COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
***DRAFT* PERMIT**
TO WITHDRAW GROUNDWATER IN THE EASTERN SHORE GROUNDWATER MANAGEMENT AREA

Permit Number: GWI000291
Effective Date: Xxxxxxx XX, 2025
Expiration Date: Xxxxxxx XX, 2040

Pursuant to the Ground Water Management Act of 1992 (Section 62.1-254 et seq. of the Code of Virginia) and the Groundwater Withdrawal Regulations (Regulations) (9VAC25-610), the Department of Environmental Quality hereby authorizes the Permittee to withdraw and use groundwater in accordance with this permit.

Permittee Ray Newman

Facility Highway Farm

Facility Address Lankford Hwy (Parcel #48-A-32, #48-A-33, #48-A-34)

Machipongo, VA 23405

The Permittee's authorized groundwater withdrawal shall not exceed:

481,071,000 gallons for the permit term,
47,558,000 gallons per year,
16,417,000 gallons per month

The permitted withdrawal will be used to provide recharge water to an irrigation pond used for crop irrigation and for overhead spray application of herbicides and pesticides to crops. Other uses are not authorized by this permit.

The Permittee shall comply with all conditions and requirements of the permit.

By direction of the Department of Environmental Quality, this Permit is granted by:

Signed _____ Date _____

Bryant Thomas
Interim Director, Water Division

DRAFT

This permit is based on the Permittee's application submitted on February 26, 2025, and subsequently amended to include supplemental information provided by the Permittee on May 19, 2025. The following are conditions that govern the system set-up and operation, monitoring, reporting, and recordkeeping pertinent to the Regulations.

Part I
Operating Conditions

A. Authorized Withdrawal

1. The withdrawal of groundwater shall be limited to the following wells identified in the table below. Withdrawals from wells not included in Table 1 are not authorized by this permit and are therefore prohibited. 9VAC25-610-140 A

Table 1. Summary of Wells Authorized for Groundwater Withdrawals

Owner Well Name	DEQ Well #	Type	Well Depth (ft. bls)	Screen Intervals (ft. bls)	Aquifer
Well #1	165-00537	Production	172	115.7-172 (infilled)	Upper Yorktown-Eastover
Well #2	165-00538	Production	57.3	30.3-57.3 (infilled)	Surficial
Well #3	165-00590	Production	281.3	251.3-281.3	Lower Yorktown-Eastover
Well #4	165-00625	Production	287	257-287	Lower Yorktown-Eastover

2. The withdrawal limits for a well or well group are identified in Table 2 below. 9VAC25-610-140 A 4 and 9VAC25-610-140 B 1 and B 2

Table 2. Apportionment Withdrawal Limit per Well Group

Group Number	DEQ Well #	Owner Well Name	Aquifer	Apportionment Limit per Well Group (gallons per year)
1	165-00537	Well #1	Upper Yorktown-Eastover	11,889,500
2	165-00590 165-00625	Well #3 Well #4	Lower Yorktown-Eastover	23,779,000

3. Any actions that result in a change to the status, construction, or pump intake setting of wells included in this permit must be pre-approved by the Department of Environmental Quality (Department or DEQ) in writing prior to implementing the change and a revised GW-2 Form must be submitted to the Department within 30 days after the physical construction of a well is altered or the pump intake setting has been changed. If changes are a result of an emergency, notify the Department within 5 days from the change. 9VAC25-610-140 C

B. Pump Intake Settings

1. The Permittee shall not place a pump or water intake device lower than the top of the uppermost confined aquifer that a well utilizes as a groundwater source or lower than the bottom of an unconfined aquifer that a well utilizes as a groundwater source in order to prevent dewatering of the aquifer, loss of inelastic storage, or damage to the aquifer from compaction. 9VAC25-610-140 A 6

2. Pump settings in individual wells are limited as follows. Any change in the pump setting must receive prior approval by the Department.

Table 3. Maximum Pump Intake Settings

Owner Well Name	DEQ Well #	Maximum Pump Setting (feet below land surface)
Well #1	165-00537	130
Well #2	165-00538	87
Well #3	165-00590	260
Well #4	165-00625	260

C. Reporting

1. Water withdrawn from each well and impoundment shall be recorded monthly at the end of each month and reported to the Department, in paper or electronic format, on a form provided by the Department by the tenth (10^{th}) day of each January, April, July and October for the respective previous calendar quarter. Records of water use shall be maintained by the Permittee in accordance with Part III.F, 1 through 5 of this permit. 9VAC25-610-140 A 9

2. The Permittee shall report any amount in excess of the permitted withdrawal limit by the fifth (5th) day of the month following the month when such a withdrawal occurred. Failure to report may result in compliance or enforcement activities. 9VAC25-610-140 C

3. Reporting requirements contained in Part II.XX require water quality monitoring. The reports required by that condition shall be submitted in conjunction with the records required above.

4. Groundwater withdrawal reports may be submitted electronically through the myDEQ portal at https://portal.deq.virginia.gov/ or via email to withdrawal.permitting@deq.virginia.gov. Groundwater withdrawal reports may also be mailed to the office address stated below. All other required notifications and submittals shall include facility name and permit number and be submitted electronically to withdrawal.permitting@deq.virginia.gov or mailed to the office stated below, unless otherwise directed in writing by the Department subsequent to the issuance of this permit: Virginia Department of Environmental Quality, Attn: Groundwater Withdrawal Compliance, P.O. Box 1105, Richmond VA 23218.

5. The following is a summary of reporting requirements for specific facility wells:

Table 4. Summary of Reporting Requirements for Facility Wells

Owner Well Name	DEQ Well #	Reporting Requirements
Well 1	165-00537	Water Use
Well 2	165-00538	Water Use
Well 3	165-00590	Water Use
Well 4	165-00625	Water Use

6. Surface water withdrawals associated with the facility that meet the threshold requiring reporting according to 9VAC25-200-30 shall be reported annually.

D. Water Conservation and Management Plan

1. The Water Conservation and Management Plan (WCMP) submitted in the application received February 26, 2025 and subsequently amended on March 13, 2025 and then approved by the Department on May 19, 2025 is incorporated by reference into this permit and shall have the same effect as any condition contained in this permit and may be enforced as such.

2. By the end of the first year of the permit cycle [*date*] the Permittee shall submit documentation to the Department that the leak detection and repair program defined in the WCMP has been initiated. This documentation shall include activities completed during the first year of the permit term. 9VAC25-610-100 B

3. As soon as completed but not later than the end of the second year of the permit cycle [*date*] the Permittee shall submit to the Department results of an audit of the total amount of groundwater used in the distribution system and operational processes. This documentation shall include any resulting changes to the leak detection and repair program in the WCMP. 9VAC25-610-100 B

4. A report on the plan's effectiveness in reducing water use, including revisions to those elements of the WCMP that can be improved and addition of other elements found to be effective based on operations to date shall be submitted by the end of years five [*date*] and ten [*date*] of the permit term. These reports shall include as appropriate: 9VAC25-610-140 C

    a. Any new water saving equipment installed or water saving processes adopted;

    b. WCMP actions taken to reduce the volume of water needed to supply the system;

    c. Planned short or long term efforts and actions to be added to the WCMP to improve the efficiency of water use in the system or by customers and for reducing the loss of water;

    d. Results of additional water audits completed;

    e. Review of water use category (residential, commercial, industrial) per-connection use in municipal systems;

    f. Evaluation of the leak detection and repair program;

    g. Description of educational activities completed; and

    h. Identification of any water reuse opportunities identified.

5. If revisions or additions to the plan are necessary, an updated WCMP shall be submitted to the Department for approval along with the report prior to implementation of the revised plan.

6. Records of activities conducted pursuant to the WCMP are to be submitted to the Department upon request.

E. Mitigation Plan

The Mitigation Plan approved on May 19, 2025 by the Department is incorporated by reference into this permit and shall have the same effect as any condition contained in this permit and may be enforced as such. 9VAC25-610-110 D 3 g

F. Well Tags

1. Each well that is included in this permit shall have affixed to the well casing, in a prominent place, a permanent well identification plate that records, at a minimum, the Department well identification number, the groundwater withdrawal permit number, the total depth of the well, and the screened intervals in the well. Such well identification plates shall be in a format specified by the Department and are available from the Department. 9VAC25-610-140 A 12

2. Well tags shall be affixed to the appropriate well casing within 30 days of receiving the tags from the Department. The accompanying well tag installation certification form shall be returned to the Department within 60 days of receipt of the tags. 9VAC25-610-140 C

Part II
Special Conditions

Pursuant to 9VAC25-610-140 B and C, the following Special Conditions apply to this permit in order to protect the public welfare, safety, and health or conserve, protect and help ensure the beneficial use of groundwater.

A. Impoundment Water Level Control

The Permittee shall install and maintain a device to measure impoundment water levels as prescribed in the WCMP to ensure that groundwater pumping does not result in overfilling the impoundment.

Part III
General Conditions

A. Duty to Comply

The Permittee shall comply with all conditions of the permit. Nothing in this permit shall be construed to relieve the permit holder of the duty to comply with all applicable federal and state statutes, regulations and prohibitions. Any permit violation is a violation of the law and is grounds for enforcement action, permit termination, revocation, modification, or denial of a permit application. 9VAC25-610-130 A

B. Duty to Cease or Confine Activity

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a permit has been granted in order to maintain compliance with the conditions of the permit. 9VAC25-610-130 B

C. Duty to Mitigate

The Permittee shall take all reasonable steps to avoid all adverse impacts that may result from this withdrawal as defined in 9VAC25-610-10 and provide mitigation of the adverse impact when necessary as described in 9VAC25-610-110 D 3 g and 9VAC25-610-130 C.

D. Inspection, Entry, and Information Requests

Upon presentation of credentials, the Permittee shall allow the Department, or any duly authorized agent of the Department, at reasonable times and under reasonable circumstances, to enter upon the Permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the permit conditions, and to inspect any facilities, well(s), water supply system, operations, or practices (including sampling, monitoring and withdrawal) regulated or required under the permit. For the purpose of this section, the time for inspection shall be deemed reasonable during regular business hours. Nothing contained herein shall make an inspection time unreasonable during an emergency. 9VAC25-610-130 D

E. Duty to Provide Information

The Permittee shall furnish to the Department, within a reasonable time, any information that the Department may request to determine whether cause exists for modifying or revoking, reissuing, or terminating the permit, or to determine compliance with the permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by regulation or this permit. 9VAC25-610-130 E

F. Monitoring and Records Requirements

1. The Permittee shall maintain a copy of the permit on-site and/or shall make the permit available upon request. 9VAC25-610-130 E

2. Monitoring of parameters shall be conducted according to approved analytical methods as specified in the permit. 9VAC25-610-130 F 1

3. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. 9VAC25-610-130 F 2

4. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three years from the date of the expiration of a granted permit. This period may be extended by request of the Department at any time. 9VAC25-610-130 F 3

5. Records of monitoring information shall include as appropriate: 9VAC25-610-130 F 4

    a. the date, exact place and time of sampling or measurements;

b. the name(s) of the individual(s) who performed the sampling or measurements;

c. the date the analyses were performed;

d. the name(s) of the individual(s) who performed the analyses;

e. the analytical techniques or methods supporting the information, such as observations, readings, calculations and bench data used;

f. the results of such analyses; and

g. chain of custody documentation.

G. Environmental Laboratory Certification

The Permittee shall comply with the requirement for certification of laboratories conducting any tests, analyses, measurements, or monitoring required pursuant to the State Water Control Law (§ 62.1-44.2 et seq. of the Code of Virginia), Environmental Laboratory Certification Program (§ 2.2-1105 et seq. of the Code of Virginia), Certification for Noncommercial Environmental Laboratories (1VAC30-45), and/or Accreditation for Commercial Environmental Laboratories (1VAC30-46), and

1. Ensure that all samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

2. Conduct monitoring according to procedures approved under 40CFR Part 136 or alternative methods approved by the U.S. Environmental Protection Agency.

3. Periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will ensure accuracy of measurements. 1VAC30-45-20

H. Future Permitting Actions

1. A permit may be modified or revoked as set forth in Part VI of the Groundwater Withdrawal Regulations. 9VAC25-610-290 and 9VAC25-610-130 G

2. If a Permittee files a request for permit modification or revocation, or files a notification of planned changes, or anticipated noncompliance, the permit terms and conditions shall remain effective until the Department makes a final case decision. This provision shall not be used to extend the expiration date of the effective permit. 9VAC25-610-130 G

3. Permits may be modified or revoked upon the request of the Permittee, or upon Department initiative, to reflect the requirements of any changes in the statutes or regulations. 9VAC25-610-130 G

4. The Permittee shall schedule a meeting with the Department prior to submitting a new, expanded or modified permit application. 9VAC25-610-85

5. A new complete permit application shall be submitted at least 270 days prior to the expiration date

of this permit, unless permission for a later date has been granted by the Department, to continue a withdrawal greater than or equal to 300,000 gallons in any month while an application for a renewal is being processed. 9VAC25-610-96

6. A new complete permit application shall be submitted at least 270 days prior to any proposed modification to this permit that will (i) result in an increase of withdrawal above permitted limits; or (ii) violate the terms and conditions of this permit. 9VAC25-610-96

7. The applicant shall provide all information described in 9VAC25-610-94 for any reapplication. 9VAC25-610-96 C

8. The Permittee must notify the Department in writing of any changes to owner and facility contact information within 30 days of the change. 9VAC25-610-140 C

I. Metering and Equipment Requirements

1. Each well and/or impoundment or impoundment system shall have an in-line totalizing flow meter to read gallons, cubic feet, or cubic meters installed prior to beginning the permitted use. Meters shall produce volume determinations within plus or minus 10% of actual flows. An alternative method for determining flow may be approved by the Department on a case-by-case basis. 9VAC25-610-140 A 7 b

    a. A defective meter or other device must be repaired or replaced within 30 days.

    b. A defective meter is not grounds for not reporting withdrawals. During any period when a meter is defective, generally accepted engineering methods shall be used to estimate withdrawals. The period during which the meter was defective must be clearly identified in the groundwater withdrawal report required by Part I, Subsection D of this permit.

2. Each well shall be equipped in a manner such that water levels can be measured during pumping and non-pumping periods without dismantling any equipment. Any opening for tape measurement of water levels shall have an inside diameter of at least 0.5 inches and be sealed by a removable plug or cap. The Permittee shall provide a tap for taking raw water samples from each permitted well. 9VAC25-610-140 A 7 e

J. Minor Modifications

1. A minor modification to this permit must be made to replace an existing well(s) or add an additional well(s) provided that the well(s) is screened in the same aquifer(s) as the existing well(s), and is in the near vicinity of the existing well(s), the total groundwater withdrawal does not increase, the area of impact does not increase, and the well has been approved by the Department prior to construction. 9VAC25-610-330 B 4 and B 5

2. A minor modification to this permit must be made to combine withdrawals governed by multiple permits when the systems are physically connected as long as interconnection will not result in additional groundwater withdrawal and the area of impact will not increase. 9VAC25-610-330 B 6

3. Minor modifications to this permit must also be made to:

a. Change an interim compliance date up to 120 days from the original compliance date, as long as the change does not interfere with the final compliance date. 9VAC25-610-330 B 7

b. Allow for change in ownership when the Department determines no other change in the permit is necessary and the appropriate written agreements are provided in accordance with the transferability of permits and special exceptions. 9VAC25-610-320 and 9VAC25-610-330 B 8

c. Revise a Water Conservation and Management Plan to update conservation measures being implemented by the Permittee that increase the amount of groundwater conserved. 9VAC25-610-330 B 9

K. Well Construction

At least two weeks prior to the scheduled construction of any well(s), the Permittee shall notify the Department of the construction timetable and receive prior approval of the well(s) location(s) and acquire the Department Well number (DEQ Well #). All wells shall be constructed in accordance with the following requirements.

