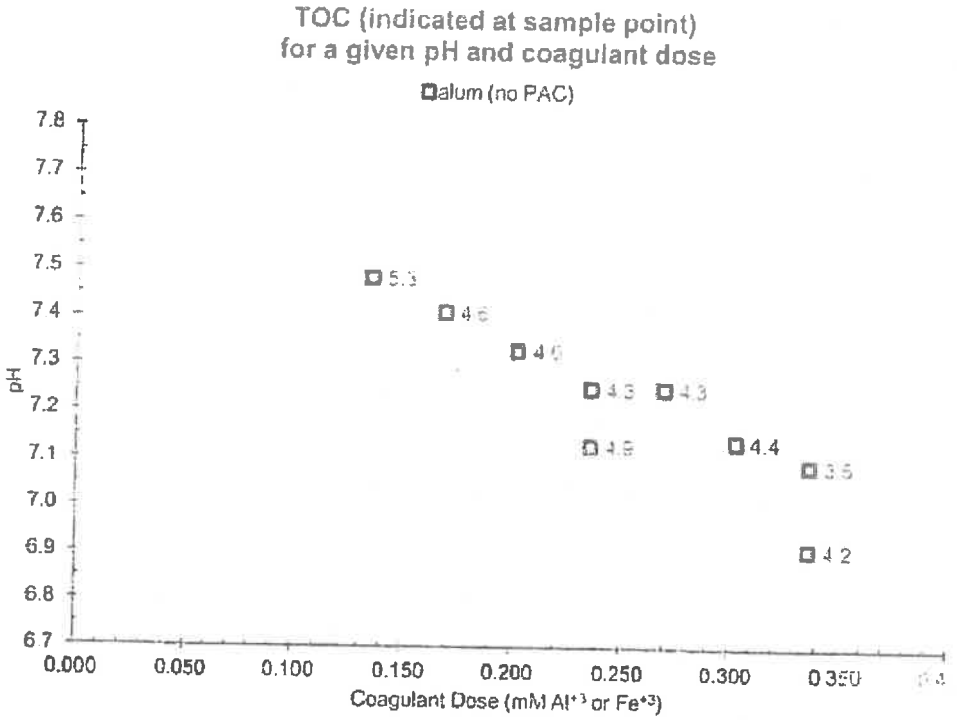

Figure 11 Coagulant dose versus pH for tests with alum without PAC

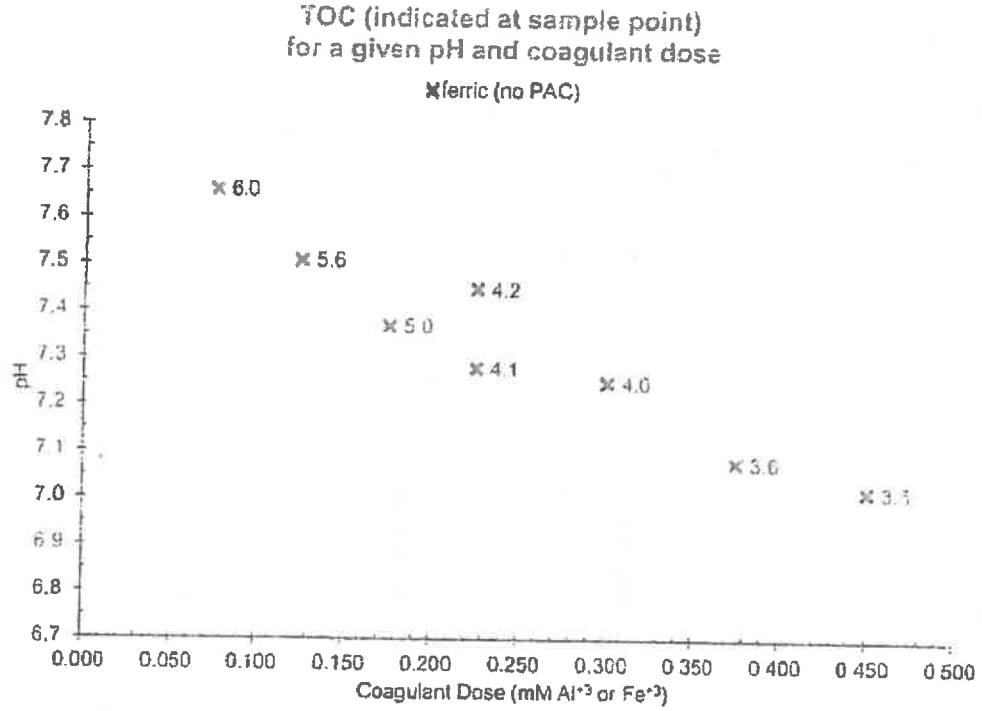

Figure 12 Coagulant dose versus pH for tests with ferric sulfate without PAC

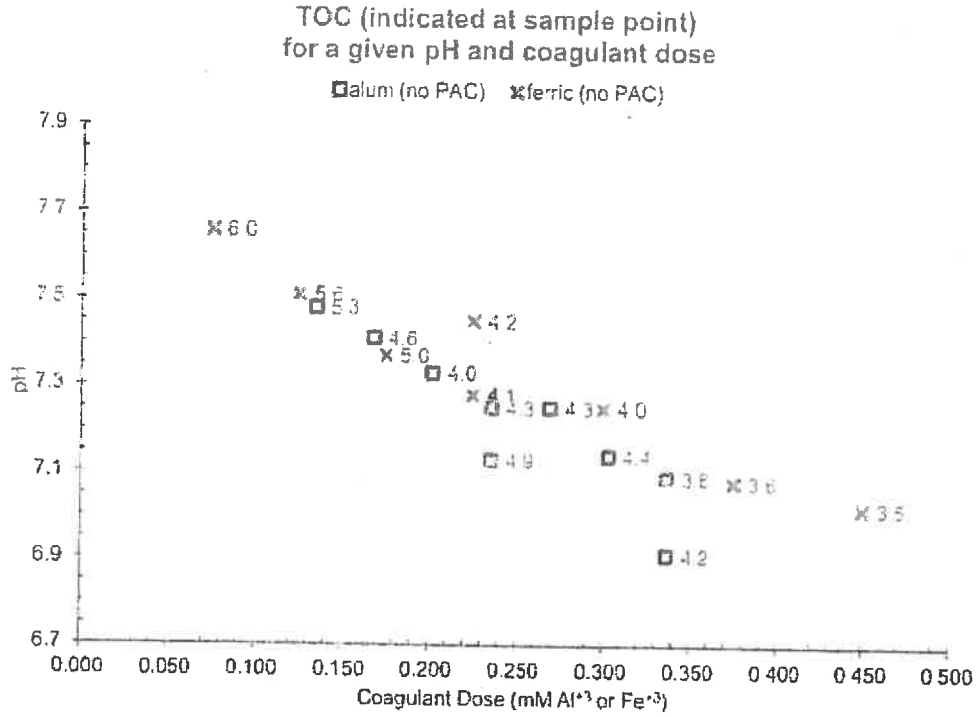

Figure 13 Coagulant dose versus pH for tests with alum or ferric sulfate without PAC

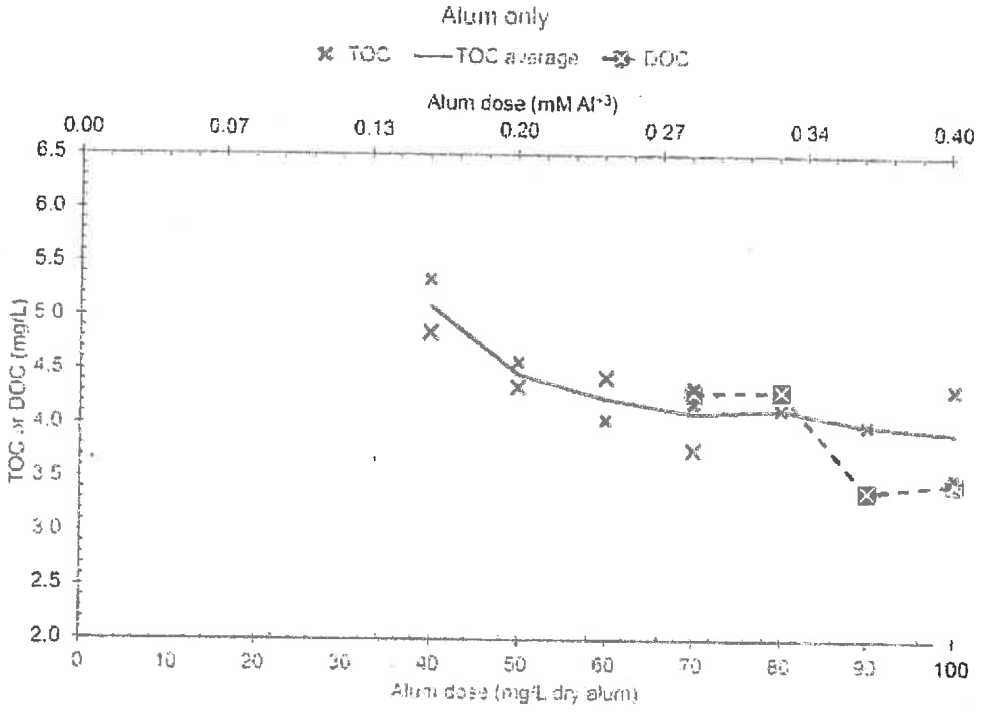

Figure 14 TOC and DOC data for tests with alum without PAC

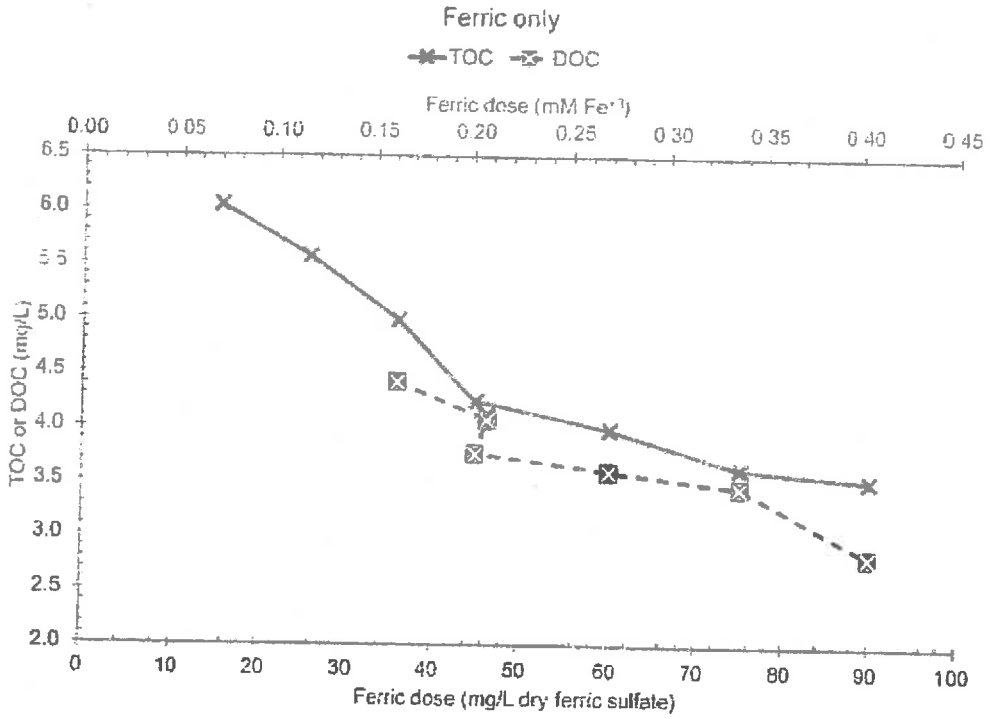

Figure 15 TOC and DOC data for tests with ferric sulfate without PAC

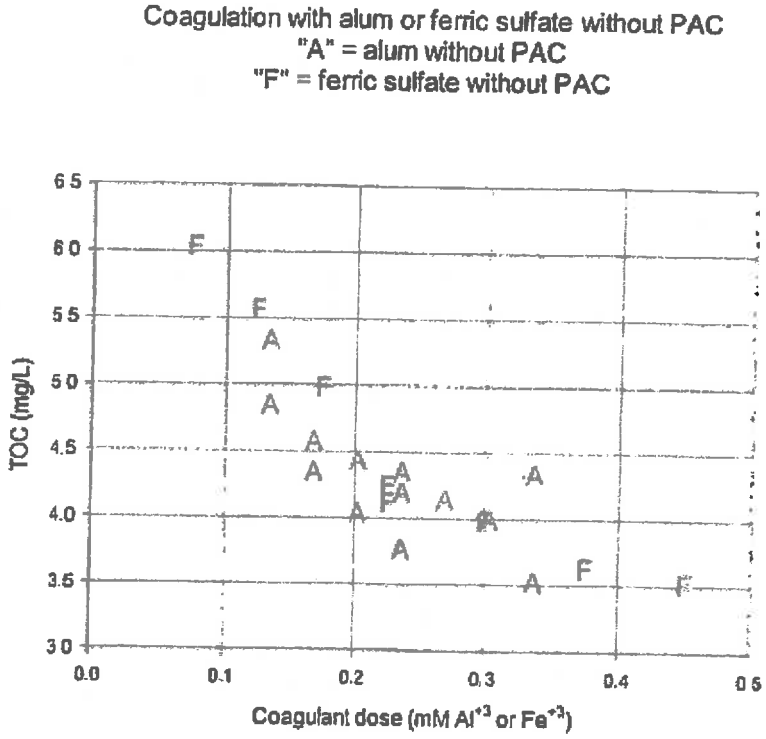

Figure 16 TOC data for tests with either alum or ferric sulfate without PAC

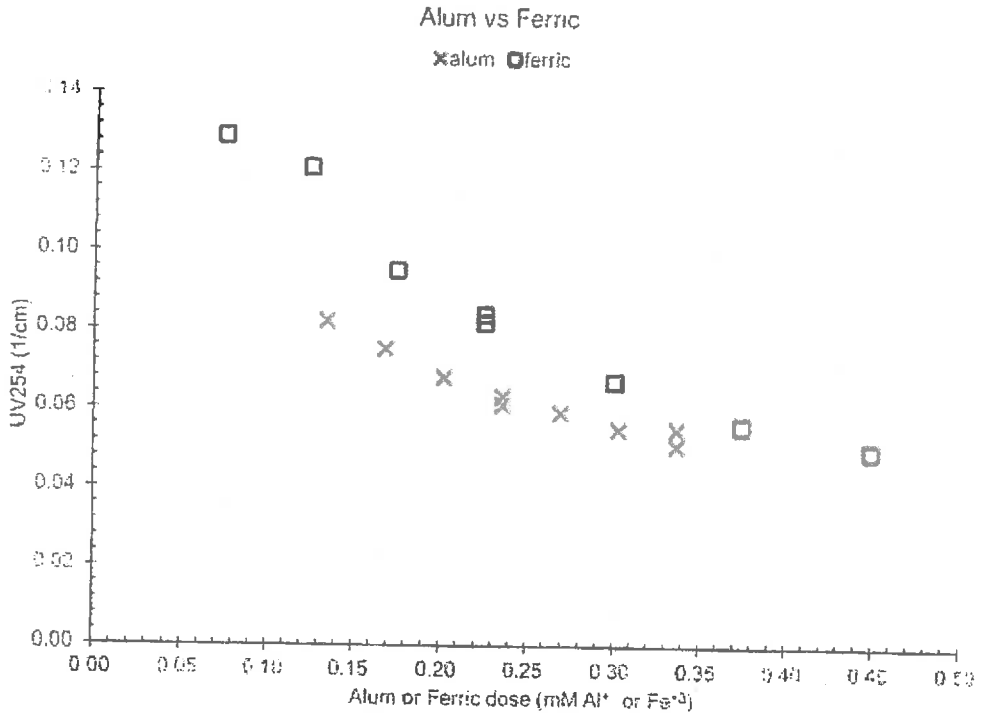

Figure 17 UV254 data for tests with either alum or ferric sulfate without PAC

Jar Tests with PAC

Jar tests with PAC included addition of a powdered activated carbon (PAC) product that Cornwell has successfully tested in other drinking water sources in Virginia.

In jar tests with PAC, the PAC was added to raw water first, mixed for 10 minutes to allow contact with soluble NOM in the water, then coagulant was added and the jar tests conducted like the others described above. PAC can be added along with coagulant, however, typically the PAC does not work as well because the coagulant forms large flocculated particles with part of the PAC inside the floc and thereby unavailable for contact with NOM in the water.

Table 4 and Figures 18 and 19 summarize NOM removal data from jar test with alum (Figure 18) and ferric sulfate (Figure 19) after 10 min of PAC contact. Note that Figure 18 is TOC data and Figure 19 is DOC data (there was not DOC data for alum with PAC and not sufficient TOC data for ferric with PAC – see Table 4). The results with PAC were expected to me more encouraging, but the NOM removal depicted in the following table and figures do not show any positive impact for the PAC product tested at doses up to 30 mg/L. It is possible that higher doses of this PAC product may have produced better results, but testing of a different PAC product may be needed. This should probably include evaluation of different PAC products from different manufacturers. For example, while it is useful to compare different types of carbon sources (wood, bituminous, etc.) it is also useful to compare different products from different suppliers/manufacturers.

Table 4

Jar Test Results with ferric sulfate or alum with PAC added

Ferric Dose (mg/L)	Alum Dose (mg/L)	PAC Dose (mg/L)	Dose (mM Al^{+3} or Fe^{+3})	Coagulation pH	TOC (mg/L)	DOC (mg/L	UV (1/cm)
	60	0	0.202	7.3	4.4		0.068
	60	10	0.202	7.4	4.7		0.063
	60	20	0.202	7.4	4.5		0.063
	60	30	0.202	7.4	4.3		0.056
35		0	0.175	7.4		4.4	0.095
35		0	0.175	7.4	5.0		0.095
35		30	0.175	7.6		3.8	0.078
45		0	0.225	7.3		4.1	0.084
45		0	0.225	7.3	4.1		0.084
45		0	0.225	7.5	4.2	3.8	0.082
45		30	0.225	7.5		4.2	0.068

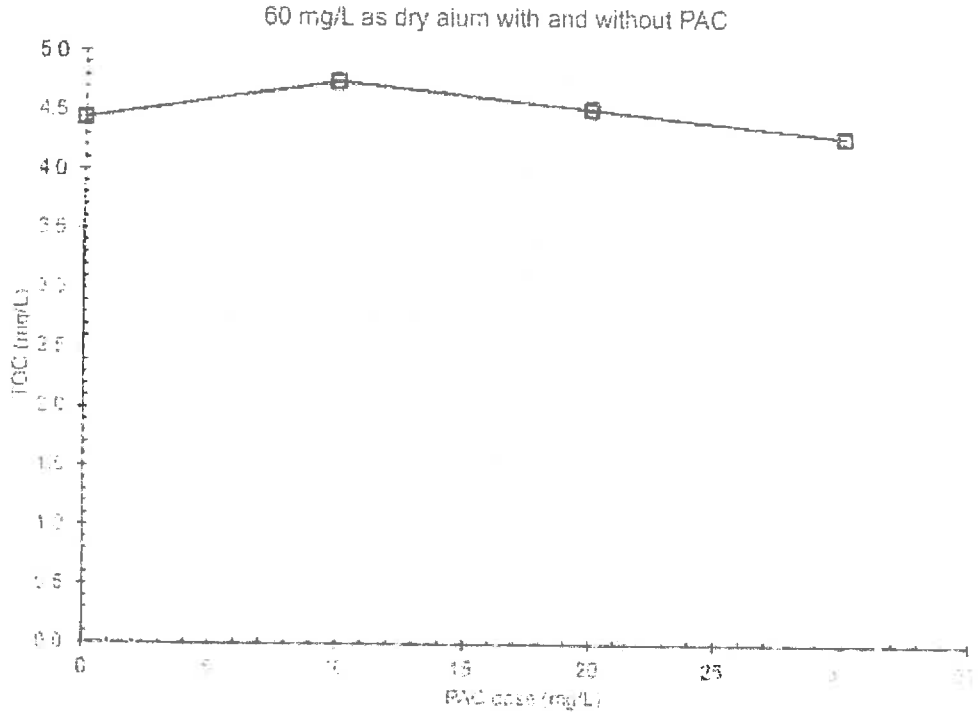

Figure 18 TOC with 10 min PAC contact prior to coagulation with alum

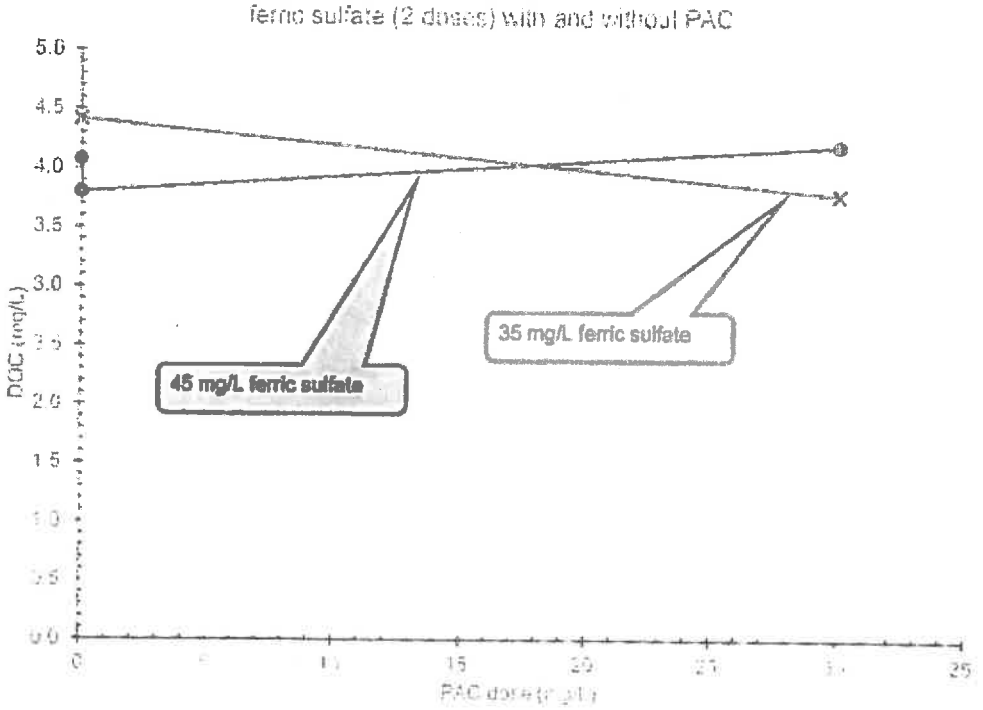

Figure 19 DOC with 10 min PAC contact prior to coagulation with ferric sulfate

TREATABILITY STUDIES FOR REDUCING SETTLED TURBIDITY

Since the settled turbidities were relatively high, tests were done to show that a polymer addition would lower the turbidity into an acceptable range. Four jars were dosed with 70 mg/L of alum at the start of rapid mix, then 0.1, 0.2, 0.4, and 0.6 mg/L of a nonionic (dry) polyacrylamide polymer were added at the end of the first flocculation stage. Note that Figure 20 also includes the settled turbidity data with 70 mg/L alum and no PAC or polymer as shown in Figure 9. An overflow rate of about 0.4 gpm/ft^2 is typical for a conventional settling basin. Without polymer the turbidity was over 14 at this overflow rate which would not be acceptable. As typically occurs, adding more polymer provides additional improvement. As shown, at a polymer dose of 0.6 mg/L the settled turbidity was lowered to under 4. The use of tube or plate settlers operate in the 0.1 gpm/ft^2 range where the turbidity was less than 2.

Cornwell typically recommends that nonionic polymer be added at the end of the 1st floc stage, and not in rapid mix. Past experiences have shown that the nonionic polymer works best when it can help agglomerate particles that have already been growing and coagulating in the rapid mix and first floc stage. However, some water systems do add nonionic polymer in the rapid mix for a variety of reasons, often because there is no suitable location to feed after 1st flocculation stage. Figure 21 compares the turbidity for a 0.1 mg/L dose of nonionic polymer added in the rapid mix versus added after the first flocculation stage. This figure demonstrates that addition of the polymer following the first flocculation stage improves turbidity more than adding the polymer in rapid mix. Therefore, the use of polymer after the 1st flocculation stage can improve turbidity removal while optimized pH and coagulant dose can be targeted for optimal NOM removal.