1. A well site approval letter or well construction permit must be obtained from the Virginia Department of Health prior to construction of the well. 9VAC25-610-130 A

2. A complete suite of geophysical logs (16"/64" Normal, Single Point, Self-Potential, Lateral, and Natural Gamma) shall be completed for the well and submitted to the Department along with the corresponding completion report. 9VAC25-610-140 C

3. The Permittee shall evaluate the geophysical log and driller's log information to estimate the top of the target aquifer and; therefore, a depth below which the pump shall not be set. The Permittee's determination of the top of the target aquifer shall be submitted to the Department for review and approval, or approved on site by the Department's Groundwater Characterization staff, prior to installation of any pump. 9VAC25-610-140 A 6

4. The Permittee shall install gravel packs and grout in a manner that prevents leakance between aquifers. Gravel pack shall be terminated close to the top of the well screen(s) and shall not extend above the top of the target aquifer. 9VAC25-610-140 C

5. A completed GW-2 Form and any additional water well construction documents shall be submitted to the Department within 30 days of the completion of any well and prior to the initiation of any withdrawal from the well. The assigned Department Well number shall be included on all well documents. 9VAC25-610-140 C

6. In addition to the above requirements, if required by the permit, construction of a Water Level Monitoring State Observation Well (SOW) requires:

   a. The Permittee shall coordinate activities with the Department's Groundwater Characterization Program (GWCP) to determine the appropriate observation well location and construction schedule, along with the needed screen interval(s), and other completion

details following review of geophysical logging. 9VAC25-610-140 C

b. Prior to preparation of bid documents for construction of the observation well, the Permittee shall notify the Department and shall include any GWCP requirements in the bid documents. At a minimum, the Department will require a pre-bid meeting with interested drilling contractors and a pre-construction meeting with the successful bidder. 9VAC25-610-140 C

c. Instrumentation to meet the requirements for real-time data transmission consistent with the State Observation Well Network shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall install the real-time equipment infrastructure with Department oversight. The Department will conduct the installation of the transducer and final hook-up of the equipment. 9VAC25-610-140 C

7. In addition to the above requirements, if required by the permit, construction of a Chloride Monitoring SOW requires:

a. The Permittee shall coordinate activities with the Department's Groundwater Characterization Program (GWCP) to determine the appropriate observation well location and construction schedule, along with the needed screen interval(s), and other completion details following review of geophysical logging. 9VAC25-610-140 C

b. Prior to preparation of bid documents for construction of the observation well, the Permittee shall notify the Department and shall include any GWCP requirements in the bid documents. At a minimum, the Department will require a pre-bid meeting with interested drilling contractors and a pre-construction meeting with the successful bidder. 9VAC25-610-140 C

c. Instrumentation to meet the requirements for real-time data transmission consistent with the State Observation Well Network shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall install the real-time equipment infrastructure with Department oversight. The Department will conduct final hook-up of the equipment. 9VAC25-610-140 C

d. Instrumentation to meet the requirements for continuous measurement of specific conductance from multiple levels within the well screen shall be purchased by the Permittee. The Permittee shall submit a purchase order based on the Department's equipment specifications for review and approval prior to purchase of the equipment. The Permittee shall install the real-time equipment infrastructure with Department oversight. The Department will conduct the final hook-up of the equipment. 9VAC25-610-140 C

L. Permit Reopening

This permit may be reopened for the purpose of modifying the conditions of the permit as follows:

1. To meet new regulatory standards duly adopted by the Board. 9VAC25-610-140 A 11

2. When new information becomes available about the permitted withdrawal, or the impact of the

withdrawal, which had not been available at permit issuance and would have justified the application of different conditions at the time of issuance. 9VAC25-610-310 B 1

3. When the reported withdrawal is less than 60% of the permitted withdrawal amount for a five year period. 9VAC25-610-310 B 2

4. If monitoring information indicates the potential for adverse impacts to groundwater quality or level due to this withdrawal. 9VAC25-610-140 C

COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMIT ISSUANCE FACT SHEET

Groundwater Withdrawal Permit Number: GWI000291
Application Date: February 26, 2025

The Department of Environmental Quality (Department or DEQ) has reviewed the application for a Groundwater Withdrawal Permit. This document provides the pertinent information concerning the legal basis, scientific rationale, and justification for the reissuance of the Groundwater Withdrawal Permit listed below. Based on the information provided in the application and subsequent revisions, the Department has determined that there is a reasonable assurance that the activity authorized by the permit is a beneficial use as defined by the regulations. Groundwater impacts have been minimized to the maximum extent practicable. The following details the application review process and summarizes relevant information for developing the Permit and applicable conditions.

Permittee / Legal Responsible Party

Name & Address: Ray Newman
4131 Richardson Road
Virginia Beach, VA 23455
Phone: (757) 464-5236

Facility Name and Address

Name & Address: Highway Farm
Lankford Hwy (Parcel #48-A-32, #48-A-33, #48-A-34)
Machipongo, VA 23405
Phone: (757) 948-0368

Contact Information:

Name: Aarin Nottingham
E-mail: aarin.nottingham@lipmanfamilyfarms.com
Phone: (757) 948-0368

Proposed Beneficial Use: The permitted withdrawal will be used to provide recharge water to an irrigation pond used for crop irrigation and substance dilution for spray application. Other uses are not authorized by this permit.

Staff Findings and Recommendations

Based on review of the permit application, staff provides the following findings.

- The proposed activity is consistent with the provisions of the Ground Water Management Act of 1992, and will protect other beneficial uses.
- The proposed permit addresses minimization of the amount of groundwater needed to provide the intended beneficial use.
- The effect of the impact will not cause or contribute to significant impairment of state waters.
- This permit includes a plan to mitigate adverse impacts on existing groundwater users.

Staff recommends Groundwater Withdrawal Permit Number GWI000291 be issued as proposed.

Approved: _____
Bryant Thomas
Interim Director, Water Division

Date: _____

Processing Dates

Processing Action	Date Occurred/Received
Pre-Application Meeting:	December 4, 2024
Application Received by DEQ:	February 26, 2025
Permit Fee Deposited by Accounting:	Agricultural application
Local Government Ordinance Form Received by DEQ:	February 26, 2025
Application Review Conducted:	March 13, 2025
Notice of Deficiency Sent:	NA
Request for Additional Information Sent:	March 13, 2025
Response to Request for Additional Information Received:	March 19, 2025
Request for Additional Information Sent:	May 16, 2025
Response to Request for Additional Information Received:	May 19, 2025
Application Complete:	May 19, 2025
Submit Request for Technical Evaluation:	May 22, 2025
Technical Evaluation Received by DEQ:	June 5, 2025
Draft Permit Package Sent:	
Public Notice Published:	
End of 30-Day Public Comment Period:	
Response to Public Comment:	
Public Meeting or Hearing:	
Permit Issued:	

Application

Application Information

Description:

Background / Purpose of Facility:
The property is owned by Ray Newman and leased by Kuzzens, Inc. The system currently uses four production wells designated as Well #1 (DEQ Well #165-00537), Well #2 (DEQ Well #165-00538), Well #3 (DEQ Well #165-00590), and Well #4 (DEQ Well #165-00625). Well #1 is screened in the Upper Yorktown-Eastover aquifer. Well #2 is screened in the Surficial aquifer. Well #3 and Well #4 are both screened in the Lower Yorktown-Eastover aquifer. Highway Farm was previously permitted under Groundwater Withdrawal Permit GW0075100 which authorized withdrawals of 394,000,000 gallons for the 10-year permit term, 49,390,000 gallons per year (gal/yr), and 18,950,000 gallons per month (gal/mo). Permit GW0075100 has an expiration date of May 31, 2026.

Location of Facility/Withdrawal:

Previous Local or Regional Water Supply Planning Unit according to 2013 Water Supply Plans:
Northampton County and Towns Regional Water Supply Plan

New Regional Water Supply Planning Region:
Eastern Shore Regional Water Supply Plan due 2029 subject to change pursuant to 9VAC25-780-45 C

County: Northampton

GWMA/Aquifer:
Eastern Shore GWMA / Upper Yorktown-Eastover, Lower Yorktown-Eastover, and Surficial aquifers

Conjunctive Use Source:
An unnamed on-site irrigation impoundment that drains to an unnamed tributary of Mattawoman Creek.

Withdrawal Use, Current Need, and Projected Demand:

Basis of Need:
Groundwater withdrawals are used primarily to provide supplemental water to an on-site irrigation pond used for tomato crop irrigation, and to dilute substances for spray application on the farm. Irrigation occurs through plasticulture low flow drip emitters placed within raised earthen beds covered by plastic mulch that reduces water loss by controlling soil temperature, minimizing weed growth, and capturing potential evaporation from the soil. Tomato plants require a precise amount of water. The irrigation system is operated remotely by computer to ensure no overwatering or underwatering occurs. Wells are used to mechanically recharge the irrigation pond only when the existing volume of water within the pond and stormwater runoff does not adequately support the daily flow needed to properly irrigate the crop.

Of the property's 96.8 acres, 64.53 acres are available for cultivation, representing approximately 66.7% of the total acreage. Since 2016, between 0 and 54.26 acres were farmed. The Farm Manager plans to farm all 64.53 available acres until the end of the upcoming permit term.

Water Demand and Projections:
To project the system's water demand during the 15-year permit term, the applicant took into consideration the facility's historical water use trends and the anticipated acreage intended for farming. The estimated monthly withdrawal demand was estimated through the following equation, resulting in a figure of 16,417,000 gal/mo after rounding:

$$Projected\ Demand\ (monthly) = \frac{Historical\ Maximum\ Monthly\ Water\ Use\ (July\ 2019)}{Acres\ Planted\ in\ 2019} \times Total\ Net\ Acres$$

$$Projected\ Demand\ (monthly) = \frac{10{,}431{,}000\ Gallons}{41\ Acres} \times 64.53\ Acres$$

For the estimated annual groundwater demand, the applicant used the following equation, resulting in a figure of 47,558,000 gal/yr after rounding:

$$Projected\ Demand\ (annual) = Historical\ Maximum\ Annual\ Gallons\ per\ Net\ Acre \times Total\ Net\ Acres$$

$$Projected\ Demand\ (annual) = 737{,}000\ Gallons\ per\ Net\ Acre \times 64.53\ Acres$$

For the estimated groundwater demand for the 15-year permit term, the applicant used the following equation, resulting in a figure of 481,071,000 gallons after rounding.

$$Projected\ Demand\ (permit\ term) = Historical\ Average\ Annual\ Gallons\ per\ Net\ Acre \times Total\ Net\ Acres \times 15\ Years$$

$$Projected\ Demand\ (annual) = 497{,}000\ Gallons\ per\ Net\ Acre \times 64.53\ Acres \times 15\ Years$$

Withdrawal Volumes Requested:
The applicant requested the following withdrawal volumes based upon the projected groundwater demand.

Table 1. Withdrawal Volumes Requested

Period of Withdrawal	Total Volume (gallons)	Volume in gallons per day
Maximum Fifteen Year:	481,071,000	87,867
Maximum Annual:	47,558,000	130,296
Maximum Monthly:	16,417,000	529,581

Department Evaluation

Historic Withdrawals:
Withdrawals from the last nine years (2016-2024) were analyzed. The applicant noted no leaks during the previous permit term, so the entire range of groundwater withdrawal measurements were included in the analysis. During this period, the system's annual withdrawals ranged significantly from 0 gallons (2023) to 30,215,000 (2020). Monthly withdrawals ranged from zero gallons during winter months to a summertime monthly peak at 10,431,000 gallons in July 2019.

Analysis of Alternative Water Supplies:
The Town of Eastville Public Water Supply was evaluated as a potential alternative water supply. The Town has no plans to extend service to Newman Farm and already holds a groundwater withdrawal permit from the Department. The facility uses stormwater runoff to naturally recharge the onsite irrigation pond. Some ditches in the fields are graded to facilitate collection of water runoff into the irrigation pond. Because this runoff is not metered, the amount of runoff collected by ponds is unknown. Tidal creeks exist in the vicinity of the farm but are not suitable irrigation sources due to high salinity.

Under current operations, all of the groundwater is pumped from four existing production wells screened within the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers. Groundwater withdrawal from the production wells is used to mechanically recharge the irrigation ponds.

The facility is partially supplied by wells screened in the confined Yorktown-Eastover aquifer. Since the permitted withdrawals are not for an increase to an existing permitted facility, a site-specific investigation of the Surficial aquifer is recommended but not required during this permit term.

Public Water Supply:
The proposed beneficial use does not contain a public water supply component.

Water Supply Plan Review:
Highway Farm is not included in the Northampton County Water Supply Plan (2011). Water Supply Plan demand projections for the facility were not included in the Plan and could not be considered in the

evaluation of the permit request. The Water Supply Plan states that existing sources for Northampton County were projected to meet demands through 2040 (Plan pg. 8-1, PDF pg. 119).

Department Recommended Withdrawal Limits:
The Department concurs with the requested monthly, annual, and permit term limits proposed in the application.

The Department recommends the following withdrawal volumes based upon evaluation of the groundwater withdrawal permit application.

Table 2. Department Recommended Withdrawal Limits

Period of Withdrawal	Total Volume (gallons)	Volume in gallons per day
Maximum Fifteen Year:	481,071,000	87,867
Maximum Annual:	47,558,000	130,296
Maximum Monthly:	16,417,000	529,581

Technical Evaluation:
Aquaveo, LLC performed a technical evaluation of the application for the Department based on the VAHydro Groundwater Eastern Shore model (VAHydro-GW-ES). The objectives of this evaluation were to determine the areas of any aquifers that will experience at least one foot of water level decline due to the proposed withdrawal (the Area of Impact or AOI), to determine the potential for the proposed withdrawal to cause salt-water intrusion, and to determine if the proposed withdrawal meets the 80% drawdown criteria as required by 9VAC25-610-110 D 3 h. Aquaveo, LLC also evaluated water levels in the Eastern Shore model compared to measured field values.

The VAHydroGW-ES model results indicated that there was one cell in the Upper Yorktown-Eastover Confining Unit which simulates an increase in chloride concentrations greater than 100 mg/L due to the proposed withdrawal. In addition, there was one cell in the Middle Yorktown-Eastover aquifer and three cells in the Lower Yorktown-Eastover aquifer which simulate an increase in chloride concentrations greater than 50 mg/L due to the proposed withdrawal. Additionally, the model results establish a potential for upconing of the potentially more brackish Middle Yorktown-Eastover waters into the overlying Upper Yorktown-Eastover source aquifer. However, the model cells simulating an increase in chloride concentrations are offshore and modeling results also indicate that the timing of the potential change for simulated concentration increases of 50 mg/L or greater is 19 years from when the Technical Evaluation was conducted. Since the simulated concentration increases are offshore and the potential changes occur outside of the 15-year permit term, water quality monitoring and reporting is not required as a permit condition. The results of these simulations are provided in the Technical Evaluation (Attachment 1).

The Department concluded that the proposed withdrawal satisfies the technical evaluation criteria for permit issuance. A summary of the results of the evaluation and the AOI for the Surficial, Upper Yorktown-Eastover, Middle Yorktown-Eastover, and Lower Yorktown-Eastover aquifers is provided in the Technical Evaluation (Attachment 1).

Part I
Operating Conditions

Authorized Withdrawals:

Table 3. Wells Authorized for Groundwater Withdrawals

Owner Well Name	DEQ Well #	Type	Well Depth (ft. bls)	Screen Intervals (ft. bls)	Aquifer
Well #1	165-00537	Production	172	115.7-172 (infilled)	Upper Yorktown-Eastover
Well #2	165-00538	Production	57.3	30.3-57.3 (infilled)	Surficial
Well #3	165-00590	Production	281.3	251.3-281.3	Lower Yorktown-Eastover
Well #4	165-00625	Production	287	257-287	Lower Yorktown-Eastover

Apportionment:

Specific well apportionment limits are required for Well #1 (DEQ Well #165-00537), Well #3 (DEQ Well #165-00590), and Well #4 (DEQ Well #165-00625) since these wells are screened in two different confined aquifers. Well #1 is screened in the Upper Yorktown-Eastover aquifer while Well #3 and Well #4 are screened in the Lower Yorktown-Eastover aquifer. The AOI may be influenced by differing withdrawal volumes between these production wells. The apportionment limits are required as an operating condition of the permit. The annual withdrawals from Well #1 are limited to 25% or 11,889,500 gal/yr. The annual withdrawals from Well #3 and Well #4 are limited to 50% or 23,779,000 gal/yr.

Table 4. Apportionment Withdrawal Limit per Well Group

Group Number	DEQ Well #	Owner Well Name	Aquifer	Apportionment Limit per Well Group (gallons per year)
1	165-00537	Well #1	Upper Yorktown-Eastover	11,889,500
2	165-00590 165-00625	Well #3 Well #4	Lower Yorktown-Eastover	23,779,000

Additional Wells:

Observation Wells: No observation wells.

Abandoned Wells: No abandoned wells.

Out of Service Wells: No out of service wells.

Groundwater Characterization Program Recommendations:

A Department staff geologist has reviewed available information and made the following determinations regarding the location of the aquifer tops for Well #1 (DEQ Well #165-00537), Well #2 (DEQ Well #165-00538), Well #3 (DEQ Well #165-00590), and Well #4 (DEQ Well #165-00625). Information reviewed in this process included GW-2 forms, geophysical logs, and The Hydrogeologic Framework of the Virginia Eastern Shore (USGS Scientific Investigations Report 2019-5093).

Table 5. Groundwater Characterization Program Recommendations

Unit	Well #1 (ft/bls)	Well #2 (ft/bls)	Well #3 (ft/bls)	Well #4 (ft/bls)
Surficial Aquifer Bottom		87		
Upper Yorktown-Eastover Aquifer Top	130			
Upper Yorktown-Eastover Aquifer Bottom	205			
Lower Yorktown-Eastover Aquifer Top			260	260
Lower Yorktown-Eastover Aquifer Bottom (estimated)			350	350

Pump Intake Settings:

Table 6. Maximum Pump Intake Settings

Owner Well Name	DEQ Well #	Maximum Pump Setting (feet below land surface)
Well #1	165-00537	130
Well #2	165-00538	87
Well #3	165-00590	260
Well #4	165-00625	260

All well pumps are correctly positioned in accordance with 9VAC25-610-140 A 6. Well #1 (DEQ Well #165-00537) pump is set at 130 feet below land surface (ft/bls), Well #2 (DEQ Well #165-00538) pump is set at 55 ft/bls, Well #3 (DEQ Well #165-00590) pump is set at 151 ft/bls, and Well #4 (DEQ Well #165-00625) pump is set at 256 ft/bls.

Withdrawal Reporting:
Groundwater withdrawals are to be recorded monthly and reported quarterly. Groundwater withdrawal reports may be submitted electronically through the myDEQ portal at https://portal.deq.virginia.gov/ or via email to withdrawal.permitting@deq.virginia.gov. Groundwater withdrawal reports may also be mailed to the office address stated below. All other required notifications and submittals shall include facility name and permit number and be submitted via email to withdrawal.permitting@deq.virginia.gov or mailed to the office stated below, unless otherwise directed in writing by the Department subsequent to the issuance of this permit: Virginia Department of Environmental Quality, Attn: Groundwater Withdrawal Compliance, P.O. Box 1105, Richmond VA 23218.

Water Conservation and Management Plan:
A Water Conservation and Management Plan (WCMP) meeting the requirements of 9VAC25-610-100 B was submitted and reviewed as part of the application process. The accepted Plan is to be followed by the permittee as an operational Plan for the facility/water system, is incorporated by reference into this permit, and shall have the same effect as any condition contained in this permit and may be enforced as such (Attachment 2). In addition, the Permit includes conditions requiring the following:

- Documentation that the leak detection and repair program defined in the WCMP has been initiated is due by the end of the first year of the permit term.
- A result of an audit of the total amount of groundwater used in the distribution system and operational processes is due by the end of the second year of the permit term.
- A report on the plan's effectiveness in reducing water use, including revisions to those elements of the WCMP that can be improved and addition of other elements found to be effective based on operations to date shall be submitted by the end of years five [*date*] and ten [*date*] of the permit term.

Mitigation Plan:
The predicted AOI resulting from the Technical Evaluation extends beyond the property boundaries in the Upper Yorktown-Eastover, Middle Yorktown-Eastover, and Lower Yorktown-Eastover aquifers. Given this prediction, a Mitigation Plan to address potential claims from existing well owners within the predicted area of impact is incorporated by reference in the permit and shall have the same effect as any condition contained in this permit and may be enforced as such (Attachment 3).

Well Tags:
Well tags will be transmitted by the Department as needed after issuance of the final permit.

Part II
Special Conditions

Impoundment Water Level Control:
The Permittee shall install and maintain a device to measure impoundment water levels as prescribed in the WCMP to ensure that groundwater pumping does not result in overfilling the impoundment.

Part III
General Conditions

General Conditions are applied to all Groundwater Withdrawal Permits, as stated in the Groundwater Withdrawal Regulations, 9VAC25-610.

Public Comment

The following sections will be completed after close of the public comment period.

Relevant Regulatory Agency Comments:

Summary of VDH Comments and Actions:
This facility is not a public water supply so soliciting comments from VDH was not required.

Public Involvement during Application Process:

Local and Area wide Planning Requirements:
The Northampton County Administrator certified on December 30, 2024, that the facility's operations are consistent with all ordinances. The Department received this certification on February 26, 2025.

Public Comment/Meetings:
The public notice was published in xxxxxx on XXX. The public comment period ran from xxxxx to xxxxx.

Changes in Permit Part II Due to Public Comments

Changes in Permit Part III Due to Public Comments

Attachments

1. **Technical Evaluation**
2. **Water Conservation and Management Plan**
3. **Mitigation Plan**
4. **Public Comment Sheet** ***(if warranted)***

COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL EVALUATION FOR PROPOSED GROUNDWATER WITHDRAWAL

Date: June 5, 2025

Application /Permit Number: GWI000291

Owner / Applicant Name: Ray Newman

Facility / System Name: Highway Farm

Facility Type: Agricultural

Facility / System Location: Northampton County

The Commonwealth of Virginia's Groundwater Withdrawal Regulations (9VAC25-610) provide that, for a permit to be issued for a new withdrawal, to expand an existing withdrawal, or reapply for a current withdrawal, a technical evaluation shall be conducted. This report documents the results of the technical evaluation conducted to meet the requirements for the issuance of a permit to withdraw groundwater within a Designated Groundwater Management Area (9VAC25-600).

This evaluation determines the:

(1) The Area of Impact (AOI): The AOI for an aquifer is the areal extent of each aquifer where one foot or more of drawdown is predicted to occur as a result of the proposed withdrawal.
(2) Water Quality: The potential for the proposed withdrawal to cause salt water intrusion into any portion of any aquifers or the movement of waters of lower quality into areas where such movement would result in adverse impacts on existing groundwater users or the groundwater resource.
(3) The Eighty Percent Drawdown (80% Drawdown): The proposed withdrawal in combination with all existing lawful withdrawals will not lower water levels, in any confined aquifer that the withdrawal impacts, below a point that represents 80% of the distance between the land surface and the top of the aquifer at the points where the one-foot drawdown contour is predicted for the proposed withdrawal.

Requested withdrawal amount:

Requested Withdrawal Amount		
Fifteen (15) Year Value	481,071,000 gallons	
Annual Value	47,558,000 gallons	(130,296 average gpd)
Monthly Value	16,417,000 gallons	(529,581 average gpd)

Summary of Requested Withdrawal:
Highway Farm, located in Northampton County, is an agricultural tomato farm. Groundwater withdrawals are primarily used to fill an onsite irrigation pond used for crop irrigation, and also to dilute substances for spray application. Irrigation occurs through plasticulture low flow drip emitters using water withdrawn directly from the irrigation ponds. Of the property's 96.8 acres, 64.53 acres are available for cultivation, representing approximately 66.7% of the total acreage. Since 2016, between 0 and 54.26 acres were farmed. The Farm Manager plans to farm all 64.53 available acres until the end of the upcoming permit term.

Requested Apportionment of Withdrawal:

DEQ Well #	**Owner Well #**	**Aquifer**	**Percent of Withdrawal**

165-00537	Well #1	Upper Yorktown-Eastover	25%
165-00538	Well #2	Surficial	25%
165-00590	Well #3	Lower Yorktown-Eastover	25%
165-00625	Well #4	Lower Yorktown-Eastover	25%

Production Wells:

Identification	Elevation	Construction	Pump Intake	Source Aquifer
Owner Well Name: Well #1 DEQ Well Number: 165-00537 CEDS ID: 871000001148 Hydro ID: 221473	Elevation: 32 ft amsl	Completion Date: Unknown Screens (ft/bls): 115.7-172 infilled Total Depth (ft/bls): 172	130 ft/bls	Upper Yorktown-Eastover
Owner Well Name: Well #2 DEQ Well Number: 165-00538 CEDS ID: 871000001147 Hydro ID: 221475	Elevation: 31 ft amsl	Completion Date: Unknown Screens (ft/bls): 30.3-57.3 infilled Total Depth (ft/bls): 57.3	55 ft/bls	Surficial
Owner Well Name: Well #3 DEQ Well Number: 165-00590 CEDS ID: 871000001145 Hydro ID: 221477	Elevation: 30 ft amsl	Completion Date: December 14, 2009 Screens (ft/bls): 251.3-281.3 Total Depth (ft/bls): 281.3	151 ft/bls	Lower Yorktown-Eastover
Owner Well Name: Well #4 DEQ Well Number: 165-00625 CEDS ID: 871000001146 Hydro ID: 1823	Elevation: 30 ft (estimated from topo)	Completion Date: April 25, 2014 Screens (ft/bls): 257-287 Total Depth (ft/bls): 287	256 ft/bls	Lower Yorktown-Eastover

Geologic Setting:
The Highway Farm wells (applicant wells) are located in Northampton County. The production wells are screened in the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers.

The Columbia aquifer is a shallow unconfined aquifer found throughout the Virginia Coastal Plain and Eastern Shore areas. It is defined as the saturated, chiefly sandy, surficial sediments that overlie the uppermost continuous clay-silt unit[1].

The upper portion of the Yorktown-Eastover aquifer (described in the 2006 Virginia Coastal Plain Hydrologic Framework[2] (VCPHF) as a combination of the Upper, Middle, and Lower Yorktown-Eastover aquifers) is composed primarily of estuarine to marine quartz sands of the Yorktown Formation of Pliocene age.

The nearest USGS geologic cross section found in the USGS Scientific Investigations Report 2019-5093 is cross-section A-A' (see attached figure at the end of the report) [3].

Virginia Eastern Shore Model data:
The following table lists the locations of the applicant production wells within the Virginia Eastern Shore Model[4] (VAHydroGW-ES).

VAHydroGW-ES Model Grid					
Well	**CEDS ID**	**Hydro ID**	**Well Number**	**Row**	**Column**
Well #1	871000001148	221473	165-00537	271	38
Well #2	871000001147	221475	165-00538	271	38
Well #3	871000001145	221477	165-00590	271	37
Well #4	871000001146	1823	165-00625	271	37

Hydrologic Framework:
Data from the VCPHF is reported in this technical report to illustrate the hydrogeologic characteristics of the aquifers in the Virginia Eastern Shore near the applicant wells and identify major discrepancies between regional hydrogeology and site logs interpreted by the DEQ.

The following average aquifer elevations were estimated from the VAHydroGW-ES at the model cells containing the applicant production wells.

[1] Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.
[2] McFarland, E.R., and Bruce, T.S., 2006, The Virginia Coastal Plain Hydrogeologic Framework: U.S. Geological Survey Professional Paper 1731, 118 p., 25 pls.
[3] McFarland, E.R., and Beach, T.A., 2019, Hydrogeologic framework of the Virginia Eastern Shore: U.S. Geological Survey Scientific Investigations Report 2019-5093, 26 p., 13 pl., https://doi.org/10.3133/sir20195093.
[4] Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.

VAHydroGW-ES Average Hydrologic Unit Information		
Aquifer	**Elevation (feet msl)**	**Depth (feet bls)**
Surface	31	0
Columbia aquifer (bottom)	-47	78
Upper Yorktown-Eastover aquifer (top)	-89	120
Upper Yorktown-Eastover aquifer (bottom)	-148	179
Middle Yorktown-Eastover aquifer (top)	-190	221
Middle Yorktown-Eastover aquifer (bottom)	-237	268
Lower Yorktown-Eastover aquifer (top)	-267	298
Lower Yorktown-Eastover aquifer (bottom)	-376	407

Groundwater Characterization Program Recommendations:
DEQ staff reviewed available information and made the following determinations regarding the location of the aquifer tops for the following wells: Well #1 (DEQ Well # 165-00537), Well #2 (DEQ Well #165-00538), Well #3 (DEQ Well #165-00590), and Well #4 (DEQ Well #165-00625). Information reviewed in this process included GW-2 forms, geophysical logs, and The Hydrogeologic Framework of the Virginia Eastern Shore (USGS Scientific Investigations Report 2019-5093).

Unit	Well #1 (ft/bls)	Well #2 (ft/bls)	Well #3 (ft/bls)	Well #4 (ft/bls)
Surficial Aquifer Bottom		87		
Upper Yorktown-Eastover Aquifer Top	130			
Upper Yorktown-Eastover Aquifer Bottom	205			
Lower Yorktown-Eastover Aquifer Top			260	260
Lower Yorktown-Eastover Aquifer Bottom (estimated)			350	350

Comparison of the Hydrogeologic Framework and Groundwater Characterization Program Recommendations:
The average bottom elevation of the Surficial aquifer obtained from the VAHydroGW-ES framework of 78 ft-bls is 9 feet higher than the average value provided by the DEQ of 87 ft-bls indicating general agreement.

The average top elevation of the Upper Yorktown-Eastover aquifer obtained from the VAHydroGW-ES framework of 120 ft-bls is 10 feet higher than the average value provided by the DEQ of 130 ft-bls also indicating general agreement. The average bottom elevation of the Upper Yorktown-Eastover aquifer obtained from the VAHydroGW-ES framework of 179 ft-bls is 26 feet higher than the value provided by the DEQ of 197 ft-bls, indicating general agreement.

The average top elevation of the Lower Yorktown-Eastover aquifer obtained from the VAHydroGW-ES framework of 298 ft-bls is 38 feet lower than the average value provided by the DEQ of 260 ft-bls. The average bottom elevation of the Lower Yorktown-Eastover aquifer obtained from the VAHydroGW-ES framework of 407 ft-bls is 57 feet lower than the value provided by the DEQ of 350 ft-bls. The top and bottom elevations of the Lower Yorktown-Eastover aquifer from the VAHydroGW-ES framework are lower than those identified by the DEQ, but are in general agreement.

Water Level Comparison:
Below water levels retrieved from the USGS regional observation network wells are compared to the simulated water levels reported in the *Virginia Eastern Shore Model (VAHydroGW-ES) 2023-2024 Simulation of Potentiometric Groundwater Surface Elevations of Reported and Total Permitted Use* report (the 2023-2024 report).[5] This comparison is made in order to evaluate the performance of the regional model in the vicinity of the applicant wells and assess historical groundwater trends.

The 2023-2024 report provides two sets of simulated potentiometric water surface elevations. The VAHydroGW-ES model is divided into three parts. The first portion of the model simulates water levels within the Eastern Shore aquifers from 1900 through 2023 based upon historically reported pumping amounts (the "*Historic Use Simulation*"). This portion of the model has been calibrated to match water levels observed in USGS regional observation network wells situated throughout the peninsula. The water levels reported in the 2023-2024 report are based upon two separate simulations, each simulation running from 2023 through 2073. The simulated pumping amount in these two simulations are based upon, 1) the average 2019-2023 reported withdrawal amount of wells in the VAHydroGW-ES model (the "R*eported Use Simulation*") and, 2) the current (2023) maximum withdrawal amount allowed under their current permit for wells in the VAHydroGW-ES model (the "*Total Permitted Simulation*"). Both these simulations are an extension of the *Historic Use Simulation* and the water levels reported in the 2023-2024 report are the final water levels simulated at the end of the simulations (2073).

The "VAHydroGW-ES 2073 Reported Use Water Level," reported in the tables below, is the simulated water level – 50 years from present – if all permitted pumping continued at the average 2019-2023 reported withdrawal amount for the next 50 years. The "VAHydroGW-ES 2073 Total Permitted Water Level," reported in the tables below, is the simulated water level – 50 years from present – if all Eastern Shore permitted wells were to pump at the maximum permitted amount allowed under their current permit for the next 50 years. Finally, the "VAHydroGW-ES 2023 Historic Use Water Level," reported in the tables below, is the water level simulated for the year 2023 in the *Historic Use Simulation*.

The nearest USGS regional observation network wells to the applicant wells, completed in the Upper Yorktown-Eastover aquifer, are listed in the following tables and shown in Figure 1. For the USGS regional observation network wells, average 2023 reported water levels are shown in the following tables. Simulated water levels for the VAHydroGW-ES cells containing the USGS regional observation network wells are also shown in the following tables.

Comparing the VAHydroGW-ES 2023 Historic Use Water Level with the USGS Network Well 2023 Water Level provides a method for judging the accuracy of the VAHydroGW-ES. Figures 2 through 4 show graphs of the recorded water levels from the USGS observation wells listed in the following tables. These figures also show the simulated VAHydroGW-ES *Historic Use Simulation* water levels for the model cell containing each USGS well. Observing the simulated and observed water elevations together provides a second method for assessing the accuracy of the VAHydroGW-ES in the vicinity of the applicant wells.

[5] Refer to "*Virginia Eastern Shore Model (VAHydroGW-ES) 2023-2024 Simulation of Potentiometric Groundwater Surface Elevations of Reported and Total Permitted Use"* at https://www.deq.virginia.gov/home/showpublisheddocument/27228/638702936863430000.