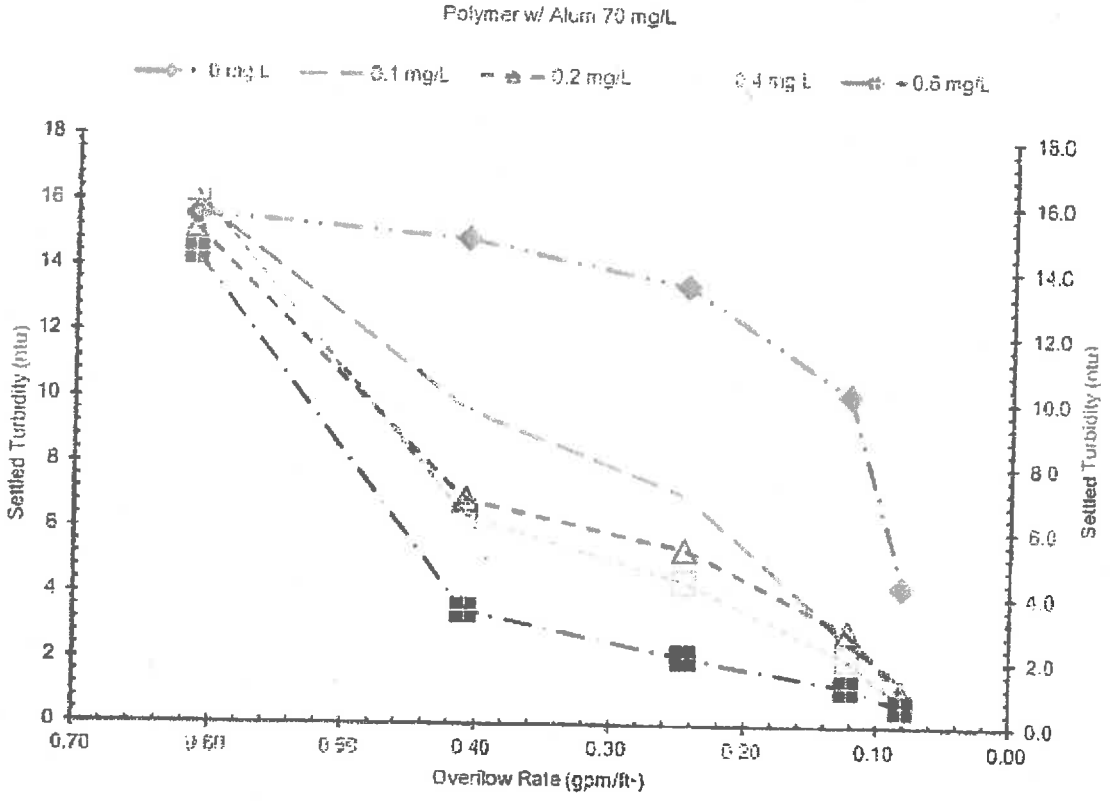

Figure 20 Impact of polymer added during flocculation on settled turbidity

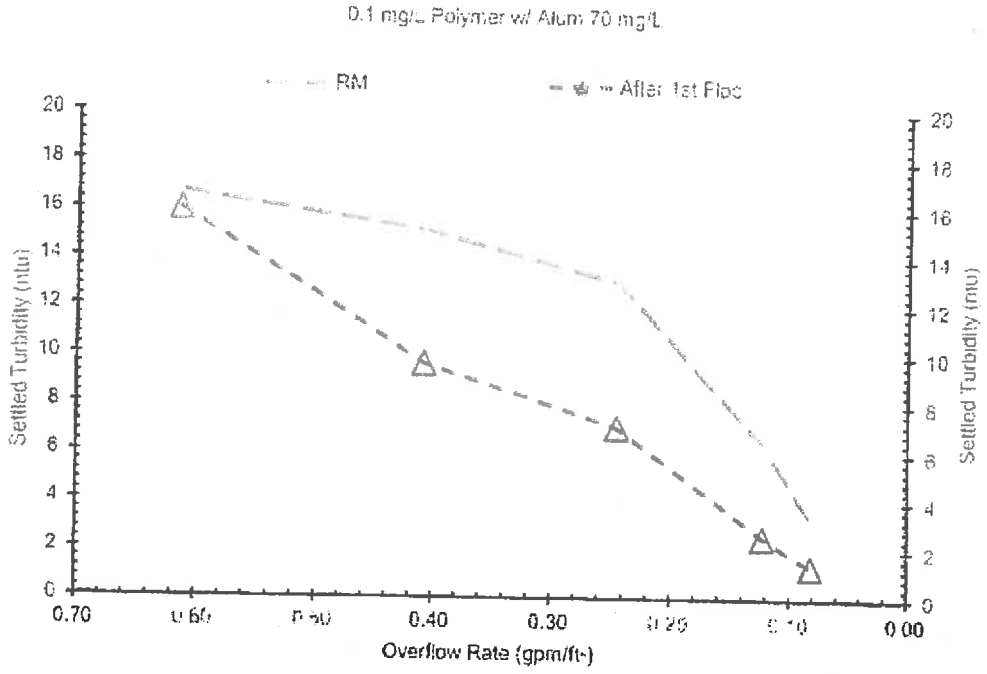

Figure 21 Impact of polymer added during rapid mix versus flocculation on settled turbidity

SUMMARY AND RECOMMENDATIONS

The testing indicated that this water can be treated using conventional treatment for traditional parameters such as color, turbidity, and dissolved solids. It is likely that an additional step will be needed to reduce NOM, which is not unusual for many Virginia surface water sources.

The optimal alum dose for turbidity and NOM removal for the source water sample collected in June 2017 was about 0.28 mM Al^{+3}, or about 70 mg/L as alum on a dry weight basis. Similarly, for ferric sulfate the optimal dose was about 0.32 mM Fe^{+3} or about 70 mg/L as ferric sulfate. It is possible that addition of an acid may have improved NOM removal with the ferric and alum, though storage and handling of acid at a water plant creates complications and safety concerns for water plant staff. The PAC product tested did not result in additional NOM removal. It is possible a different PAC product and/or different doses may have produced better NOM removal.

The TDS and conductivity are satisfactory for distribution to customers, and should not cause any public health or compliance difficulties.

The potential for disinfection by-product (DBP) formation was not evaluated (TTHM and HAA5 are regulated in drinking water and are the main DBPs of concern). Cornwell typically recommends that TOC be reduced to 2 mg/L or lower in order to reduce the potential for DBP formation, though even at these TOC levels the DBP formation can cause compliance issues in warm climates and distribution systems with potential for large water ages. Experience is that this water under conditions tested above would not meet THM and HAA regulations since a TOC of 2 mg/L was never achieved. In fact the treated TOC was generally around 4 mg/L. We recommend a phase 2 testing to evaluate the use of chloramines, MIEX, GAC. MIEX is an anion exchange process that is applied to raw water to remove NOM prior to coagulations. Chloramines are used to reduce or stop the formation of DBPs. GAC is a process applied after conventional treatment to remove additional TOC. There are advantages and disadvantages to each of these processes that can be evaluated in Phase 2.

COMMONWEALTH of VIRGINIA

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To: The Honorable Terence R. McAuliffe, Governor

The Honorable Thomas C. Wright, Jr.
Chairman, State Water Commission

The Honorable Daniel W. Marshall III
Chairman, House Committee on Agriculture, Chesapeake and Natural Resources

The Honorable Richard H. Stuart
Chairman, Senate Committee on Agriculture, Conservation and Natural Resources

Hal E. Greer
Director, Joint Legislative Audit and Review Commission

From: David K. Paylor, Director

Date: November 1, 2017

Subject: Report on Eastern Virginia Groundwater Management Advisory Committee Work

In accordance with § 62.1-256.1 of the *Code of Virginia*, I am providing this report on the final report of the Eastern Virginia Groundwater Management Advisory Committee (EVGMAC). The EVGMAC was authorized by the General Assembly during the 2015 Regular Session of the General Assembly to assist the State Water Commission and the Department of Environmental Quality (DEQ) in developing, revising, and implementing a management strategy for groundwater in the Eastern Virginia Groundwater Management Area. The EVGMAC was appointed by me as a 24-member Committee with an additional five workgroups, allowing nearly 70 stakeholders to participate and share their expertise. Over the past two years, the EVGMAC and its workgroups met 42 times, carefully deliberating on the issues associated with long-term groundwater management. The process was facilitated by Mark Rubin of the Institute

for Consensus Building at Virginia Commonwealth University and the attached report represents the consensus report of the EVGMAC.

I want to express my deep appreciation for the time and effort put into this process by the EVGMAC members and all of the other talented people who gave their time to participate on one of the various workgroups. The EVGMAC Report provides a thoughtful and deliberate review of the issues from the perspective of stakeholders affected by declining groundwater reserves and DEQ efforts to reduce those declines. The report contains useful recommendations that can assist with long-term management of the aquifer.

At the same time that the EVGMAC was meeting, DEQ was working with the 14 largest groundwater permittees in the Eastern Virginia Groundwater Management Area to reduce their overall groundwater withdrawal allocation. This effort to reduce overall demand on the aquifer was unprecedented in the history of groundwater management in the Commonwealth. The actions taken by these permittees represent a significant commitment of financial and technical resources on their part to reconsider future expectations of groundwater availability and to look for creative ways of reducing groundwater use through conservation and alternative sources of supply. Working with these permittees, we have collectively reduced the future demand on the aquifer system from 146 million gallons per day (mgd) to as low as 69 mgd. This represents as much as a 52% reduction in permitted withdrawals from the aquifer. While this represents incredible progress toward maintaining the availability and productivity of this valuable resource, it is a first step toward long-term sustainability of the coastal groundwater resource. The recommendations in the EVGMAC Report represent additional steps that can be taken to help ensure that coastal groundwater will be available for future growth and development.

As required by statute, the EVGMAC and its alternative supply workgroup spent a great deal of time reviewing options for developing long-term alternative water sources. DEQ has the following comments on the recommendations of the EVGMAC related to alternative sources of supply.

- The Hampton Roads Sanitation District's (HRSD) Sustainable Water Initiative For Tomorrow (SWIFT) Project appears to offer great potential for long-term regional aquifer benefits that improve prospects for overall aquifer sustainability. The project should not be considered the sole solution because of its long time horizon and because it is not without technical challenges that need to be systematically assessed and addressed as it matures. Some uncertainty remains about the long-term ability to inject the design volumes. While the modeling completed for this project is very positive, modeling results must be validated through empirical data from monitoring in the field. This uncertainty is being addressed through the project's demonstration program, which includes some on-site monitoring and will likely be an ongoing issue that is evaluated throughout the life of the project. HRSD, DEQ, and the Virginia Department of Health (VDH) are involved in ongoing discussions regarding the long-term oversight of project water quality and how those safeguards will be institutionalized. These discussions are continuing and have been very productive in addressing concerns about what to monitor, at what levels, at what frequency, and by whom.

- Historically, water has been a commodity that formed the basis of competition among localities in the Hampton Roads Region. Rural members of the EVGMAC noted that when resource availability is finite, it can lead to the perception, if not the reality, of "haves" and "have nots." Competition among localities for control of resources can sometimes limit the optimal management of the groundwater resource. Some members of the EVGMAC understood that this may negatively impact the ability to provide water for unforeseen economic development opportunities, and potentially result in losing these prospects to other states. While it may not be clear in the report, members of the EVGMAC recognized the need to move to ensure greater prospects for long-term sustainability of the groundwater resource by providing regional incentives and other efforts that result in greater interdependence on available water supply among localities.

- Another potential alternative source of supply that was suggested may be drilling deep into the crystalline bedrock beneath the coastal aquifer system. It is possible that there are freshwater reserves contained in the bedrock deep below the aquifers currently being used for water supply. Deep drilling techniques may allow for exploration for freshwater supplies and, if found, allow them to be developed. These depths have not been previously explored as sources of water supply due to the cost of deep drilling and the previous abundance of supply from current sources. While the Crystalline Bedrock Proposal merits further exploration of its feasibility, it should not be considered to be a viable solution until it can be shown that water supplies are available and that they will not result in unintended impacts on the Potomac aquifer. There is a reasonable expectation that groundwater supplied from these wells is also connected to the Potomac aquifer, and steps should be taken to monitor the aquifer in proximity to these wells to assess whether this is the case. DEQ would anticipate being involved in such an effort and there may be resource implications for the agency.

The EVGMAC and its options for future permitting criteria workgroup reviewed options for changing existing permit criteria to promote long-term sustainability. DEQ has the following comments on the recommendations of the EVGMAC related to future permitting criteria.

- The report recommends extending the permit term for a groundwater withdrawal from 10 years to 15 years. While DEQ supported the committee's consensus, expectations regarding the certainty of groundwater availability should not be implied simply by virtue of a longer permit term. Groundwater availability and withdrawal volume expectations need to continue to be site-specific determinations of aquifer conditions at a point in time. Changes to aquifer conditions in the future, both positive and negative, may result in changes to permitted withdrawal volumes even during a given permit term.

- DEQ manages approximately 250 groundwater withdrawal permits. If the permit term is changed as recommended, it is the agency's position that all of these permits should not be extended unilaterally, but should be extended upon reissuance of the permits currently in place when they expire.

- The longer permit term reduces the amount of permit fee revenue to support DEQ's implementation of the program. There should be a process to consider options to address

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the anticipated reduction in agency revenue as the current fee structure supports less than 10% of the costs of the program. In addition, more than 125 new permits have been added to the workload from expanding the management area and efforts to bring existing users who have been withdrawing without permits into the program.

- The EVGMAC recommendation to encourage voluntary planning (recommendation #4) may need to be further developed to have the intended impact. The expectation of DEQ's role in encouraging this planning activity is unclear and should be developed. Such a planning effort may have resource implications for the state, localities and potentially planning district commissions.

- DEQ agrees with the conclusion of the EVGMAC that the available data demonstrate that more needs to be done to address the impact of unpermitted groundwater withdrawals. Aquifer benefits achieved by reducing the permitted withdrawals can be offset by growth of unpermitted withdrawals. The cumulative withdrawal of unpermitted withdrawals for 2017 is estimated to be 39 million gallons per day (mgd). Current permitted withdrawals from the entire Eastern Virginia Groundwater Management Area are approximately 100 mgd. If current trends continue, unpermitted withdrawals could grow to be as much as 49 mgd in 2027 and 59 mgd in 2037. Permitted groundwater withdrawals are not expected to be increased significantly beyond the current 100 mgd through 2027.

The EVGMAC and its trading and alternative management structure workgroups reviewed options for promoting greater regional input into permit decision-making and evaluated different options for establishing banking or trading programs to promote long-term sustainability. DEQ has the following comments on the recommendations of the EVGMAC related to alternative management structures, banking and trading.

- Groundwater banking and trading systems are recommended by the EVGMAC (recommendations #9 and #10). While there may be worthy benefits from trading and banking in reducing the costs of developing alternative sources of supply to comply with permit reductions, these recommendations should be evaluated with reasonable caution. Our understanding of the aquifer system at this time suggests that there are temporal and spatial limits to the benefits of credits generated. This means that the potential "credits" generated in increased groundwater levels appear to quickly become part of the background condition, limiting the duration of time that they can be used without resulting in impacts to the aquifer or other existing groundwater users. Therefore, for each one million gallons injected it may not mean that one million gallons of additional groundwater is available for use. It also appears that the geographic scope of a potential credit area may be limited for similar reasons. At this time, it appears that transferring the "benefit" of higher groundwater levels from one location to a location with low groundwater levels simply results in further lowering of water levels in the location with already low levels.

- If such a banking or trading program were to be developed, it may be too limited to be economically attractive to most potential participants. In addition, the need to increase

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monitoring of potential impacts to individual existing users would be expected and the current monitoring network is likely to be insufficient to provide reasonable protection.

- The resolution of current predictive regional modeling tools also may be insufficient for the anticipated increase in complexity resulting from the generation of credits and trades. Local scale water level impacts will be of greater importance to predict and at a higher resolution than the current model. Given this complexity in modeling and the limitations of the current monitoring network, there also are potential fiscal implications that may need to be considered if this recommendation is explored. DEQ is unaware of any program in other states that has established a trading program in a confined coastal aquifer system like the one in Virginia so there is some significant uncertainty regarding what the costs of developing and implementing a program of this kind will be.

The EVGMAC and its funding workgroup reviewed options for securing adequate and consistent funding to implement the groundwater management program at the level of service expected by stakeholders. Much of the activity associated with this topic centered around the technical and data needs of the program to maintain existing capabilities and improve them where needed. DEQ appreciates the EVGMAC recommendations in support of identified funding and data needs. Meeting these needs is a critical aspect of future management of the coastal aquifer system for all current and future users of the resource and for the citizens of the Commonwealth. Funding for this program has not been maintained over time and state budget cuts over the years have eroded the ability of DEQ to adequately maintain the existing monitoring network, expand it to address known gaps, and to continuously invest in improving the modeling tools. DEQ is increasingly being asked to provide informed technical judgements regarding local scale impacts to individual users that challenge the limits of our predictive tools. EVGMAC members understood that there are gaps in the current monitoring network and local scale resolution of predictive modeling tools. For example, more than half of DEQ's groundwater monitoring network was constructed in the 1970's-80s, but the useful life span of a monitoring well installed in the coastal plain is typically only 30 years.

Thank you again for your interest in addressing this important challenge. The criticality of maintaining a sustainable coastal aquifer system cannot be overemphasized. The groundwater of the coastal aquifer system represents some of the highest quality water that we have in the Commonwealth and is vital to maintaining a robust economy. We look forward to continuing to work with all of our stakeholders to assure the long-term viability of this resource.

Attachment A: Eastern Virginia Groundwater Management Advisory Committee Report to the Virginia Department of Environmental Quality and Virginia General Assembly

A copy of the Eastern Virginia Groundwater Management Advisory Committee's Report to the Virginia Department of Environmental Quality and Virginia General Assembly is available at: http://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterSupplyPlanning/EVGWAC/FinalReport/GWAC_FinalReport_10.27.17.pdf?ver=2017-10-31-110609-433.

EASTERN VIRGINIA GROUNDWATER MANAGEMENT ADVISORY COMMITTEE

Report to the Virginia Department of Environmental Quality and Virginia General Assembly

July 2017

construction is needed, is estimated between the low to mid-level ranges. Using purified surface water for injection is a proven technology in other places. A means to recover the costs would be needed.

In Virginia, the City of Chesapeake for years has used the Northwest River aquifer storage and recovery (ASR) well as a closed-loop aquifer recharge system, in which treated surface water is injected into the aquifer for long-term storage to meet peak demands.

Existing Impoundments and Quarries:

The use of existing impoundments or converting existing quarries to reservoirs may provide another viable option as an alternative supply of water. Some existing impoundments are not currently being used as water supplies and may be converted to water supply use. In other cases, existing reservoirs that are used for water supply may be able to be expanded to increase the available water supply. The Committee felt that these types of solutions are worthy of further exploration by localities and the private sector to help diversify the available water supply alternatives to groundwater. The benefits to this type of water source include: (1) utilizing the already-existing infrastructure, (2) minimizing environmental impacts, and (3) reducing the demand for groundwater. The potential cost, depending on whether new construction is needed, is estimated between the low to mid-level ranges. The feasibility of using existing impoundments and quarries to hold surface water depends on the proximity of such features to the area where the water is needed. In addition, most quarries are located near the Fall Line so they may not be a cost effective alternative to meet the water demands in the EVGMA. However, if a suitable location is found, then feasibility is high, based on proven technology.

Actions typically needed to move forward with such a project include: (1) applying for a surface water withdrawal permit; (2) obtaining easements or title to be able to use the quarries, impoundments, and reservoirs; (3) determining whether the impoundment/quarry is watertight; and (4) completing a thorough chemical analysis of the source water to ensure its treatability. In Virginia there are several examples of converting existing quarries into reservoirs for alternative water sources including projects in Loudoun County, Fairfax County, and the City of Richmond. There is also a project underway in Hanover County. Additionally, an innovative example of an existing privately-owned impoundment that has applied for a water withdrawal permit is Cranston's Mill Pond in James City County. The water from the impoundment may result in much lower, long-term treatment costs compared to treating brackish water from other surface water sources.

Reducing Water Losses in Water Distribution Systems

Water loss from an aging infrastructure translates in Virginia to between 19 MGD to over 24 MGD of potable groundwater that is potentially lost per day.[20] According to the information submitted to DEQ in water supply plans, the reported metered water losses ranges from 3.95% - 22.66% of water produced. Other localities or community water systems not actively metering provided estimates within this range but they could be higher. Thus, improvements to water distribution systems, to reduce losses could reduce demand for groundwater, primarily for municipal withdrawals.[21] The costs for implementing such projects would be high-level improvements. EPA stated that Virginia needed $6.7 billion over the next 20 years just to maintain its drinking water infrastructure throughout the Commonwealth.[22] About 67% of that total, or about $4.5 billion, was needed for transmission and distribution mains across the Commonwealth.

Actions needed to move forward with these types of infrastructure projects include: (1) continuing to require entities to develop and implement a Water Conservation and Management Plan under Virginia's State Water Control Law and Groundwater Withdrawal Regulations; (2) continuing to require Permittees in the EVGMA to complete a water audit within the second year of a permit or for a reissued permit for an existing user; (3) creating more detailed specifications in the regulations regarding the implementation of a "leak detection and repair program" required by all permittees in the EVGMA; and (4) establishing a standard for an acceptable water loss rate in the Code of Virginia.

Recommendation # 2: Committee recommends that the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships and potential funding for further evaluation and study of short-term and long-term alternative water sources and solutions.

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[20] *See* AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE), 2017 INFRASTRUCTURE REPORT CARD 36–41 (2017), https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-Infrastructure-Report-Card.pdf. This report card only looked at the drinking water industry. It did not take into account industrial, commercial or other entities that are not regulated by the Safe Drinking Water Act. According to the report card, approximately 14% to 18% of the water produced is lost to leaky, aging pipes across the US (i.e., nearly six billion gallons of treated drinking water lost per day). Using 14% to 18% as a baseline and looking at the total permitted withdrawal for last year in the Annual Water Resources Report, from 2011-2015, the average groundwater withdrawal over the course of that five year period was about 135 MGD just from permitted users (14% of that number is about 19 MGD, while 18% would be over 24 MGD).

[21] The Committee heard from some Committee members that new technologies for infrastructure enhancements such as plastics vs. ductile iron might help improve water distribution systems. *See* PLASTICS PIPE INSTITUTES, INC., FREQUENTLY ASKED QUESTIONS: HDPE PIPE FOR WATER DISTRIBUTION AND TRANSMISSION APPLICATIONS (2009), http://plasticpipe.org/pdf/tn-27-faq-hdpe-water-transmission.pdf.

[22] *See* EPA, DRINKING WATER INFRASTRUCTURE NEEDS SURVEY AND ASSESSMENT (April 2013), https://www.epa.gov/sites/production/files/2015-07/documents/epa816r13006.pdf. When EPA starts looking at drinking water infrastructure maintenance and replacement issues to determine how much funding is needed, they do a "needs assessment."

III. Groundwater Management Subject Areas Examined and Recommendations

Short-Term and Long-Term Alternative Water Sources and Solutions

Alternative water sources and solutions include transitioning from groundwater to surface water resources where applicable, piloting innovative aquifer recharge projects to create a greater water supply in the EVGMA, and supporting water conservation and efficiency. The workgroups developed a list of potential alternative water source projects, identified the benefits, costs, actions needed to utilize such sources, described the feasibility of such projects, and provided examples of current projects. The workgroups recommended the list to the Committee, and the Committee adopts the list as a set of possible alternative sources. The workgroups developed a qualitative cost evaluation of the various water supply options that included a low-level, mid-level, and high-level rank associated with each option. The Committee also acknowledges that some of the ideas on the list are more viable than others, and some of the options may be more successful in certain areas of the aquifer than others.

Overall, in considering the options, the Committee stresses the need for public/private partnerships to facilitate the financing and development of short-term and long-term water supply projects. Financing alternative sources of supply can be daunting for individual localities and small water users due to limits in available financing, bonding capacity, and impacts to user rates. Even for larger private water well users, the costs can be overwhelming. The Committee further recommends, along with the following options, the need to identify options that foster innovation, including the use of new technologies.

Aquifer Recharge by Injection:

Purified Wastewater

Hampton Roads Sanitation District's Sustainable Water Initiative for Tomorrow (HRSD SWIFT) regional project is a purified wastewater aquifer injection project that is currently underway as a pilot project in Virginia (see a more detailed discussion below), and other potential local projects are being evaluated for New Kent and Hanover Counties. An aquifer recharge project is where tertiary treated wastewater is purified to drinking water standards through an advanced drinking water treatment plant and is injected into an aquifer. These systems utilize wells that pump water into the aquifer instead of withdrawing water. Projects of this kind are used successfully in many parts of the country and can create many benefits for the groundwater resources, including: (1) recharging the aquifer to increase water availability for consumptive use; (2) using a readily available source in most communities (i.e., wastewater); (3) potentially reducing pollutant loads currently being discharged into surface water; (4) potentially reducing land subsidence; and (5) utilizing the natural structure of the aquifer itself for distribution and storage. The cost associated with this type of project would be in the high-

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Office of Research and Advisory Services

January 27, 2017

Mr. Matthew Link
Water Withdrawal Permit Writer
Office of Water Supply
Department of Environmental Quality
P.O. Box 1105, Richmond, VA 23218

Dear Mr. Link:

The Virginia Institute of Marine Science (VIMS) forwards the following comments addressing the proposal for a surface water intake by Cranston Mill Pond, LLC. VIMS faculty and staff from the departments of Physical Sciences, Biological Sciences, and Fisheries Science, and the Office of Research and Advisory Services contributed to the analyses of potential adverse environmental impacts within Yarmouth Creek and the greater Chickahominy River watershed from the operation of an intake within Cranston's Mill Pond and the resulting reduction in freshwater flow to Yarmouth Creek.

Cranston's Mill Pond's spillway flows into a tidal freshwater swamp at the head of Yarmouth Creek, a tributary to the Chickahominy River. Tidal freshwater swamps are unique and limited estuarine communities in Virginia's portion of Chesapeake Bay and is the primary resource of concern associated with this project. To address this concern we engaged in conversations with the applicants on the most appropriate means to provide data needed to assess any measurable changes to local hydrology and salinity patterns. Our analyses of these and other available data show that the average daily flow of 8.3 million gallons per day from Cranston's Mill Pond has only minimal influence on the overall hydrology and salinity patterns within Yarmouth Creek. Therefore, the operation of the proposed surface water intake is not expected to result in adverse environmental impacts to estuarine resources.

As VIMS stated in comments on the draft State Water Resources Plan (May 4, 2015 letter to Scott Kudlas), we have concerns for tidal freshwater areas as future surface water supplies to replace challenged groundwater resources in Virginia's coastal plain. Over-reliance on tidal freshwater will lead to adverse impacts to estuarine vegetative communities and the aquatic fauna that exploit these areas. Use of existing freshwater supplies such as Cranston's Mill Pond can reduce the risk to tidal freshwater resources and should be considered a viable alternative water supply strategy.

Thank you for the opportunity to comment and please do not hesitate to contact me if you have questions or require additional information.

Sincerely,

Lyle Varnell
Associate Director for Advisory Services

PO Box 1346 • 1375 Greate Road • Gloucester Point, Virginia 23062-1346 USA
804.684.7482 • www.vims.edu

95

Wortzel, Andrea W.

From: Fernald, Ray (DGIF) <Ray.Fernald@dgif.virginia.gov>
Sent: Friday, February 17, 2017 1:05 PM
To: Link, Matthew (DEQ)
Cc: Kudlas, Scott (DEQ); Schneider, Jutta (DEQ); Whitehurst, David (DGIF); Ewing, Amy (DGIF); Greenlee, Bob (DGIF); Smith, Scott (DGIF)
Subject: 37647_16-1937_Crantson's Mill Pond

Matthew;

We have reviewed the referenced application to withdraw surface water from Cranston Millpond for undesignated purposes. Cranston Millpond is but one of many similarly situated ponds in the tidal James/Chickahominy system; i.e., at the head of tide, and at or near the mouths of small streams adjacent to large marshes or tidal complexes. In this case, the pond abuts a large marsh complex associated with Yarmouth Creek, itself a tributary of the Chickahominy River. Given the pond's location in the watershed, its adjacency to a large tidal marsh complex, and the relatively small size of the requested withdrawal, we essentially concur with the written VIMS opinion that "operation of the proposed surface water intake is not expected to result in adverse environmental impacts to estuarine resources."

Nonetheless, we are concerned regarding the precedent that may be set by issuing a water withdrawal permit that would essentially allocate a public resource (surface water) to a private entity without a demonstrated purpose or proposed use, and without specific demonstrated need or demand. In short, there is no documentation that the allocated water would serve any beneficial use. While we do not question the need for additional water supplies in coastal Virginia, issuance of the requested permit could appropriate surface waters to the applicant, thereby potentially affecting future applicants who may document need and demand for this water, but who might be denied a permit because the water had already been allocated. The permit might be conditioned such that it would not jeopardize subsequent applicants, by making this permit subordinate to any other permits issued before a customer/use is determined, but that would, in effect, mean that the instant permit is really just a documentation of surface water availability, not a permit to withdraw. Such issuance could significantly complicate review of future permit applications, and set a precedent that might be followed throughout the Commonwealth. This said, we believe that DEQ is best positioned to render a policy decision in this regard.

Thank you for the opportunity to review this proposed surface water withdrawal application. Please contact us if we may provide additional information

Ray

Raymond T. Fernald (Ray)
Chair, Mid-Atlantic Panel on Aquatic Invasive Species
Manager, Environmental Programs
Virginia Department of Game and Inland Fisheries
PO Box 90778
7870 Villa Park Drive
Henrico, VA 23228-0778
Phone: (804) 367-8364
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Commonwealth of Virginia

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Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

May 17, 2019

By e-mail: jcorbin@restorationsystems.com
Receipt Confirmation Requested

Cranston Mill Pond, LLC
c/o Mr. Jeff Corbin
5735 S. Laburnum Ave.
Richmond, VA 23231

Re: Draft Virginia Water Permit (VWP) Individual Permit Number 16-1937
Cranston's Mill Pond Raw Water Supply Project, James City County, Virginia
Draft Permit and Public Notice

Dear Mr. Corbin:

Enclosed for your review are the Virginia Department of Environmental Quality (DEQ) Public Notice and draft Virginia Water Protection (VWP) individual permit to be issued for the above-referenced project. If you have any questions, comments, or objections concerning the Public Notice or draft permit, please contact me within **14 calendar days** of the date of this letter. Once the Public Notice is published, changes cannot be made to the permit unless public comments warrant a change.

Acceptance of the permit is evidenced by publishing the enclosed Public Notice, which must be done once at your (the applicant's) expense in a newspaper of general circulation in the area of the project. Publication of the Public Notice initiates the required 30-calendar day comment period. Day 1 of the comment period begins the day following its publication. It is your responsibility to ensure that the comment period stated on the public notice is for a full 30-calendar day period and that the final day of the comment period ends on a state business day. DEQ requires proof of publication of the Public Notice. Please instruct the publisher to complete the attached sworn verification statement and forward the statement to my attention at the address on this letterhead.

Please notify me via email when the public notice is published in the paper. If the Public Notice is not published within **14 calendar days**, DEQ will suspend processing of your permit application until evidence of publication is received. The processing clock will resume on the date of publication.

Should you have any questions, please contact me by phone at 804-698-4180 by email at Brian.McGurk@deq.virginia.gov, or at the above address. Thank you for your cooperation in this matter.

Respectfully,

Brian McGurk, PG
Water Withdrawal Permit Writer

Enclosures: Public Notice, Public Notice Verification Form, Permit Cover Page, Part I - Special Conditions, Part II - General Conditions

Cc (by e-mail):
Scott Reed, CBNLT

2. No less than two years prior to initiating a withdrawal, the permittee shall provide to the DEQ, Office of Water Supply the following in a report for Department review and approval:

   a. Information on the proposed use of and need for the surface water and information on how demand for surface water was determined;

   b. A detailed description of the processes that require the use of water and the amounts of water associated with each process;

   c. If the proposed use is for public supply, an alternatives analysis that meets the requirements of 9VAC25-210-360.3;

   d. Documentation, using a consistent vertical datum, of the stage-storage relationship in Cranston's Mill Pond, including any available storage volume above that required to operate Cranston's Mill Pond as a certified nutrient offset facility;

   e. A plan including the description, layout, design drawings, and alternatives analysis for the construction of a raw water intake with associated appurtenances meeting the requirements of 9VAC25-210-80.B.1. The intake screens shall be designed so that screen openings are not larger than 1 millimeter in width and height and the screen face intake velocities are not greater than 0.25 feet per second; and

   f. The results of consultation with the Virginia Department of Conservation and Recreation Natural Heritage Program (DCR-DNH) and the U.S. Fish and Wildlife Service (USFWS) regarding the presence of state and/or federally threatened or endangered species within the project area and in the Yarmouth Creek watershed upstream of its confluence with Little Creek. Such consultation shall include performance of a project review for threatened and endangered (T&E) species, and subsequent detailed habitat assessment if the review indicates the potential presence of any T&E species.

   Upon approval of the report, the permittee shall request a permit modification in accordance with 9VAC25-210-380 to authorize the surface water withdrawals and impacts identified in the report.

3. The withdrawal of water from Cranston's Mill Pond for any justified beneficial use shall not exceed the following:

   a. A maximum daily withdrawal of 15 million gallons per day (mgd);

   b. A maximum monthly withdrawal of 465 million gallons (mg);

   c. A maximum annual withdrawal of 3285 mg; and

4. At no time shall the volume of water withdrawn from Cranston's Mill Pond be greater than ten percent (10%) of the previous day's provisional inflow into Cranston's Mill Pond as measured by the procedures outlined in Part I.D.5.

5. The permittee shall estimate inflow to Cranston's Mill Pond on a daily basis using one of the following procedures:

   a. Inflow to Cranston's Mill Pond may be estimated in units of cubic feet per second (cfs) by monitoring the U.S. Geologic Survey (USGS) Gaging Station No. 02042500 (Chickahominy River near Providence Forge, Virginia) and by applying the equation "Inflow = Q_{mo} * 0.028", where:

      i. Q_{mo} is the previous day's provisional mean daily flow in cfs; and

Education
BS Biology College of William and Mary 1985
MEM Environmental Management Duke University 1987

Years of Experience
Total – 33

Professional Registrations
Certified Ecologist
Habitat Evaluation Procedures

Paul E. Peterson

Certified Project Manager and Associate Vice President

Paul is a water resource scientist and certified Project Manager who specializes in managing water supply development programs. His experience includes reservoir and river withdrawal feasibility studies, environmental impact assessments, surface water model development, permitting, and water supply plans throughout the eastern United States.

Most Recent Project Manager Responsibilities

- Henrico County – Cobbs Creek Reservoir Engineering
- Chesterfield County – New Water Supply
- Loudoun Water – Quarry A Engineering
- WestRock – Hopewell Mill James River Intake Retrofit
- New Kent County – Pamunkey River Water Supply
- Frederick Water – Opequon Creek Water Supply
- Fayetteville Public Works Commission – Water Supply Advisory Services

Cobbs Creek Reservoir Permitting and Engineering
Cumberland and Henrico Counties, VA
Project Manager for initial feasibility study, Joint Permit Application and EA for Cobbs Creek Reservoir. Secured key federal and state approvals. Project Manager in subsequent phase for engineering services including permit compliance studies and regulatory negotiations, mitigation program, property acquisition, utility relocation assistance, and preliminary engineering for 150 mgd James River withdrawal facilities and 14.8 BG reservoir.

New Water Supply
Chesterfield County, VA
Project Manager for a comprehensive study of water supply options to meet Chesterfield County's long-term needs. Prepared joint permit application for selected project which includes: (1) submerged 40 mgd Appomattox River raw water intake, (2) pump station on the bluff adjacent to the river intake, (3) raw water pipeline to convey river withdrawals to (4) new water treatment plant approximately 1.3 miles from the pump station.

Quarry A Engineering
Loudoun Water, Loudoun County, VA
Project Manager for Potomac Water Supply Program engineering services to develop an updated PER and perform detailed design for conversion of a Luck Stone quarry into a water storage reservoir. Planned facilities include quarry pump station, quarry intake, transmission main, quarry geotechnical improvements and access. Also technical advisor on permitting of 40 mgd Potomac River withdrawal facilities.

Rocky Pen Run Reservoir Permitting
Stafford County, VA
Project Manager for EA and permit applications for 5.54 BG Rocky Pen Run Reservoir and 40 mgd Rappahannock River withdrawal facilities. Secured key federal and state approvals. Managed subsequent fisheries entrainment monitoring studies for the river intake facilities.

Pamunkey River Withdrawal Supply
New Kent County, VA

Project Manager for initial engineering and Joint Permit Application for development of a new 8 mgd Pamunkey River withdrawal, transmission and treatment system.

James River Intake Replacement
WestRock, City of Hopewell, VA
Project Manager for permitting and preliminary engineering associated with replacement of 20 mgd James River withdrawal facilities at Hopewell Mill that were damaged by a barge collision.

Opequon Creek Water Supply
Frederick Water, Stephens City, VA
Project Manager for initial engineering and Joint Permit Application for development of a new 8 mgd Opequon Creek withdrawal, transmission and treatment system.

Water Supply Advisor
Public Works Commission, City of Fayetteville, NC
Project Manager for assistance on the allocation process for Corps of Engineers' Jordan Lake, development of Cape Fear River Basin Hydrologic Model, development of water supply plans, and interbasin transfer issues including litigation support. Expert witness in contested case trial in which Fayetteville challenged conditions of an interbasin transfer permit approved by the State of North Carolina.

Citizens Reservoir
Citizens Energy Group, Indianapolis, IN
Technical advisor for preliminary engineering and design of conversion of quarry adjacent to Geist Reservoir into a water storage reservoir. Planned facilities include reservoir intake, quarry pump station, quarry intake, transmission main, quarry geotechnical improvements and access.

White River Intake and Canal Outfall
Citizens Energy Group, Indianapolis, IN
Technical advisor for preliminary engineering of 70 mgd White River intake, pump station and canal outfall.

SCADA Systems Replacement
Henrico County, VA
Project Manager for planning, design, and construction administration to replace the existing Supervisory Control and Data Acquisition system with a new system for all Henrico County Department of Public Utilities facilities.

Verdon Quarry Reservoir Safe Yield Analysis
Hanover County, VA
Project Manager for study to simulate operation of Hanover County's planned Verdon Quarry Reservoir pumped storage system. Developed estimates of the system's safe yield under various possible operating scenarios using a simulation tool developed for this evaluation.

King William Reservoir Permitting
Regional Raw Water Study Group, City of Newport News, VA
Project Manager for EIS evaluating 35 alternatives. Secured key federal and state approvals for 12.2 BG King William Reservoir to be supplied by 75 mgd Mattaponi River withdrawal. Also managed multi-year pre-operational ecological monitoring program in the Mattaponi and Pamunkey rivers to comply with permit conditions.

James River Withdrawal Permitting
Powhatan County, VA
Project Manager for initial feasibility study and permitting assistance including development of a Joint Permit Application for a new 15 mgd James River withdrawal and transmission system.

Falling Creek Reservoir Restoration

Chesterfield County, VA
Project Manager for PER to restore Falling Creek Reservoir which covers 90 acres and drains 34,000 acres. This project is a component of the County's plan to address its MS4 permit requiring reductions in surface water loading of total nitrogen, total phosphorus, and total suspended solids. Currently serving as permitting leader for the detailed design phase.

Rappahannock River Withdrawal Permitting
Birchwood Power, King George, VA
Technical advisor for Rappahannock River withdrawal re-permitting for coal-fired power plant.

Water System Expansion Permitting
Amherst County Service Authority, VA
Provided permitting assistance for water supply system expansion including Graham Creek Reservoir, Harris Creek withdrawal and new James River withdrawal. Also developed safe yield estimates for various Buffalo River water supply development scenarios using a simulation tool developed for this evaluation.

Water System Expansion Permitting
Buckingham County, VA
Provided permitting assistance and developed safe yield model for use in negotiating permit conditions for proposed expansion of Troublesome Creek Reservoir.

Water System Expansion Permitting
City of Winchester, VA
Evaluated permitting requirements associated with expansion of Winchester's North Fork Shenandoah River withdrawals.

James River Withdrawal Permitting
Goochland County, VA
Prepared Environmental Report and permit applications for proposed water supply and wastewater treatment facilities on the James River.

Lake Gaston Pipeline Project Litigation
City of Virginia Beach, VA
Technical lead for several studies on demands and water supply alternatives required to defend against legal challenges of the 60 mgd withdrawal and transmission facilities from the Roanoke River associated with this project. Also Project Manager for development of a calibrated and verified safe yield model of the Norfolk, Virginia water supply system.

New Water Source Investigations
Birmingham Water Works & Sewer Board, AL
Technical lead for alternatives analysis and development of integrated system models associated with long-term water source investigation to expand Birmingham's raw water supply. Technical advisor for preparation of permitting documentation and detailed hydrologic modeling to support new 60 mgd withdrawal from Black Warrior River.

Integrated Water Resources Management Plan
Beaufort Jasper Water & Sewer Authority, Beaufort, SC
Project Manager for development of a plan to integrate groundwater, surface water, reused water and stormwater to sustain services for the next 50 years.

Water Resources Development & Optimization
City of Frederick, MD
Project Manager for examination of existing and potential new sources of water supply and addressing methods of optimization. Work included development of detailed safe yield model for the existing water supply system and potential supply expansion alternatives.

Water & Wastewater Strategies
Carroll County, MD
Project Manager for development of reports on available surface water and groundwater supply by watershed, wastewater limitations, and water supply and wastewater alternatives to support the Water Resources Element of the Comprehensive Plan.

Water Supply Plan
Region 2000, Lynchburg, VA
Project Manager for alternatives evaluation as part of a regional water supply plan covering five counties plus the City of Lynchburg.

Water Supply Plan
Henrico County, VA
Project Manager for water supply plan to comply with Virginia local and regional water supply planning regulations.

Water Supply Plan
Stafford County, VA
Project Manager for water supply plan to comply with Virginia local and regional water supply planning regulations.

Water Supply System Model
City of Baltimore, MD
As part of Fullerton Water Filtration Plant Study directed development of a Water Supply Simulation Tool for use in developing operating rules to optimize Baltimore raw water source utilization and storage capacity.

Value Engineering Review
City of Columbus, OH
Technical lead on water supply simulation modeling and safe yield analysis as part of a value engineering review for the proposed Upground Reservoir Project.

Water System Reliability Analysis
Charlotte County, FL
Developed Water Supply Simulation Tool for reliability analysis of Peace River Manasota Regional Water Supply Authority river withdrawal, reservoir and ASR facilities.

Water Master Plan
Del-Co Water Company, Delaware, OH
Surface water supply option analysis for Water Master Plan including development of an integrated system safe yield model.

Water Supply System Model
City of Akron, OH
Developed model of the Akron raw water supply system to perform safe yield analysis and other applications.

Water Master Plan
Citizens Energy Group, Indianapolis, IN
Surface water supply option analysis for Water Master Plan including development of safe yield models.

Water Supply System Model
Indianapolis Department of Waterworks, IN
Developed safe yield model for Geist Reservoir – Fall Creek raw water supply system.

Water Supply System Model

City of New London, CT
Directed development of an integrated safe yield model for New London's water supplies.

Water Supply System Model
Columbus Water Works, GA
Conducted safe yield evaluation for the Columbus Water Works and Fort Benning water supply systems.

Water Supply System Model
Mobile Area Water and Sewer System, AL
Developed water supply system safe yield model.

Safe Yield Analysis
Puerto Rico Aqueduct and Sewer Authority
Directed safe yield analysis of La Plata River and La Plata Reservoir as part of La Virgencita Water Treatment Plant Evaluation.

Watershed Management Plan
Mariners' Museum, City of Newport News, VA
Project Manager for development of a watershed management plan update to determine current causes of water quality problems in Lake Maury and recommend actions to improve long-term lake health.

Sandy River Reservoir Protection Plan
Prince Edward County, VA
Project Manager for development of a Prince Edward County ordinance to protect Sandy River Reservoir water quality and quantity. Work included reservoir protection area delineation and recommended protection measures as determined in conjunction with a Task Group review and public involvement process.

GREGORY CARPENTER GARMAN

1000 W. Cary Street, Box 843050; Virginia Commonwealth University
Richmond, Virginia 23284-3050
(804) 828-1574, 828-1622 (fax); ggarman@vcu.edu

a. Professional Preparation

B.A. in Biology	Millersville University	1978
M.S. in Fisheries Science	Virginia Tech	1980
Ph.D. in Zoology	University of Maine	1984
NSERC Postdoctoral Fellow	Fisheries and Oceans Canada St. Johns, Newfoundland	1985

b. Academic Appointments

Director, Rice Rivers Center, Virginia Commonwealth University (2016-present). Manage personnel and facilities at VCU's 500-acre field research station located on the tidal James River, Virginia (www.vcu.edu/rice); tasked with expanding research and training opportunities in the biological and environmental sciences for faculty and students.

Director, Center for Environmental Studies, Virginia Commonwealth University (1995-2017). Principal for one of ten University Charter Centers with a current enrollment of +300 majors in four undergraduate and graduate degree programs, an annual operating budget of $800K, including 14 research and teaching faculty, and 5 professional staff (www.vcu.edu/cesweb).

Associate Professor (tenured), Department of Biology, Virginia Commonwealth University (2001-present). Principle investigator for an externally funded Fish Ecology research lab that successfully trained over 30 Masters and Doctoral degree candidates and Post-doctoral Fellows.

c. Recent Publications

Balazik, M., D. Farrae, T. Darden, and G. Garman. 2017. Genetic differentiation of spring-spawning and fall-spawning male Atlantic Sturgeon in the James River, Virginia. PLoS ONE 12(7):e0179661.

Wood, J., D. Elliott, G. Garman, D. Hopler, W. Lee, S. McInnch, A. Porter, and P. Bukaveckas. 2016. Autochthony, allochthony and the role of consumers in influencing the sensitivity of aquatic systems to nutrient enrichment. Food Webs 7: 1–12.

Wood, J., R. Franklin, G. Garman, S. McInnch, and P. Bukaveckas. 2014. Exposure to the cyanotoxin microcystin arising from intraspecific differences in feeding habits among fish and shellfish in the James River estuary, Virginia. Enviro. Sci. and Tech. 10.1021.

Balazik, M., S. McInnch, B. Langford, G. Garman, M. Fine, J. Stewart, and R. Latour. 2013. Comparison of MS222 and electronarcosis on cortisol levels in aquacultured juvenile Atlantic sturgeon. Transactions of the American Fisheries Society 142:1640-1643.

Aunins, A., B. Brown, M. Balazik and G. Garman. 2012. Migratory movements of American shad in the James River fall zone, Virginia. North American Journal of Fisheries Management

33:569-575. doi:10.1080/02755947.2013.768564.

Balazik, M., S. McIninch, G. Garman, M. Fine, and C. Smith. 2012. Using energy dispersive x-ray fluorescence microchemistry to infer migratory life history of Atlantic sturgeon. Environmental Biology of Fishes 95:191-194. doi: 10.1007/s10641-012-9979-3

Balazik, M., S. McIninch, G. Garman, and Robert J. Latour. 2012. Age and growth of Atlantic sturgeon in the James River, Virginia, 1997-2011. Transactions of the American Fisheries Society 141:1074-1080. doi: 10.1080/00028487.2012.676590

Balazik, M., G. Garman, J. Van Eenennaam, J. Mohler, and L. Woods. 2012. Empirical evidence of fall spawning by Atlantic sturgeon in the James River, Virginia, USA. Transactions of the American Fisheries Society 141:1465-1471. doi: 10.1080/00028487.2012.703157

Balazik, M., K. Reine, A. Spells, C. Fredrickson, M. Fine, G. Garman, and S. McIninch. 2012. The potential for vessel interactions with adult Atlantic sturgeon in the James River, Virginia, USA. North American Journal of Fisheries Management 32:1062-1069.

Schlosser, R., M. Fabrizio, G. Garman, R. Greenlee, and M. Groves. 2011. Ecological role of blue catfish in Chesapeake Bay communities and implications for management. Chapter 6 In: Conservation, Ecology, and Management of Worldwide Catfish Populations and Habitats. American Fisheries Society, Bethesda.

Balazik, M., G. Garman, M. Fine, C. Hager, and S. McIninch. 2010. Changes in age composition and growth characteristics of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) over 400 years. Biology Letters 6:708-710. doi: 10.1098/rsbl.2010.0144

Balazik, M., G. Garman, C. Hager, and S. McIninch. 2010. Changes in Atlantic sturgeon life history in the James River, Virginia over 400 years. Biology Letters 10:2010-2014.

d. Recent and Current Synergistic Research Activities (selected)

Principle Investigator for the INSTAR initiative (http://instar.vcu.edu), an online geospatial database and decision support tool focused on EPA Healthy Watersheds ecological assessments of streams and rivers that are used by agencies and other stakeholders to inform environmental and regional planning, conservation targeting, permit review, and policy development (1998-2023; $1.1M from EPA Office of Water and Chesapeake Bay Program)

Co-Principle Investigator for NOAA/NMFS (ESA Section 6) study of threats to recovery for federally endangered Atlantic Sturgeon (Chesapeake Bay distinct population unit) in Virginia and Maryland waters (2013-2024; $4.4M from NOAA Protected Resources Office)

Co-Principle Investigator of 3-year, multi-institution study to evaluate the likely causes and possible effects of harmful algal blooms (HABs) and other water quality impairments in coastal riverine and estuarine ecosystems of Chesapeake Bay (2014-2016; $510K from the Commonwealth of Virginia)

Co-Principle Investigator of 15-year study of long-term trends in riverine and estuarine water quality dynamics in a Chesapeake Bay tidal tributary (2009-2026; $3.1M from the City of Richmond, Virginia)

ARCADIS Design & Consultancy for natural and built assets

Ms. Andrea W. Wortzel, Esq.
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Water

Subject:
Cranston's Mill Pond Raw Water Supply
Withdrawal Permitting Assistance – Inflow Estimation

Date:
September 6, 2018

Contact:
Paul Peterson

Phone:
757.593.0193

Email:
Paul.Peterson@arcadis.com

Our ref:

Dear Ms. Wortzel:

Troutman Sanders requested that Arcadis provide comments relating to the Cranston's Mill Pond (CMP) inflow estimation method identified in the September 15, 2017 draft Virginia Water Withdrawal permit conditions provided by DEQ. The first method listed by DEQ is to rely on Chickahominy River flows as measured near Providence Forge and adjusted by a drainage area correction factor of 0.028 which is the ratio of CMP drainage area (7.0 sq.mi.) to Chickahominy River gage drainage area (251 sq.mi.).

Arcadis is concerned that known significant contributions of groundwater discharge to CMP may not be adequately represented by the Chickahominy gage. Specifically, underestimation of CMP inflows may occur, especially during lower flow periods when groundwater discharge may be a higher percentage of total CMP inflow.

In order to evaluate this concern, Arcadis assembled available daily flow records for the active USGS gage on the Chickahominy River near Providence Forge, CMP spillway flows (formerly measured using LASSO Technologies monitoring equipment and more recently measured using FTS radar sensor), and daily flow records for the discontinued USGS gage on Ware Creek near Toano.

The discontinued Ware Creek gage location is just a few miles due north of CMP in James City County and much closer to CMP than Providence Forge. The Ware Creek gage drained a nearly identical area as CMP (6.29 sq.mi. vs. 7.0 sq.mi., respectively), whereas the Chickahominy gage drains 36 times more area than CMP and its watershed extends far to the west. The Chickahominy River rises about 15 miles northwest of Richmond and includes significant urban and residential areas upstream of Providence Forge. The degree of watershed development can certainly influence streamflow rates. The USGS published a study in 1995 entitled "Selected Characteristics of Stormflow and Base Flow Affected by Land Use and Cover in the Chickahominy River Basin, Virginia, 1989-91". The study showed that the total volume of base flow per unit drainage area for 1990 was smallest at the urban station (Upham Brook) and largest at the rural station (Providence Forge). Hydrographs from the urban station had relatively higher short-term peaks and lower base flow than the rural and residential stations,

and indicate the possible effects of urbanization.

The three daily flow records were converted to unit flows (i.e., cfs/sq.mi.) so that direct comparisons could be made during periods when records existed for the same time periods. The attached graphics portray comparisons of unit flows for Chickahominy vs. CMP (July 31, 2015 – August 4, 2018) and Chickahominy vs. Ware Creek (1979-1995). The portions of the datasets portrayed focus on the lower end of the flow regime when Chickahominy flows are at or below 1 cfs/sq.mi. For comparison, average Chickahominy flow over a period of record (1942-2017) is 265.7 cfs or about 1.06 cfs/sq.mi. and median Chickahominy flow over that same period of record is 171.0 cfs or about 0.68 cfs/sq.mi.

In each case, the attached graphics show that Chickahominy unit flows (blue lines) most commonly underestimate CMP and Ware Creek unit flows, and this is especially evident at the lower end of the flow regime. In other words, the Chickahominy gage generally results in an underestimation bias for both small James City County watersheds and this is most evident at low flow levels.

Given the likelihood that use of the Chickahominy gage data will underestimate CMP inflows, we suggest that a preferable permit condition would allow use of the current CMP flow monitoring system (i.e., USGS-approved FTS radar sensor).

Sincerely,

Arcadis U.S., Inc.