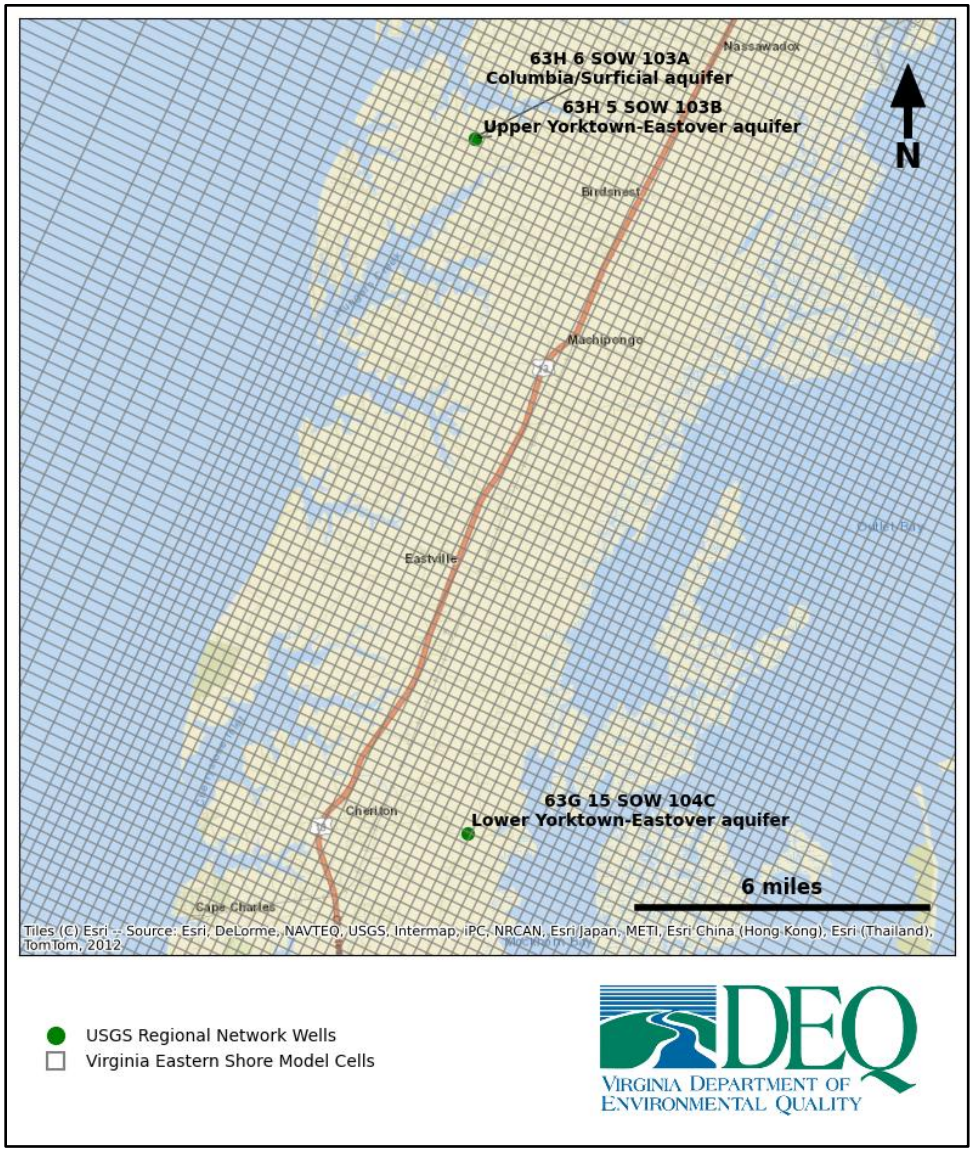


Figure 1. Nearest USGS regional observation network wells.

The Columbia VAHydroGW-ES 2023 Reported Use water levels are in general agreement with the USGS Network Well water levels observed in Well 63H 6 SOW 103A. The water levels observed at this USGS Network Well fluctuate several feet per year and have varied up to 9 feet over the duration of the measured data. The VAHydroGW-ES 2023 Reported Use water levels for Well 63H 6 SOW 103A are within 5 feet of the USGS observed water level for the duration of the available observed water level data and are therefore in general agreement.

The Upper Yorktown-Eastover VAHydroGW-ES 2023 Reported Use water levels are also in general agreement with the USGS Network Well water levels observed in Well 63H 5 SOW 103B. The water levels observed at this USGS Network Well fluctuate several feet per year and have varied up to 7 feet over the duration of the measured data. The VAHydroGW-ES 2023 Reported Use water levels for Well 63H 5 SOW 103B are within 5 feet of the USGS observed water level for the duration of the available observed water level data and are therefore also in general agreement.

The Lower Yorktown-Eastover aquifer observed water levels for USGS Network well 63G 15 SOW 104C show yearly fluctuations up to approximately 1 to 5 feet. The VAHydroGW-ES simulated water levels are

generally within 4 feet of the USGS Network well observed water levels and are therefore in general agreement.

Water levels simulated by the VAHydroGW-ES do not fluctuate in the same manner because the pumping and recharge simulated in the model for any given year are averaged over the year and entered in the model as the average value for the year.

Columbia Measurements	**Well 63H 6 SOW 103A**
Distance from applicant wells (miles)	4.6
VAHydroGW-ES Row	251
VAHydroGW-ES Column	25
VAHydroGW-ES Land Surface Elevation (ft-msl)	15.0
USGS Well Land Surface Elevation (ft-msl)	17.0
USGS Network Well 2023 Water Level (ft-msl)	8.7
VAHydroGW-ES 2023 Reported Use Water Level (ft-msl)	13.2
VAHydroGW-ES 2073 Reported Use Water Level (ft-msl)	13.2
VAHydroGW-ES 2073 Total Permitted Water Level (ft-msl)	13.2

Upper Yorktown-Eastover Measurements	**Well 63H 5 SOW 103B**
Distance from applicant wells (miles)	4.6
VAHydroGW-ES Row	251
VAHydroGW-ES Column	25
VAHydroGW-ES Land Surface Elevation (ft-msl)	15.0
USGS Well Land Surface Elevation (ft-msl)	17.0
USGS Network Well 2023 Water Level (ft-msl)	6.2
VAHydroGW-ES 2023 Reported Use Water Level (ft-msl)	5.9
VAHydroGW-ES 2073 Reported Use Water Level (ft-msl)	5.8
VAHydroGW-ES 2073 Total Permitted Water Level (ft-msl)	5.2

Lower Yorktown-Eastover Measurements	Well 63G 15 SOW 104C
Distance from applicant wells (miles)	6.9
VAHydroGW-ES Row	306.0
VAHydroGW-ES Column	50.0
VAHydroGW-ES Land Surface Elevation (ft-msl)	28.0
USGS Well Land Surface Elevation (ft-msl)	28.0
USGS Network Well 2023 Water Level (ft-msl)	9.1
VAHydroGW-ES 2023 Reported Use Water Level (ft-msl)	11.8
VAHydroGW-ES 2073 Reported Use Water Level (ft-msl)	11.7
VAHydroGW-ES 2073 Total Permitted Water Level (ft-msl)	11.5

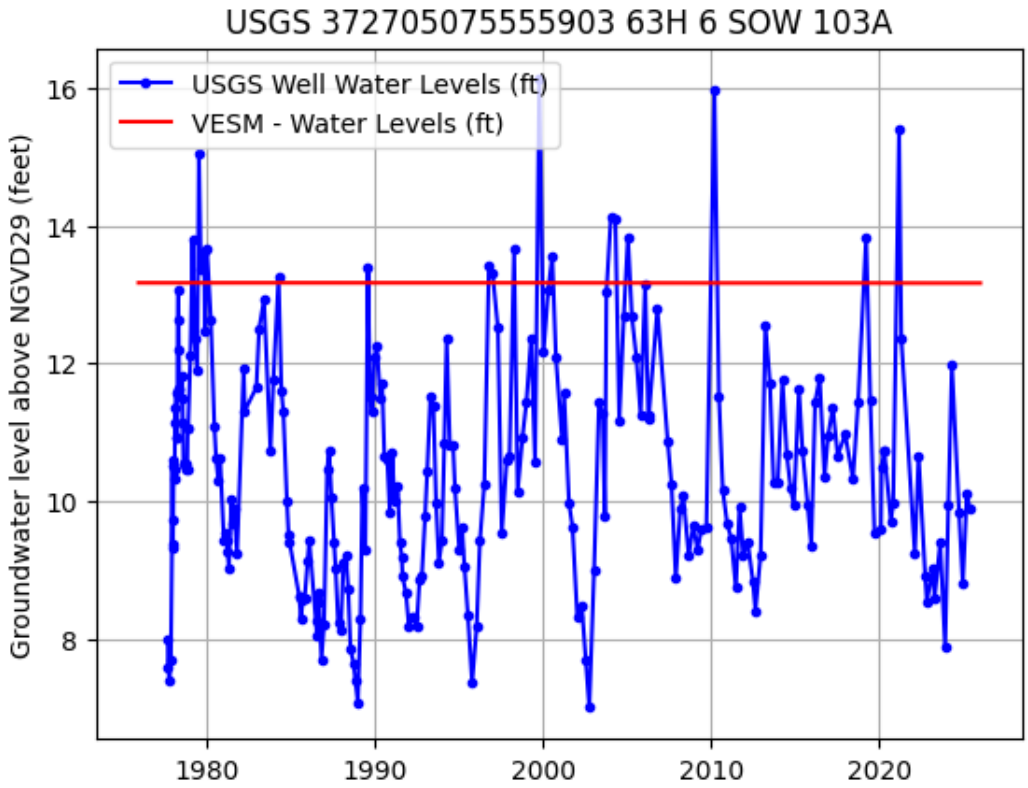


Figure 2. USGS Regional Observation Well 63H 6 SOW 103A, Columbia/Surficial aquifer water levels recorded from 1977 to present (well depth 37.0 ft bls, land surface 17.0 ft msl) and VAHydroGW-VESM reported use water levels.

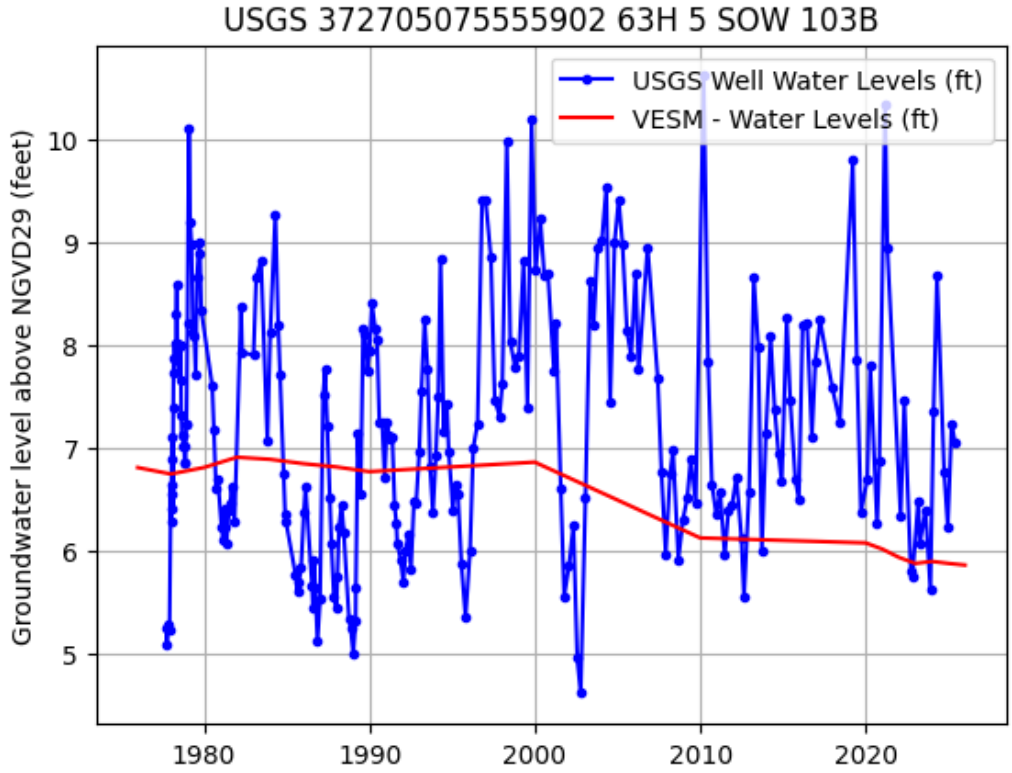


Figure 3. USGS Regional Observation Well 63H 5 SOW 103B, Upper Yorktown-Eastover aquifer water levels recorded from 1977 to present (well depth 132.0 ft bls, land surface 17.0 ft msl) and VAHydroGW-VESM reported use water levels.

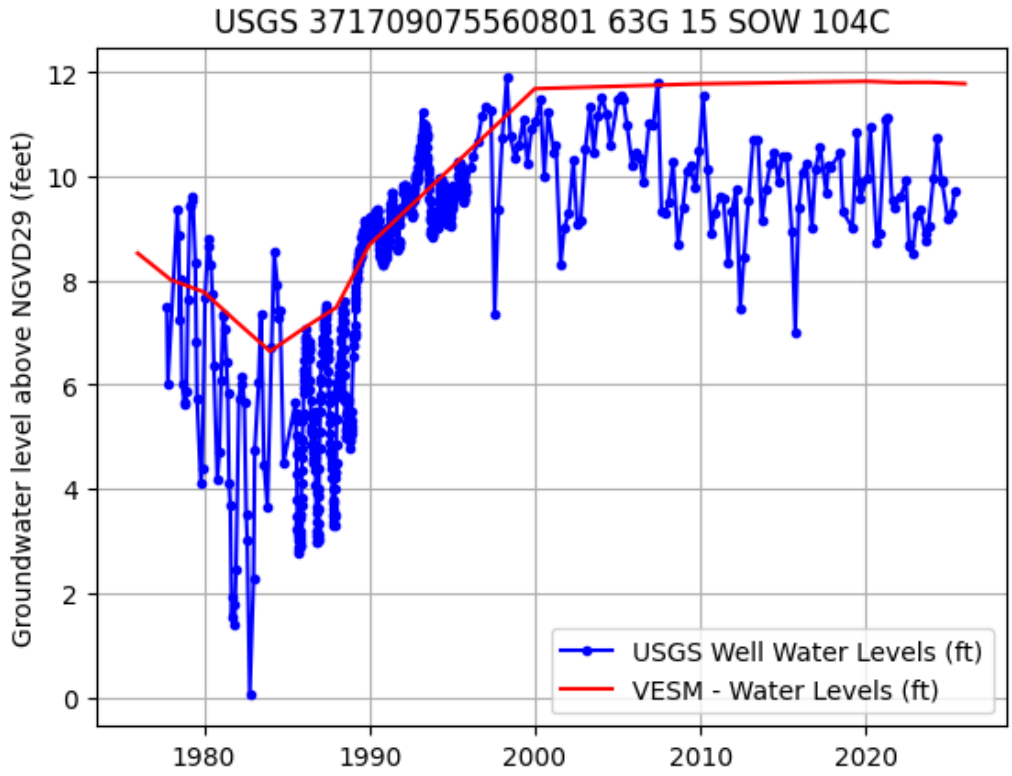


Figure 4. USGS Regional Observation Well 63G 15 SOW 104C, Lower Yorktown-Eastover aquifer water levels recorded from 1977 to present (well depth 310.0 ft bls, land surface 28.0 ft msl) and VAHydroGW-VESM reported use water levels.

Aquifer Test(s):
An aquifer test has already been completed at this location for the Lower Yorktown-Eastover aquifer. The aquifer test report is available upon request from DEQ.

The following table provides the average hydrogeologic properties assigned to the VAHydroGW-ES cells containing the applicant wells.

Virginia Eastern Shore Model Hydrogeologic Properties							
Aquifer	**Top Elevation (feet msl)**	**Top Elevation (feet bls)**	**Aquifer Thickness (feet)**	**Horizontal Conductivity (feet/day)**	**Vertical Conductivity (feet/day)**	**Specific Storage (1/feet)**	**Specific Yield**
Columbia	31	0	78	53	0.5	0.00001	0.15
Upper Yorktown-Eastover	-89	120	60	2	1.2	0.000004	N/A
Middle Yorktown-Eastover	-190	221	47	1	0.8	0.000004	N/A
Lower Yorktown-Eastover	-267	298	109	11	15.3	0.000004	N/A

Model Results

Evaluation of Withdrawal Impacts:
The VAHydroGW-ES model was used to simulate the effects resulting from the proposed withdrawal due to the multi-aquifer impacts for the Upper, Middle, and Lower Yorktown-Eastover aquifers. The stabilized effects resulting from the proposed withdrawal were simulated using an annual withdrawal rate of 32,071,400 gallons per year (87,809 average gpd), which was determined by dividing the 15-year value (481,071,000 gallons) by the term duration of 15 years. The stabilized effects were simulated by replacing the reported use amounts in the 2023 VAHydroGW-ES Reported Use Simulation with the current maximum annual withdrawal limit allowed under the terms of their permit for all Ground Water Management Area (GWMA) permit holders. That same simulation was executed twice, once with the proposed withdrawal removed (the *baseline simulation*), and once with the proposed withdrawal added (the *proposed withdrawal simulation*). The stabilized effects of the proposed withdrawal were considered by simulating both simulations for 50 years and observing the difference in water potentiometric levels at the end of the simulations.

The magnitude of the proposed withdrawal does not allow for assessment of the area of impact using VAHydroGW-ES for the Columbia aquifer. The aquifer parameters from the VAHydroGW-ES regional model were used to perform a two-dimensional analytical simulation to simulate drawdown due to the requested withdrawal for the Columbia aquifer for this technical evaluation. The impacts of the proposed withdrawal were calculated using the Neuman (1972) 2-D analytical simulation, which predicts the drawdown from a fully penetrating well in an unconfined aquifer. The two-dimensional analytical simulation was run for a period of 50 years to simulate the long-term effects of the withdrawal after reaching equilibrium. The following parameters were used for the 2-D analytical simulation for the Columbia aquifer:

Columbia 2D Model Input Parameters (source: VAHydroGW-ES regional model aquifer parameters for cell row 271, column 38):

Columbia Transmissivity	=	4,363.7 ft2/day
Columbia Storage Coefficient	=	8.2×10^{-4}
Columbia 1/B	=	7.21×10^{-5} ft-1
Columbia Specific Yield	=	1.5×10^{-1} ft-1

Withdrawal rate/Simulation Time = 50 years at 8,017,850 gallons per year.

Area of Impact:
The area of impact (AOI) for an aquifer is the area where the additional drawdown due to the proposed withdrawal exceeds one foot.

The results of the VAHydroGW-ES simulations, outlined in the preceding section, predict areas of impact in the Upper, Middle, and Lower Yorktown-Eastover aquifers. The AOIs extend a maximum distance of approximately 0.7, 0.4, and 0.6 miles from the production center for the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. These areas are shown in the accompanying maps at the end of this report. There are no existing permitted wells located within the applicant's AOIs.

The results from the Neuman analytical simulation for the Columbia aquifer, with the parameters listed above, predict an area of impact in the Columbia aquifer that extends approximately 3 feet from the pumping center for Well #2. An AOI map for the Columbia aquifer is included at the end of this report. There are no existing permitted wells within the Columbia AOI.

80 % Drawdown:
The 80% drawdown criterion was evaluated for all impacted, confined aquifers in the Virginia Eastern Shore using the VAHydroGW-ES *proposed withdrawal simulation*.

Section 9 VAC 25-610-110(D)(3)(h) of the Ground Water Withdrawal Regulations[6] states that proposed withdrawals in combination with all existing lawful withdrawals shall not lower water levels, in any **confined** aquifer below a point that represents 80% of the distance between the land surface and the top of the aquifer. Since the proposed withdrawal withdraws from the Columbia aquifer - a generally unconfined aquifer - the proposed withdrawal from the Columbia aquifer is not in violation of the 80% drawdown criteria.

The elevations of the top of the Upper, Middle, and Lower Yorktown-Eastover aquifers at the VAHydroGW-ES cell simulating the greatest drawdown (row 271, column 38) are -89, -190, and -267 feet msl, respectively. Based on the results of the *proposed withdrawal simulation*, the predicted potentiometric water levels at the same VAHydroGW-ES cell are 7.7, 9.6, and 4.8 feet msl for the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. The 80% drawdown criterion allows the potentiometric water level (based on the critical surface elevation calculated from the VAHydroGW-ES data) to be reduced to -64.2, -145.8, and -206.6 feet msl in the Upper, Middle, and Lower Yorktown-Eastover aquifers, respectively. Therefore, the water levels in the VAHydroGW-ES cells containing the applicant wells for each confined aquifer are not simulated to fall below the critical surface. Additionally, no new VAHydroGW-ES cells are simulated to have water levels fall below the critical surface. Therefore, this withdrawal is within the limits set by the 80% drawdown criterion.

Water Quality:
The EPA has established the National Secondary Drinking Water Regulations (NSDWRs) which are non-enforceable guidelines regulating contaminants that may cause cosmetic or aesthetic (such as taste, odor, or color) effects in drinking water. The EPA recommends the secondary standards to water systems – states may choose to adopt them as enforceable standards. The EPA NSDWRs specify the limit on chloride as 250 mg/L.

[6] Refer to http://www.deq.virginia.gov/gwpermitting/pdf/gwwithdrawal_regs.pdf, pg. 15

The VAHydroGW-ES was created "to help the Commonwealth and local water managers better plan water use and estimate future changes in water and salinity levels in response to changes in water use."[7] Use of the model to predict future chloride concentrations results in a "general useful understanding of system behavior, but water-resource managers must be careful in trusting the accuracy of predictions at individual wells from a regional model."[8] Further, chloride concentrations at individual wells, predicted using the regional model, should not be relied upon to predict actual concentrations at those locations.

The potential for adverse changes to water quality due to the requested withdrawal was evaluated using transient, density-dependent, SEAWAT simulations using the VAHydroGW-ES. Two simulations were executed – one simulation without the proposed withdrawal included and a second with the proposed withdrawal included. Both simulations were executed for 50 years. Both used the 2024 total permitted stresses, concentrations, and heads as starting conditions. In an effort to simulate the long-term effects on water quality due to the proposed withdrawal, the total annual amount of 32,071,400 gallons per year (87,809 average gpd) was used for the duration of the second simulation. The two simulations were compared to evaluate the potential for adverse changes to water quality. The results indicated that there was one cell in the Upper Yorktown-Eastover Confining Unit which simulates an increase in chloride concentrations greater than 100 mg/L due to the proposed withdrawal. In addition, there was one cell in the Middle Yorktown-Eastover Aquifer and 3 cells in the Lower Yorktown-Eastover Aquifer which simulate an increase in chloride concentrations greater than 50 mg/L due to the proposed withdrawal (see figures at the end of this report). <u>As a result, the VAHydroGW-ES model results establish a very slight potential for adverse changes to water quality as a result of the proposed withdrawal.</u>

The first year when simulated chloride concentration increase is 50 mg/L or more within each AOI is shown in the following table.

Aquifer	First year when simulated concentration increase is 50 mg/L or greater within AOI
Upper Yorktown-Eastover Aquifer	N/A
Middle Yorktown-Eastover Aquifer	2044
Lower Yorktown-Eastover Aquifer	2069

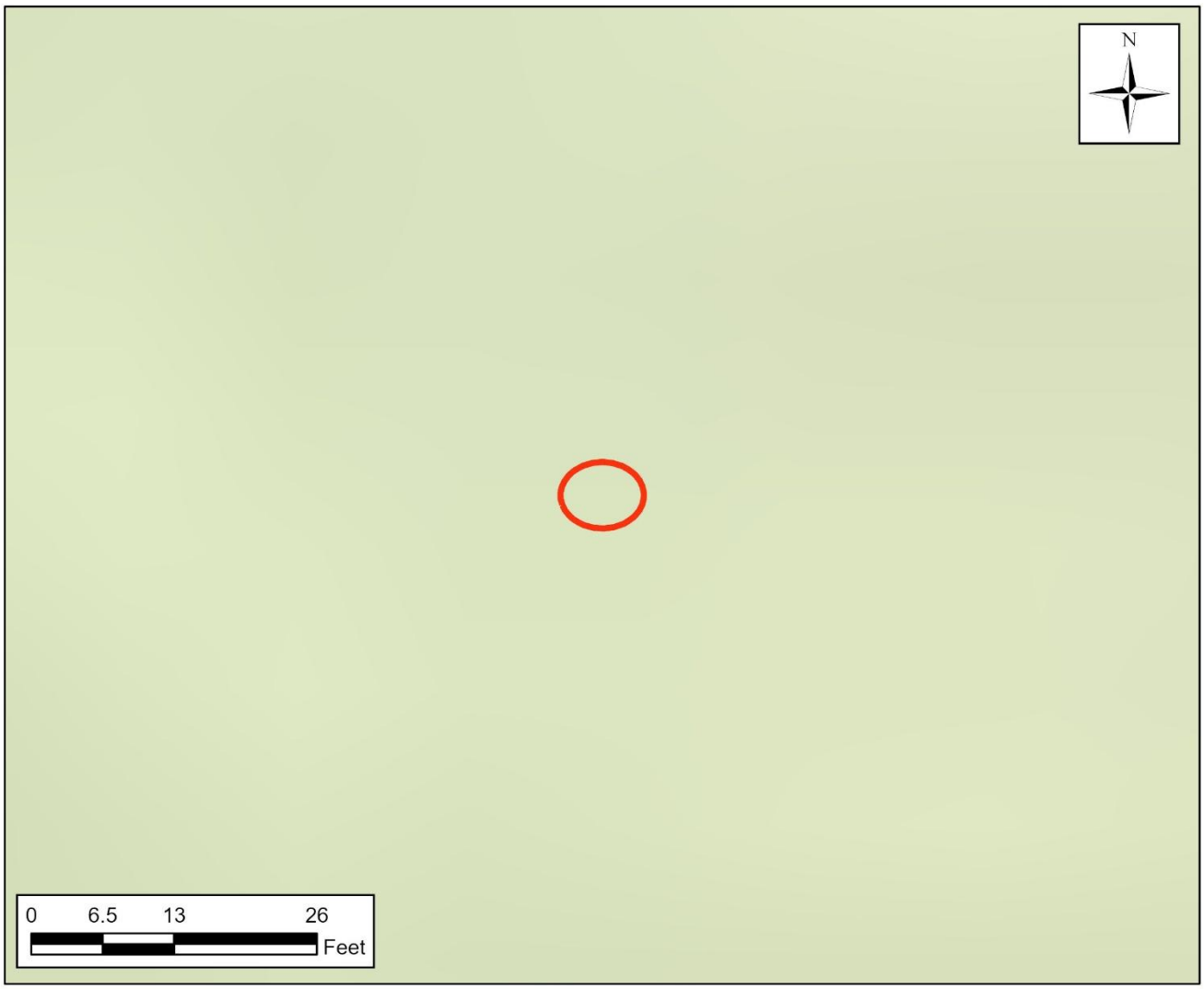
Upconing:
The reversal of vertical flow between two confined aquifers so that the underlying aquifer begins to flow upward into the layer above is called upconing. Upconing is predicted when the modeled head in the upper layer drops below the head in the lower layer directly beneath the referenced head. Upconing has the potential to degrade water quality when the contributing area of the lower aquifer is of a poorer quality than that in the receiving aquifer. The predicted water level in the Upper Yorktown-Eastover aquifer for the VAHydroGW-ES cell simulating the maximum drawdown is simulated to fall below the simulated water level for the Middle Yorktown-Eastover aquifer. This indicates, based upon VAHydroGW-ES results, the potential for upconing of the potentially more brackish Middle Yorktown-Eastover waters into the overlying Upper Yorktown-Eastover source aquifer. Consequently, the model results do establish a potential for adverse changes to water quality due to an influx of more saline waters in the general vicinity of the withdrawal as a result of the proposed pumping.

[7] Sanford, W.E., Pope, J.P., and Nelms, D.L., 2009, Simulation of groundwater-level and salinity changes in the Eastern Shore, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5066, 125 p.
[8] Sanford, W.E. and Pope, J.P., 2009, Current challenges using models to forecast seawater intrusion: lessons from the Eastern Shore of Virginia, USA. Hydrogeology Journal (2009), Volume: 18, Issue: 1, p: 73-93

Conclusion:

The withdrawal requested by Ray Newman for Highway Farm satisfies the technical evaluation criteria for permit issuance. The AOIs for the Columbia, Upper, Middle, and Lower Yorktown-Eastover aquifers are shown in the following maps. Modeling results do establish a very slight potential for adverse changes to water quality due to simulated chloride concentration increases as a result of the proposed pumping. Additionally, the VAHydroGW-ES model results establish potential for upconing of the potentially more saline waters of the Middle Yorktown-Eastover aquifer into the Upper Yorktown-Eastover aquifer.

Highway Farm
Area of Impact - Columbia Aquifer



Columbia Area of Impact

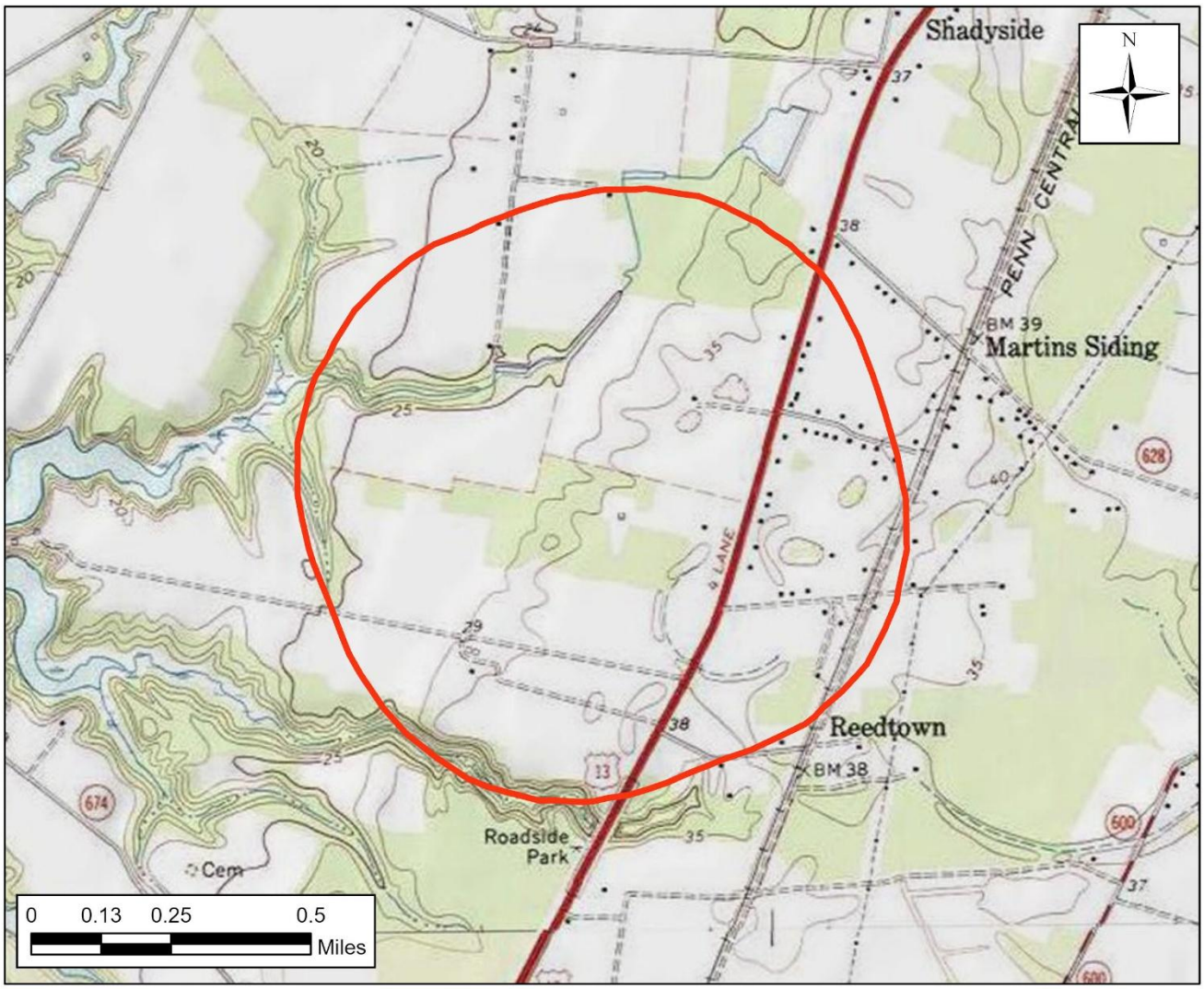
Simulated drawdown at or exceeding one foot in the Columbia aquifer resulting from a two-dimensional Neuman simulation of 50 years at 8,017,850 gallons per year from the Columbia aquifer.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 3 feet from the pumping center of Well #2.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
August 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm
Area of Impact - Upper Yorktown-Eastover Aquifer