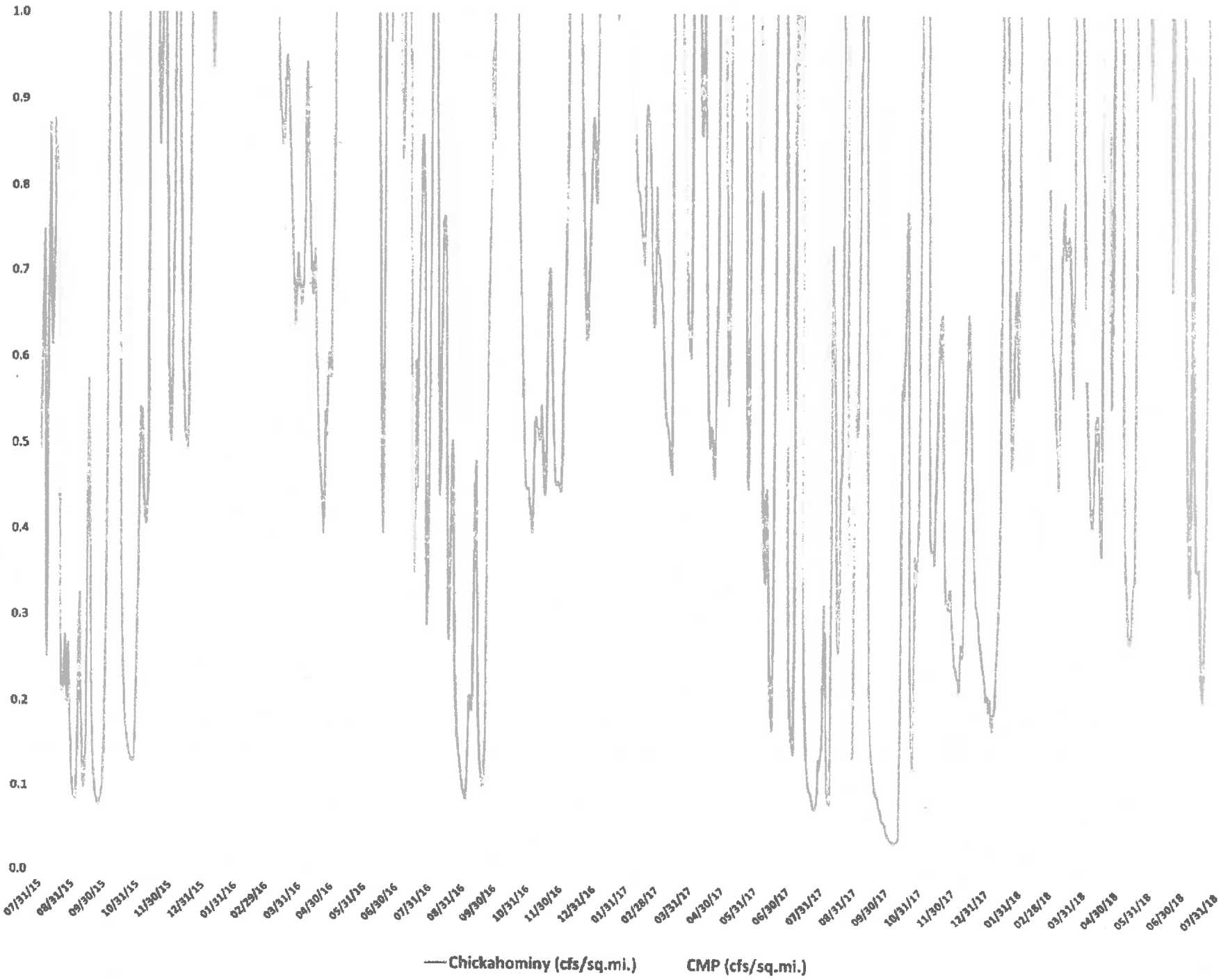
Paul Peterson

Paul E. Peterson
Associate Vice President

Attachments (2)

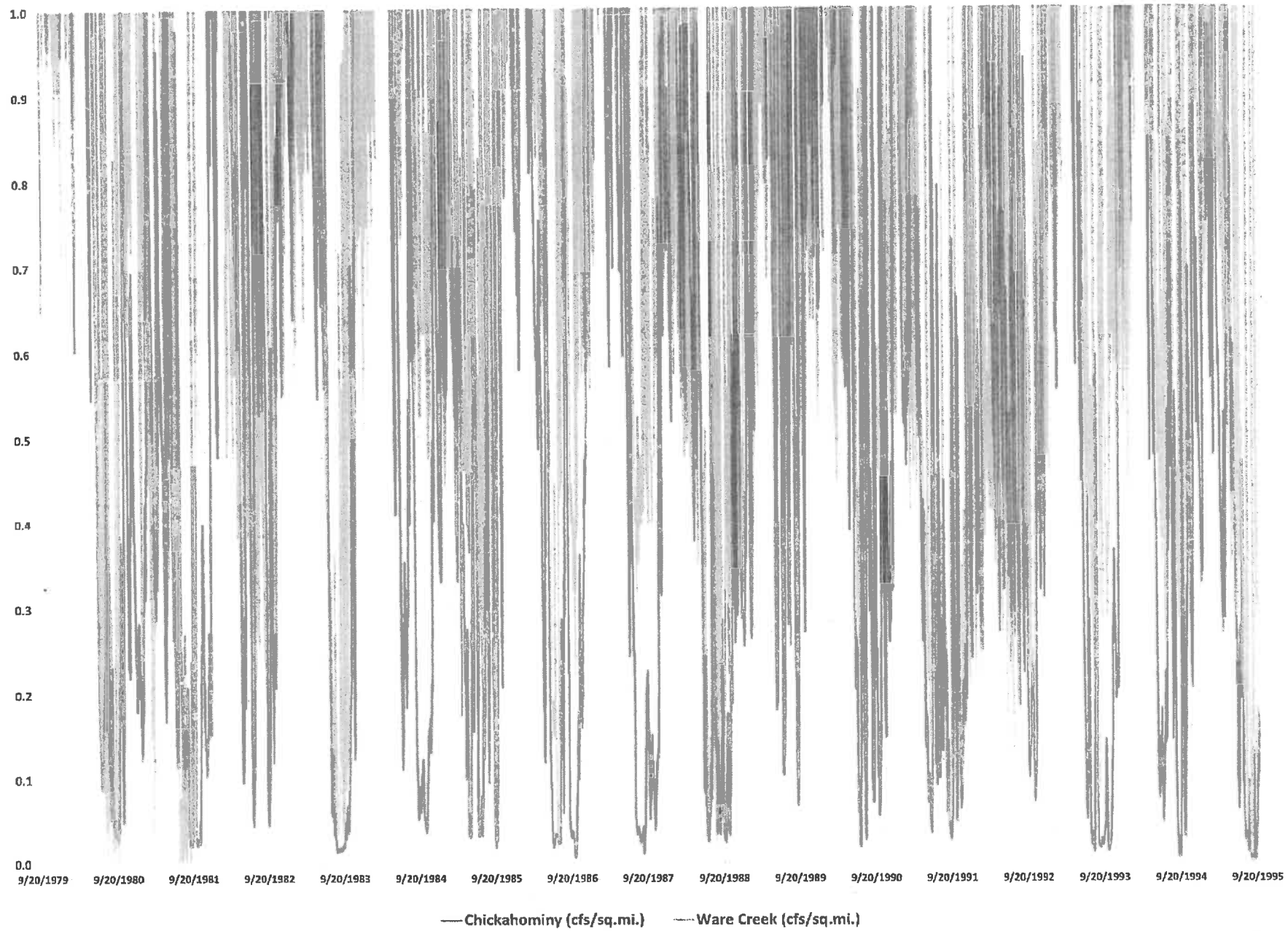
ARCADIS

Unit Flow Comparison Chickahominy River vs. CMP



ARCADIS

Unit Flow Comparison -- Chickahominy River vs. Ware Creek



Tab 6

Previously Submitted Yarmouth Creek Water Volume Calculations and Graphics

This information was originally submitted to VIMS on January 5, 2017 and to DEQ staff on March 2 and again on June 7, 2017. Using County GIS data and NOAA tide data the average volume of tidal water that inundates upper Yarmouth Creek (from the confluence with Little Creek to CMP over a 24-hour tidal cycle was calculated to be 232 million gallons. The average daily flow from CMP represents 3.5% or less of the daily tidal volume in upper Yarmouth Creek.

Estuary Analysis
(Volumetric Calculations)

Yarmouth Creek Volumes Based Upon County GIS Elevation Data					
Elev.	Contour Area Acres	Contour Area Based Upon Avg. End Area	Incremental Vol. (Cubic Feet)	Accumulated Vol. (Cubic Feet)	Accumulated Vol. (MG)
0.00	58.16		0	0	0.00
1.00		139.935	4,314,509.10	4,314,509.10	32.27
2.00	163.55		6,609,903.30	10,924,412.40	81.71
3.00		182.54	9,275,339.70	20,199,752.10	151.09
4.00	197.53		10,015,424.10	30,215,176.20	226.01

We have calculated the tidal flushing volume for the portion of upper Yarmouth Creek from the confluence of Little Creek to slightly downstream of Cranston's Mill Pond Rd. (please see the attached maps to illustrate the cut-off boundaries for our analysis). Using County GIS data, we calculated the surface area and volume of water present at elevations 0 - 4 feet. The calculations in the table illustrate that at elevation 3', there are approximately 151 million gallons of water in that segment of the creek. Extrapolating to 2.5' (the approximate tidal range the day that we collected the salinity data, based on the Wright Island Landing Station), there are approximately 116 million gallons present. At elevation 4' (the approximate tidal range of full/new moon spring tides), the volume increases to 226 million gallons. With two tidal cycles daily, there are, therefore, a total of 232 (2.5' tidal range) to 452 (4' tidal range) million gallons of water daily moving in and out of the segment. With an average daily flow of 8.3 MGD out of CMP, our flow represents from 1.8 - 3.5% of the daily water volume in that segment. Please note that this calculation is only for the upper segment of Yarmouth Creek. The proportion of our flow is further reduced if compared to the larger entirety of the creek system.

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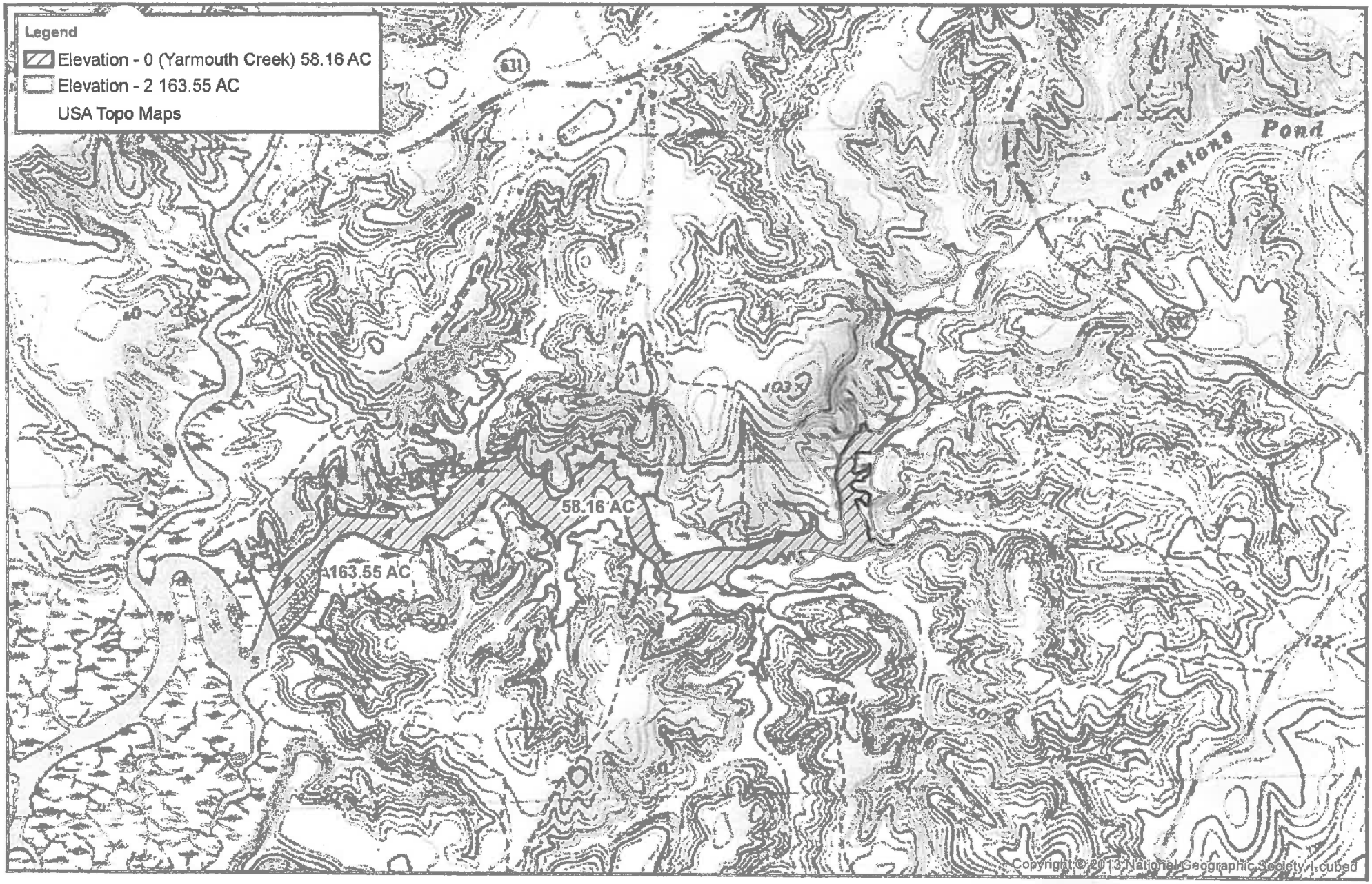


"Tomorrow's Natural Resources Today"

Drawn By: CJJ

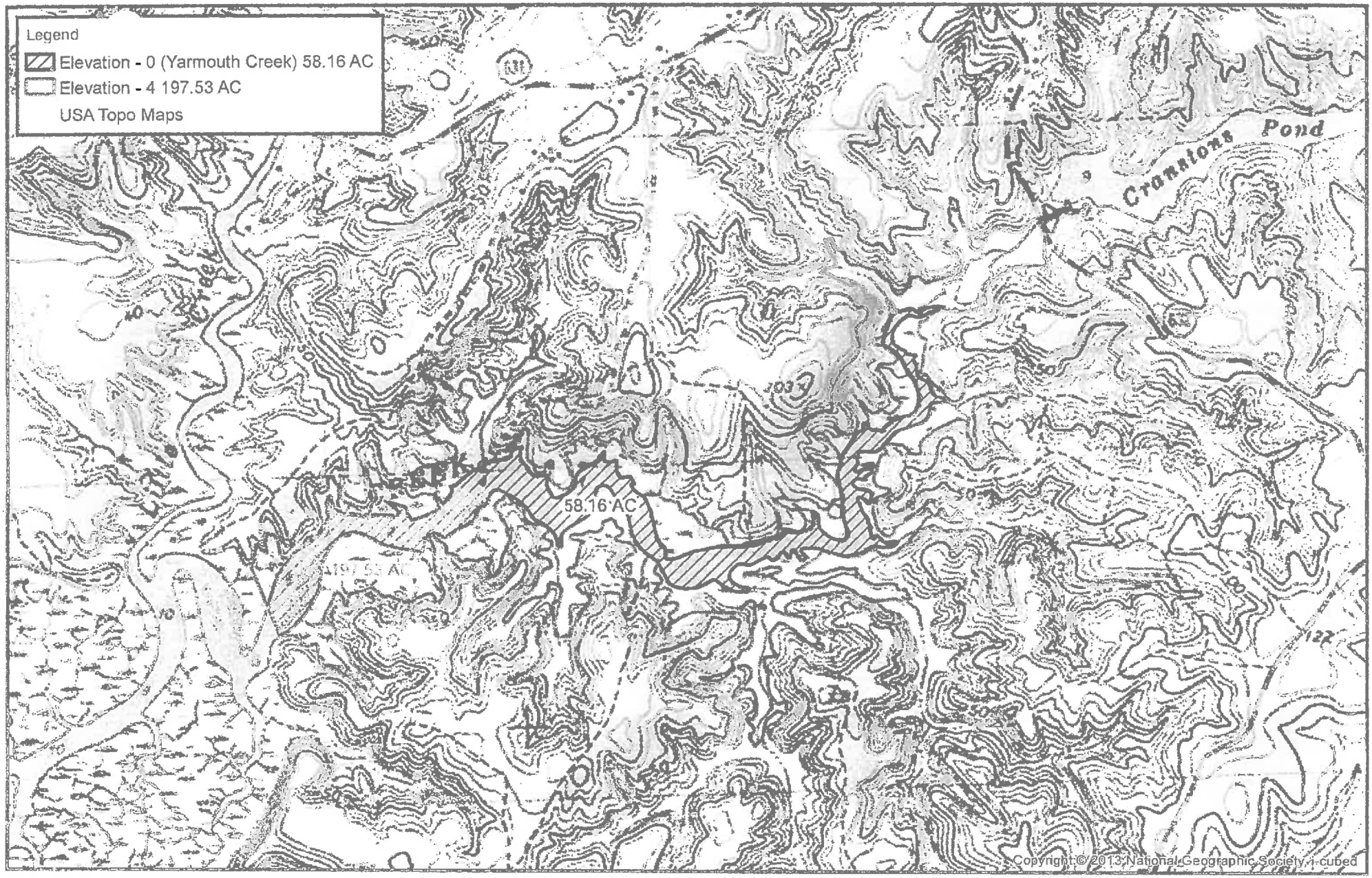
N

Date: 06/27/2016
Scale: 1 Inch : 1250 Feet
Location: James City County, Va

Cranston Mill Pond

(Estuary Analysis - Elevation 2)

Chesapeake Bay
Nutrient Land Trust, LLC
5736 S. Laburnum Avenue
Richmond, VA 23231
P: 804.222.5114



"Tomorrow's Natural Resources Today"

Drawn By: CJJ

N

Date: 06/27/2016
Scale: 1 Inch : 1250 Feet
Location: James City County, Va

Cranston Mill Pond

(Estuary Analysis - Elevation 4)

Chesapeake Bay
Nutrient Land Trust, LLC
5735 S. Laburnum Avenue
Richmond, VA 23231
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Tab 7

Controlled Flow Release Field Study

Department of Environmental Quality staff had questioned whether the proposed water withdrawal would adversely impact aquatic habitat conditions during low tide.

This scientific field study was designed specifically to visually document the appearance of low tide aquatic habitat conditions in upper Yarmouth Creek under various reduced flows (from 300,000 gallons/day to 8 million gallons/day) from CMP. The results of the study conclude that the downstream aquatic conditions at low tide are essentially equal under all of the flow releases evaluated. These findings confirm that the physical nature of Yarmouth Creek is controlled predominantly by the tidal effect of the Chickahominy and James Rivers, not by flow releases from CMP.

These results and conclusions are supported by VIMS, Dr. Greg Garman and Paul Peterson of ARCADIS.

Controlled Flow Release Field Study
Cranston's Mill Pond – Yarmouth Creek
March 19 – 27, 2018

Jeff Corbin, Restoration Systems
Brent Fults, Chesapeake Bay Nutrient Land Trust

This scientific field study was designed and conducted to document the extent of tidal inundation and evaluate any visual differences in the appearance of the low tide aquatic habitat conditions in upper Yarmouth Creek, below Cranston's Mill Pond, at three different reduced release flows from the pond (300,000 gpd, 1 mgd, 4 mgd) and the long-term average flow over the spillway of approximately 8 mgd.

Executive Summary

During the period from March 19 – 27, 2018, the water surface of Cranston's Mill Pond (CMP) was drawn down to below the elevation of the spillway (8.1 feet above sea level) in order to perform a controlled flow release field study. Releases were conducted via the four existing 16" diameter steel release pipes and manually operated marine grade butterfly valves contained in the spillway. The field study was designed to allow for the downstream aquatic conditions to be documented via aerial drone during low tide when release flows from CMP were 4 million gallons per day (mgd), 1 mgd, and 300,000 gallons per day (gpd). In addition, the downstream conditions were documented during even higher flow release (approximately 8-10 mgd) following a significant precipitation event on April 15. Visual comparison of 13 locations, ranging from immediately downstream of Cranston's Mill Pond Rd. to more than 2600 feet downstream, was conducted to determine if decreasing the volume of flow released from CMP resulted in any discernable negative effects in the natural downstream aquatic conditions at low tide. The visual comparison clearly documents that at low tide the downstream aquatic conditions are essentially equal under all of the flow release volumes.

These findings confirm the previous position of the applicants, the Virginia Institute of Marine Science (VIMS), and third-party fisheries experts and water supply project experts, that the physical nature of the Yarmouth Creek ecosystem is controlled predominantly by the tidal effect of the Chickahominy and James Rivers, not by flow releases from CMP. Moreover, any adverse environmental impacts to the downstream aquatic conditions as a result of reducing the releases from CMP for use as a raw water supply are expected to be minimal or absent.

These findings and conclusions have been reviewed and endorsed by VIMS, ARCADIS, and Dr. Greg Garman.

Introduction

Cranston's Mill Pond, LLC has applied to DEQ and VMRC for a permit to withdraw water from the 50-acre CMP impoundment in order to be used as a new and sustainable source of municipal or commercial raw water for existing or future water users in the region. The applicants submitted their Joint Permit Application on December 7, 2016 and have been in discussions with agency staff since that time. (See Attachment 1 for site location map)

Staff from DEQ and DGIF have expressed concerns that at low tide, the upper reaches of Yarmouth Creek are "fee flowing," implying that the volume of water in the upper creek at low tide is highly dependent upon the water flowing from CMP.

The position of the permit applicants, supported by hydrodynamic and freshwater tidal estuary experts at VIMS and third-party fish ecology experts, has been that the physical nature of the Yarmouth Creek ecosystem is controlled predominantly by the tidal effect of the Chickahominy and James Rivers, not by flow releases from CMP.

Cranston's Mill Pond is uniquely positioned to quantify the relationship between flow from the impoundment and downstream aquatic conditions at low tide since the spillway contains 4 16-inch diameter pipes and marine grade butterfly valves. The valves can be used to release a known flow rate of water from the impoundment.

The Controlled Flow Release Field Study was designed to collect visual information and document the aquatic conditions (e.g., wetted perimeter) at low tide under a wide range of releases from CMP.

Methodology

CMP Pool Drawdown

On the morning of March 20, 2018 all 4 release pipes (16" diameter) had their butterfly valves opened to their full release rate (5 mgd/pipe) in order to begin drawing the full pool level of CMP down below the spillway elevation to the mid-point of the release valves (approximately 18" below the lip of the spillway). It took approximately 36 hours to complete the drawdown since the top 18" of the pool contains approximately 20 million gallons of water, plus the pond was receiving a minimum of 4 mgd of inflow from surface and groundwater sources. (see photos in Attachment 2 and schematics of release pipes and valves in Attachments 3 and 4)

The initial plan was to begin the first phase of the experiment (controlled release of 300,000 gpd) at midnight on March 21, but due to significant precipitation during March 20 and 21 (1" of rain and 0.5" of snow), the first sampling was postponed until 8:00 AM on March 26 to allow for the system to flush out the high precipitation flows. All four release valves remained in the

partially open position between March 21 and March 26 to ensure that the pool level remained at the proper draw down elevation.

Controlled Flow Releases

The applicants have been collecting highly accurate flow data (free flow over the crest of the spillway) since July 2015 using an Infrared Sensor and cellular datalogger developed by Lasso Technologies. In addition, since January 2018, a radar stage pool measuring device developed by Forest Technology Systems, and approved by USGS for hydrologic data collection, was installed and began documenting pool elevation. The long-term average daily flow from CMP, as verified by a third-party engineering firm and the applicants' engineering staff, is slightly less than 8 mgd. Therefore, the experiment was designed to release flows over a range of lower flows, from 300,000 gpd to 4 mgd.

During construction of the spillway in 2009-2010, as part of the *As Built* design plan verification process, a third-party engineering firm (McKinney & Company) compiled an operational memorandum that included a matrix, based on engineering specs provided by the valve manufacturer, that determined the number of turns on the valve control wheel (see photo of valve wheel in Attachment 2) to generate varying degree of release flows (see Attachment 5 for the matrix). This information was used as a rough guide to generate the desired release flows for the field study, however, the release flows were further verified by using a Hach FH950 Portable Velocity Meter.

Timing of Flow Release and Documentation

The Field Study was designed to account for two critical components: 1) allow the downstream environment to equalize to each new flow release for a minimum of 12 hours (one full low and high tide cycle) before downstream documentation occurred and 2) optimize the timing of downstream documentation to capture the minimum of each low tide.

Attachment 7 illustrates the tidal cycle (Wright Island Landing NOAA Station) over the duration of the experiment with flow release rates and sampling points superimposed.

As can be seen in Attachment 7, the high and low tide elevations ranged from 2.76' to 0.13'. These tides are relatively average based on the range of high tide elevations (1.6' – 3.0') and low tide elevations (-0.6' +0.6') that occurred throughout 2017.

The experiment was also designed to document a release flow of 600,000 gpd, but the high tide occurred at 10:34 PM and the low tide at 5:02 AM and daylight limitations prevented aerial video documentation at those times. Therefore, the results of this experiment assess the release flows of 300,000 gpd, 1 mgd, and 4 mgd.

It is important to note, that the tide changes very quickly in Yarmouth Creek and the tide rises and falls at a rapid rate. The true dead low tide period is relatively brief. To capture the lowest

portion of the low tide period, each drone flight was initiated within 10 minutes of the low tide prediction for the NOAA tide station at Wright Island Landing.

Aerial Drone Documentation

For each flow release the same downstream section was documented. A DJI Mavic Pro drone with Ultra HD resolution video capture was used to document the same pre-programmed flight path. Downstream conditions were documented from the CMP spillway to approximately 2600 feet downstream at an elevation of 160 feet. It took approximately 20 minutes to complete each drone flight. Prior to the start of the experiment, numerous test flights were conducted to determine the most effective altitude and focus points for video documentation. Attachment 6 shows the flight path (.kmz file format) using Google Earth.

After examination of all video footage (approximately 3 hours total), thirteen distinct locations (see Attachment 6), ranging from just downstream of Cranston's Mill Pond Rd. to 2600 feet downstream, were selected to compare the downstream conditions at 1) high tide, 2) low tide @8 mgd release, 3) low tide @4 mgd release, 4) low tide @1 mgd release, and 5) low tide @300,000 gpd release. These locations were selected based upon: 1) they were easily recognized in each aerial documentation, 2) they are fairly equally spaced over the entire downstream section documented, and 3) they clearly document the aquatic conditions (based upon wetted perimeter, landmarks, etc.). The approach of assessing a limited number of comparison sites was conducted for ease of Agency review, but full video documentation is available upon request.

In addition, a video compilation (17 minutes in length) was produced that illustrates the conditions at high tide and low tide for the various flow releases. The video (provided to agency staff on thumb drive) traverses the entire length of the study area documenting the conditions at high tide when 1 mgd was being released from CMP. This release scenario was chosen to document high tide conditions because lighting and video clarity provided the best conditions of any drone flight. The video stops at 13 distinct locations (the same locations as included in Attachment 6) and documents the low tide conditions for all four release flows.

Results

The video footage from all the drone flights were compared to select key locations where low tide aquatic conditions could be clearly identified and visually examined between the various flow release scenarios (see Attachment 6 for comparison site locations and the video compilation was provided to agency staff on a thumb drive).

Attachment 8 contains photographic evidence and illustrates the aquatic conditions (high and low tide at four release rates) at thirteen locations progressing downstream from Cranston's Mill Pond Rd. to 2600 feet downstream.

The video compilation comparing high tide with low tide under the four flow scenarios was provided to agency staff separately on a thumb drive. The high tide shown in the video is from the 1 mgd release scenario since the lighting and weather conditions during that time allowed for the best video clarity.

In addition, Attachment 9 contains photographic evidence illustrating the low and high tide conditions at two locations immediately downstream of the CMP spillway. These locations were selected to evaluate the reach of tidal inundation on the east side of Cranston's Mill Pond Rd., up to the foot of the spillway.

Conclusions

From examination of the extensive raw video footage, condensed video compilation, and photographs from thirteen select locations along the entire 2600-foot length of the study area, it is clear that the extent of aquatic habitat coverage at all locations under all flow release scenarios (300,000 gpd – 8 mgd) is essentially equal. This conclusion is not surprising and supports the long-standing position of the applicant, VIMS, ARCADIS, and Dr. Greg Garman, that the physical aquatic conditions of Yarmouth Creek are highly controlled by tidal processes and not surface water releases from CMP.