Upper Yorktown-Eastover Area of Impact

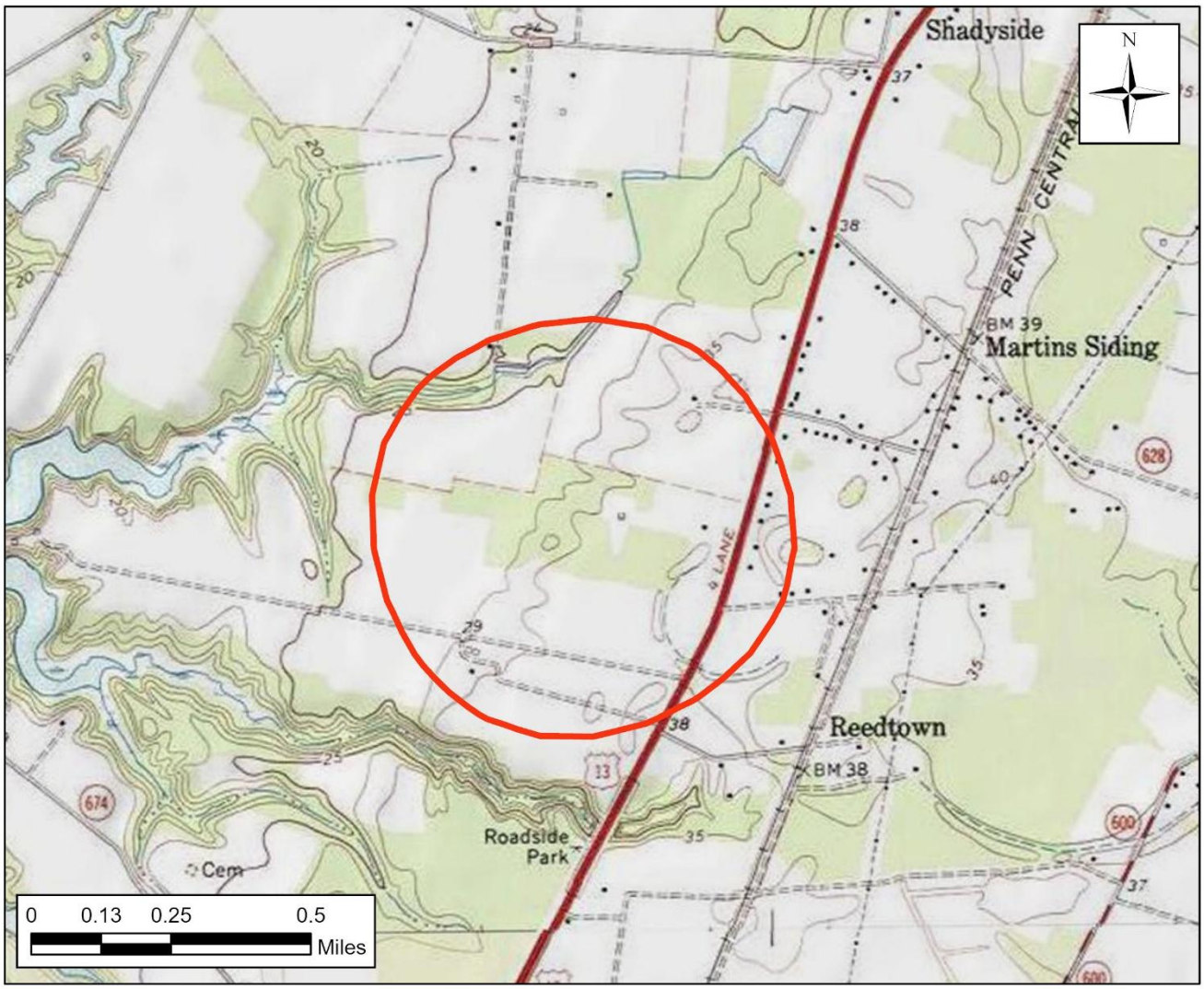
Simulated drawdown at or exceeding one foot in the Upper Yorktown Eastover (UYE) aquifer resulting from a 32,071,400 gpy, 50 year withdrawal from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.7 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm
Area of Impact - Middle Yorktown-Eastover Aquifer



Middle Yorktown-Eastover Area of Impact

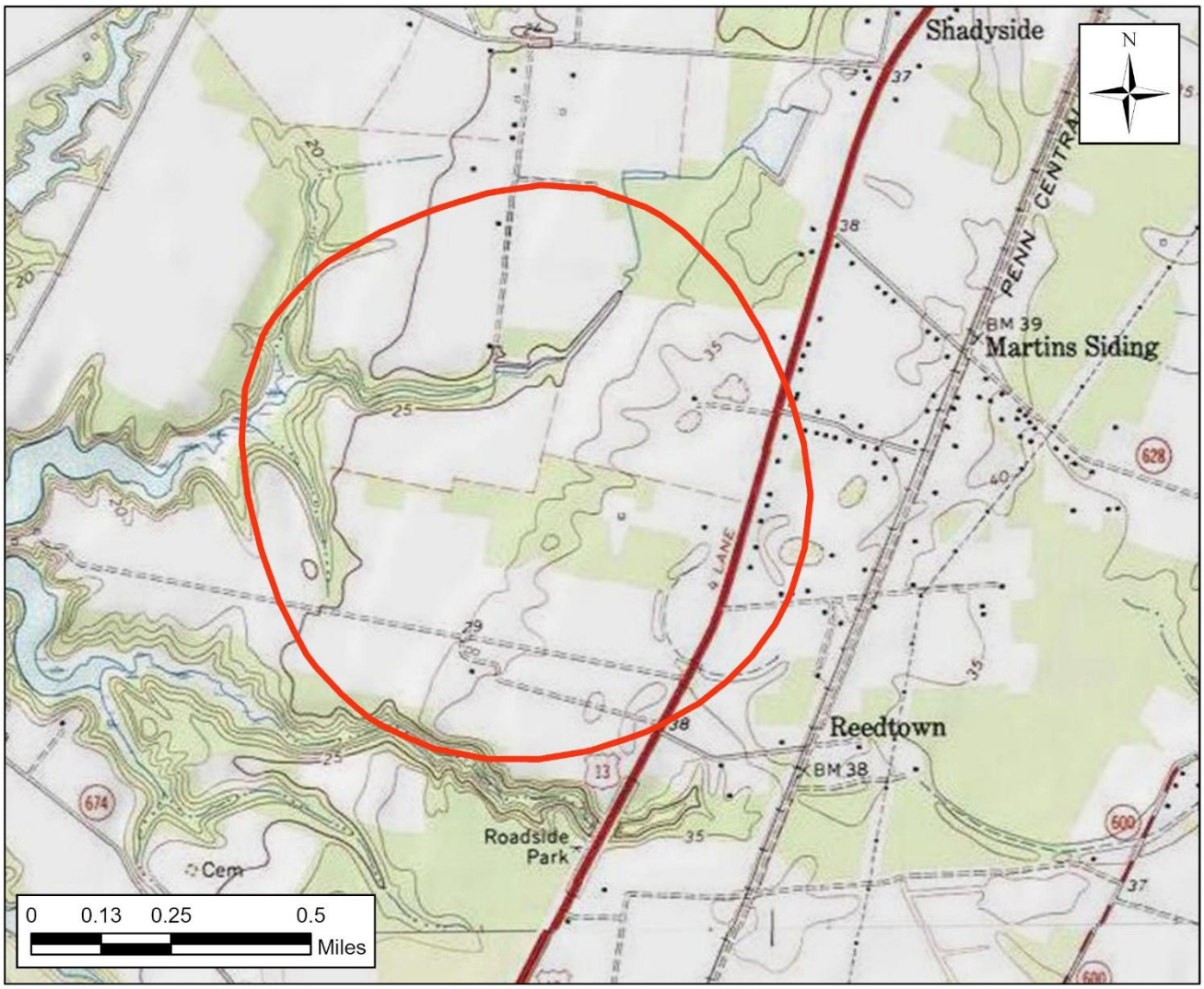
Simulated drawdown at or exceeding one foot in the Middle Yorktown Eastover (MYE) aquifer resulting from a 32,071,400 gpy, 50 year withdrawal from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.4 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm
Area of Impact - Lower Yorktown-Eastover Aquifer



Lower Yorktown-Eastover Area of Impact

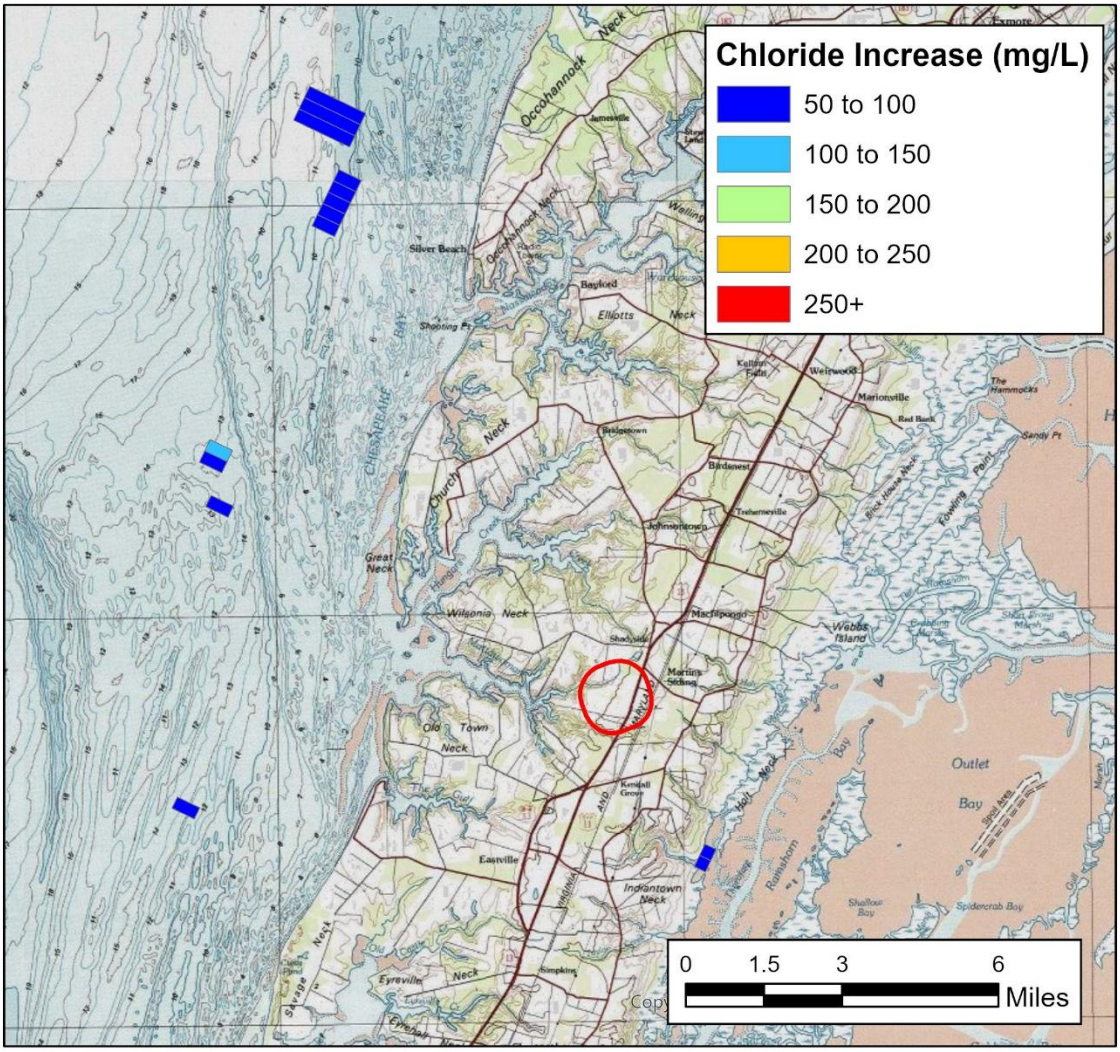
Simulated drawdown at or exceeding one foot in the Lower Yorktown Eastover (LYE) aquifer resulting from a 32,071,400 gpy, 50 year withdrawal from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.6 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm - Upper Yorktown-Eastover Confining Unit - Simulated VESM Chloride Concentration Increase



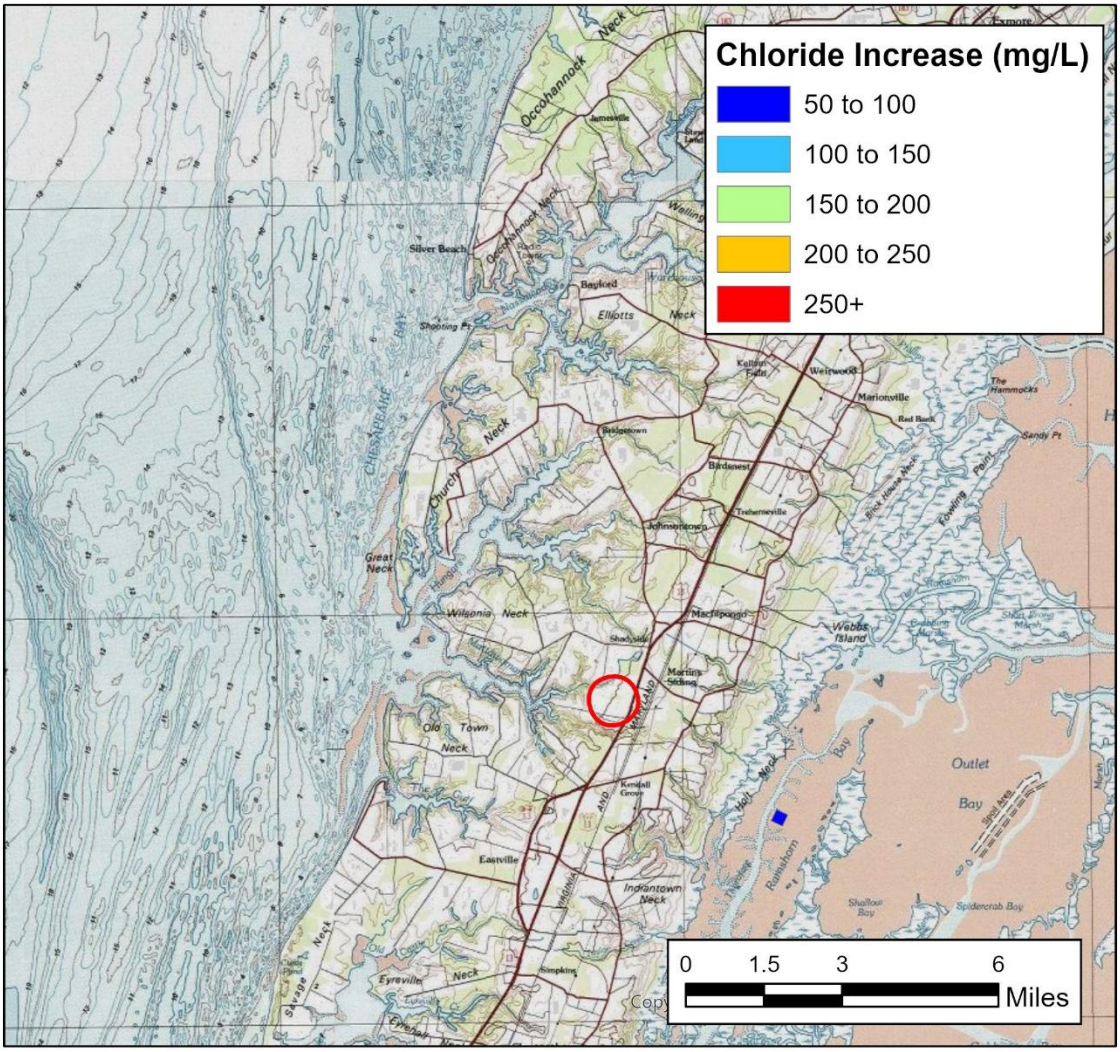
UYE AOI

Simulated chloride concentration increase in the Upper Yorktown-Eastover confining unit resulting from a 50-year simulation of 32,071,400 gallons per year from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers.

Technical Evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm - Middle Yorktown-Eastover Aquifer - Simulated VESM Chloride Concentration Increase



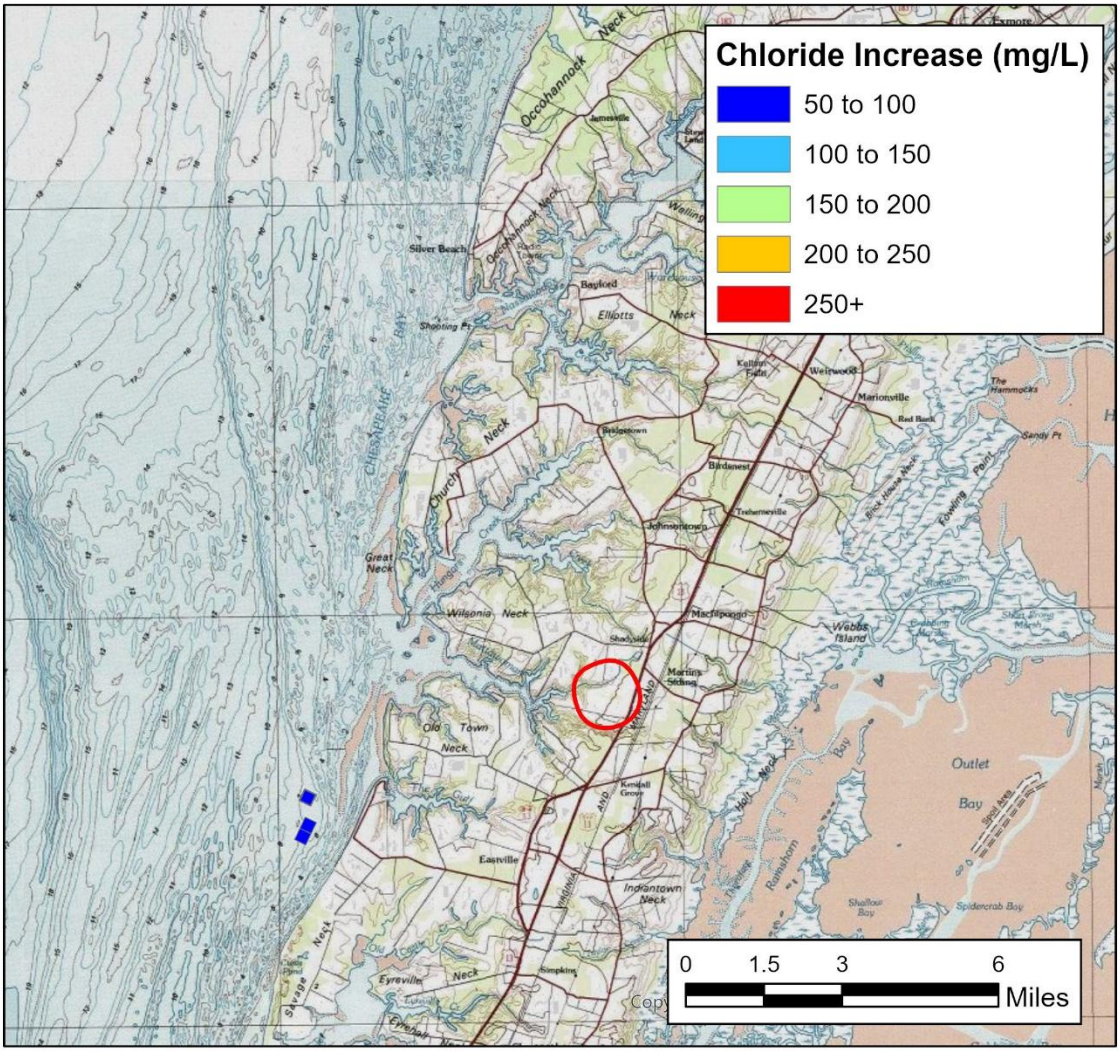
MYE AOI

Simulated chloride concentration increase in the Middle Yorktown-Eastover aquifer resulting from a 50-year simulation of 32,071,400 gallons per year from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers.

Technical Evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm - Lower Yorktown-Eastover Aquifer - Simulated VESM Chloride Concentration Increase

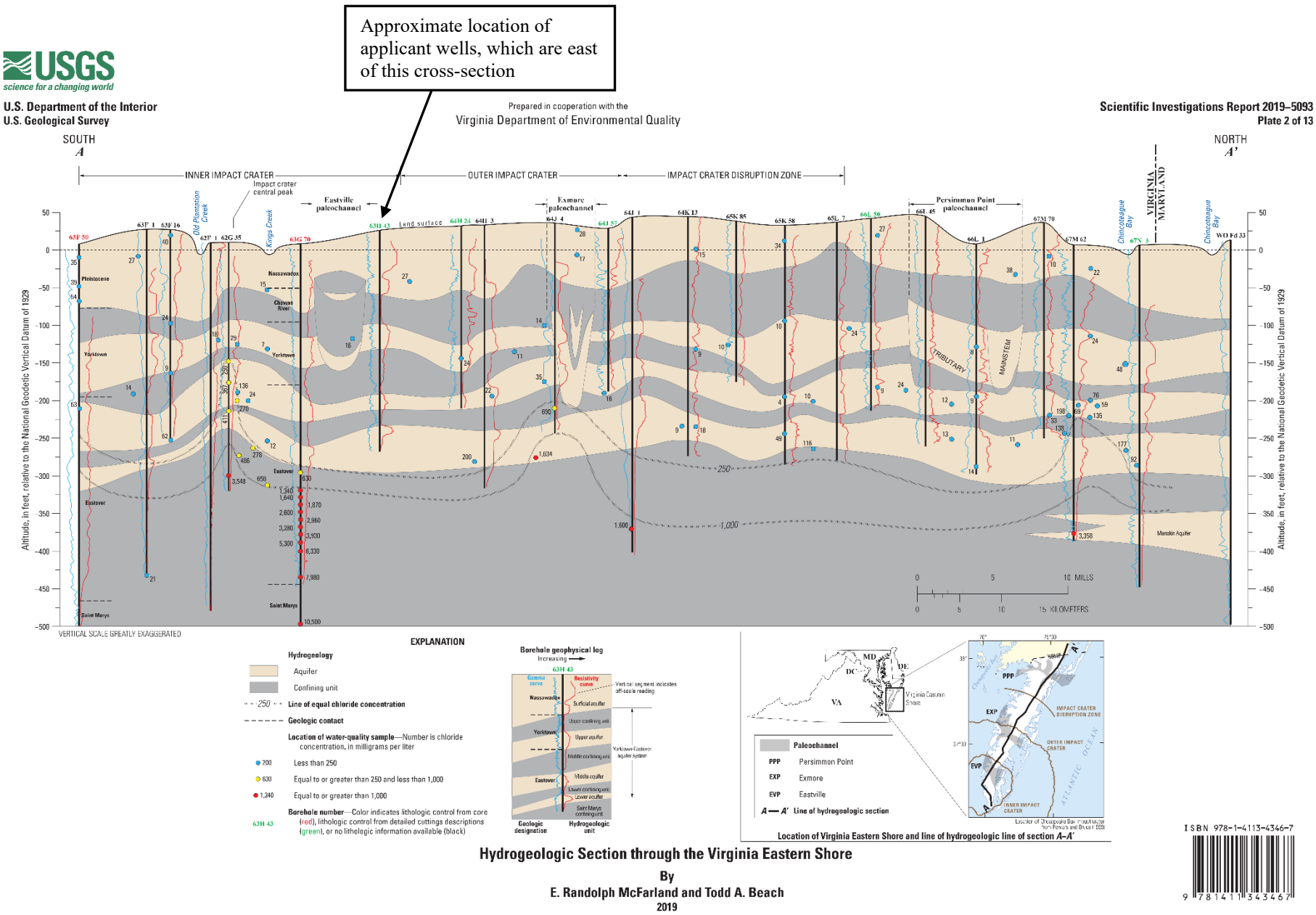


LYE AOI

Simulated chloride concentration increase in the Lower Yorktown-Eastover aquifer resulting from a 50-year simulation of 32,071,400 gallons per year from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers.

Technical Evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY



Cross-Section A-A' from USGS Scientific Investigations Report 2019-5093 (2019).

Section 13. Groundwater Conservation and Management Plan

Kuzzen's Highway Farm
Machipongo, Northampton County Virginia
Tax Map IDs: 48-A-34; 48-A-32; 48-A-33
GWI000291

March 2025

1) Table of Contents

INTRODUCTION: GENERAL OVERVIEW AND SYSTEM INFORMATION

The Highway Farm, herein referred to as the "Farm", is an agricultural Farm used to grow tomatoes and house labor. This Farm is located within the town of Machipongo, Northampton County Virginia. The Farm utilizes drip irrigation.

Typical consumption at the Farm requires varying amounts of groundwater from its four-well system located on the Farm property. This Farm is located within Virginia's Eastern Shore Groundwater Management Area – as defined by the Virginia Department of Environmental Quality [VDEQ] – a Water Conservation and Management Plan has been prepared in accordance with the Groundwater Management Act of 1992, Chapter 25 (§62.1-254 et seq.) of Title 62.1 of the Code of Virginia. The purpose of this document is to analyze water supply and demand issues facing the Farm and develop a reasoned and justifiable response for water conservation and management. This document is intended to help guide the Facilities' management, who are responsible for the operation and policy management decisions of the potable water facilities. Lastly, this document will meet the Groundwater Withdrawal Permit requirement for a water conservation and management plan.

As there are no other municipal supply pipelines located within several miles of the facilities property boundaries, irrigation and potable water is directly withdrawn and distributed at the Farm. Due to the nature of the facility, the majority of groundwater used at the farm is used to refill the on-site pond and with pond water is then withdrawn for irrigation.

Water withdrawal data was assessed, and no patterns had emerged suggesting that the water usage at the Farm is evenly distributed. The withdrawal is seasonal in nature with heavier use in the summer and lesser use in the winter.

1.0 WATER SAVINGS EQUIPMENT AND PROCESSES

To ensure the most efficient use of groundwater and decrease water demand, this plan requires the use of water-saving equipment, procedures, and improvements wherever practical. As a Farm, there are no residents who could have their water use regulated through ordinances, as would be the case in a town or city.

The Farm will be subject to the following:

Staff will be required to install fixtures per The Uniform Statewide Building Code 13VAC5-63 when renovating or installing new plumbing within the Farm.

The pond overflow will be equipped to ensure that it is not overfilled by groundwater.

The well cut-offs will remain locked in the “off” position while the Farm is not in operation. The Farm Manager will have the only set of keys.

The tomato crops are automatically irrigated on a schedule set daily by the Farm Manager utilizing Motorola ICC software that integrates data from electronic soil moisture probes, weather data, and plant stages. To ensure that no overwatering or underwatering occurs the irrigation system is operated remotely by computer, using telemetric valves and timers.

Stormwater will be allowed to naturally flow into the on-site pond in order to capture runoff for use in crop irrigation.

2.0 *WATER LOSS REDUCTION PROGRAM*

The following revised Water Loss Reduction Plan will be implemented by the Farm upon issuance of the new Groundwater Withdrawal Permit (GW0070600).

1) The production well meters will be read once a month by a consultant and the withdrawal amounts evaluated monthly within the first 10 days of the following month to ensure withdrawals are reasonable and within expectations for the permit and seasonal use. The consultant maintains an electronic database of these readings to allow for immediate identification of unusual water use amounts. Variations more than twice the historical monthly average will be reported to the owner within the first 10 days of the month following each meter reading. Operations staff will attempt to correlate any significant variations to changes in system operation and other events that may have occurred during the month.

2) In order to ensure the accuracy of the production meters, accuracy testing for all well meters will occur once per permit term (every 15 years). Should any meter accuracy report show greater than +/-10% inaccuracy, that meter will be replaced. These reports will be kept on file by the operator for the duration of the permit term. More frequent well meter verification may be undertaken if the annual audit or unusual monthly data indicate that there may be an issue. Water meters on-site were last factory tested before installation.

3) Water lines are walked once per month by Farm staff while the Farm is in production to check for obvious signs of leaks. Pump stations are checked daily for leaks by the Farm Manager. Any leaks or relevant circumstances will be recorded on the Leak Detection & Repair (LDR) Report, including photographs if available. Should a leak occur, the size of the leak and where it is located will dictate the course of action taken to move towards repair, but in all cases, attempts will be made to bypass the leak as soon as possible in order to avoid further loss of water.

Larger leaks will make their location known by the sheer volume of water present. Smaller leaks may be identified by the annual water audits. When a major leak is located, The Farm Manager will assess if the leak can be fixed by Farm Staff. If the assessment determines that the leak can be fixed by the Farm itself, the leak will be fixed within 48 hours.

If a leak is suspected, or cannot be fixed by the Farm staff, the following companies can be contacted to investigate, locate and/or fix the leak, which will be repaired within 7 days of the suspicion:

a. Bundick Well and Pump Co. – 35162 Lankford Hwy, Painter VA 23420 - 757-442-5555
b. Boggs Water and Sewage – 28367 Railroad Ave, Melfa, VA, 23410 - 757-787-4000
c. Somerset Well Drilling Co. Inc. – 30170 Ritzel Rd. Westover, MD 21871 – 410-651-3721

4) LDR report will be completed once per season, being updated throughout the season to indicate any changes or unusual circumstances. Attached to this plan (see Appendix A) is an example Leak Detection and Repair (LDR) Report which will be used to implement the leak detection and repair program and it will be used to inform the annual groundwater audit. This reporting form is only an

example template and can be added to in order to suit the permittee's needs for documentation. Additional details regarding the LDR are as follows:

a) The LDR Report will be filled out once per season by the Farm Manager or consultant and this report will include, but not be limited to, the well water used during the months assessed compared to the same month during previous years, seasonal changes, events etc., leak inspection/detection, leak repair schedules, relevant photographs, water use area/device inspections and any high volume water consumption reported by the Farm.

b) This plan will act as a scheduling tool and report form for the Farm to refer to in order to properly document leaks and have them repaired in a timely fashion. This tool will be formally filed each season but will be updated as leaks and repairs occur. The inspection report may comment on the previous report's findings and set dates, deadlines and schedules for repairing leaks. Following leak repair, the latest report will be updated to indicate the repair.

5) A groundwater audit will be conducted annually by owner's consultant during the month of permit issuance to evaluate the prior year. Generally, this will consist of the comparison of the groundwater withdrawn over time and compared with the crops grown, fumigation events, population served etc.

The annual audit will provide a review of the following:

a) The Production well meter data.
b) Comparison of current use to prior use.
c) Review of seasonal/climatological fluctuations and potential impact on water use.
d) Crops grown versus water use.
e) Estimation of system water loss and corrective actions needed.

3.0 WATER USE EDUCATION PROGRAMS

Paper notices will be dispatched annually at the start of the summer season, notifying employees and staff that use water that the Facilities' wells are located within Virginia's Eastern Shore Ground Water Management Area. This notice will explain the obligation the Farm has to obtain and preserve a groundwater withdrawal permit with the Virginia Department of Environmental Quality. These notices will also include highlights on how each individual can assist in water conservation efforts at the Farm and implementing water reductions and restrictions (detailed in Section 5 below), the water loss reduction program detailed herein, and the local water supply plan that governs water use during normal and drought conditions.

Farm personnel that deal with the operation and monitoring of the system will be required to review this Plan annually.

4.0 EVALUATION OF POTENTIAL WATER REUSE OPTIONS

No water used at this Farm can be reused or recycled because it is either pumped into a pond and then used to irrigate crops or is mixed with pesticide and sprayed on the fields/plants.

5.0 WATER USE REDUCTIONS, RESTRICTIONS & PENALTIES FOR NON-COMPLIANCE DURING DROUGHT OR WATER USE EMERGENCIES

Mandatory water use restrictions will be implemented during water shortage emergencies declared by the local governing body, the Director of DEQ, or the Governor. Depending on the Stage of Drought, Non-essential uses of water will be restricted, water use reduced, and penalties will be put in place for non-compliance. Farm personnel will be subject to all of the following requirements as well. The Farm will comply with penalties for demonstrated failure to comply with mandatory water use restrictions.

According to the Northampton County Water Supply Plan, drought stages are identified by Drought Response and Contingency Plan (DRCP) stages. There are 4 stages: (Stage I) Normal Conditions, (Stage II) Drought Watch, (Stage III) Drought Warning and (Stage IV) Drought Emergency. Stage I places no mandatory restrictions on water users. The three latter stages place restrictions on non-essential water uses by public water supply systems. Given that the Farm is not a public water supply, the Farm will not be required to comply with all restrictions outlined in the Northampton County Water Supply Plan if and when a drought stage is declared. The relevant portion of the Northampton County Water Supply Plan is attached. The Farm will take the following actions or place the following reductions or restrictions on all consumers when particular stages of drought are declared as follows:

Stage II Drought Watch:

The Farm will review existing drought water conservation and contingency plans.

The Farm will make reasonable efforts to pursue leak detection and repair programs.

The Farm will encourage the following water use reductions as a result of a Stage II Drought Warning. All employees will be notified following the declaration of a Stage II Drought Watch and any subsequent increase in these stages. This notification will include encouragement of the voluntary reduction or elimination of non-essential water uses. According to the Northampton County Water Supply Plan, “Voluntary water conservation activities are identified with the goal of reducing water use by 5-10%”. The Farm Manager will voluntarily attempt to reduce water use by 5% during a Stage II Drought Watch. However, because all water use at the facility is essential for crop production, there are no practical operational procedures can be employed on the farm to reduce water use without impacting crop production.

Stage III Drought Warning:

The Farm Manager will voluntarily attempt to reduce water use by 10% during a Stage III Drought Warning. However, because all water use at the facility is essential for crop production, there are no practical operational procedures can be employed on the farm to reduce water use without impacting crop production. Any person found to have violated any of the Stage III provisions shall be warned in writing of their specific transgressions of this plan.

Stage IV Drought Emergency:

In addition to the items described above, all relevant items from Section 7.4.4 of the attached Northampton County WSP will also be enforced. Any person found to have violated any of the Stage IV provisions or provisions of Section 7.4.4 of the WSP shall be warned in writing of their specific transgressions of this plan. A second violation of these provisions within a given year would be grounds for consideration of termination of employment.

CONCLUSION

This concludes the Water Conservation and Management Plan for Highway Farm, all requirements are addressed in the sections above.

MITIGATION PLAN

DEQ GROUNDWATER WITHDRAWAL PERMIT NO. GWI000291

OWNER NAME: Ray Newman

FACILITY NAME: Highway Farm

LOCATION: Tax Parcel IDs: {48-A-34; 48-A-32; 48-A-33} Machipongo, VA 23405

INTRODUCTION

On February 26, 2025, Ray Newman submitted a Groundwater Withdrawal Permit Application to the Virginia Department of Environmental Quality (DEQ) to withdraw groundwater. Groundwater withdrawals associated with this permit will be utilized to fill an on-site irrigation pond to be used for crop irrigation, dilute substances for spray application on the associated farms, and to wash farm equipment.

The purpose of this Mitigation Plan is to provide existing groundwater users a method to resolve claims that may arise due to the impact of the withdrawal from Highway Farm well field. Predicted drawdown of water levels due to the withdrawal from the Upper and Lower Yorktown Eastover and Columbia aquifers is shown in the attached maps(s).