Also, as the applicant has stated previously, tidal inundation occurs to the east side of Cranston's Mill Pond Rd. up to the foot of the dam spillway. The photographic documentation contained in Attachment 9 clearly demonstrates the change in water volume between low and high tide approximately 100 feet below, and immediately adjacent to, the spillway.

In addition to the dominant influence of the tide, the contribution of groundwater discharge to the total surface flow, both above the CMP dam and downstream in Yarmouth Creek, has very likely been significantly underestimated. This contribution of groundwater to the total water volume in the downstream creek will be continuous, regardless of the flow release from CMP.

Paul Peterson (ARCADIS) conducted a statistical comparison of unit flow records (cfs/mile^2) during the 12-year period (Jan 1984 – Sept 1995) when flow records exist for the DEQ model, Chickahominy River Near Providence Forge Gage, and Ware Creek Near Toano Gage (discontinued, but was monitored from Sept. 1979 to Sept. 1995). During that overlapping period of record, at the low end of the flow regime, the DEQ unit flow record is lower than flows observed at the Chickahominy River gage station. Moreover, at the low end of the flow regime both DEQ and Chickahominy unit flows are much lower than flows recorded at the Ware Creek gage station. Lastly, the applicants' three-year record of measured flows (measured via ultrasonic device at the spillway lip) continue to show significantly higher flows than measured at the Chickahominy River gage station. As noted in DEQ's June 2016 report titled "DEQ Modeling Summary: Cranston's Mill Pond", it states that "The actual outflow data was assumed to produce the most accurate inflow estimates" and "While evidence suggests a relatively high level of base flow contribution to the stream at this location, the period of inflow monitoring in

Cranston's Mill Pond is short, and it is critical to avoid over-estimating inflows to any water supply system."

It should be noted, however, that during the period of this field study and for several months prior to the study, the groundwater levels in the study region were at levels significantly lower than historic levels for the same time period. USGS Long-term groundwater monitoring well 56H 31 SOW 135B, located approximately 2.5 miles North of CMP and screened in the shallow (30') unconfined Quaternary aquifer, showed groundwater levels near the 25th percentile for the months January – April. In addition, according to DEQ's Drought Monitoring and Response website, the Chowan Drought Evaluation Region, which includes James City County where CMP resides, was under a groundwater "warning", defined as measured groundwater levels between the 5th and 10th percentiles for all historic levels. These conditions are noted because if the field study were performed during times of higher, or at least average, groundwater levels, and therefore higher baseflows, the results would likely have shown even greater water volumes present under low tide conditions. Therefore, the results of this field study provide a conservative estimate of the aquatic conditions.

The results of this experiment conclusively demonstrate that the proposed withdrawal from Cranston's Mill Pond will have negligible effect on the downstream aquatic habitat, especially under the critical period of low tide.

The Conclusions in this Report are Supported By:

Virginia Institute of Marine Science - The VIMS review team included faculty and staff from the Office of Research and Advisory Services, Department of Physical Sciences, Department of Biological Sciences, and the Department of Fisheries Science.

Greg Garman, PhD - Dr. Garman is currently an Associate Professor, Department of Biology at the Virginia Commonwealth University. In addition, he is Director of the University's Rice Rivers Center and was previously the Director of the University's Center for Environmental Studies

Paul Peterson – Paul Peterson is a water quality scientist and Associate Vice President for ARCADIS U.S., Inc. and has been integral to the development and approval of several large water supply projects in Central Virginia.

Attachments

1 – Site Location Map
2 – Photos of Release Pipes and Valves
3 – Release Valve Schematics - Plan View
4 – Release Valve Schematics - Section View
5 – McKinney and Co Valve Matrix
6 – Google Earth Maps of Drone Flight Path and Location of Photo Comparison Sites
7 – Tide Chart with Drone Flight Times
8 – Visual Comparison (photos) of Downstream Locations at Low Tide
9 – Visual Comparison of 2 Locations Immediately Downstream of the CMP Spillway

November 12, 2018

Scott Reed
Chesapeake Bay Nutrient Land Trust
5735 S. Laburnum Ave.
Richmond, VA 23230

Jeff Corbin
Restoration Systems
P.O. Box 18368
Richmond, VA 23226

Dear Messrs. Reed and Corbin:

You have requested that the Virginia Institute of Marine Science (VIMS) conduct a critical review of all technical and environmental information associated with your proposal to withdraw water from Cranston's Mill Pond, and thus periodically modify freshwater releases to estuarine headwaters. VIMS personnel from the departments of Physical Sciences, Fisheries Science, and Biological Sciences and the Office of Research and Advisory Services contributed to this review, and this letter constitutes our response to your request.

This particular review represents a continuation of VIMS' involvement that began in 2016. In January 2017 VIMS provided the Virginia Department of Environmental Quality Office of Water Supply a letter summarizing our initial project assessment, which incorporated analyses by the same VIMS personnel that contributed to this review, and which have had continuous involvement throughout this permitting process. Our January 2017 letter forwarded our conclusion that the proposed modifications to freshwater inflow would not adversely affect downstream estuarine resources. Our analyses of all subsequent information developed for this proposed project, and analyzed collectively, remains consistent with the conclusions of our January 2017 letter. Existing data do not support conclusions of any adverse environmental effects to estuarine resources below Cranston's Mill Pond.

Please contact me if you have questions or require additional information.

Sincerely,

Lyle Varnell
Associate Director for Advisory Services

SIMULATION OF CHANGES OF SALINITY IN YARMOUTH CREEK DUE TO REDUCED FRESHWATER INFLOW FROM CRANSTON'S MILL POND

A report submitted to

Cranston's Mill Pond, LLC

By

Jian Shen & Mac Sisson

Virginia Institute of Marine Science

College of William & Mary

November 26, 2018

1. Introduction

Yarmouth Creek, which lies to the south of Cranston's Mill Pond, is located in the Chickahominy River watershed. The Creek is a tidal creek and salinity is influenced by tidal variations in the Chickahominy River and the freshwater discharge from the watershed. Withdrawal of freshwater from Cranston's Mill Pond for use as a raw water supply has been proposed by the property owner and a Joint Permit Application has been submitted to the Virginia Department of Environmental Quality (VA-DEQ). VA-DEQ has expressed concern that withdrawals of freshwater during periods of low freshwater inflow from CMP could cause adverse impacts due to incrementally greater salinity intrusion during the tidal cycle in Yarmouth Creek. VA-DEQ has requested Cranston's Mill Pond, LLC to provide the potential impact on salinity due to the freshwater withdrawal from Cranston's Mill Pond. In 2017, VIMS provided preliminary model results to VA-DEQ for a 3-year period. VA-DEQ reviewed those results and suggested conducting model simulations with additional modifications including: revising and expanding the model grid, simulating a longer time period to include additional low-flow periods, and conducting additional withdrawal/release scenarios.

Virginia Institute of Marine Science (VIMS) assisted Cranston's Mill Pond, LLC by conducting model simulations to determine any changes in salinity resulting from withdrawals from Cranston's Mill Pond during the low-flow periods. This report documents the changes to the model grid, model configuration for simulation, and model results submitted to Cranston's Mill Pond, LLC.

2. Model grid modification

The model grid used for the previous 3-year simulation in 2017 did not extend to the furthest upstream reach of Yarmouth Creek. The revised model grid was extended upstream to immediately below Cranston's Mill Pond. A small branch of Little Creek, immediately below the reservoir, was also added to link it to the Chickahominy River. The model grid of Chickahominy River, including Yarmouth Creek, is shown in Figure 1. The grid follows the shoreline based on DEQ GIS estuary shapefile. There are a total of 2690 grid cells in the horizontal and 8 vertical layers. Because of the limitation of the model grid resolution, the width of the Yarmouth Creek was represented by one grid cell with 8 vertical layers. As NOAA chart(s) do not provide accurate depths of the Creek below the Mill Pond, Cranston's Mill Pond, LLC conducted a field survey to measure the depth of the Creek at low tide. Depths at low tide for the survey locations are shown in Figure 2, and these depths range from 2.9 to 15 ft. The linear interpolation is used to estimate the depth for the model grid between measurement locations.

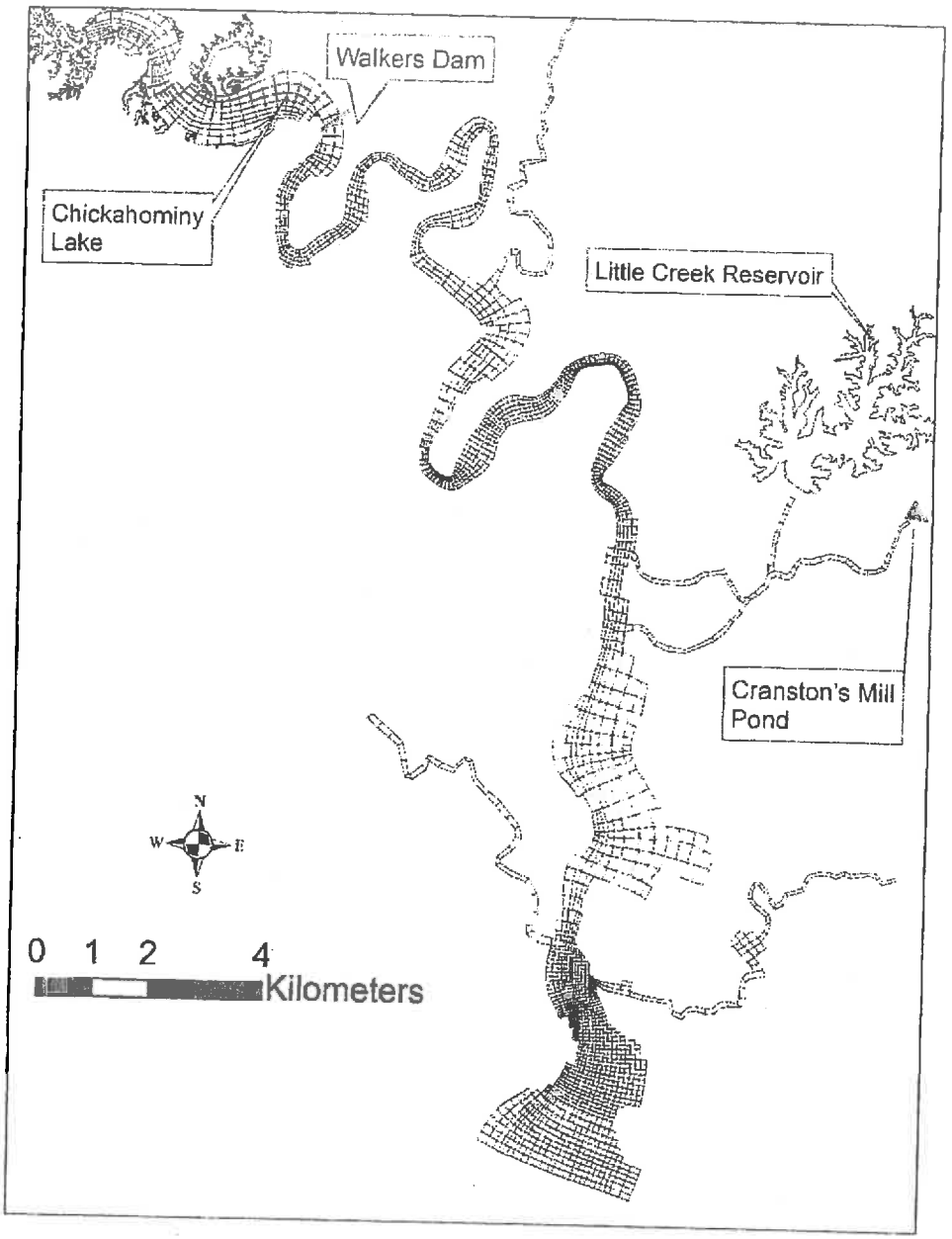

Figure 1. Model grid of the Chickahominy River and Yarmouth Creek.

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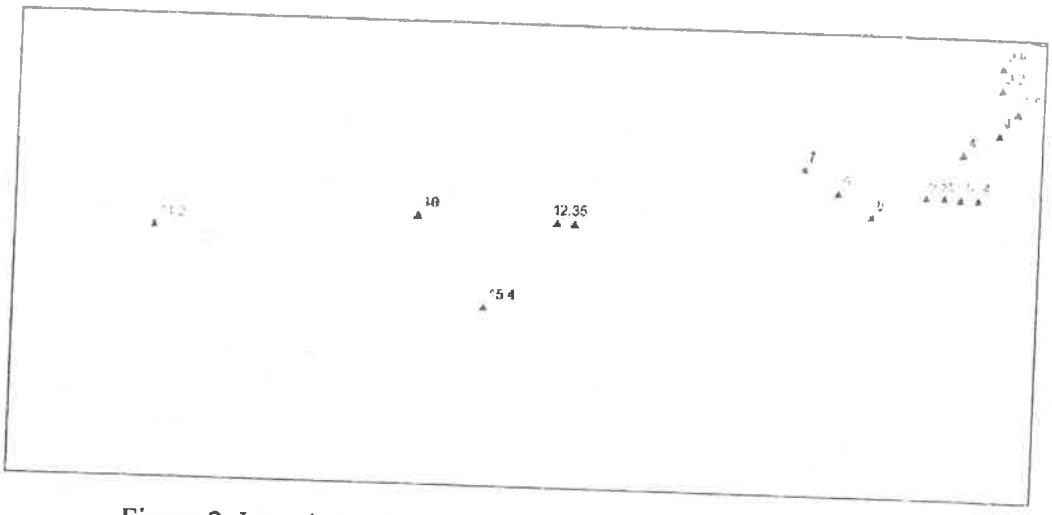

Figure 2. Locations of observations and depths (feet) at low tide.

3. Model configuration and calibration

The model was driven by the open boundary condition derived from the James River three-dimension model (Shen et al., 2016). The model grid of the James River is shown in Figure 3. The James River model was run from 1998-2008, which includes both a high-flow year (2003) and a low-flow period (2001-2002) according to USGS flow measurements at the Richmond station (Figure 4). The James River model was driven by hourly tide and salinity at the mouth and daily freshwater discharge at the fall line and discharge from watersheds adjacent to the river. Open boundary conditions were provided by the Chesapeake Bay three-dimensional model output and lateral flow was derived from Bay Program phase 6 watershed model output. The surface wind used hourly wind obtained from Norfolk airport. The output of hourly tide and salinity at the mouth of the Chickahominy River was used to drive the Chickahominy River model. The flow from the Yarmouth Creek watershed was derived from the unit flow (cfs/ac) provided by DEQ. The freshwater outputs from Walkers Dam and Little Creek Reservoir were provided by the City of Newport News (VADEQ, 2017). The distribution of flow from Little Creek Reservoir is shown in Figure 5. The lateral flow of the Chickahominy River watershed was based on the watershed model developed by Tetra Tech (CEC, 2015), which provides better resolution for the Chickahominy River watershed than the Bay Program watershed model.

Salinity calibration was conducted by comparing high-frequency salinity measurements at the middle of the Chickahominy (Chickahominy Haven) http://web2.vims.edu/vecos/StationDetail.aspx?param=CHK015.12&program=CMON, and at the DEQ long-term fixed Station RET5.1a. Comparison of model results and observations are shown in Figures 6 and 7, respectively, for Chickahominy Haven and RET5.1a. The comparisons show that the model simulated salinity well for both monthly and high-frequency observations. Because the model was driven by modeled open boundary conditions and freshwater discharge, some discrepancy between model and observations can be expected. Overall, the model simulates seasonal and inter-annual variations of salinity in the Chickahominy River. Figure 7

shows that the model accurately simulates the high salinity intrusion from the James River during low flow period from 1999-2002.

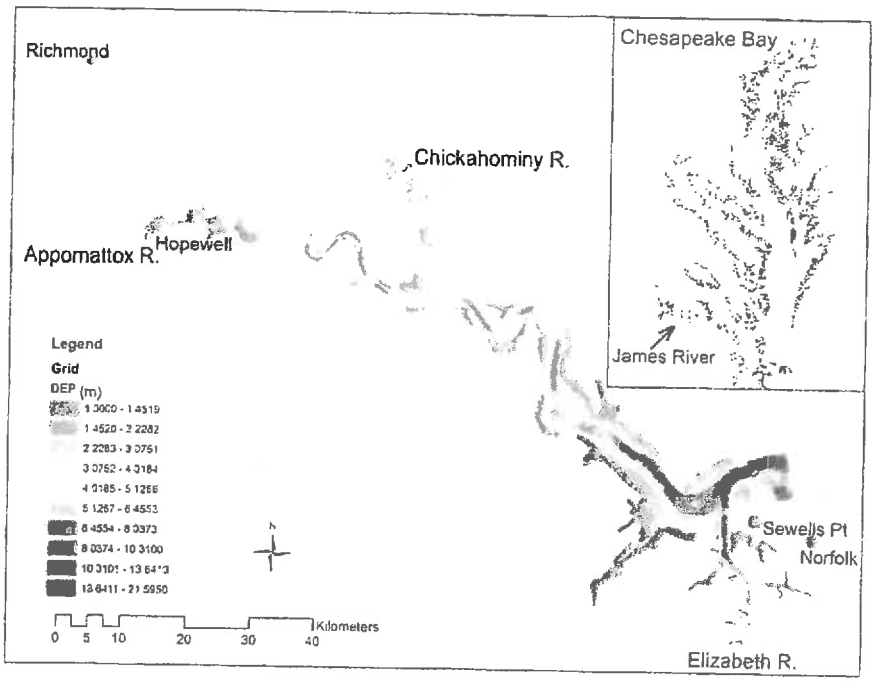

Figure 3. Model grid of the James River three-dimensional hydrodynamic model.

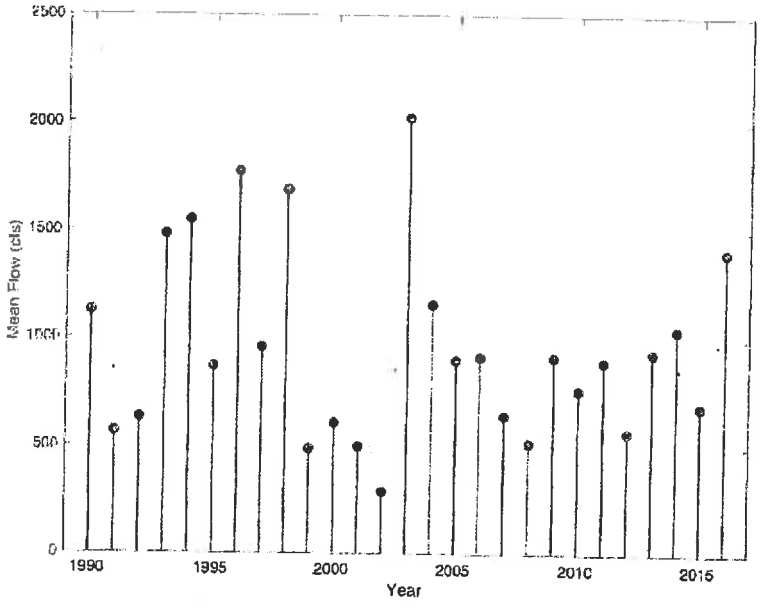

Figure 4. Annual Mean Flow at USGS02042500 Station from 1990-2016.

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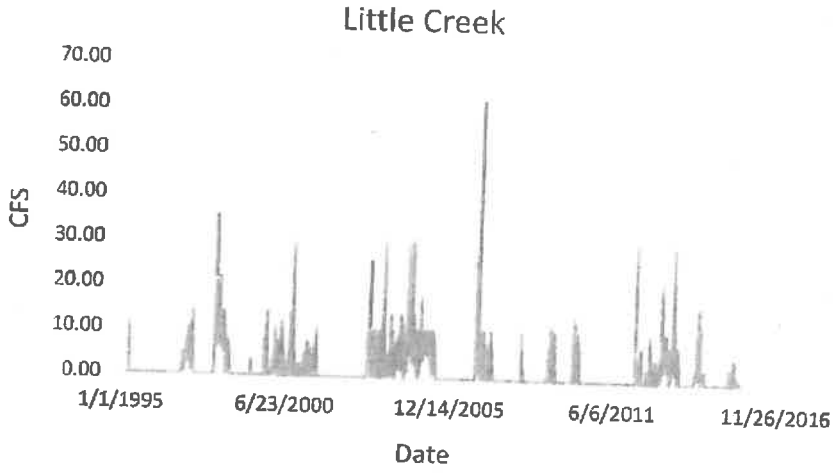

Figure 5. Discharge from Little Creek Reservoir.

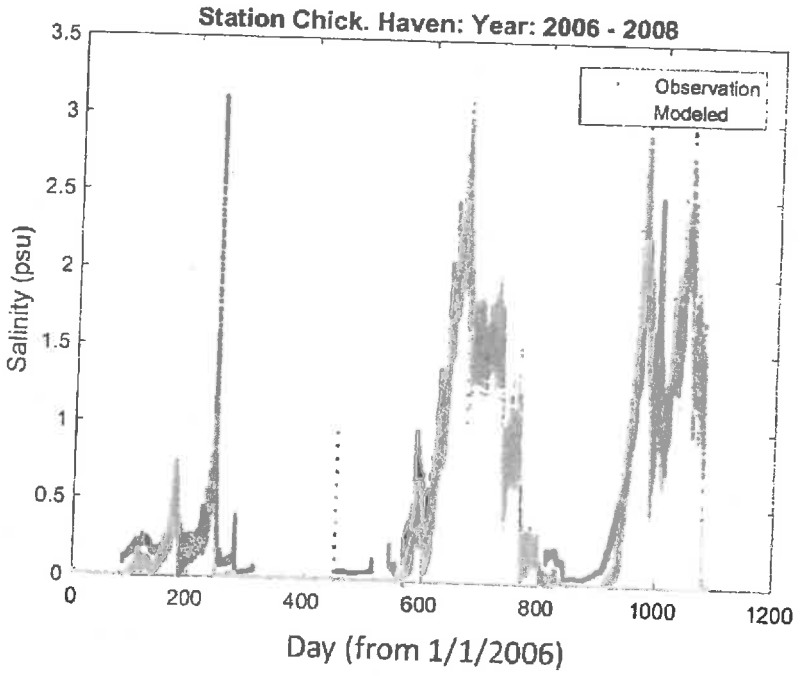

Figure 6. Comparison of model simulation and observations at Chickahominy Haven Station from 2006-2008 period.

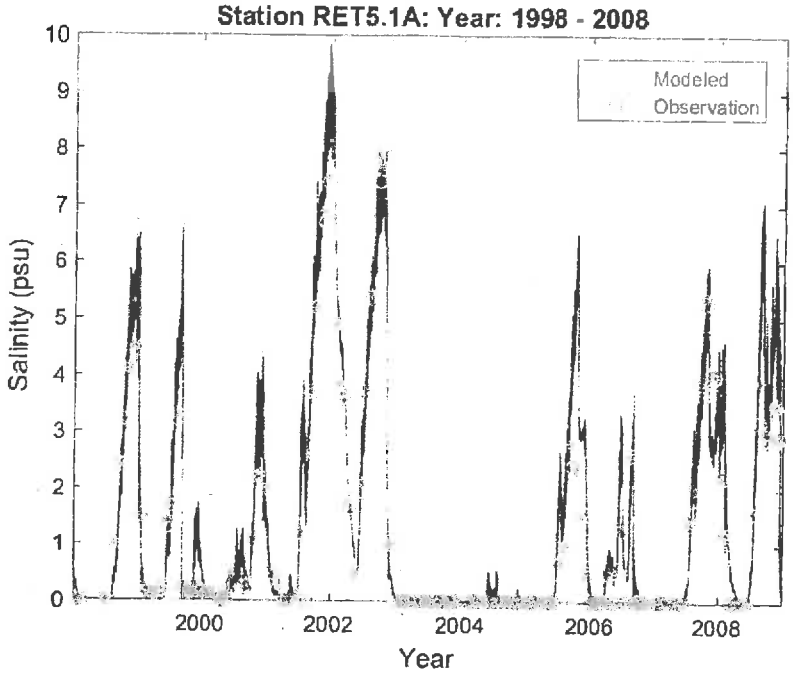

Figure 7. Comparison of model simulation and monthly observations at Station RET5.1A from 1998-2008 (o are observations near the surface, * are observations at the bottom, blue line is modeled vertical mean salinity.

4. Model simulation of scenarios and model output

According to the tasks required by Cranston's Mill Pond, LLC, four withdrawal and release scenarios were conducted based on different withdrawal parameters from CMP provided by Cranston's Mill Pond, LLC. The withdrawal and release scenarios are listed in Table 1. Model simulations were conducted from 1998-2008 for each scenario. Modelled salinity outputs, both hourly and daily, at selected stations from 1998-2008 were output to 'xls' file format and provided to Cranston's Mill Pond, LLC. The stations selected are shown in Figure 8. The selected stations are evenly spaced every 5 grid cells. The local (x,y) coordinates (UTM Zone 18) are listed in Table 2. Results of four model scenarios, namely expA, expB, expC, and expD were provided in zip format to Cranston's Mill Pond, LLC for further analysis. The model output format is shown in Table 3. Each model output file has five columns (date/time, baseline surface and bottom salinity, scenario surface and bottom salinity, respectively. The starting date and time are 1/1/1998 0:00 am.

The tidal prism of Yarmouth Creek was computed based on the surface area and tidal range between low tide and high tide. The surface area was computed based on the GIS layer obtained from the DEQ estuary GIS shapefile (https://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx). The estimated surface area of the Yarmouth Creek is 607,349.7 (m^2). Mean flow from Cranston's Mill Pond is about 10,192.1

m^3 per tidal cycle (5.2 mgd, 1998-2017), which was converted from daily flow by a factor of 12.42/24, where 12.42 is M_2 tidal period. Tidal range varies daily from 0.40 -1.0 m in Yarmouth Creek. Example mean tidal range at three stations are shown in Figure 9 for the low flow year of 2000. The mean tidal range estimated is about 0.74 m in the Yarmouth Creek, which is slightly higher than NOAA reported tidal range in the lower Chickahominy River (0.67 m). The estimated tidal prism for the Yarmouth Creek (from the conjunction of Chickahominy to upstream below CMP) for different tidal ranges and percent of mean freshwater discharge from Cranston's Mill Pond with respect to tidal prism is listed in Table 4. The mean flow from Cranston's Mill Pond is less than 2.3% of the mean tidal prism.

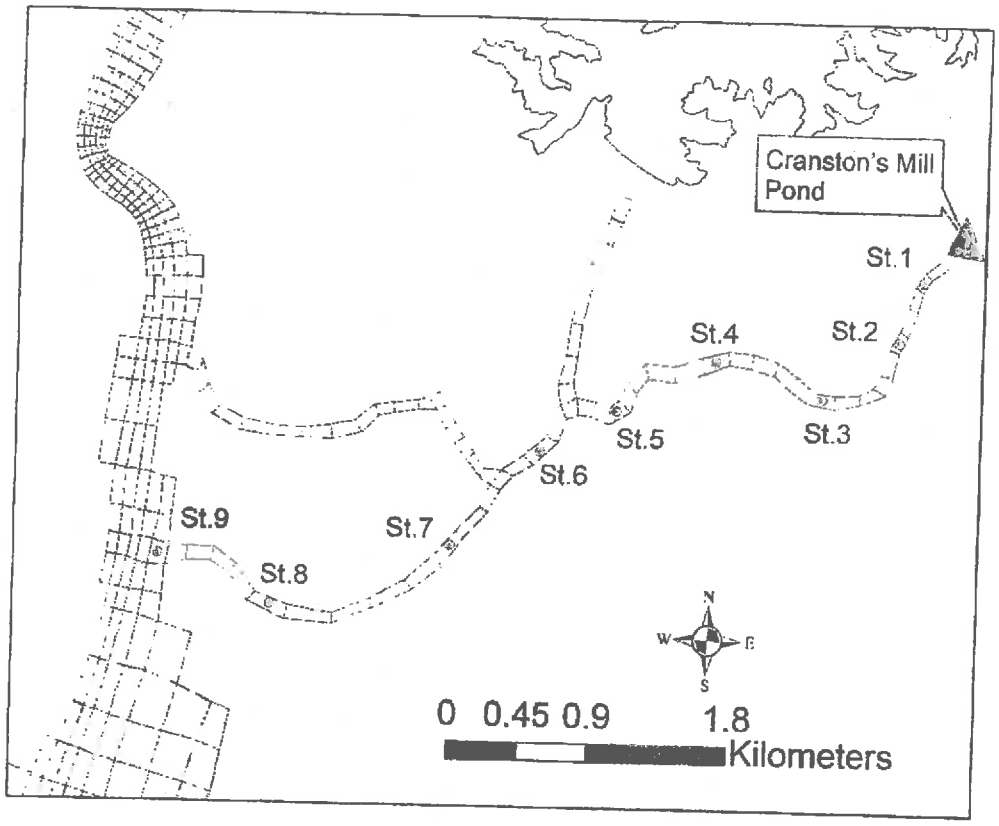

Figure 8. Map of model output location.

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Table 1. List of withdrawal and release scenarios

Withdrawal & Release	Baseline	Scenario A	Scenario B	Scenario C	Scenario D
CMP Baseline Target Withdrawal (mgd)	0.0	6.0	6.0	6.0	6.0
CMP Pump Station Capacity (mgd)	0.0	10.0	15.0	10.0	15.0
CMP Minimum Target Release (mgd)	0.0	0.3	0.3	0.6	0.6

Table 2. Location of output stations.

Station	X (m)	y(m)
1	338805	4134650
2	338653	4134260
3	338161	4133880
4	337480	4134110
5	336844	4133780
6	336356	4133520
7	335782	4132880
8	334629	4132500
9	333918	4132810

Table 3. Format of model output (example).

Time	Baseline	Baseline	Scenarios	scenarios
hour, from 1/1/1998	Surface (psu)	Bottom (psu)	Surface (psu)	Bottom (psu)
0.0000	0.0000	0.0000	0.2542	0.2551
0.0415	0.0000	0.0000	0.2507	0.2510
0.0833	0.0000	0.0000	0.2491	0.2491
0.1250	0.0000	0.0000	0.2478	0.2478
0.1665	0.0000	0.0000	0.2560	0.2556

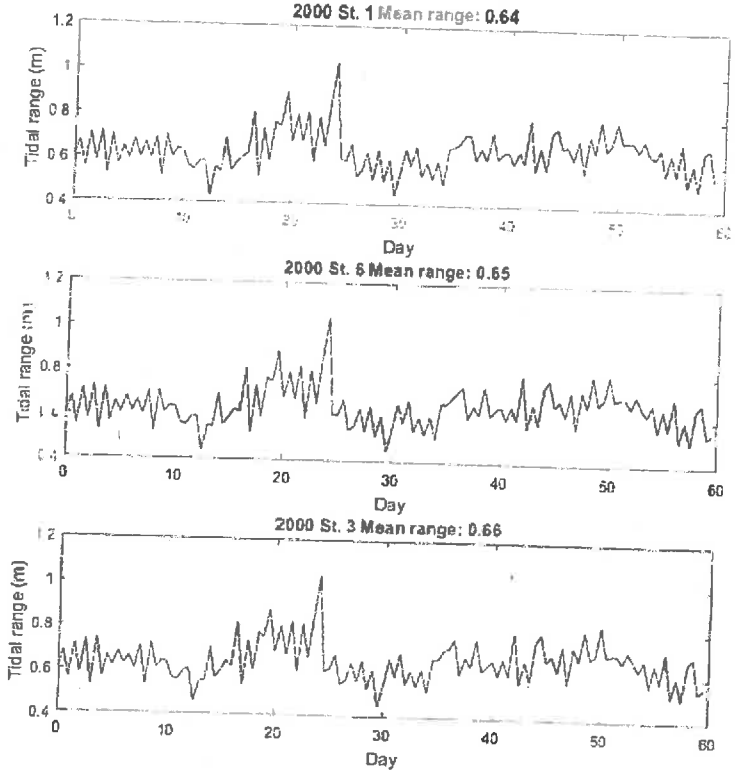

Figure 9. Tidal range variation in year 2000 in Yarmouth Creek.

Table 4. Estimated tidal prism[1] and percent of freshwater discharge from Cranston's Mill Pond

Selected Tidal Range (m)	Tidal Prism (m^3/tidal cycle)	Mean discharge from Cranston's Mill Pond (1991-2017) (m^3/tidal cycle)	Percent of volume (per tidal cycle)
0.40	242,939.88	10,192.10	4.2%
0.74	449438.8	10,192.10	2.3%
1.00	607,349.70	10,192.10	1.7%

[1]From the conjunction of Chickahominy River to upstream below CMP.

5. Conclusion

The Chickahominy three-dimensional model was revised and calibrated for salinity for the period from 1991-2008 using DEQ monthly observation data and 2006-2008 NOAA high-frequency shallow water station data. The model accurately simulates salinity and is capable of conducting model simulations for freshwater withdrawal scenarios. Four withdrawal scenarios were conducted with hourly and daily output at nine selected stations provided to Cranston's Mill Pond, LLC for further analysis.

6. References

Chesapeake Environmental Communications (CEC). Modeling Support for the James River Chlorophyll Study: Modeling Report, prepared by CRC, HDR, Tetra Tech, and Virginia Institute of Marine Science for Virginia Department of Environmental Quality: Richmond, VA, USA, February 29, 2015.

Shen, J., Wang, R., Sisson, M. 2016. Development of the hydrodynamic model for long-term Simulation of water quality processes of the Tidal James River, Virginia. *Journal of Marine System*, 4, 82; doi:10.3390/jmse4040082.

VADEQ. 2017. Bacteria TMDL development for lower Chickahominy River watershed located in Charles City, James City, and New Kent Counties, VA.

ARCADIS | for natural and built assets

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Water

Date:
November 9, 2018

Contact:
Paul Peterson

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Email:
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Our ref: 02933010.0000

Subject:
Cranston's Mill Pond Raw Water Supply
Withdrawal Permitting Assistance – Salinity Evaluation

Dear Ms. Wortzel:

Arcadis hereby provides an evaluation of salinity changes in Yarmouth Creek attributable to proposed Cranston's Mill Pond (CMP) withdrawals under the Applicant's proposed minimum release operating rules.

Methods

A time-series water withdrawal simulation tool was developed and used to simulate CMP operations under Baseline conditions with no CMP withdrawals, and under potential withdrawal operating scenarios. Time-series output of simulated CMP releases was generated based on 1998-2008 daily streamflow records for the Chickahominy River near Providence Forge gage which has a contributing drainage area of 251 square miles. These daily streamflow records were adjusted using a simple drainage area correction factor to the 7.0 square mile CMP watershed area. This streamflow dataset was used since it is the only available record of streamflow in the Chickahominy River watershed that covers the 2001-2002 and 2007-2008 drought periods. It was agreed that these two periods should be included in the evaluation during a March 12, 2018 meeting with DEQ which included CMP representatives as well as staff from Department of Game and Inland Fisheries and the Virginia Institute of Marine Science (VIMS).

The simulated CMP release records prepared by Arcadis were provided to VIMS in April 2018 for use in updated salinity modeling by VIMS under methods described under separate cover. The three scenarios reflected in the attached exhibits to this letter are as follows:

Operating Parameter	Baseline	Scenario A	Scenario B
CMP Baseline Target Withdrawal (mgd)	0.0	6.0	6.0
CMP Pumping Station Capacity (mgd)	0.0	10.0	15.0
CMP Minimum Target Release (mgd)	0.0	0.3	0.3

Results

For this evaluation, simulated salinity levels are presented for VIMS stations 2, 3 and 4 in the reach of Yarmouth Creek between the dam at CMP and the mouth of Little Creek. The exhibits were developed to show:

(1) Periodicity and duration of low flow events (time-series line plots).
(2) Frequency of salinity levels occurring (ranked format with salinity exceedance curves).
(3) Percentages of time within various salinity regimes (pie charts).

The time-series plots show that differences at higher salinity levels are small and the shapes of the time-series curves are very similar between Baseline and Withdrawal scenarios. The much larger volume and drainage area of the James/Chickahominy/Yarmouth estuary exerts an overwhelming influence on the magnitude of salinity levels as compared to the localized influence of CMP releases.

The exceedance curves were assessed to consider both maximum (0% exceedance) and near maximum (5% exceedance) levels.

Maximum Salinity Levels (ppt):

	Baseline		Withdrawal	
	Surface	Bottom	Surface	Bottom
Scenario A / Station 2	7.70	8.11	8.05	8.23
Scenario A / Station 3	8.11	8.48	8.28	8.51
Scenario A / Station 4	8.54	8.81	8.64	8.82
Scenario B / Station 2	7.70	8.11	8.05	8.24
Scenario B / Station 3	8.11	8.48	8.28	8.51
Scenario B / Station 4	8.54	8.81	8.65	8.82

- Increases in maximum salinity were between 0.01 and 0.35 ppt, with the largest increases at the most upstream station (Station 2) and smallest increases at the most downstream station (Station 4).
- Surface salinity was more affected than bottom salinity, but increases were still only slight.
- Insignificant differences occurred between Scenario A and B (i.e., <= 0.01 ppt).

5% Exceedance Salinity Levels (ppt):

	Baseline		Withdrawal	
	Surface	Bottom	Surface	Bottom
Scenario A / Station 2	4.76	5.00	5.09	5.15
Scenario A / Station 3	5.08	5.32	5.30	5.56
Scenario A / Station 4	5.34	5.64	5.56	5.79
Scenario B / Station 2	4.76	5.00	5.08	5.16
Scenario B / Station 3	5.08	5.32	5.30	5.55
Scenario B / Station 4	5.34	5.64	5.56	5.78

- Increases in 5% exceedance salinity were between 0.14 and 0.33 ppt.
- Surface salinity was more affected than bottom salinity, but increases were still only slight.
- Insignificant differences occurred between Scenario A and B (i.e., <= 0.01 ppt).

The pie charts show the percentages of time in which the salinity regime is either tidal fresh (0 to 0.5 ppt), oligohaline (>0.5 to 5.0 ppt) or mesohaline (>5 to 18 ppt). Based on these charts:

- Small decreases occurred in tidal fresh conditions as compared to Baseline conditions (i.e., 4.2% to 7.5% of the time), with the largest decreases at the most upstream station (Station 2) and smallest decreases at the most downstream station (Station 4).
- Minimal increases occurred in mesohaline conditions as compared to Baseline conditions (i.e., 0.7% to 1.2% of the time).
- Negligible differences occurred between Scenario A and B results with tidal fresh time differences <= 0.5% and mesohaline time differences <= 0.1%.
- Surface salinity was more affected than bottom salinity.
- Overall, the pie charts show maintenance of the general salinity regimes to which the stations are already exposed.

Based on the preceding analysis and attached exhibits, Arcadis considers the extent of salinity change to be minimal under withdrawal Scenarios A and B as compared to Baseline conditions. The changes are small when viewed in relation to the range and frequency of salinity levels already experienced at the same Yarmouth Creek stations. CMP is a very small reservoir when compared to the volume present in the downstream estuary. Consequently, minor salinity changes due to simulated CMP withdrawals are over-shadowed by the larger salinity trends established by the downstream estuary.

Sincerely,

Arcadis U.S., Inc.

Paul Peterson

Paul E. Peterson
Associate Vice President

Attachments

VIMS | WILLIAM & MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE

Office of Research and Advisory Services

June 21, 2019

Jeff Corbin
Senior Vice-President for Water Quality Markets & Mitigation
Restoration Systems

Dear Mr. Corbin:

This letter responds to your email request of June 12, 2019 to Dr. Jian Shen for a critical review of information contained in the May 17, 2019 DEQ document *FACT SHEET, Virginia Water Protection Individual Permit No. 16-1937, Cranston's Mill Pond Raw Water Supply, James City County, Virginia* (the Fact Sheet) to determine the degree of consistency between VIMS' analyses and DEQ staff's interpretation of the VIMS conclusions. This review is a result of an evaluation by Dr. Shen, staff within the Office of Research and Advisory Services, and me. Our review included only products originating from VIMS and did not attempt to review consistencies with data presentations originating from ARCADIS or other entities.

VIMS' contributions to the evaluation of the Cranston Mill Pond withdrawal application are referenced throughout the Fact Sheet. Our comments below include only those occurrences where we have concerns with interpretations presented in the Fact Sheet. It is important to point out at the outset that references to "significant changes in salinity" in VIMS comments and the DEQ Fact Sheet may not always be comparable in their meaning. Without making any judgment about DEQ's interpretation of significance, when used by VIMS in this context it refers to ecologically significant (i.e., likely to have measurable and long-term detrimental system-level, community-level, and/or species-level effects), as opposed to statistically significant differences in estimated mean salinities under different withdrawal scenarios. As we have done throughout VIMS' history of research and advisory service, we base these judgments on published physical, biological, and chemical effects as they relate to known estuarine processes.

Contribution of Cranston Mill Pond to flow and salinity in upper Yarmouth Creek – The Fact Sheet states that, based upon VIMS' salinity modeling, DEQ staff *concluded that the location of potential impacts due to the proposed withdrawal from CMP would extend downstream from the dam approximately to the confluence of Yarmouth Creek with Little Creek* (p. 7, para. 4; italicized text is quoted from the Fact Sheet). DEQ staff interpreted that the VIMS salinity model results showed that flow in the upper part of Yarmouth Creek (upstream of the confluence with Little Creek) is dominated by freshwater inflow from Cranston's Mill Pond. The Fact Sheet states: *According to the VIMS model results, freshwater inflow makes up more than 67% of the average inflow to this part of Yarmouth Creek under baseline conditions (no CMP withdrawal). The VIMS model results also showed that the proposed withdrawal rule framework proposed by the applicant (constant 0.3 mgd release regardless of inflow rate), would result in significant increases in salinity within the portion of Yarmouth Creek upstream of Little Creek* (p. 7, para. 5). The Fact Sheet also points out that *VIMS staff confirmed use of a VIMS-developed methodology by DEQ to evaluate the output of the VIMS salinity model. Modeling confirmed that use of the ten percent of flow withdrawal rule framework with the same withdrawal would result in relatively insignificant increases in salinity with the upper portion of Yarmouth Creek*

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(pp. 7-8) and in doing so referred to Attachment A that provides an equation from "Tidal Flushing Characteristics in Virginia's Tidal Embayments" (VIMS 2007) on page 24.

Response - VIMS' modeling approach includes no upfront bias as to the extent or magnitude of potential impacts. We relied solely on the model output and did not assume inherent adverse impacts or potential benefits during design or analyses.

VIMS' model only provided salinity time series, therefore DEQ staff's interpretation is unclear to us. It is reasonable that inflow of freshwater can be termed "dominant" the closer one is to Cranston's Mill Pond. However, the pathways of freshwater entering Yarmouth Creek upstream of Little Creek include lateral runoff to Yarmouth Creek downstream of Cranston Mill pond, water from Little Creek, and even water from outside of Yarmouth Creek (the Chickahominy and James rivers). Therefore, freshwater has multiple origins beyond overflow from Cranston's Mill Pond and contributions of freshwater from individual sources varies dramatically with hydrological and tidal conditions.

The percentages of inflow to Yarmouth Creek from Cranston's Mill Pond under various environmental scenarios do not necessarily result in environmental impacts to estuarine living resources. Outflows from Cranston Mill Pond are generally confined to the narrow channel in the upper reaches of Yarmouth Creek and do not normally flow out onto the floodplain during low tides. During high tides the outflow from Cranston Mill Pond can be overwhelmed volumetrically by inflows originating in the James River, Chickahominy River, and legacy waters from Little Creek and Yarmouth Creek.

We agree that the fractional method can be used to estimate total freshwater supplied to a particular location in a tidal embayment (hence our confirmation of the appropriateness of it use); however, as noted above there are multiple origins of freshwater into Yarmouth Creek. We do not therefore agree with DEQ staff's apparent interpretation that the 67% of the inflow to upper portion of Yarmouth Creek is freshwater that has its origin in Cranston Mill Pond. [One further note here is that the equation presented on page 24 of the Fact Sheet for the Relative Percent of Local Watershed Inflow, (f_L) as $100.0 * S_x - S_r$, where S_x is salinity at a given point in the stream, and S_r is salinity at RET5.1a, should read $f_L = 100 * (|S_x - S_r|) / S_r$. We assume that this is a typographical error, since the formula in the Fact Sheet would not result in a percentage and would, in most cases, be a negative value.]

Based on our comment above about judging significance, we do not consider outflow volumes from Cranston's Mill Pond to meet our definition of significant impacts to salinity, except during some instances of extreme meteorological events that are generally localized and short-term. Our modeling showed that salinity variations in the upper reaches of Yarmouth Creek are driven more by tidal variation and regional rainfall patterns in the James watershed than outflow from Cranston Mill Pond under almost all scenarios. The living resources in this system will be much more affected by these variations than the modest ones resulting from the water withdrawal scenarios that we modeled.

Consideration of the effects of climate change – The Fact Sheet correctly notes that we did not include any modeling scenarios that incorporated climate change and goes on to note that [b]*ased on the information that is available, it appears adverse changes in salinity and area of freshwater refugia*

will result from the proposed withdrawal. While, as stated in the addendum, these changes may seem relatively small, in a system such as Yarmouth Creek / CMP where freshwater input is limited, we anticipate those relatively small changes will result in measurable impacts upon resident aquatic species and associated freshwater habitats. While we understand that Yarmouth Creek is highly influenced by tide, the freshwater inputs and flushing flows provided by CMP overflow are necessary to support the existing and unique freshwater tidal habitats located below CMP, particularly considering climate change (p. 14, para. 1).

Response - VIMS considered, but did not model, climate change scenarios for two primary reasons. The first is that as salinity intrusion increases with sea-level rise, it is likely that the influence of the overflow from Cranston's Mill Pond on estuarine living resources and salinity will decrease. Freshwater contributions from Cranston's Mill Pond will decrease volumetrically in proportion to volumetric increases in the creek due to mean sea-level rise in the Chickahominy and James rivers. Therefore, the ecological importance of freshwater specifically from Cranston's Mill Pond is likely to diminish under future climate change scenarios. To be clear, we do anticipate that continued sea-level rise, salt water intrusion and perhaps extreme weather events will significantly alter the environment of Yarmouth Creek in the future, and DEQ staff are wise to consider such changes in their evaluation. However, our modeling under current conditions lead us believe that the proposed water withdrawal from Cranston Mill Pond will not play a major role ameliorating that change.

The second primary reason that modeling sea-level rise and salinity intrusion was not attempted was that all modeling scenarios were agreed to at a March 12, 2018 meeting with the applicant, VIMS, and DEQ personnel prior to model development. DEQ staff decided at that time that modeling climate change scenarios was not necessary.

Potential impacts on freshwater tidal marsh species – The Fact Sheet correctly notes that the VIMS report states that the salinities above 1.5 to 2 psu can result in significant decreases in above-ground biomass of freshwater marsh species (pp. 22-24).

Response – Our only concern here is that this statement needs to be put into context with respect to the proposed project. Our report *Evaluation of withdrawal of freshwater in the Yarmouth Creek watershed and its impact on the change of salinity in Yarmouth Creek* notes that salinities in the region containing Yarmouth Creek are known to range from 0.1 – 7 psu depending on seasonal rainfall. Within this same report it is noted that maximum increase of salinity due to the modeled withdrawal rate is less than 1 psu. The mean difference is less than 0.05 psu and the maximum difference is 0.96 psu during the extremely dry year of 2008. The report goes on to state that this change in salinity is much less than natural inter-daily and seasonal variations and the simulation shows that the predicted salinity changes are less than the critical values for the freshwaters marsh species. The significant above-ground biomass decrease mentioned in the VIMS report is based on averaged salinity during the growing season, i.e. long-term exposure, not short-term exposure to higher salinities. Based on this modeling VIMS concludes that a withdrawal of 8.3 mgd will not cause a change of marsh conditions in this region. To be clear, we do expect the long-term fate of tidal freshwater marshes in this region to be very much affected by salt water intrusion; it is simply

the case that proposed withdrawals from Cranston Mill Pond are likely to have very little effect on the regional salinity.

Effects on water quality – In the conclusions the Fact Sheet states that *VIMS modeling demonstrates that water quality in most of the 2.5 mile segment of Yarmouth Creek above Little Creek is significantly influenced by local watershed inflows, with mean percent of local watershed inflow accounting for 67-82% of water in segments 1-3 on average under baseline conditions* (p. 31, para. 1)

Response - VIMS provided only salinity modeling, so we assume that DEQ staff are referring only to salinity in this statement. Presumably DEQ staff determined the 67-82% level of water in segments 1–3 by employing the fractional method described on page 2 of this letter. Our attempts to extract these numbers from our model documentation proved unproductive.

As we described previously, in the context of evaluating this or any other proposed alteration in freshwater inputs to a tidal basin we use the term "significantly" to refer to ecological significant alterations. Our modeling results indicate that the salinity fluctuations in the upper reaches of Yarmouth Creek are driven more by regional factors that vary on inter-daily and season time scales than by outflow from Cranston Mill Pond, thus we did not predict significant ecological alterations associated with the proposed water withdrawals.

I trust that this satisfies your request. Please do not hesitate to contact either me, Lyle Varnell, or Jian Shen if you have further questions.

Sincerely,

Mark Luckenbach

Dr. Mark Luckenbach
Associate Dean of Research & Advisory Service

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Draft flow recommendation standards

John Kauffman

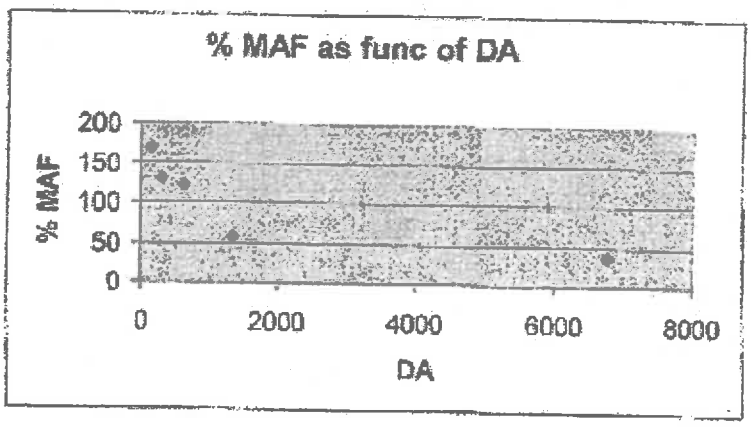
10/19/04

DEQ is charged with facilitating water supply planning and developing a water management plan for the state including water supply. As part of that planning process, DEQ and other agencies need to identify the water necessary for beneficial instream uses. DGIF is responsible for management of fish and wildlife and recommending flows necessary to protect the public trust resource. Very few studies have been conducted in Virginia to document the flows necessary for this resource. In the past, several desktop methods have been used to recommend flows. Studies have been conducted on the James. The Orth and Leonard instream flow study on the upper James as well as study on the middle James for Henrico County was used to develop these recommendations for non-tidally influenced streams. From these studies, some potential guidance criteria for instream resources can be developed that ensure degraded or impaired aquatic resources are not being permitted. All values recommended are based upon development of a monthly exceedence table for the proposed area. These recommendations do not cover coastal streams that are tidally influenced or trout waters, because of the grater importance of winter habitat for eggs and larvae and lack of studies in Eastern streams.

Summer habitat

For the most critical time (summer for warmwater streams), upper and middle James studies were reviewed. From that study, the resident species that required the highest flows was chosen and the flow that provided maximum habitat was identified. The species was always Northern hogsucker adult habitat except for the Middle James in Richmond where Redhorse adult was the most flow dependent. Several studies from the literature indicate that as stream size increases flow is less critical. It is obvious from the James studies review that the smaller the stream the more critical the summer flow and that summer flow can be very limiting to the resource (Fig 1). Therefore, any recommendations should account for stream size since wet summers are probably very important for fluvial dependent species in small streams. Small streams are considered to have a drainage area of less than 2000 square miles where a line fitted to the curve rises steeply.

Figure 1. Summer optimum habitat for the most flow dependent resident species as impacted by watershed size.



State, federal and local governments are working hard restoring access to historic spawning grounds for anadromous shad and herring. The state is stocking American shad into the Rappahannock and James Rivers and their larger tributaries as part of that restoration effort. For the middle James study (Henrico), the literature was used to define preferred habitat for depth and velocity for juvenile American shad. Based upon that analysis optimum summer habitat occurs at a flow of 6500 cfs. Flows at this level are very rare for sustained times in the summer but flows of about 4500 cfs will provide 80% of optimum habitat.

Spring flows In the spring, waters have to be at a certain level to induce fish to move upstream for spawning purposes. March is the time suckers move upstream to spawn and optimum flows from the upper James study were again related to drainage size. For Northern Hogsucker, as the watershed became larger the amount of the March flow needed decreased. For small watershed, optimum habitat was calculated at the 75% March exceedence levels. For larger streams the 90% March exceedence should be used.

Shad and herring spawn in March and April. Shad spawning habitat in the James near Richmond was optimum when March flows were at 70% exceedence and April flows were at 60% exceedence. The observation of increased flow needs as stream size decreases is probably true for this species habitat as well but has to be modeled in mid-size watersheds such as the Rappahannock River.

May and June flows recommendations are derived from the results of the smallmouth bass recruitment and flow model developed from sampling the James, Rappahannock and Shenandoah Rivers. Smallmouth bass recruitment was optimum when flows were near the average June level. Since recruitment is established in May but often disrupted in late May or early June due to high water, we used the May average for May.

Summer flows
Summer habitat flows follow the same relationships described above where smaller streams require a greater amount of water for optimum habitat than larger streams. For small streams without anadromous fish when flows drop below 10 and 15% exceedence, habitat loss is documented. For larger streams, habitat will be impacted when flows are below the levels listed in Table 1. For large streams with anadromous fish, flows near the 10% exceedence provided good habitat but are probably the result of large storms. For this reason we capped the exceedence level on these streams at 20% of the monthly level.

Winter flows
No studies have been conducted to demonstrate winter habitat needs for warmwater fish. DO and temperature are not critical at this time of the year either.

Trout spawn in the fall with the nests dependent upon winter flows. Low flows can result in frazzle ice destroying nests and high flows can disrupt redds and recruitment. Flows in trout streams will need to be established if intakes are constructed in that resource.

Table 1. DGIF recommended flow triggers. Small streams are considered to have a drainage area less than 2000 square miles. Not applicable in trout waters where recommendations would be higher because of winter spawning needs.

Month	Small stream	Large w/o Anadromous	Large with Anadromous
Nov-Feb	70% exceed	70	70
March	75	90	70
April	50	60	60
May	40	40	40
June	40	40	40
July	10	45	20
Aug	10	40	20
Sept	10	30	20
Oct	15	40	20

On all of the above waters, total consumptive or withdrawal at a site could not exceed 10% of the instantaneous flow. From the upper James study habitat change as a function of flow change were reviewed. In the vast majority of the cases a 10% change in flows resulted in a 10% change or less of habitat.

For the winter months, a 90% exceedence is recommended to ensure winter habitat for the species. That same level is recommended as a critical trigger for the remainder of the year. In the summer at the 90% level, temperature and water quality problems may be an issue but even higher percentile levels have been documented as critical on the NF Shenandoah because of ammonia and other issues. This same may be true for other river systems.

Items that are unknowns in the above recommendations

1. Do these flows address tidally influenced stream needs?
2. The presence of endangered species should result in a species-specific study to determine if the above recommendations provide for the habitat needs.
3. What flows are needed for trout since they are fall winter spawners?
4. What are optimum flows for the striped bass spawning on Roanoke River?
5. Certain flows are needed for stream channel maintenance to create the habitat for aquatic resources. If withdrawals are significant in the year channel maintenance flows will need to be provided.
6. Flows for critical mussel populations are unknown

Fish Community Assessment for Tidal Yarmouth Creek, Virginia

Conducted for Arcadis

Greg C. Garman, PhD

December 7, 2017

Yarmouth Creek (James River Basin in Virginia) is a tidal tributary of the lower Chickahominy watershed and is typical of Coastal Plain streams in the region. Lower reaches of Yarmouth Creek near the Chickahominy River confluence are oligohaline in some years but most of the aquatic habitats are classified as tidal freshwater (salinity below 0.5 ppt). An existing low-head dam at head-of-tide creates a small, privately owned impoundment (Cranston's Mill Pond) that is the focus of a proposed water withdrawal project. The fish community in Yarmouth Creek is a diverse assemblage of native and introduced, resident and migratory, species including estuarine (euryhaline) and freshwater taxa. Compared to other tidal creeks in the region, Yarmouth Creek is ecologically healthy and exhibits good water quality. Since 2010, the fish assemblages of the tidal reaches have been surveyed at least annually by several groups and, as a consequence, an unusually comprehensive and current faunal dataset is available for the system.

The Bridle Shiner (*Notropis bifrenatus*) is a small native minnow (Cyprinidae) with a broad distribution along the Atlantic Slope, including documented occurrences within the James/Chickahominy basin. It is never abundant in collections and several decades of decline throughout its range (Starnes et al. 2014) have raised concerns about the species' status in several states, including Virginia, where it is a species of concern. The short (2-year+) lifespan of the Bridle Shiner may cause it to be particularly vulnerable to local extirpations as lack of recruitment for two successive seasons could eliminate a given population. For example, recent collections by Starnes et al. (2014) in South Carolina failed to demonstrate persistence in several previously documented populations. The Bridle Shiner is not a strict habitat specialist, but is most typically found in relatively clear, non-acidic waters (tidal and nontidal) in association with aquatic vegetation. According to Jenkins and Burkhead (1994) the species exhibits some salinity tolerance—up to 3 ppt—in tidal habitats and has been documented recently in both Coastal Plain and Piedmont streams in Virginia (Starnes et al. 2014). It is not surprising that a species of fish adapted primarily to tidal habitats would exhibit tolerance to euryhaline conditions.

Starnes et al. (2014) conducted targeted sampling for Bridle Shiner in tidal sections of Yarmouth Creek on two dates (JUN 2011 and AUG 2010) and the 2011 collection of three individuals represents the most recent documented occurrence of the species in Yarmouth Creek. The same survey failed to find Bridle Shiners in the Yarmouth system in 2010. Sampling in lower Yarmouth Creek by Virginia Department of Game and Inland Fisheries (VDGIF) biologists collected several individuals identified as *N. bifrenatus* in 2001 and 2003 (VDGIF unpublished data) but accurate, species-level identifications of small minnows, including Bridle Shiner, may be problematic under field conditions. For example, a congener of *N. bifrenatus*—the Ironcolor Shiner (*N. chalybaeus*) may be confused with *bifrenatus*, with which it may co-occur. To the best of our knowledge, there are no voucher specimens from the 2001 or 2003 VDGIF collections.

Quantitative electrofishing of tidal Yarmouth Creek was conducted in 2017 by Virginia Commonwealth University (VCU) fish biologists (S. McInnch, D. Hopler, G. Garman) as part of a broader survey of the lower Chickahominy for the Virginia Coastal Zone Management Program. These new data represent the most current and comprehensive fisheries survey of the Yarmouth system with sampling protocols designed specifically for community-level (i.e., all species) assessment. The VCU data, combined with other recent data from VDGIF, may be used to determine whether Yarmouth Creek is likely to currently support a Bridle Shiner population.

On several dates during Fall, 2017 (Table 1; Figure 1), VCU fish biologists completed extensive boat and backpack electrofishing (Smith-Root equipment; 3,976 seconds of combined sampling effort, approximately 2,400 meters of combined sampling distance), using standard protocols and with necessary permits, of the tidal Yarmouth Creek system up to the VDOT culvert/road below Cranston's Mill Pond dam. Sampling included reaches previously sampled by both VDGIF (Figure 2) and Starnes, as well as some novel reaches. Sampling was conducted under acceptable conditions for electrofishing (e.g. water temperature 9-10° C) and at tides that allowed access to shallow, margin, and vegetated habitats that might be preferred by the target species. We used fine-mesh dip nets that captured small fishes, including *Notropis* spp., suggesting that Fall, 2017 sampling would have collected Bridle Shiner if it was present in the habitats sampled. However, VCU collected no Bridle Shiners on any 2017 date by boat or backpack electrofishing. Fall 2017 collections (i.e., species documented, relative abundance) were comparable to VDGIF collections in the same locations (Figure 2) over six consecutive years (2011-2016) and these results suggest that electrofishing by VCU was effective and accurately characterized (for that season and in those habitats) local fish assemblages, which did not include Bridle Shiner. Recent (2011-2016) VDGIF collections (Figure 2) also failed to document the occurrence of Bridle Shiner in Yarmouth Creek (VDGIF unpublished data).

In summary, the occurrence of Bridle Shiner in Yarmouth Creek was confirmed by Wayne Starnes in 2011 based on three individuals but more recent and extensive electrofishing in the system by VDGIF (2011-2016) and VCU (2017) in likely habitats failed to document the species. The survey by Starnes et al. (2014) documented the lack of persistence by the species at other previously documented locations. Recent data, including the extensive 2017 VCU collections, are strong evidence that Bridle Shiners no longer occur in those parts of the watershed (tidal freshwater) that might potentially be affected by the proposed Cranston's Mill Pond (CMP) project.

Even if the species does persist in the system, or at some future time recolonizes the study area from other sites, a degree of salinity tolerance (Jenkins and Burkhead 1994) suggests that Bridle Shiners may not be impacted by the rare and ephemeral salinity events predicted by hydrologic models that include withdrawals from the impoundment. Tidal creeks in the Chesapeake basin, including Yarmouth, experience natural variations in salinity—from fresh (defined as <0.5 ppt) to oligohaline (up to about 3 ppt)—across diurnal (tides), seasonal (rainfall), and annual (drought) time scales. Many tidal-resident fishes are (to greater or lesser degrees) euryhaline and can cope with

minor increases in salinity through behavioral or physiological adaptations. Salinity modeling results were provided by VIMS (documented elsewhere) for a point approximately one mile downstream of CMP and during low-flow (drought) conditions. The mean salinity change in Yarmouth, concomitant with the proposed withdrawal parameters and based on this modelling, was 0.05 psu (approximates ppt units). VIMS concluded that "...the change of salinity due to withdrawal is much less than the natural salinity variations in this Creek...," and was unlikely to have any ecological effect on the creek/marsh system. Based on the best information we have for *Notropis bifrenatus*, the proposed withdrawals (CMP project) are also unlikely to have an adverse impact on the species, should it actually occur in Yarmouth Creek.

The current guidelines for design and operation of water withdrawal intakes in Virginia (1-mm screens, 0.25 f/s velocity; Gowan and Garman 1999) were developed specifically to protect early life history stages (eggs and larvae) of anadromous clupeid species (*Alosa* spp.) from impingement and entrainment losses. If the proposed Cranston's Mill Pond intake is located within the existing impoundment (i.e., above the dam), the more stringent published guidelines could be relaxed (e.g. 2-mm mesh) without any concomitant risk to migratory species (which are blocked by the existing dam), including Blueback Herring and Alewife, that may reside in Yarmouth Creek.

Table 1. Summary of electrofishing collections by VCU at four locations and on three dates in Fall, 2017 within the Yarmouth Creek system (tidal reaches only). Specific sampling locations are provided in Figure 1.

Yarmouth Creek Area Collections Fall 2017				
Collection (reference Fig. 1)	A	B	C	D
Date	15-Sep-17	1-Nov-17	1-Nov-17	15-Nov-17
Transect Length (meters)	100	500	500	1300
Electrofishing Effort (seconds)	473	1116	973	1414
Taxon				
Banded Killifish	3			1
Eastern Mosquitofish	18			
Bluespotted Sunfish	132	3	1	3
American Eel	16	1		1
Largemouth Bass	5	6	3	3
Brown Bullhead	47			1
Tadpole Madtom	4			
Yellow Bullhead	31			
Tessellated Darter	1			
Bluegill Sunfish	16	5	2	2
Pumpkinseed Sunfish	18	3	4	2
Mummichog	1			
Readear Sunfish	1	1		4
Eastern Silvery Minnow	5	2		
Spottail Shiner	6			
White Perch	1	34	2	2
Golden Shiner	2			
Common Carp		2	2	
Gizzard Shad		42	37	102
Striped Mullet		1	3	
Yellow Perch		2	1	3
Black Crappie		3	1	
Bay Anchovy		18		2
Inland Silverside		1		12
Creek Chubsucker				5

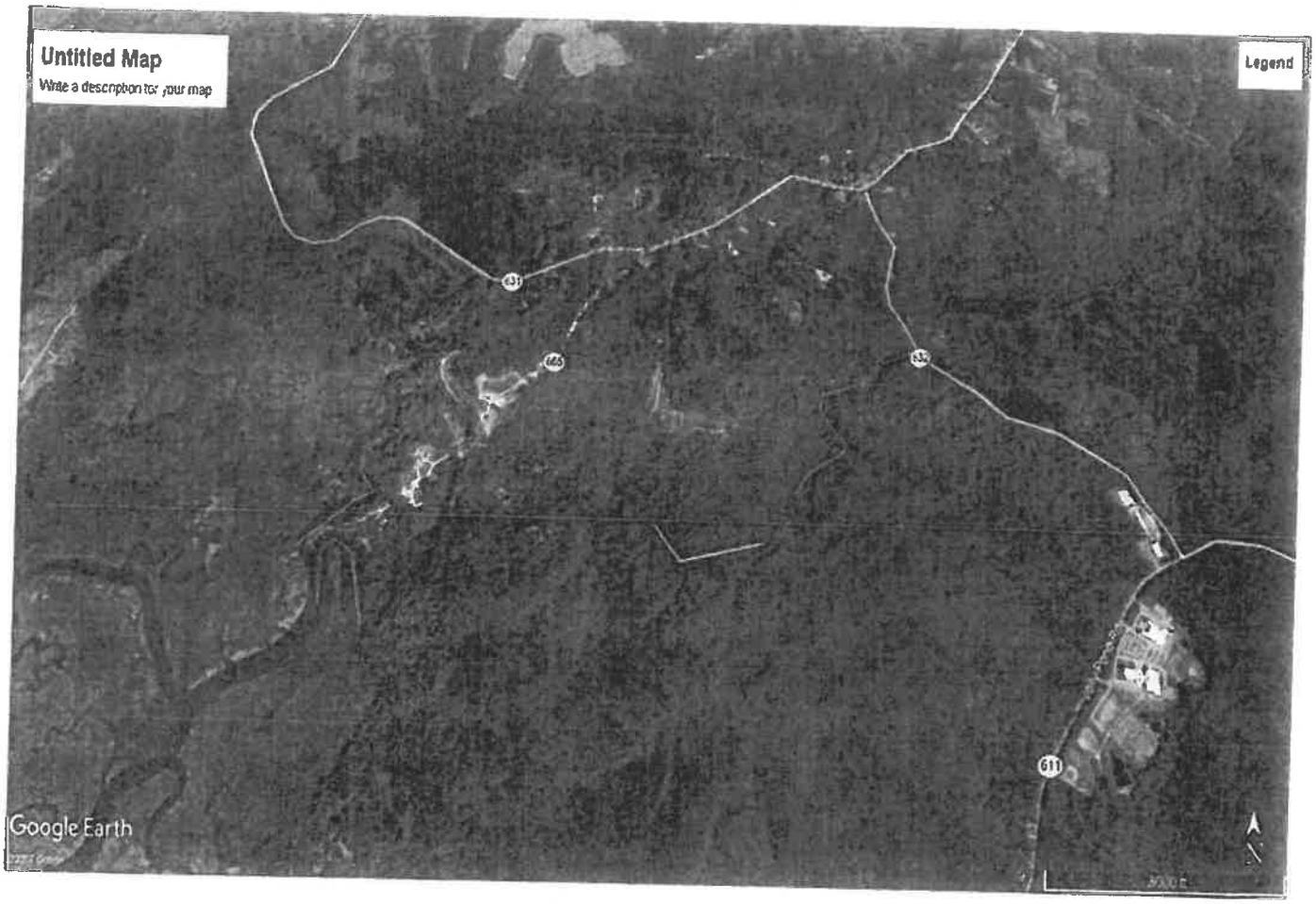


Figure 1. Locations of quantitative fish community collections in the tidal Yarmouth Creek system during Fall 2017 that generated data provided in Table 1. Specific collections are: NOV 15 (Collection D; Red, boat electrofishing), NOV 1 (Collections B & C; Yellow, boat electrofishing; includes lower Little Creek), SEP 15 (Collection A; Blue, backpack electrofishing). Combined sampling effort for these collections was 2,400 meters and 3,976 seconds of electrofishing.

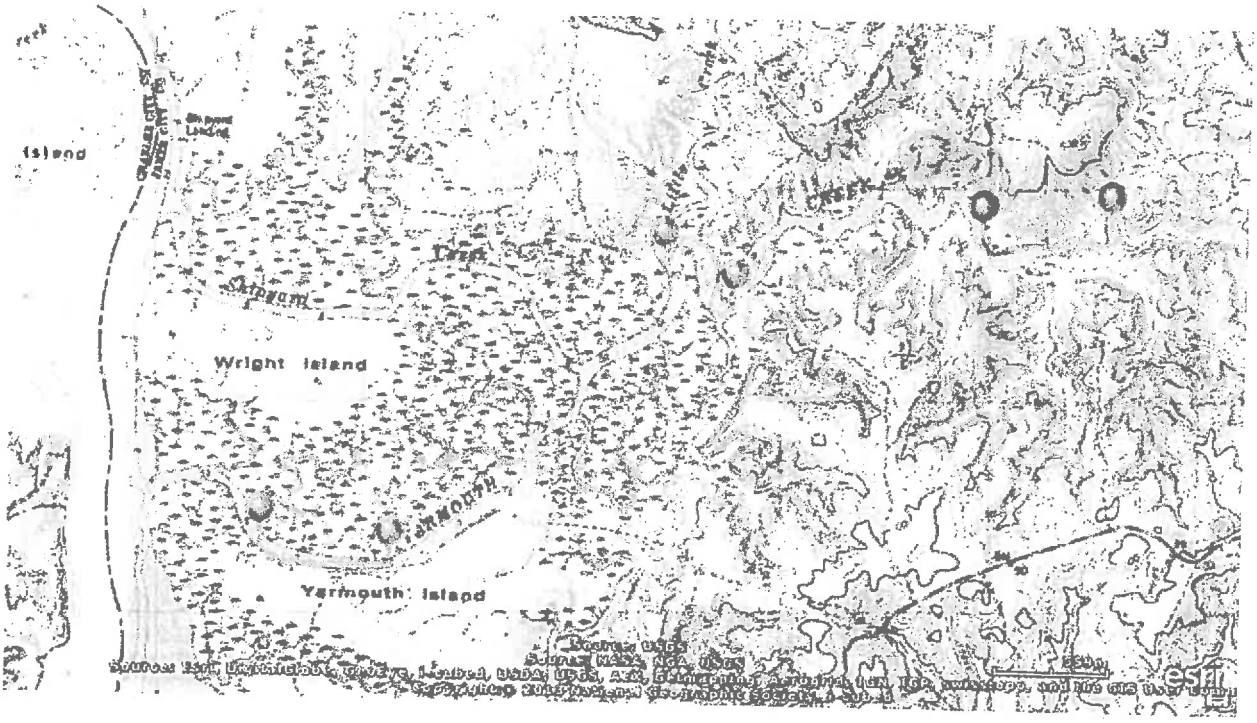


Figure 2. Locations of VDGIF sampling in lower Yarmouth Creek (referenced in the text) during the period 2010-2016. Data provided by Virginia Department of Game and Inland Fisheries.

Literature Cited

Gowan, C, and G. Garman. 1999. Design criteria for fish screens in Virginia: recommendations based on a review of the literature. Report to Virginia Department of Game and Inland Fisheries, 78 pp.

Jenkins, R.E., and N.M. Burkhead. 1994. Freshwater fishes of Virginia. American Fisheries Society, Bethesda, Maryland.

Starnes, W., G. Hogue, and M. Raley. 2014. STATUS OF BRIDLE SHINER, NOTROPIS BIFRENATUS, POPULATIONS IN VIRGINIA AND RESULTS OF PRELIMINARY GENETIC INVESTIGATIONS OF EXTANT VIRGINIA POPULATIONS. North Carolina Museum of Natural Sciences, Raleigh, North Carolina

October 15, 2020

Heather Wood, Chair
State Water Control Board
c/o Office of Regulatory Affairs
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

Dear Ms. Wood and Members of the Water Control Board:

The Virginia Institute of Marine Science (VIMS) has a three-part mission to conduct research in coastal ocean and estuarine science, educate students and citizens, and *provide advisory service to policy makers, industry, and the public.* In fulfillment of this mission, we routinely review proposed projects that require permits and that may have impacts on aquatic resources in the coastal zone at the request of state agencies, local boards, businesses, and citizens.

In the case of the project proposed by Cranston Mill Pond, LLC, we were contacted prior to the development of their application to review what impact their proposed water withdrawal might have on the downstream environment of Yarmouth Creek. To conduct this review we employed our state-of-the-art, well-calibrated James River model adapted to include the Chickahominy River and Yarmouth Creek. We ran two sets of simulations involving freshwater reductions of 8.3 million gallons per day at the head of Yarmouth Creek, using input data on James River flows for the time periods 2004 – 2008 and 1998 – 2008, to predict salinity changes that would occur from this level of water withdrawal from Cranston Mill Pond. These model simulations included two very dry periods (2000-2003 and 2006-2008) that should represent worse case scenarios for salinity changes resulting from the proposed withdrawal. The maximum salinity increases in Yarmouth Creek predicted by our model simulations resulting from the proposed withdrawal from Cranston Mill Pond was less than 1 part per thousand (ppt), with an average change ranging from 0.2 – 0.3 ppt. These changes are small in comparison to the natural daily and seasonally variations in salinity in the creek of 0 – 8 ppt.

Faculty and staff with expertise in tidal wetlands, marsh ecology, and fish utilization of habitats like those provided by Yarmouth Creek reviewed the outputs from these model simulations and concluded that this level of salinity change was unlikely to have significant impact on the vegetation or on fish utilization of this creek. We provided these results to both the applicant and to DEQ staff and have subsequently had numerous meetings and conversations with both explaining our analyses and conclusions.

We have very high confidence in our modeling, analyses, and conclusions resulting from this review. The individuals that contributed to this review are well-recognized experts in their fields and the model used in the evaluation has been validated in numerous other applications.

I want to make several things clear. First, although we conducted this review at the request of the applicant, we do not work for applicant nor are we representing the applicant in any way during this

permitting process. Our reviews of proposed projects are conducted with the same scientific rigor regardless of who requests the review and our results are always made available to the permitting agency and any other interested party. DEQ staff have our full set of comments and I assume that they will be part of the materials that the Board reviews. We also do not make policy recommendations for particular projects and have not done so here. We recognize that permitting agencies may choose to be more or less protective of the environment than our review might suggest is necessary and that factors other environmental impacts are relevant in permitting decisions.

Please feel free to contact me at the number below or via email (luck@vims.edu), if you have any questions or if VIMS may be of any assistance to you in your consideration of this matter.

Sincerely,

Mark Luckenbach

Dr. Mark Luckenbach
Associate Dean of Research and
Advisory Service
Professor of Marine Science

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A REPORT TO

THE HONORABLE RALPH S. NORTHAM, GOVERNOR,

AND

THE GENERAL ASSEMBLY OF VIRGINIA

STATUS OF VIRGINIA'S WATER RESOURCES

A REPORT ON VIRGINIA'S WATER RESOURCES MANAGEMENT ACTIVITIES

Virginia Department of Environmental Quality
COMMONWEALTH OF VIRGINIA

OCTOBER 2020

Executive Summary

The Report on Virginia's Water Resources Management Activities (Annual Report) is submitted in October of each year to the Governor and the Virginia General Assembly in accordance with § 62.1-44.40 of the Code of Virginia. The Annual Report focuses on water quantity and supply, summarizing reported water withdrawals for the 2019 calendar year, identifying water withdrawal trends, and providing an update on the Commonwealth's water resources management activities. The Annual Report also serves as a status report on activities associated with the State Water Resources Plan between five year updates. The next State Water Resources Plan is expected to be published in 2020.

Water quality issues are addressed in the most recent biennial Water Quality Assessment Integrated Report, published by the Virginia Department of Environmental Quality (DEQ).

State Water Resources Plan

The State Water Resources Plan (State Plan), finalized and released to the public in October 2015, identified potential areas of water availability concern within the state as well as challenges for future water resources management and recommendations for action. An update on several of these challenges is provided in Chapter 4 of this report. In 2019, DEQ began development of the 2020 State Plan. This included significant organization and review of data, as well as development of new and improved systems and techniques to support existing cumulative impact modeling. The 2020 State Plan as a whole will build upon the 2015 State Plan with significant refinement of nearly every aspect of the original including: updated water demand projections and water withdrawal/discharge data, improved spatial information on withdrawals and discharges, more robust cumulative impact analysis modeling, and three climate change scenarios. Additionally, each major river basin has been further subdivided into minor basins for modeling and analysis purposes, with the end result being a higher resolution product that will provide a more detailed and localized picture across the Commonwealth. These analyses will provide a wealth of information that can be utilized by localities, water users, and the state for future planning and management decisions.

Data analysis conducted during the 2020 State Plan development predicts a net increase of approximately 20% in daily water demands between 2020 and 2040. This highlights the importance of evaluating water supply statewide and determining where current supplies may be insufficient, one of the major objectives of the State Plan. The next step in the State Plan development process is conducting outreach to stakeholders to solicit input on other content that may be beneficial in informing future planning processes. In 2023, new local and regional Water Supply Plans are required to be submitted. The State Plan will provide a critical resource to support these efforts, allowing planning decisions to be based on a public repository of the most current water use data, water use projections, and state of the art resource modeling evaluations for both surface water and groundwater within Virginia.

Coastal Plain Aquifer Systems

DEQ continues to work with permitted groundwater withdrawal facilities within the Eastern Virginia and Eastern Shore Groundwater Management Areas to decrease withdrawals, increase system efficiencies, identify alternate sources of water, and to investigate other innovative ways to increase supplies in order to maintain groundwater productivity and availability over the next fifty years and beyond. Nevertheless the capacity to issue or reissue permits in some areas of the Coastal Plain, particularly around large industrial or municipal withdrawals, remains limited. Applicants seeking a groundwater withdrawal from confined coastal plain aquifers must justify their need for high-quality groundwater over other available alternative sources such as surface water, reuse, or lower-quality groundwater from other aquifers, including the surficial aquifer. Many of the largest groundwater users have recently made significant reductions in their permit limits as they work towards available alternatives. However, as population grows throughout the Commonwealth each year, new demands are added to the aquifer systems in turn. In particular, individual private self-supplied groundwater withdrawals that are largely unpermitted continue to grow and potentially offset the progress made in reducing permitted groundwater withdrawals. It is critical to continue efforts to address these and

other unpermitted groundwater withdrawals, as well as to promote and incentivize alternatives, including lower quality groundwater from shallow or unconfined aquifers, through a variety of means. The efforts DEQ is making in these areas are covered in more detail in Chapter 4 of this report. However several examples are discussed in brief in this section.

One of the first hurdles to addressing unpermitted withdrawals is the identification of them. DEQ continued its ongoing efforts to identify, permit, or register unpermitted groundwater withdrawals in 2019. Staff reviewed permit applications for a number of unpermitted groundwater users originally identified through a 2017 outreach initiative. This included a group of 56 poultry facilities in Accomack County. In 2018, the State Water Control Board (SWCB) approved Consent Special Orders (CSOs) for these 56 poultry facilities. The CSOs provided temporary authorization to withdraw groundwater while requiring the submission of a groundwater withdrawal permit application, metering, and reporting of water use. Throughout 2019, DEQ worked with these facilities to complete the permitting process and permits were approved by the State Water Control Board for 45 of the original 56 facilities in December, 2019. The remaining facilities were determined to be operating below the permit threshold requirement or to have discontinued operation. DEQ continues to process applications from several other facilities identified during these outreach efforts, including schools, universities, and crop irrigation facilities.

Evaluating the use of lower quality groundwater from shallow aquifers or the unconfined surficial aquifer (commonly known as the water table) in lieu of higher quality groundwater from confined aquifers remains a key requirement in any application for a Groundwater Withdrawal Permit. In many areas of the Commonwealth, the surficial aquifer can provide a viable alternative and due to its higher recharge rate is less susceptible to overuse. DEQ is currently working to implement two pieces of legislation enacted following the 2019 and 2020 General Assembly sessions which are intended to increase use of the surficial aquifer (2019 Va. Acts Ch. 755 and 2020 Va. Acts Ch. 670). See Chapter 4 for more details on these bills.

Groundwater withdrawal reductions are not the only method to address the resource issue. The Hampton Roads Sanitation District's (HRSD) Sustainable Water Initiative for Tomorrow (SWIFT) project proposes to reverse groundwater declines through direct injection of highly treated water into the Potomac Aquifer. As of summer of 2020, the SWIFT water treatment project has successfully injected 328 million gallons of treated water into the Potomac Aquifer, with plans to expand the project by constructing additional injection facilities. However, as the project is still in the pilot phase, the ultimate benefits of large-scale injection may not be known for a decade or more. DEQ continues to consult with and support HRSD; the pursuit of this project and others like it is another key recommendation made by the Eastern Virginia Groundwater Management Advisory Committee.

Water Withdrawals

In calendar year 2019, 1,249 facilities reported water withdrawals. The total volume of reported withdrawals from all water use categories (including fossil-fuel and nuclear power generation) was approximately 5.72 billion gallons. When excluding withdrawals for power generation, the total volume of reported withdrawals was approximately 1.23 billion gallons per day, a decrease of approximately 0.4% when compared to the five-year average. Note that withdrawals associated with power generation are often excluded throughout this report as they are largely non-consumptive (the withdrawal is discharged back to the same source at near the same quantity). Nuclear and fossil fuel power plants make up the majority of users within this category, and are addressed separately in the Power Generation section in Appendix 4.

Surface water withdrawals accounted for approximately 89% of total withdrawal volumes in 2019 (excluding withdrawals for power generation), which is consistent with the proportion of reported use over the previous five years. Public water supply was the largest use type of surface water withdrawals with 727.31 MGD withdrawn. Irrigation facilities reported the largest increase (5.5%) in surface water withdrawal reporting when compared to the five-year average. The largest surface water withdrawals by volume occurred within the Richmond, Hampton Roads, and Washington D.C. metro areas, and within Giles County. Total reported surface water withdrawals declined when compared to the five-year average, decreasing by 1%.

Table 2: 2019 Permitted and Unpermitted (Excluded) Withdrawals (MGD)

Withdrawal Type	2019 Withdrawal Amount	% of Total
Groundwater		
Permitted	72.18	51.81
Unpermitted	67.13	48.19
Surface Water		
Permitted	276.61	25.25
Unpermitted	818.99	74.75
Total (GW + SW)		
Permitted	348.79	28.24
Unpermitted	886.12	71.76

Table 3 disaggregates the reported permitted and unpermitted water withdrawals by use category, and shows the percent composition of each withdrawal category in 2019.

In 2019, a total of 139.26 MGD in groundwater withdrawals were reported (excluding power generation). Manufacturing withdrawals, both permitted and unpermitted, were the largest percentage of the total reported groundwater in 2019 at approximately 41.5%, with 15% of the total from unpermitted manufacturing. The unpermitted portion is generally made up of manufacturing/industrial facilities that rely on groundwater outside of the groundwater management areas. Withdrawals for public water supply were the second largest contributor to total groundwater withdrawals in 2019. Approximately 40% of all groundwater withdrawals reported in 2019 were used for public water supply needs, with 18% associated with unpermitted public water supply facilities. Unpermitted public water supply facilities are generally made up of those outside the management areas. DEQ staff continue to work with manufacturing and public water suppliers who rely on groundwater to identify water conservation measures and alternative sources when available, especially when the supply is inside a GWMA or an area with existing resource concerns.

As with groundwater, surface water withdrawals in 2019 were dominated by withdrawals associated with manufacturing and public water supply facilities, with the two categories making up approximately 93% of total surface water withdrawals. Manufacturing facilities comprised 26.8% of all surface water withdrawals, with 25.4% unpermitted. Withdrawals for public water supply comprised 66% of total surface water withdrawals. Within the public water supply category, 42.8% were unpermitted. As noted previously, three quarters of surface water withdrawals are unpermitted. Unpermitted withdrawals, whether groundwater or surface water, continue to present a significant challenge for management of the resource both for DEQ and water users across the state. More information on measures DEQ is taking to better evaluate the impacts from unpermitted users is provided in Chapter 4 of this report.

or 60,000,000 gallons in any month for tidal streams[15]. However, even smaller scale agricultural withdrawals can have a significant impact on the resource, particularly if located in headwaters or minor streams. One challenge is that there is very limited water use data for many agricultural users in the state which makes quantifying impacts challenging. DEQ has tentatively been approved for federal funding from the USGS Water Use Data Research Program to support a project to improve estimates of agricultural water use. This project will help address a critical information gap which can then be fed into resource modeling, which in turn is used by both the state and localities for water supply planning purposes.

- Challenge: Gaps in Water Withdrawal Reporting, Differences in Reporting Thresholds between the Local and Regional Water Supply Planning Regulation and the Water Withdrawal Reporting Regulation, and Lack of Adequate Data.

  The data gaps in withdrawal reporting have prompted a systematic approach to improve reporting of annual withdrawals, which initially focused on golf courses with the current focus on the agricultural community. This is largely due to the aforementioned gaps in water use data for agricultural users, which remains a critical data gap for planning purposes. As a result of the work done by the Withdrawal Permitting Program, 45 poultry facilities will begin quarterly reporting as a result of the issuance of their groundwater withdrawal permits. This represents a significant increase in water use reporting for agricultural use on the Eastern Shore. Additionally, DEQ received a list of poultry facilities located outside of groundwater management areas that will be contacted to begin reporting. Notably, poultry facilities historically maintained limited water use information, so these data will also be useful in future efforts to better estimate water use for poultry facilities statewide.

- Challenge: Quantifying Current and Future Risks to Groundwater Availability Outside of Current Groundwater Management Areas.

  Groundwater resource investigations continued in 2019 in the fractured rock aquifer portion of the state to better understand the complexities associated with the flow and storage of groundwater in fractured rock settings. During the 2019 calendar year, DEQ continued the collection and analysis of hydrogeologic data from the granitic and meta-sedimentary rocks in northern Fauquier County as part of a larger, ongoing study being conducted by the USGS to characterize the groundwater resources in the county. In the Valley and Ridge portion of Virginia, a hydrogeologic study was conducted to characterize the seasonal component of groundwater storage and movement within the Staunton-Pulaski Thrust Sheet – a regionally significant geologic structure in the Great Valley. After publication, this work was continued through long term aquifer characterization studies at a state observation well in Rockbridge County (SOW 063). Regional studies are critical to understanding these fractured rock systems, as flow and storage can vary significantly across even modest distances. DEQ continues to be contacted by concerned citizens in Prince William and Stafford counties regarding groundwater well problems.[16]

- Challenge: Managing Groundwater Use in Groundwater Management Areas.

  Managing groundwater in Virginia continues to present new opportunities and challenges. With respect to the Eastern Virginia Groundwater Management Area, some areas continue to show stabilizing water levels in response to the reductions in permit limits negotiated with many of the largest groundwater users. However, as population continues to increase, thereby also increasing demand on groundwater, further reductions may be necessary to sustain these gains and to ensure availability of groundwater into the future. Reductions in withdrawals are generally accomplished through the pursuit and development of alternative sources, often at significant cost to the user. At the same time, development continues on the HRSD SWIFT project which seeks to increase pressure in the aquifer system through injection.

[15] 9VAC25-210-310.A.4

[16] Maynard, Joel P. and White, Brad A. 2018, 'Packer Testing and Borehole Geophysical Characterization of Observation Wells in a Vertically Integrated Karst Aquifer in Augusta County, Virginia', paper presented to the Third Annual Appalachian Karst Symposium, Shepherdstown, West Virginia, April 2018.

This project if realized at scale would also come at significant expense. In 2019 through 2020, DEQ worked with HRSD and VDH on the permitting of the first large scale injection project at the James River Plant.

Legislation enacted following the 2020 General Assembly Session (2020 Va. Acts Ch. 805) reestablishes the Eastern Virginia Groundwater Management Advisory Committee. This committee, along with the Eastern Shore Groundwater Committee, offer excellent opportunities to engage stakeholders in addressing the complexity of managing groundwater in the two groundwater management areas. DEQ looks forward to the work that will be completed in these committees.

- Challenge: Understanding the Impact of Consumptive Use on Water Supply.

  In 2018, DEQ obtained federal grant funding for a two year project to develop consumptive use data and analysis tools, as well as to improve transfer and export of withdrawal and discharge data to allow wider access to these datasets. In 2019, the data development and analysis portions of this project were completed. DEQ, along with the USGS and Virginia Tech studied consumptive use trends and predictive model development to better understand and track impacts of consumptive use as well as inter-basin transfers of water. This information has allowed DEQ to create a more robust surface water budget that accounts for consumptive use trends for specific facilities. The products of this project are already being integrated into cumulative impact modeling efforts that inform work in both the Water Supply Planning and Water Withdrawal Permitting programs. The result of these efforts will also be incorporated into the next iteration of the State Plan, allowing localities to better evaluate how consumptive use affects water availability on both regional and local scales.

- Challenge: Understanding Stream Water Quality/Ecology.

  Informed decision-making requires practical, data-driven means of assessing potential risk to fish and benthic macroinvertebrates resulting from human consumptive water use. Through a collaboration with the Virginia Tech Department of Biological Systems Engineering and the USGS Virginia and West Virginia Water Science Center, DEQ has developed a new instream flow framework for rapid generation and optimization of flow-ecology relations (elfgen). Current streamflow management guidelines were developed using extensive Instream Flow Incremental Methodology (IFIM) studies. IFIM describes the field method for creating detailed habitat-streamflow models. These traditional habitat-based instream flow management approaches are often time and cost prohibitive. This was a primary driver to develop a new framework of analytical methods and best practices to reduce the cost of flow-ecology analysis by integrating widely available hydrologic and ecological datasets. Ecological limit function (ELF) models are used to describe the upper limit of increasing biodiversity with increasing stream size. The primary outcome of this study is a decision support tool for ELF generation and analysis in the form of the elfgen R package (available on GitHub: https://github.com/HARPgroup/elfgen). The findings and the elfgen tool developed provide a consistent framework for ELF analysis and can be used to quantify potential species richness response to human consumptive water use.

  The project found that flow-ecology relations were watershed specific, and species richness changes resulting from flow reduction varied based on sample sets derived from hydrologic unit classifications of different sizes (from HUC 6 large major river basins, to smaller HUC 8 and HUC 10 local scale watersheds). Ten percent of HUC 8s and 25 percent of HUC 10s showed richness decreases of one or more species resulting from a 20 percent flow reduction. While absolute richness change was consistent across various sized streams within a HUC, percent richness change was found to be stream size dependent. Streams with smaller mean annual flow were shown to have an increased potential risk of species loss resulting from equivalent flow reductions. Percent richness change was evaluated with percent habitat change using IFIM models to compare elfgen results to currently accepted streamflow management guidelines. Predicted habitat loss was shown to be greater than predicted richness change, however the magnitude of change increased in a similar manner as stream size decreased. Species richness loss rates varied between different watersheds, which could allow water supply management decisions to be made locally based on the predicted richness change and stream size response from a given flow reduction.

Commonwealth of Virginia

Grist, Joseph <joseph.grist@deq.virginia.gov>

Public Comments - VWP Permit for Cranston's Mill Pond

1 message

Mike Lang <cmlang@newkent-va.us> Mon, Nov 30, 2020 at 10:23 AM
To: "joseph.grist@deq.virginia.gov" <joseph.grist@deq.virginia.gov>
Cc: Larry Dame <ladame@newkent-va.us>, "Wortzel, Andrea W." <Andrea.Wortzel@troutman.com>, "Rodney A. Hathaway" <rahathaway@newkent-va.us>

Mr Grist:

I am writing on behalf of New Kent County with regards to the referenced permit. Admittedly, New Kent will likely not see any direct benefit nor adverse impacts from the decision on this particular permit. Geographically this source is not a practical water supply solution for New Kent County. However, as a rapidly growing groundwater-dependent community with eight active water withdrawal permits, we are concerned that taking water supply options off the table will ultimately limit the potential of small communities such as ours. As I am sure you are aware, each permit application requires the consideration of alternative water supplies. Prior appropriations (aka "grandfathering"), protecting our valuable cultural resources, expanding environmental protections & mitigation and the time & expense in securing a water withdrawal permit all factor in narrowing the water supply options available, especially to small communities. The permitting and ready availability of this particular supply has the potential to fulfill two goals that should be important to everyone: alleviating stress on the potable aquifers of the Virginia Coastal Plain as well as providing regional resources for future economic growth and water need.

Thank you for your time in considering our concerns.

C. Michael Lang, PG

Assistant Director

New Kent County Department of Public Utilities

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VIMS | WILLIAM & MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE

Office of Research and Advisory Services

October 15, 2020

Heather Wood, Chair
State Water Control Board
c/o Office of Regulatory Affairs
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

Dear Ms. Wood and Members of the Water Control Board:

The Virginia Institute of Marine Science (VIMS) has a three-part mission to conduct research in coastal ocean and estuarine science, educate students and citizens, and *provide advisory service to policy makers, industry, and the public.* In fulfillment of this mission, we routinely review proposed projects that require permits and that may have impacts on aquatic resources in the coastal zone at the request of state agencies, local boards, businesses, and citizens.

In the case of the project proposed by Cranston Mill Pond, LLC, we were contacted prior to the development of their application to review what impact their proposed water withdrawal might have on the downstream environment of Yarmouth Creek. To conduct this review we employed our state-of-the-art, well-calibrated James River model adapted to include the Chickahominy River and Yarmouth Creek. We ran two sets of simulations involving freshwater reductions of 8.3 million gallons per day at the head of Yarmouth Creek, using input data on James River flows for the time periods 2004 – 2008 and 1998 – 2008, to predict salinity changes that would occur from this level of water withdrawal from Cranston Mill Pond. These model simulations included two very dry periods (2000-2003 and 2006-2008) that should represent worse case scenarios for salinity changes resulting from the proposed withdrawal. The maximum salinity increases in Yarmouth Creek predicted by our model simulations resulting from the proposed withdrawal from Cranston Mill Pond was less than 1 part per thousand (ppt), with an average change ranging from 0.2 – 0.3 ppt. These changes are small in comparison to the natural daily and seasonally variations in salinity in the creek of 0 – 8 ppt.

Faculty and staff with expertise in tidal wetlands, marsh ecology, and fish utilization of habitats like those provided by Yarmouth Creek reviewed the outputs from these model simulations and concluded that this level of salinity change was unlikely to have significant impact on the vegetation or on fish utilization of this creek. We provided these results to both the applicant and to DEQ staff and have subsequently had numerous meetings and conversations with both explaining our analyses and conclusions.

We have very high confidence in our modeling, analyses, and conclusions resulting from this review. The individuals that contributed to this review are well-recognized experts in their fields and the model used in the evaluation has been validated in numerous other applications.

I want to make several things clear. First, although we conducted this review at the request of the applicant, we do not work for applicant nor are we representing the applicant in any way during this

permitting process. Our reviews of proposed projects are conducted with the same scientific rigor regardless of who requests the review and our results are always made available to the permitting agency and any other interested party. DEQ staff have our full set of comments and I assume that they will be part of the materials that the Board reviews. We also do not make policy recommendations for particular projects and have not done so here. We recognize that permitting agencies may choose to be more or less protective of the environment than our review might suggest is necessary and that factors other environmental impacts are relevant in permitting decisions.

Please feel free to contact me at the number below or via email (luck@vims.edu), if you have any questions or if VIMS may be of any assistance to you in your consideration of this matter.

Sincerely,

Mark Luckenbach

Dr. Mark Luckenbach
Associate Dean of Research and
Advisory Service
Professor of Marine Science

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804.684.7482 • www.vims.edu

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

M. KEITH HODGES
230 VIRGINIA STREET
URBANNA, VIRGINIA 23175

NINETY-EIGHTH DISTRICT

December 18, 2020

COMMITTEE ASSIGNMENTS:
GENERAL LAWS
COUNTIES, CITIES AND TOWNS
HEALTH, WELFARE AND INSTITUTIONS

Mr. Joseph Grist
Virginia Department of Environmental Quality
P.O. Box 1005
Richmond, Virginia 23218

Email: joseph.grist@deq.virginia.gov

RE: Support for issuance of VWP permit for Cranston's Mill Pond

Dear Mr. Grist:

I am writing to oppose DEQ's proposal to deny the Virginia Water Protection Permit for Cranston's Mill Pond and encourage DEQ to issue the permit as requested by Cranston Mill Pond, LLC. I have been very active in water supply issues throughout my legislative carrier and have followed very closely the Cranston Mill Pond project. The project, including the requested withdrawal amount, has been well vetted by experts including VIMS, Arcadis and Greg Garman. CMP has expended considerable private funding to do just what the General Assembly and DEQ has suggested is needed – identify and promote new and innovative water supplies including as alternatives to groundwater. Denial of the proposed permit would be counter to this desire and sets the Commonwealth back in addressing water supply concerns.

I was the patron of legislation that created the Eastern Virginia Groundwater Management Area Advisory Committee. That Committee, after almost 2 years of thoughtful deliberation generated a consensus report in August 2017 that among other things, recommended that "the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships." The report also specifically highlighted the Cranston's Mill Pond project as "an innovative example of an existing privately-owned impoundment that has applied for a water withdrawal permit is Cranston's Mill Pond in James City County. The water from the impoundment may result in much lower, long-term treatment costs compared to treating brackish water from other surface water sources."

I also served on the State Water Commission when it positively received a presentation on the Cranston's Mill Pond on June 18, 2018. It was abundantly clear at that meeting that this was a unique and innovative project, funded by private dollars, and that an end user would be determined at a later date – after issuance of the permit. We heard no opposition from DEQ or others to the proposed project at that meeting. It was clear to Commission members that this was an opportunity to address growing water supply concerns by identifying a new water source that could be used for new withdrawals to support economic development and/or as an alternate source to groundwater usage.

Given the Commonwealth's needs and the General Assembly members' support I was stunned to learn that after several years of effort and investment, as well as issuance of two draft permits, that DEQ had reversed course and was considering denial of the permit. The draft permits included provisions for addressing the lack of a specific end user for the water. I understand that DEQ has now raised questions, despite its obvious opinion to the contrary documented in the draft permits, as to whether it has the authority to issues the permit. I disagree with those concerns but introduced HB 1674 in the 2020 legislative session to smooth the road. That bill, with near unanimous support, passed the House. Opposition by the Governor's Office was removed by amendments prepared for the Senate Agriculture Committee hearing but unfortunately HB 1674 was carried over to the 2021 Session due to confusion over its impact. Regardless of its fate, there was clear legislative support for this project.

It is clear that if the Commonwealth wants to promote the identification and investment in alternative water sources that the proposed permit should be granted. Granting the permit would provide more certainty to those who seek to develop alternative sources and to those who may wish to use those sources. Denying the permit would not only kill an important surface water alternative, it would signal that others should not search for and invest in innovative approaches.

Thank you for considering these comments.

Sincerely,

M. Keith Hodges

Chesapeake VIRGINIA

Department of Public Utilities
Chesapeake City Hall
306 Cedar Road
Chesapeake, VA 23322
(757) 382-6390 (Fax) (757) 382-8352

December 22, 2020

Joseph Grist
1111 East Main Street, Suite 1400
P.O. Box 1105
Richmond, VA 23218

VIA EMAIL TO joseph.grist@deq.virginia.gov

Subject: **Comments to Cranston's Mill Pond Virginia Water Protection Permit Application Denial**

Dear Mr. Grist,

The City of Chesapeake has reviewed the Draft VA0060526 VPDES Permit 2019 St. Brides and provides the comment below. The comments are provided as the City has significant interest in protecting groundwater and surface water sources, and supports the increase of usable surface waters where possible. The City, like all water providers in the Eastern Virginia Groundwater Management Area, is well aware of how precious water supplies are in the EVGMA, and how efforts should continue to be made in every reasonable fashion to increase the availability of surface water sources in the Area.

Denying the application for Cranston's Mill Pond Virginia Water Protection Permit seems counter to the objectives of increasing the available supply of surface water in the EVGMA. Recognizing the water challenges faces in James City County, it seems the development of any viable water source should be strongly encouraged.

This denial also seems contradictory to the recommendations of the Eastern Virginia Groundwater Management Advisory Committee Final Report, 2017:

> *Recommendation #2: Committee recommends that the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships and potential funding for further evaluation and study of short-term and long-term alternative water sources and solutions.*

The request seems to specifically meet the Report's recommendation as detailed on Page 21:

- *"The use of existing impoundments or converting existing quarries to reservoirs may provide another viable option as an alternative supply of water. Some existing impoundments are not currently being used as water supplies and may be converted to water supply use."*

- *"The Committee felt that these types of solutions are worthy of further exploration by localities and the private sector to help diversify the available water supply alternatives to groundwater. The benefits to this type of water source include: (1) utilizing the already-existing infrastructure, (2) minimizing environmental impacts, and (3) reducing the demand for groundwater."*
- *Actions typically needed to move forward with such a project include: (1) applying for a surface water withdrawal permit.*
- *"Additionally, an innovative example of an existing privately-owned impoundment that has applied for a water withdrawal permit is Cranston's Mill Pond in James City County. The water from the impoundment may result in much lower, long-term treatment costs compared to treating brackish water from other surface water sources."*

In light of these recommendations, the City of Chesapeake recommends and requests the Cranston's Mill Pond Virginia Water Protection Permit Application be approved.

If you have questions, please contact me at (757) 382-6390 or djurgens@cityofchesapeake.net.

Sincerely,

David Jurgens

David Jurgens, P.E.
Director of Utilities

AQUA

An Essential

Submitted by email to: joseph.grist@deq.virginia.gov

December 22, 2020

Mr. Joseph Grist
1111 East Main Street, Suite 1400
P.O. Box 1105
Richmond, VA 23218

Subject: Cranston's Mill Pond, LLC Virginia Water Protection Permit Application for the Raw Water Supply Project

Dear Mr. Grist:

I am writing to express concern with the DEQ preliminary decision to deny the permit application and to request consideration for permit approval to allow this important opportunity to proceed.

I was fortunate to have participated in the Eastern Virginia Groundwater Management Advisory Committee process and you will recall there was considerable discussion and interest in the development of unique alternative water supply sources. Cranston's Mill Pond is certainly an attractive option for use as a water supply and is innovative. For our water supplies to be sustainable for the future innovation must be supported and encouraged vs. rejected.

I'd like to share an excerpt from the committee's 2017 final report which remains as relevant today as it was then, if not more so.

"Recommendation #2: Committee recommends that the Commonwealth promote the development of the list of alternative water sources and solutions included in this report, including solutions for public/private partnerships and potential funding for further evaluation and study of short-term and long-term alternative water sources and solutions."

And from page 21:

- "The use of existing impoundments or converting existing quarries to reservoirs may provide another viable option as an alternative supply of water. Some existing impoundments are not currently being used as water supplies and may be converted to water supply use."
- "The Committee felt that these types of solutions are worthy of further exploration by localities and the private sector to help diversify the available water supply alternatives to groundwater. The benefits to this type of water source include: (1) utilizing the already-existing infrastructure, (2) minimizing environmental impacts, and (3) reducing the demand for groundwater."

- Actions typically needed to move forward with such a project include: (1) applying for a surface water withdrawal permit.

"Additionally, an innovative example of an existing privately-owned impoundment that has applied for a water withdrawal permit is **Cranston's Mill Pond** in James City County. The water from the impoundment may result in much lower, long-term treatment costs compared to treating brackish water from other surface water sources."

For innovation to occur, develop, and proceed all parties must find a way to work towards a common goal. With this permit application it is apparent that an opportunity for a private-public partnership exists for Cranston's Mill Pond, LLC to partner and provide innovative unique solutions. For this to occur DEQ must assist with developing a path to move forward.

Sincerely,

//original electronically signed//
John J. Aulbach II, P.E.
President

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director
(804) 698-4000

TO: **The Members of the State Water Control Board**
FROM: **Kristen Sadtler, Division of Enforcement**
DATE: **April 14, 2021**
RE: **REPORT ON FACILITIES IN SIGNIFICANT NONCOMPLIANCE AND CHESAPEAKE BAY PRESERVATION ACT PROGRAM NOTICES OF VIOLATION**

Significant Noncompliance

One new permittee was reported to EPA on the Quarterly Noncompliance Report as being in significant noncompliance (SNC) for the quarter ending September 30, 2020. The permittee, the facility and the reported instances of noncompliance are as follows:

1. Permittee/Facility:	**Roanoke Electric Steel Corporation/Steel Dynamics, Inc.- Roanoke Bar Division**
Type of Noncompliance:	**Failure to Meet Permit Effluent Limit (Total Recoverable Copper)**
City/County	Roanoke, Virginia
Receiving Water:	Peters Creek (Roanoke River Basin)
Impaired Water:	The Peters Creek section of the Roanoke River Basin is listed as impaired for PCB and Mercury in fish tissue, bacteria, and has a benthic impairment (solids). The bacteria impairment causes the section to fail to support the Water Quality Standard for swimming.
River Basin:	Roanoke River Basin
Dates of Noncompliance:	April, July, and August 2020
Requirements Contained In:	VPDES Permit
DEQ Region:	Blue Ridge Regional Office

Roanoke Electric Steel Corporation (RESC) attributes the violations to a corroded bracket that had allowed the sampling tube to fall to the bottom of the weir where solids accumulate. The bracket has been repaired and the Facility has not had any exceedances of total recoverable

copper since August 2020. DEQ's Blue Ridge Regional Office has issued a Notice of Violation to RESC and anticipates entering into a consent order with RESC to address the violations.

Chesapeake Bay Preservation Act Program Notice of Violation

DEQ did not issue any Notices of Violation to Chesapeake Bay Preservation Act programs from December 9, 2020 to March 15, 2021.