Modeled impacts, as shown on the attached maps, extend beyond the boundary of the Highway Farm facility. Due to these findings, Ray Newman recognizes that there will be a rebuttable presumption that water level declines that cause adverse impacts to existing groundwater users within the area of impact are due to this withdrawal. Claims may be made by groundwater users outside this area; however, there is a rebuttable presumption that Ray Newman / Highway Farm has not caused the adverse impact. Ray Newman proposes this plan to mitigate impacts to existing users and excludes impacts to wells constructed after the effective date of this permit.

CLAIMANT REQUIREMENTS

To initiate a claim, the claimant must provide written notification of the claim to the following address:

Contact Name:	Aarin Nottingham
Title:	Farm Manager
Permittee Name:	Ray Newman
Address:	3769 Grapeland Circle
City, State Zip Code	Exmore, VA 23350

The claim must include the following information: (a) a deed or other available evidence that the claimant is the owner of the well and the well was constructed and operated prior to the effective date of the permit; (b) all available information related to well construction, water levels, historic yield, water quality, and the exact location of the well sufficient to allow Ray Newman to locate the well on the claimant's property; (c) the reasons the claimant believes that the Highway Farm withdrawal has caused an adverse impact on the claimants well(s).

CLAIM RESOLUTION

Ray Newman will review any claim within **five (5) business days**. If Ray Newman determines that no rebuttal will be made and accepts the claim as valid, Ray Newman will so notify the claimant and will implement mitigation within **thirty (30) business days**. If the claim is not accepted as valid, Ray Newman will notify the claimant that (a) the claim is denied **or** (b) that additional documentation from the claimant is required in order to evaluate the claim. Within **fifteen (15) business days** of receiving additional documentation from the claimant, Ray Newman will notify the claimant (a) that Ray Newman agrees to mitigate adverse impacts or (b) the claim is denied. If the claim is denied, the claimant will be notified that the claimant may request the claim be evaluated by a three (3) member committee. This committee will consist of one (1) representative selected by Ray Newman, one (1) representative selected by the claimant, and one (1) representative mutually agreed upon by the claimant and Ray Newman.

Any claimant requesting that a claim be evaluated by the committee should provide the name and address of their representative to Ray Newman. Within **five (5) business days** of receipt of such notification, Ray Newman will notify the claimant and claimant's representative of the identity of Ray Newman representative and instruct the representatives to select a third representative within **ten (10) business days**. Representatives should be a professional engineer or hydrogeologist with experience in the field of groundwater hydrology. Ray Newman agrees to reimburse the members of the committee for reasonable time spent, at a rate prevailing in the area for experts in the above listed fields, and for direct costs incurred in administering the plan. The claimant may, at his or her option, choose to provide the reimbursement for the member of the committee selected by the claimant and up to half of the reimbursement for the mutual representative.

Within **ten (10) business days** of selection of the third representative, the committee will establish a **reasonable deadline** for submission of all documentation it needs to evaluate the claim. Both the claimant and Ray Newman will abide by this deadline.

Within **fifteen (15) business days** of receipt of documentation, the committee will evaluate the claim and reach a decision by majority vote. The committee will notify the claimant regarding its decision to (a) deny or (b) approve the claim. If the claim is approved, Ray Newman will mitigate the adverse impacts within **thirty (30) business days** of making the decision or as soon as practical. If the claim is denied by the committee, Ray Newman may seek

reimbursement from the claimant for the claimant's committee representative and one half of the 3rd representative on the committee.

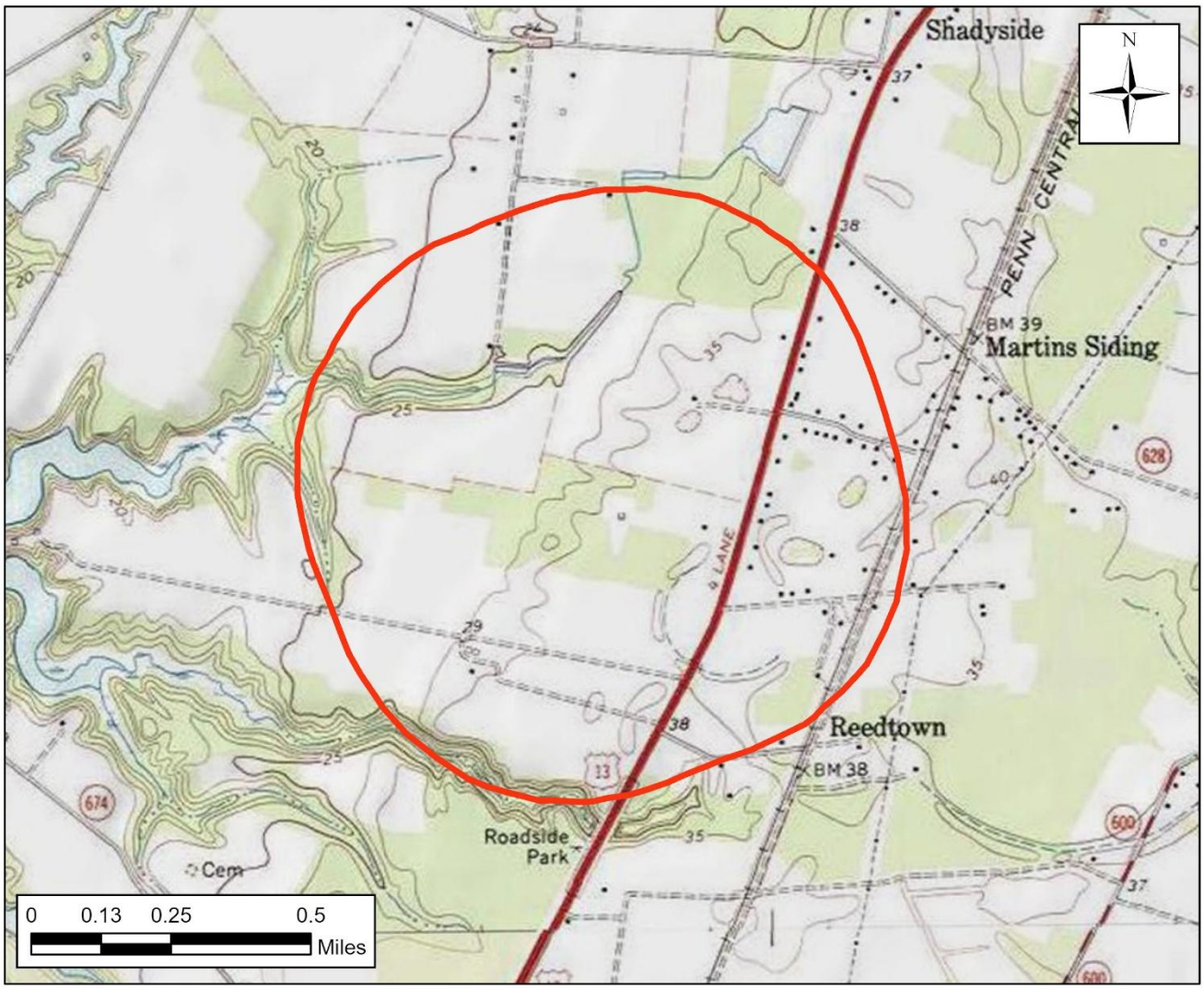
If a claimant within the indicated area of impact indicates that they are out of water, Ray Newman will accept the responsibility of providing water for human consumptive needs within **seventy-two (72) hours** and to cover the claim review period. Ray Newman reserves the right to recover the cost of such emergency supply if the claim is denied by Ray Newman or found to be fraudulent or frivolous. If Ray Newman denies a claim and the claimant elects to proceed with the three (3) member committee, Ray Newman will continue the emergency water supply at the claimants request during the committee's deliberations, but reserves the right to recover the total costs of emergency water supply in the case that the committee upholds the denial of the claim. Similarly, Ray Newman reserves the right to recover costs associated with the claim process if a claim is found to be fraudulent or frivolous.

If it is determined by the committee or shown to the committee's satisfaction that a well operating under a mitigation plan similar to Ray Newman / Highway Farm Plan other than those owned and operated by Ray Newman has contributed to the claimed adverse impact, Ray Newman share of the costs associated with mitigation will be allocated in proportion to its share of the impact. Such a determination shall be made by the committee after notification of the third party well owner, giving the third party well owner opportunity to participate in the proceedings of the committee.

PLAN ADMINISTRATION

Nothing in the Plan shall be construed to prevent the Department of Environmental Quality Staff from providing information needed for resolution of claims by the committee.

Highway Farm
Area of Impact - Upper Yorktown-Eastover Aquifer



Upper Yorktown-Eastover Area of Impact

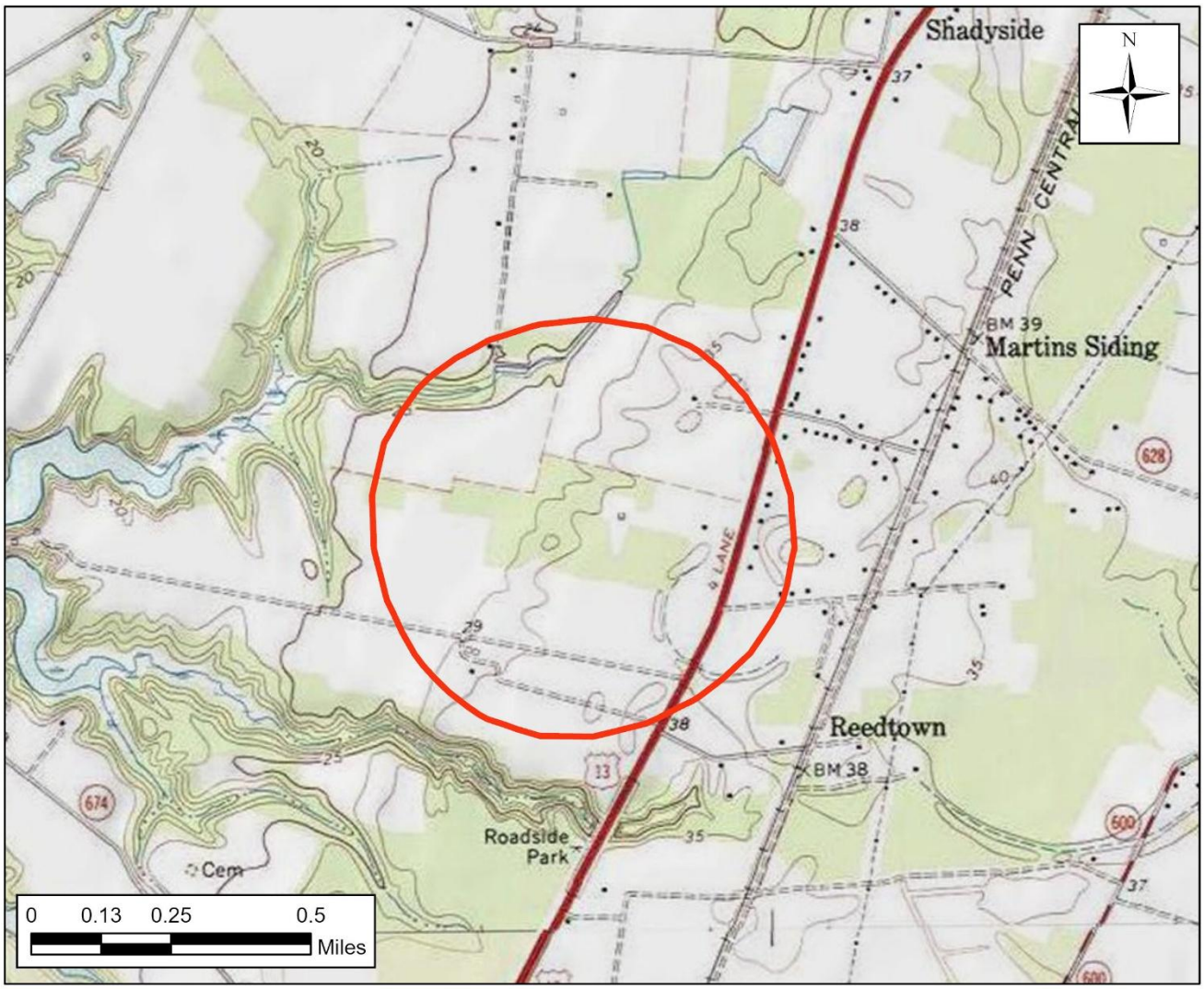
Simulated drawdown at or exceeding one foot in the Upper Yorktown Eastover (UYE) aquifer resulting from a 32,071,400 gpy, 50 year withdrawal from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.7 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm
Area of Impact - Middle Yorktown-Eastover Aquifer



Middle Yorktown-Eastover Area of Impact

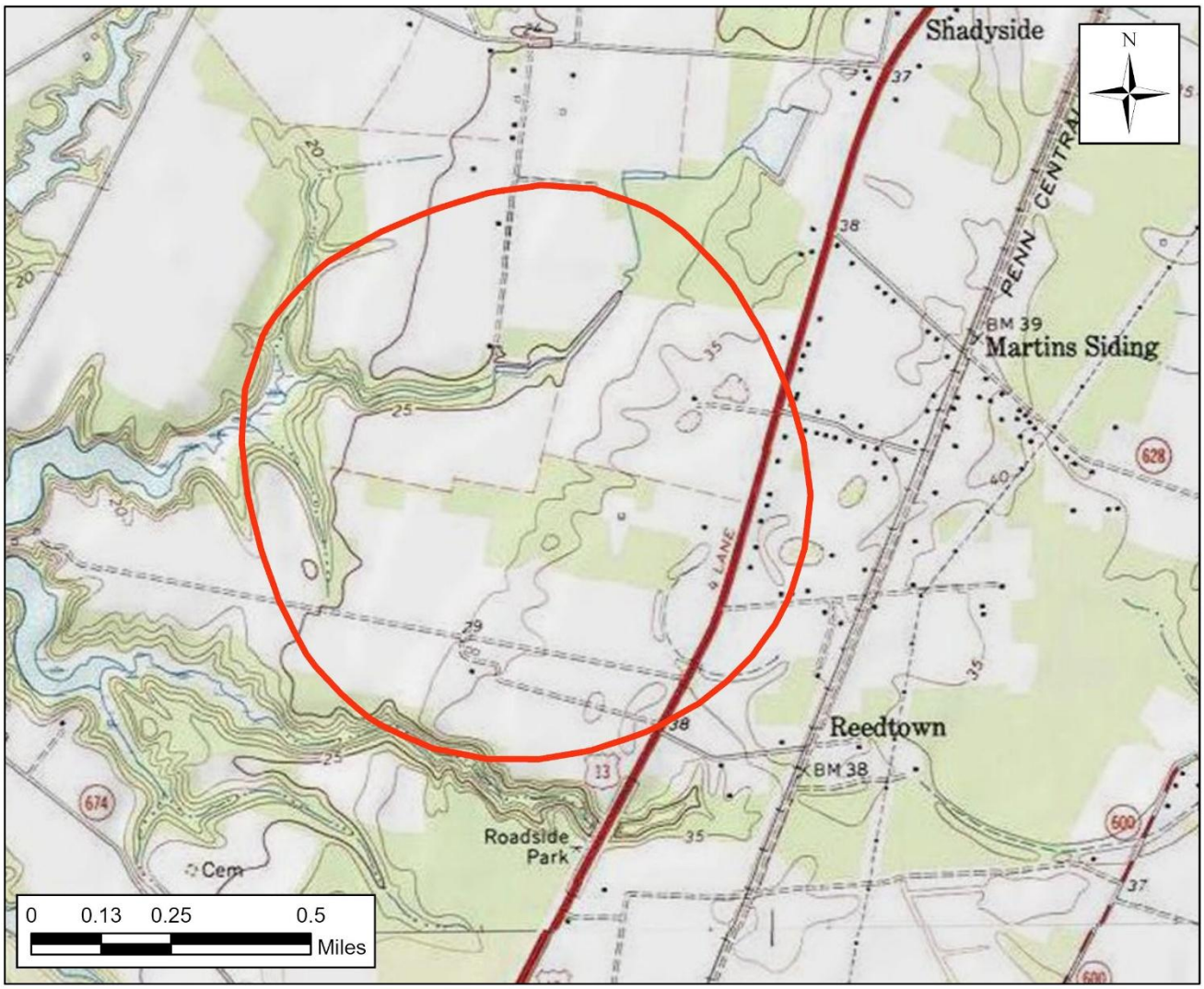
Simulated drawdown at or exceeding one foot in the Middle Yorktown Eastover (MYE) aquifer resulting from a 32,071,400 gpy, 50 year withdrawal from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.4 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Highway Farm
Area of Impact - Lower Yorktown-Eastover Aquifer



Lower Yorktown-Eastover Area of Impact

Simulated drawdown at or exceeding one foot in the Lower Yorktown Eastover (LYE) aquifer resulting from a 32,071,400 gpy, 50 year withdrawal from the Surficial, Upper Yorktown-Eastover, and Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Maximum radius of one foot drawdown (Area of Impact) extends approximately 0.6 miles from the pumping center.

Technical evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
June 5, 2025

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY