

## **PILOT PERMEABLE REACTIVE BARRIER PROJECT 4<sup>TH</sup> QUARTER STATUS REPORT**

**AND**

## **2023 INVESTIGATOR'S ANNUAL REPORT HYDROGEOLOGIC INVESTIGATION PRB DEMONSTRATION AREA**

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## TABLE OF CONTENTS

| <b><u>SECTION</u></b>                                                         | <b><u>PAGE</u></b> |
|-------------------------------------------------------------------------------|--------------------|
| 1.0 INTRODUCTION .....                                                        | 1                  |
| 1.1 PURPOSE .....                                                             | 1                  |
| 1.2 SITE DESCRIPTION .....                                                    | 1                  |
| 2.0 HYDROGEOLOGIC INVESTIGATION.....                                          | 2                  |
| 2.1 HISTORICAL INVESTIGATIONS.....                                            | 2                  |
| 2.2 PRB STUDY AREA FIELD INVESTIGATION.....                                   | 2                  |
| 2.3 PRB DEMONSTRATION AREA FIELD INVESTIGATION .....                          | 3                  |
| 3.0 PERMEABLE REACTIVE BARRIER IMPLEMENTATION .....                           | 4                  |
| 3.1 PERMITTING.....                                                           | 4                  |
| 3.2 BASELINE GROUNDWATER ASSESSMENT FOR PRB DESIGN AND<br>IMPLEMENTATION..... | 4                  |
| 3.2.1 Pilot PRB Conceptual Site Model.....                                    | 4                  |
| 3.2.2 Baseline Groundwater Assessment.....                                    | 5                  |
| 3.3 PRB DESIGN AND IMPLEMENTATION SUMMARY .....                               | 6                  |
| 3.4 POST-INJECTION PRB MONITORING PROGRAM.....                                | 7                  |
| 4.0 WATER LEVEL GAUGING AND GROUNDWATER SAMPLING .....                        | 9                  |
| 5.0 PRB DEMONSTRATION AREA EVALUATION.....                                    | 10                 |
| 5.1 EVALUATION OF GROUNDWATER SAMPLING RESULTS .....                          | 10                 |
| 5.1.1 Shallow Zone .....                                                      | 10                 |
| 5.1.2 Intermediate Zone .....                                                 | 11                 |
| 5.1.3 Summary of Groundwater Sampling Data .....                              | 11                 |
| 6.0 FUTURE ACTIVITIES .....                                                   | 12                 |

## TABLE OF CONTENTS (continued)

### FIGURES

|          |                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------|
| Figure 1 | Site Plan with Aerial                                                                                         |
| Figure 2 | PRB Demonstration Area Water Table Elevation Contours (Shallow Zone) With Nitrate Results December 2023       |
| Figure 3 | PRB Demonstration Area Potentiometric Surface Contours (Intermediate Zone) With Nitrate Results December 2023 |
| Figure 4 | Cross Section Lines (A-A' through D-D') December 2023                                                         |
| Figure 5 | Anaerobic Conditions Concentration Map (Shallow Zone) December 2023                                           |
| Figure 6 | Anaerobic Conditions Concentration Map (Intermediate Zone) December 2023                                      |

### TABLES

|         |                                                         |
|---------|---------------------------------------------------------|
| Table 1 | PRB Pilot Monitoring Well Inventory and Monitoring Plan |
| Table 2 | Summary of Water Level Elevation Measurements           |
| Table 3 | Summary of Groundwater Analytical Results               |

### APPENDIX

|   |                               |
|---|-------------------------------|
| A | PRB Special Use Permit        |
| B | Laboratory Analytical Reports |

## 1.0 INTRODUCTION

Verdantas LLC, (Verdantas) and MT Environmental Restoration (MTER) have prepared this combined 4<sup>th</sup> Quarter Status Report and Investigator's Annual Report (IAR) Hydrogeologic Investigation relative to the Permeable Reactive Barrier (PRB) demonstration study being conducted on behalf of the Town of Eastham, Massachusetts. The objectives of the PRB demonstration study are to: 1) expand on previous hydrogeologic studies conducted around the Eastham Landfill and Salt Pond; 2) refine understanding of groundwater flow direction and gradients in the immediate vicinity of the PRB demonstration area; and 3) understand the efficacy of the design and implementation of the pilot PRB installed in April 2020. The results of the study are being used to verify that the implemented 200-foot long PRB demonstrates the efficacy of this technology to intercept and treat nitrate in groundwater upgradient of Salt Pond and collect information that can be used in the development of plans for full-scale PRBs in the vicinity of Salt Pond in Eastham.

### 1.1 PURPOSE

This report will document the results of the investigation activities conducted in 2023, which continues to study hydrogeologic conditions and baseline nitrate levels around the PRB demonstration area (also referred to in this document as the Study Area), and the implementation of the pilot PRB on the northern edge of the US National Park Service's Cape Cod National Seashore Salt Pond Visitor Center property located at 50 Nauset Road. This report will be used by the Eastham PRB Team (Town of Eastham, Verdantas, MTER, and GHD) to further understanding of the pilot PRB program's efficacy and as part of the Town's Targeted Watershed Management Planning efforts.

### 1.2 SITE DESCRIPTION

The PRB demonstration area is focused specifically on the northern portion of the Salt Pond Visitor's Center (SPVC) property. The demonstration area is a relatively flat, grassy area with limited subsurface utilities adjacent to Nauset Road and the Visitor Center's parking lot. The entire PRB study area is within the Salt Pond sub-watershed (which is part of the Nauset Estuary Watershed System), with specific focus on areas to the west, north, and east of the SPVC. The Study Area consists of residential neighborhoods (many of which are occupied seasonally), and three shallow kettle ponds: Minister's Pond, Schoolhouse Pond, and Moll's Pond. The Eastham Elementary School is located approximately 1,500 feet northwest of Salt Pond, and the Eastham Landfill is located approximately one-mile northwest of Salt Pond. A site map layered over an aerial image is included as Figure 1.

## 2.0 HYDROGEOLOGIC INVESTIGATION

### 2.1 HISTORICAL INVESTIGATIONS

Significant studies and hydrogeological assessments related to 1,4-dioxane in groundwater have been conducted in the vicinity of the Eastham Landfill. Groundwater samples have been collected from monitoring wells and private drinking water wells in the neighborhoods downgradient of the landfill for 1,4-dioxane analysis and other parameters including nitrate since 2012. This work also included water level gauging of an extensive array of monitoring wells (screened in varying levels of the aquifer) and water level measurements at surface water bodies in the Study Area. The studies related to 1,4-dioxane provided an overall understanding of groundwater flow conditions, primarily north of Nauset Road (and north of Salt Pond). Previous studies of groundwater flow have also been conducted by the United State Geological Survey (USGS), Cape Cod Commission (CCC), and others. Groundwater monitoring from these latter assessments was primarily related to nitrates in groundwater and the potential effects on water quality in Salt Pond and the Nauset Estuary.

### 2.2 PRB STUDY AREA FIELD INVESTIGATION

Verdantas conducted a comprehensive hydrogeologic investigation in 2018 to further evaluate hydrogeological conditions in the Study Area, and to identify aquifer zones that were discharging groundwater into Salt Pond. The studies also were intended to determine suitable locations to conduct a PRB demonstration program.

The concentrations of nitrates detected and their depth in the aquifer, in combination with vertical groundwater gradient information obtained during the investigation, provided valuable information as to the source of the nitrates and their fate and transport. The information indicated that the downward groundwater gradients observed throughout the Study Area north of Nauset Road draw nitrates which originate in the shallow zone into the deeper aquifer zones. Since groundwater in the lower intermediate zone and deep zone appears to flow under Salt Pond with limited upwelling, it was concluded that future PRB investigations and demonstration work specifically targeting Salt Pond should focus on the shallow and upper intermediate zones (i.e., from the water table to approximately - 30 NAVD88). Groundwater below this zone flows under Salt Pond and likely discharges to the Salt Pond River and/or Salt Pond Bay.

To select an appropriate location for the PRB demonstration program, the following criteria were evaluated by the PRB Team: 1) environmental conditions similar to those anticipated for a full-scale PRB; 2) accessibility for PRB installation, monitoring well installation and monitoring; 3) well-defined groundwater flow direction; 4) adequate baseline nitrogen concentration profiles and geochemistry datasets; and 5) stakeholder acceptance.

The 2018 field investigation, in combination with discussions between the Eastham PRB Team and other stakeholders, determined that the northern portion of the SPVC parking

lot adjacent to the bike trail and Nauset Road met the stated criteria for a PRB demonstration program.

### **2.3 PRB DEMONSTRATION AREA FIELD INVESTIGATION**

More specific information was necessary to fully understand hydrogeologic conditions in the demonstration area and to plan a pilot PRB study for the Salt Pond watershed. The field investigation activities continued in early 2020 to gather necessary baseline information to verify that this location was appropriate for a PRB demonstration program, and the pilot PRB was implemented in April 2020.

## 3.0 PERMEABLE REACTIVE BARRIER IMPLEMENTATION

### 3.1 PERMITTING

The National Park Service (NPS) permitted installation of the demonstration PRB on their property by issuing Special Use Permit #200052 (Appendix A). The permit is valid from March 23, 2020, through March 23, 2025, and covers both installation of the pilot PRB and associated monitoring.

A Massachusetts Department of Environmental Protection (MassDEP) Resource Protection (BRP) WS06 Permit Application was submitted for the installation of Underground Injection Control (UIC) Class V aquifer remediation wells. The remediation "wells" were the temporary injection points used for adding the Emulsified Vegetable Oil (EVO) organic substrate to groundwater. MassDEP issued the UIC Registration approval by email on March 20, 2020. The UIC registration number for the permeable reactive barrier discharge at 50 Nauset Road, Eastham is MAS41A086303-5B6.

### 3.2 BASELINE GROUNDWATER ASSESSMENT FOR PRB DESIGN AND IMPLEMENTATION

Hydrogeologic conditions around the Eastham Landfill were studied for many years (primarily between 2012 and 2017) relative to 1,4-dioxane in groundwater that had impacted private drinking water wells. Comprehensive studies were completed in 2018 and 2019 to assess hydrogeologic conditions across an expanded study area (which includes Salt Pond) and to refine the understanding of groundwater flow direction and gradients in the PRB demonstration area. Focused groundwater studies were also completed to define baseline groundwater chemistry in the vicinity of the pilot PRB. Additional baseline groundwater data was collected through depth to groundwater gauging and sampling conducted in March 2020, before the PRB injection.

#### 3.2.1 Pilot PRB Conceptual Site Model

The data gathered to evaluate groundwater chemistry, flow direction, and velocity were used to develop a Conceptual Site Model (CSM) of the PRB Study Area. A CSM is a tool used to provide a framework of information to help understand and communicate what is known about an environmental condition, visualize available information, identify gaps in data, and prioritize needed actions. An understanding of groundwater nitrate concentrations, spatial distribution, and rate of migration in groundwater within the Study Area was necessary to design a PRB and to evaluate its performance.

The nitrogen load reduction achieved by the pilot PRB can be determined with an assessment of nitrogen transport through the area at baseline conditions compared to nitrogen transport observed after implementation. This transport of nitrogen is quantified by calculating the mass flux and mass discharge of nitrate. Mass flux is the nitrogen mass moving with groundwater flow across a defined unit area of the aquifer (e.g., through one square foot), while mass discharge is the total mass crossing a defined plane

(e.g., through the entire PRB). Nitrate sources in the watershed in combination form a large dilute plume affecting much of the watershed. Nitrate concentrations at any one location may be variable over time and the profile of nitrate concentrations from the water table to the full depth of impact can be expected to show a range of concentrations. Measurements of nitrate concentrations in groundwater from several groundwater sampling events can be averaged and combined with groundwater flow estimates to determine the mass discharge of nitrate through the PRB:

$$\text{Mass Discharge} = \text{Flow} \times \text{Concentration (e.g., Liters/day} \times \text{mg/l)} = \text{mg/day}$$

The mass discharge calculation can be used to assess PRB performance and determine kilograms of nitrate removed per year by the PRB.

Generally, groundwater flows at a rate of about one foot per day from the highest point of the watershed toward Salt Pond. Based upon hydrogeologic assessments completed over several years, groundwater flow within the Study Area that likely discharges to Salt Pond is confined to water flowing through a vertical section of aquifer from the water table, located approximately 20 feet below ground surface (bgs) (elevation ~ plus 12 feet NAVD88), down to approximately 39 feet below the water table (elevation ~ minus 30 feet NAVD88). This discharge source range is an estimate based upon previous studies of Salt Pond and hydrogeologic assessments. Groundwater below the target zone generally flows under Salt Pond and discharges to Nauset Estuary south of Salt Pond. Within this target depth range, soil borings indicated generally highly permeable medium sand with thinner layers of less permeable silty sand and clay that are interbedded and unlikely to be continuous. A PRB providing for full coverage of this vertical range during substrate injection was designed to intercept nitrogen-impacted groundwater migrating and discharging to Salt Pond.

### 3.2.2 Baseline Groundwater Assessment

A number of monitoring wells have been installed within the watershed, including wells in the Study Area, to monitor groundwater quality and flow direction. Two specific aquifer zones are monitored in the Study Area based upon expected groundwater discharge to Salt Pond. The depth to groundwater observed during the baseline assessment of the area ranged from approximately 17 to 22 feet bgs. Shallow monitoring wells were installed with screens at approximately 20 to 30 feet bgs and deeper (intermediate) monitoring wells were installed with screens set at approximately 40 to 50 feet bgs. Monitoring well information is shown on the Monitoring Well Inventory included as Table 1. Monitoring well locations are shown on Figure 1 and in more detail on Figures 2 and 3. These figures also show the injection points that comprise the pilot PRB installed in April 2020.

Groundwater elevations, calculated by subtracting the measured depth to water from the top of casing elevation at each flush-mounted monitoring well are included in

Table 2. These data were used to create water level elevation contours for the shallow and intermediate zones, which are included on Figures 2 and 3, respectively. Cross sections of the Study Area showing subsurface stratigraphy, monitoring well screen intervals, and the vertical extent of the installed PRB are included in Figure 4. Baseline and post-implementation groundwater data for these monitoring wells and selected additional monitoring wells installed in a wider area of the Salt Pond Watershed are summarized in Table 3.

Figure 2 includes shallow (water table) contours showing southerly groundwater flow toward Salt Pond and includes nitrate concentration data from sampling events starting in May 2019. Nitrate concentrations measured in the most recent December 2023 analyses for shallow monitoring wells are illustrated on Figure 2 with color contours to visualize the higher concentration areas of the nitrate plume. Figure 3 provides piezometric contours for the intermediate depth aquifer zone, which also shows southerly groundwater flow toward Salt Pond. This figure shows nitrate concentration data from intermediate depth monitoring wells and December 2023 nitrate concentration contours. Baseline groundwater quality monitoring data (Table 3) indicated that the aquifer in the Study Area before implementation was well oxygenated with aerobic conditions and that nitrate concentrations are highly variable, ranging from less than 0.11 milligrams per liter (mg/L) up to 17.9 mg/L. Post-implementation groundwater monitoring data is described in further detail in Section 5.0. Laboratory Reports are included as Appendix B.

### 3.3 PRB DESIGN AND IMPLEMENTATION SUMMARY

The demonstration PRB was installed in March/April 2020, and included:

- Installation of 21 injection points along a single linear treatment line for substrate injection set at 10-foot intervals placed to form a PRB approximately 200 feet long and up to 12 feet wide (with a radius of influence of approximately six-plus feet at individual injection points).
- A vertical treatment (injection) interval of 43 feet along the 200-foot line, with injection points 1-10 on the western side of the PRB injected to 21 to 64 feet bgs, and injection points 11-21 on the eastern side of the PRB injected to 19 to 62 feet bgs. The different depths are based upon ground surface at a higher elevation on the western end of the PRB. Substrate was injected in 5-foot lifts (injection screen interval) from the bottom up.
- Approximately 31,000 gallons of substrate was injected into 21 injection points (~1,500 gallons of dilute solution per injection point). The substrate consists of the following:
  - 6,600 gallons of 60% emulsified soybean oil diluted to 14% with water.
  - Sodium lactate (264 gallons of 60% sodium lactate) was added evenly into the diluted EVO solution on-site prior to injection.

- A total of 550 pounds of sodium bicarbonate and 550 pounds of calcium carbonate were evenly mixed into the injection solutions as a pH buffer to maintain circumneutral groundwater pH conditions.

The injection points were driven to the desired depth and the injection screen was exposed to start the injection process. A specified volume of substrate was delivered, and the well screen was then pulled up to the next interval. This process was repeated until the required volume was injected into each point evenly across the target interval. The drive points were temporary, and no drilling equipment or materials remained following the removal of the injection rods. All injection points were backfilled and sealed to the ground surface with bentonite chips. The PRB installation was completed between March 31 and April 9, 2020.

The system for preparation, mixing, and injection of substrate solutions consisted of mixing tanks, mixers, pumps, piping, meters, valves, and fittings set up in a secondary containment area constructed in the SPVC parking lot. Injection batches of 750 gallons were prepared in plastic tanks by adding appropriate quantities of EVO, sodium lactate, buffer, and water to achieve the selected dilution concentration. Mobile above-ground pumps and hoses were used to convey mixed EVO solution directly to the injection points. Flow totalizers, pressure gauges, and shut-off valves were used to monitor injection pressure, flow rates, and total volume added to each injection interval at each injection point. A summary of the volume of solution delivered to each injection point and interval, flow rate and injection pressures, and pictures taken during installation of the PRB were included in the 2020 summary report.

Monitoring wells in the vicinity of the PRB were monitored for changes in groundwater elevation during injection. Small changes in groundwater elevation were noted in monitoring wells ESMW-11S (plus 0.3 feet) and ESMW-12SR (plus 0.2 feet) during the injection program. Groundwater elevation monitoring data collected during injections are included in Table 2. A film of possible EVO material was noted on equipment used to monitor ESMW-11S indicating EVO may have reached that well location approximately 24 feet downgradient of the PRB. Generally, a radius of influence of 6 to 8 feet was expected; however, the radius of influence may extend further in highly permeable strata during injection. Once the injection is completed, the EVO is expected to adhere to soil grains and not continue to migrate.

### **3.4 POST-INJECTION PRB MONITORING PROGRAM**

The quarterly groundwater monitoring plan developed for the pilot PRB program (summarized in Table 1) includes groundwater gauging, measurement of water quality parameters in situ, and collection of samples for laboratory analysis from 21 monitoring wells. The target monitoring wells are located both upgradient and downgradient of the PRB. All existing monitoring wells have been surveyed to establish the top of casing NAVD88 elevation. Depth to the water table is quantified in the wells using a Geotech

Water Level Meter with data converted to NAVD88 elevation. Water quality parameters are monitored with a YSI ProDSS Multiparameter Water Quality Meter as groundwater is pumped from monitoring wells prior to collection of samples for lab analysis. A flow cell connected to a water quality meter is used to monitor pH, oxidation/reduction potential (ORP), dissolved oxygen, temperature, specific conductance, and turbidity. Monitoring wells are purged until field parameter readings stabilize on the water quality meter. Groundwater samples are shipped under chain of custody to SGS North America, Inc. (SGS) of Dayton, New Jersey, for analysis of total nitrogen, ammonia, nitrate, nitrite, dissolved iron, dissolved manganese, chloride, and sulfate. Select samples are also analyzed for dissolved organic carbon (DOC), dissolved arsenic, methane, and alkalinity. The sampling program will continue to be optimized based upon evaluation of data over time and any changes will be noted in quarterly status reports. Samples collected for laboratory analyses include duplicate samples from selected wells for quality control.

Quarterly pilot PRB status reports are prepared to summarize the collected data and are provided to the Town of Eastham for evaluation. These reports are also submitted to MassDEP as required by the UIC Permit. The most recent post-injection status report was submitted in December 2023.

The UIC Permit required quarterly monitoring for a proposed three-year period. This initial three-year monitoring period is complete, and there are no additional monitoring requirements through the MassDEP UIC Program, but Verdantas continues to monitor groundwater around the pilot PRB for the Town of Eastham on a reduced schedule.

## 4.0 WATER LEVEL GAUGING AND GROUNDWATER SAMPLING

Groundwater samples have been collected from select monitoring wells in and around the PRB demonstration area on a quarterly basis. During these sampling events, the depth to water and depth to bottom was first measured with an electronic water level meter. The water level data collected through 2023 is included as Table 2. These data were used to develop a Water Table Elevation Contour Map for the shallow aquifer zone (Figure 2), and a Potentiometric Surface Contour Map for the intermediate zone (Figure 3). Note that the December 2023 scope for groundwater analyses was reduced from previous quarterly events. Monitoring wells ESMW-12S, ESMW-12SR, ESMW-310I, ESMW-310S, ESMW-313I, and ESMW-313S were sampled during the fourth quarter of 2023.

Groundwater was purged from the wells using a QED Sample Pro Pump operated at a low setting and connected to disposable tubing. Groundwater was purged for at least 30 minutes with the goal of obtaining a clear, sediment free sample. Some wells were purged for much longer than 30 minutes, and a sediment free sample was not always obtainable.

Purged water was pumped through a flow cell connected to a water quality meter, and was monitored for color, pH, ORP, dissolved oxygen, temperature, specific conductance, and turbidity. Parameters were recorded every five minutes, and the pump was disconnected from the flow cell when readings stabilized. Groundwater samples were then collected in pre-cleaned bottles with the appropriate preservative. In-line, 0.45-micron field filters were utilized during the collection of samples for dissolved iron, arsenic, and dissolved organic carbon.

Groundwater samples were placed on ice and shipped under chain of custody to SGS, for analysis of total nitrogen, ammonia, total Kjeldahl nitrogen, nitrate, nitrite, chloride, and sulfate. Select samples were also analyzed for dissolved arsenic, methane, alkalinity and dissolved organic carbon. The laboratory results for all groundwater samples are summarized in Table 3. The laboratory analytical reports are included in Appendix B.

Soil descriptions and water level gauging measurements were used to create four cross sections through the PRB demonstration area. Each cross-section shows the approximate water table elevation and nitrate results in groundwater in the two depth zones. Section A-A' runs from north to south from couplet well ESMW-312 to ESMW-315, Section B-B' runs from north to south from couplet ESMW-313 to ESMW-311, Section C-C' runs from west to east from couplet ESMW-12 to ESMW-310, and Section D-D' runs from west to east from couplet ESMW-308 to ESMW-309. These cross-section lines, including subsurface geology, December 2023 nitrate results and water table elevations, are presented on Figure 4.

## 5.0 PRB DEMONSTRATION AREA EVALUATION

### 5.1 EVALUATION OF GROUNDWATER SAMPLING RESULTS

Groundwater samples were collected from monitoring wells that were installed within two groundwater zones: shallow (~15 feet to -10 feet NAVD88); and intermediate (-10 feet to -30 feet NAVD88). The following sections describe sampling results based upon these two groundwater zones.

#### 5.1.1 Shallow Zone

Nitrate concentrations are typically monitored at upgradient control monitoring wells (ESMW-312 and ESMW-313) located north of Nauset Road in an area unaffected by the PRB due to groundwater flow direction. Nitrate concentrations at these control wells have ranged from 1.50 to 17.9 mg/L over the 2023 monitoring period, fluctuating the most at ESMW-313S. These data indicate potential significant fluctuations associated with flow from septic system sources in the residential neighborhood upgradient of the PRB demonstration area or from other potential sources of nitrate in the area.

Prior to PRB implementation, baseline nitrate concentrations in the shallow zone downgradient of the PRB ranged from non-detect to 3.82 mg/L with an average baseline nitrate concentration of 1.63 mg/L for shallow screened monitoring wells. In December 2023, post-implementation of the PRB, the concentrations at the same monitoring locations ranged from 0.21 to 0.43 mg/L. The downgradient shallow well average concentration was 0.32 mg/L.

In-situ water quality data collected during groundwater monitoring and certain laboratory analyses such as dissolved iron are used to assess the oxidation-reduction potential or redox condition of the groundwater. Redox conditions are important in determining the extent and rate of biologically mediated processes including denitrification, the reduction of nitrate (NO<sub>3</sub>) to molecular nitrogen (N<sub>2</sub>). Denitrification by denitrifying bacteria occurs under anoxic conditions generally where the ORP of the groundwater is below +50 millivolts (mV). Changes in nitrate concentrations and redox conditions provide lines of evidence for the occurrence of denitrification. These parameters measured at individual monitoring wells also provide an indicator of movement of treated groundwater downgradient from the PRB. Figure 5 illustrates changes in nitrate concentrations and redox or anoxic conditions in shallow groundwater downgradient of the PRB from pre-injection data (from March 2020) and post-injection data (from December 2020, and December 2023).

Groundwater monitoring since PRB implementation has shown the progression of treated groundwater moving downgradient from the PRB. Figure 2 shows nitrate concentrations at each monitoring location since 2019 in the shallow zone. Post PRB implementation nitrate concentrations detected in groundwater at downgradient Line 1 (wells ESMW-11S, ESMW-12SR and ESMW-310S) ranged from non-detect to 1.35 mg/L during quarterly monitoring events and were non-detect or less than 0.50 mg/L in 2023. Post-PRB nitrate

concentrations in downgradient Line 2 (ESMW-308 and 309) ranged from non-detect to 0.89 mg/L in 2023.

Some of the highest concentrations historically observed during the monitoring program were detected at ESMW-105S, located cross-gradient of the leach field for the SPVC septic system (see Figure 2). This location is cross gradient and outside the area affected by the PRB. Water table mounding from this leach field could create gradients capable of inducing migration of nitrates towards the northeast to the vicinity of ESMW-105S. Monitoring well ESMW-105S has had fluctuating yet consistently higher nitrate concentrations since its installation in 2019. This monitoring well was not sampled in 2023 but may be sampled again in the future to continue to understand the influence of the SPVC septic system on the Study Area.

### **5.1.2 Intermediate Zone**

The concentrations of nitrates detected in groundwater from upgradient wells north of Nauset Road ranged from 1.5 to 17.5 mg/L over the 2023 monitoring period. Similar to the shallow zone, concentrations in the upgradient wells fluctuate significantly.

Prior to PRB implementation, baseline nitrate concentrations in the intermediate zone downgradient of the PRB ranged from non-detect to 5.72 mg/L. The average baseline concentration for intermediate screened monitoring wells was 2.32 mg/L. In December 2023, post-implementation of the PRB, the concentrations at the same monitoring locations were non-detect. Figure 3 shows nitrate concentrations at each monitoring location in the intermediate zone since 2019, including baseline and post PRB implementation data. Areas with lower redox or anoxic conditions conducive to denitrification in intermediate groundwater are shown on Figure 6.

### **5.1.3 Summary of Groundwater Sampling Data**

The concentrations of nitrates detected at shallow and intermediate depths, in combination with horizontal and vertical groundwater gradient information have been evaluated. Quarterly monitoring of groundwater elevations and nitrate concentrations and additional analyses document changes over time resulting from PRB treatment and allow for interpretation of results. Nitrate concentration data along with redox indicators provide multiple lines of evidence showing the PRB is functioning as planned and successfully cutting off the flux of nitrate traveling towards Salt Pond from the pilot area.

## 6.0 FUTURE ACTIVITIES

In 2024, Verdantas will continue quarterly monitoring of the select wells in the PRB demonstration area. Monitoring will include water level gauging and collection and laboratory analysis of groundwater samples. This data will continue to be used to understand and document the efficacy of the pilot PRB program.

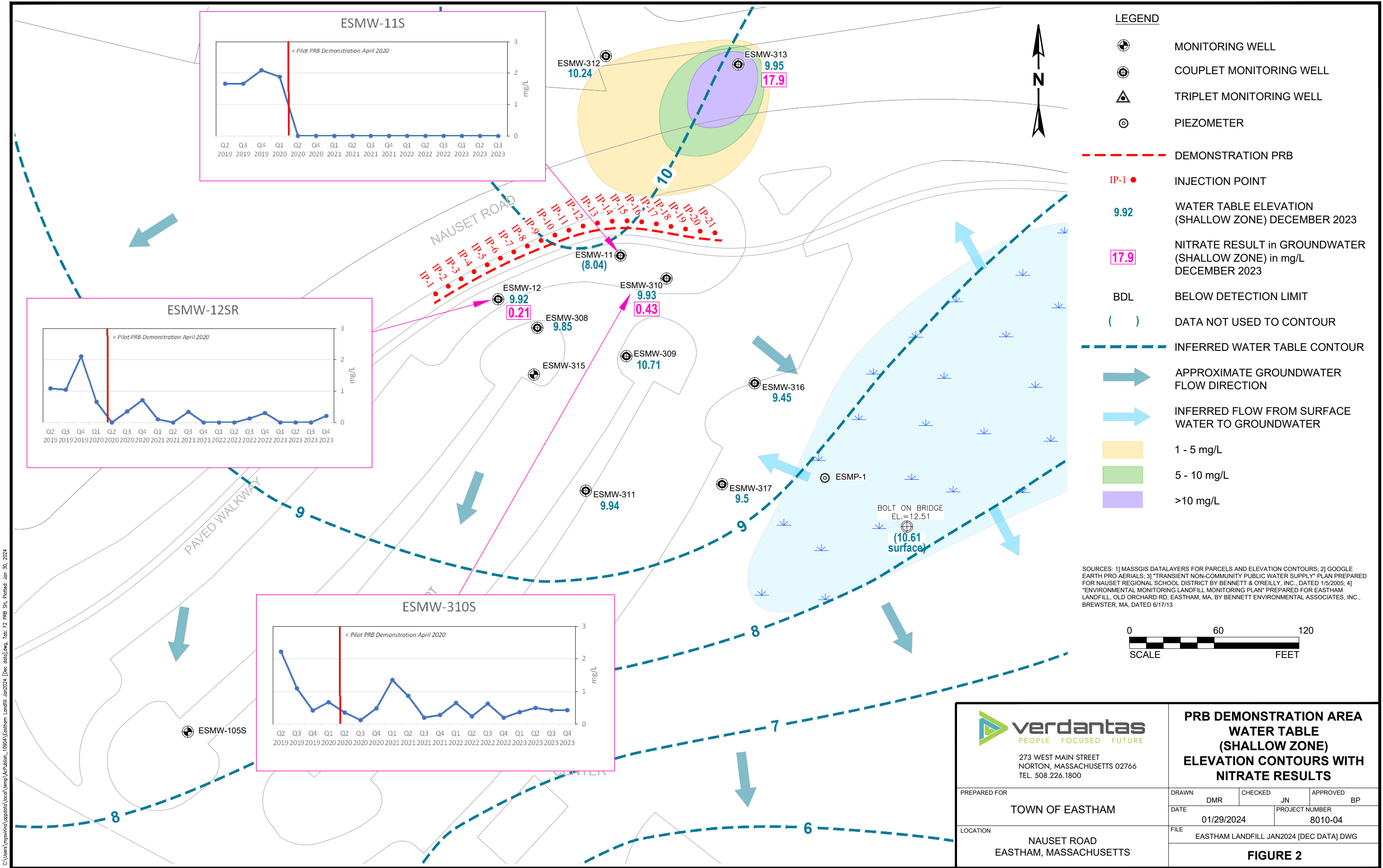
Verdantas and MTER have also proposed the installation of additional groundwater monitoring wells to further the understanding of groundwater conditions extending along Route 6 State Highway and Nauset Road to site potential full scale PRB locations.

## FIGURES

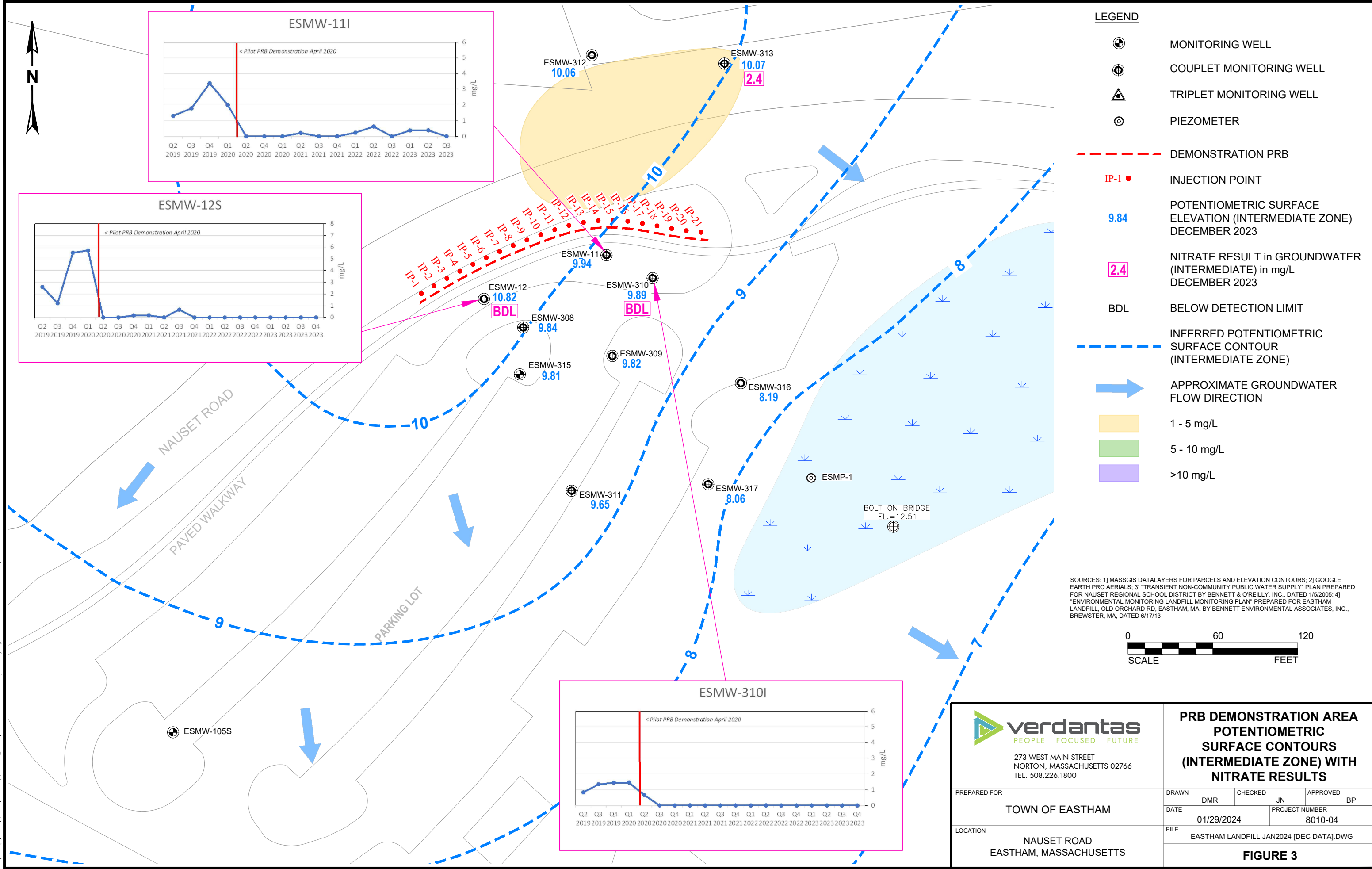
- FIGURE 1** SITE PLAN WITH AERIAL
- FIGURE 2** PRB DEMONSTRATION AREA WATER TABLE ELEVATION CONTOURS (SHALLOW ZONE) WITH NITRATE RESULTS DECEMBER 2023
- FIGURE 3** PRB DEMONSTRATION AREA POTENTIOMETRIC SURFACE CONTOURS (INTERMEDIATE ZONE) WITH NITRATE RESULTS DECEMBER 2023
- FIGURE 4** CROSS SECTION LINES (A-A' THROUGH D-D') DECEMBER 2023
- FIGURE 5** ANAEROBIC CONDITIONS CONCENTRATION MAP (SHALLOW ZONE) DECEMBER 2023
- FIGURE 6** ANAEROBIC CONDITIONS CONCENTRATION MAP (INTERMEDIATE ZONE) DECEMBER 2023



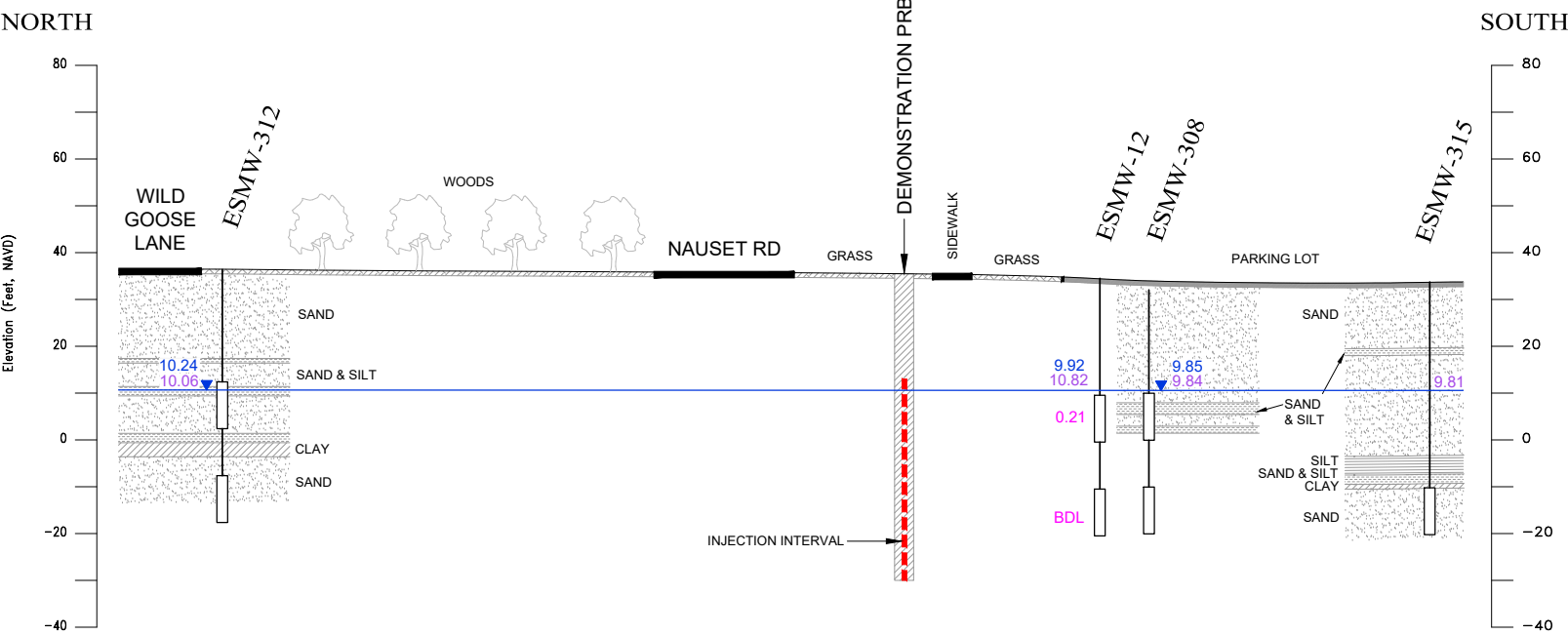
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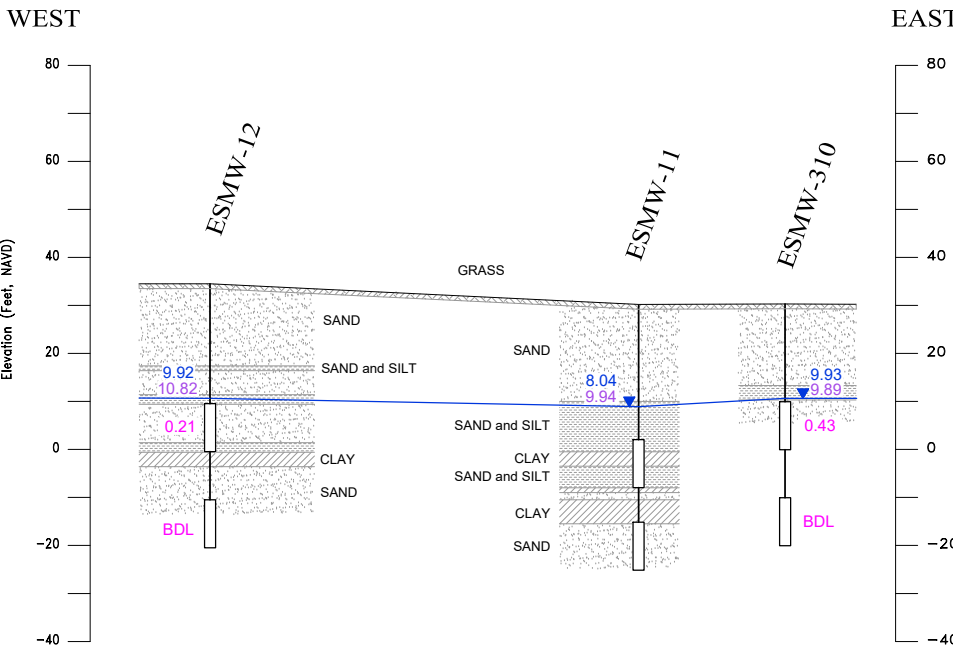
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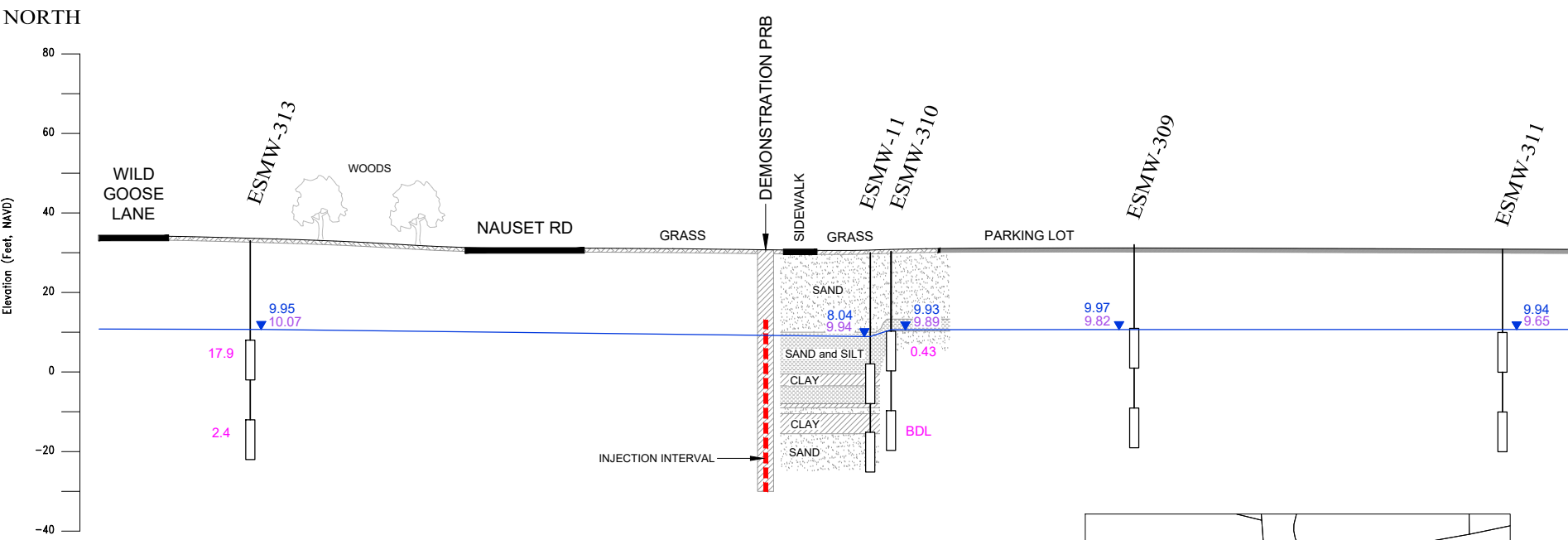
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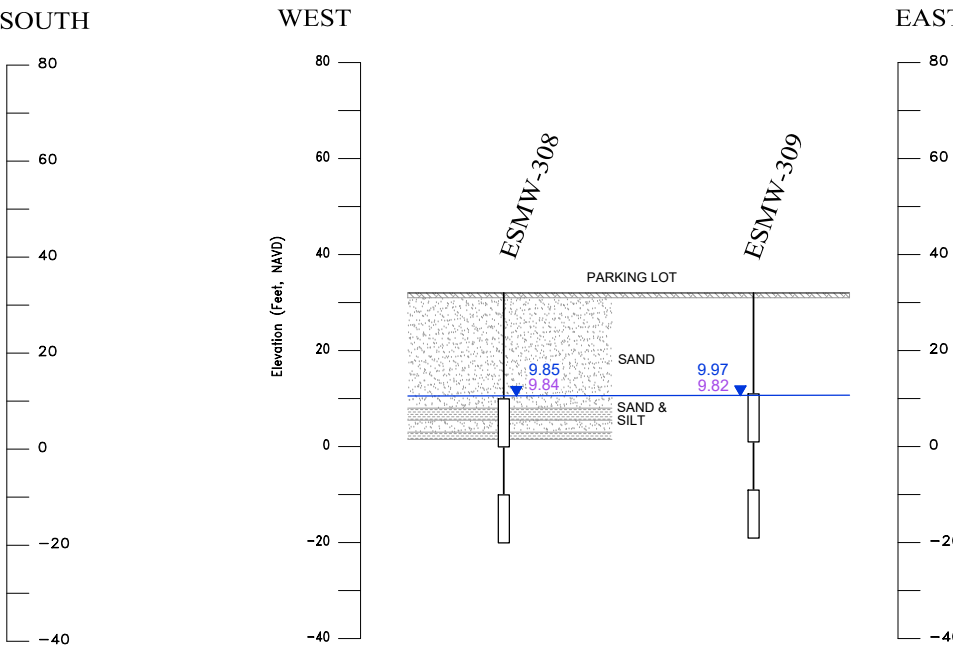
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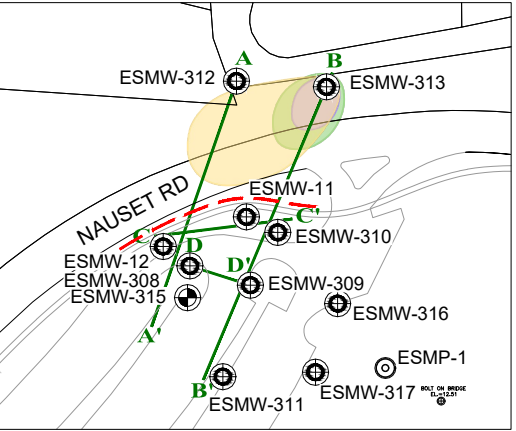
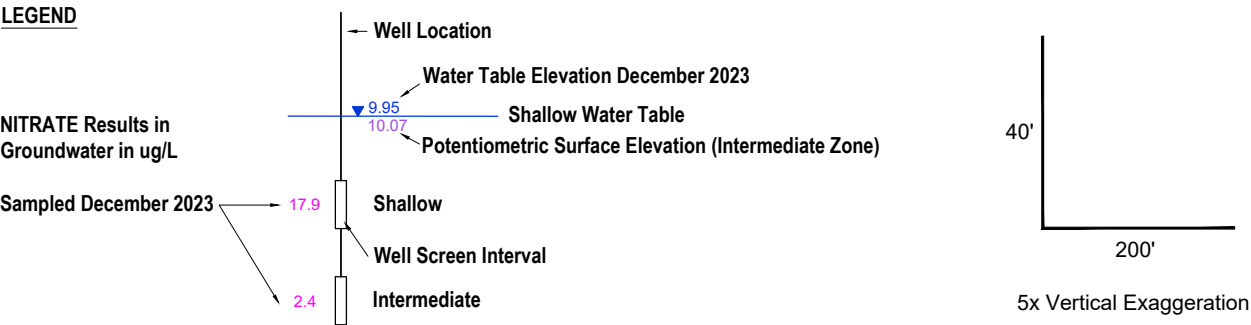
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SECTION D-D'

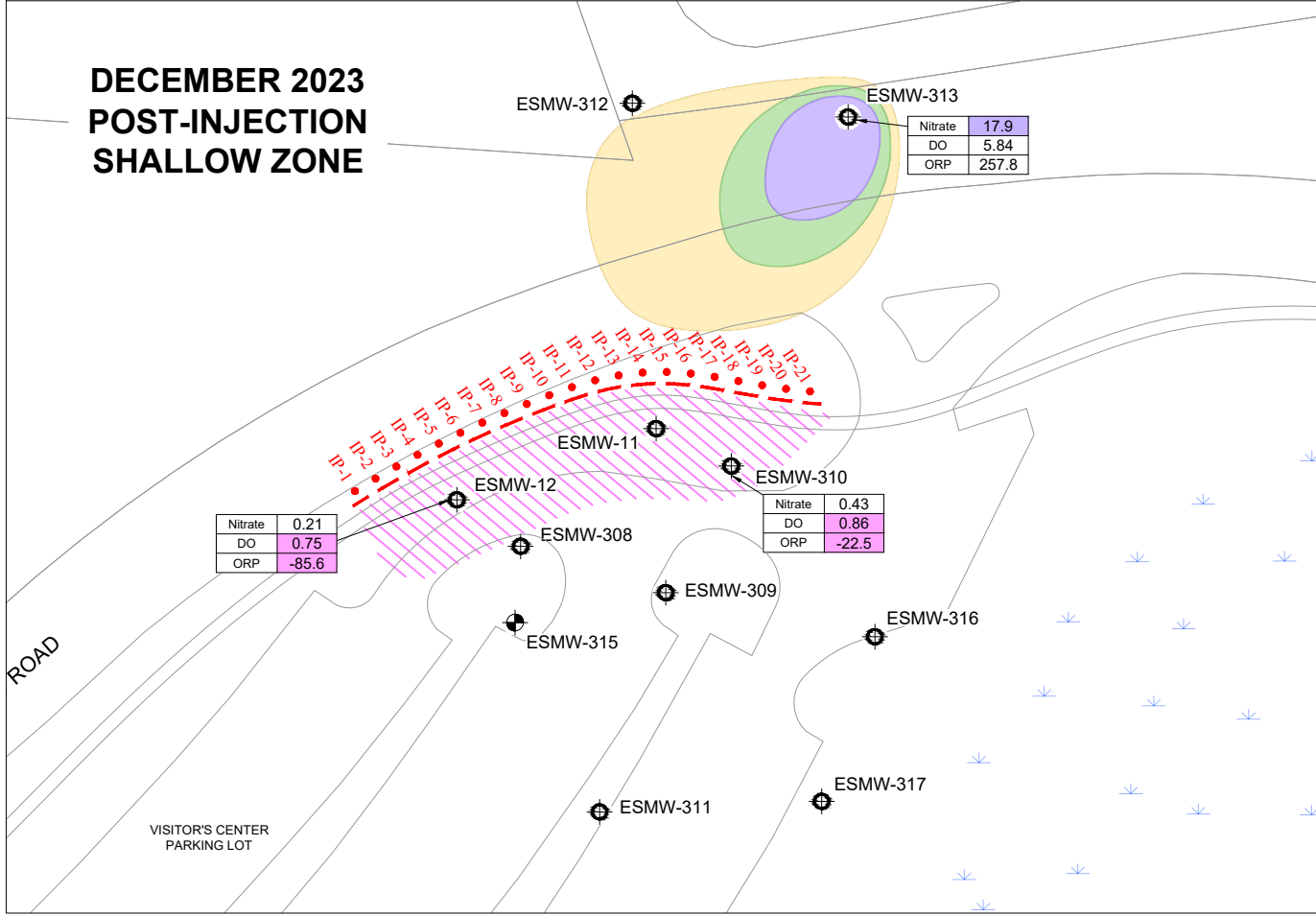
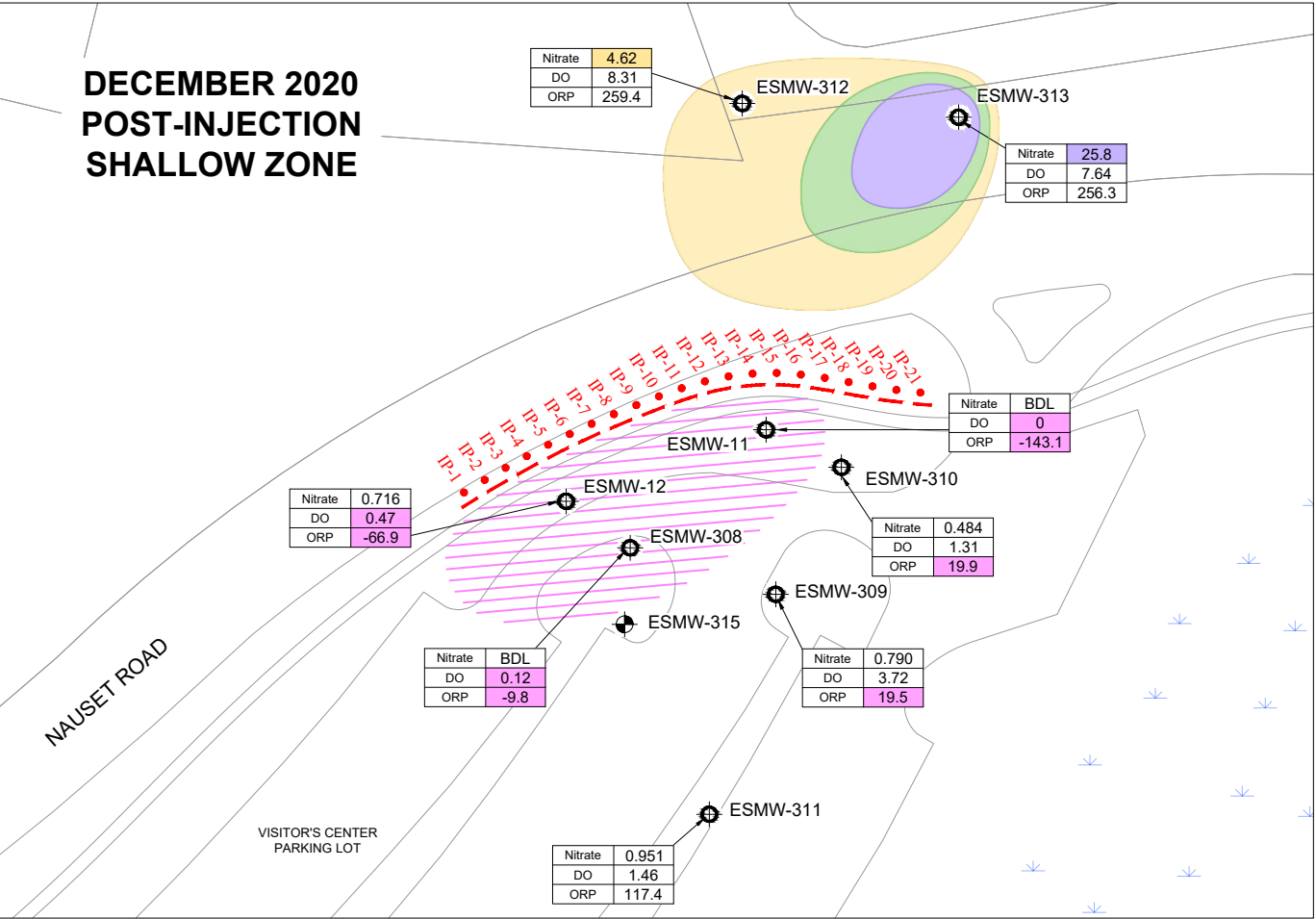
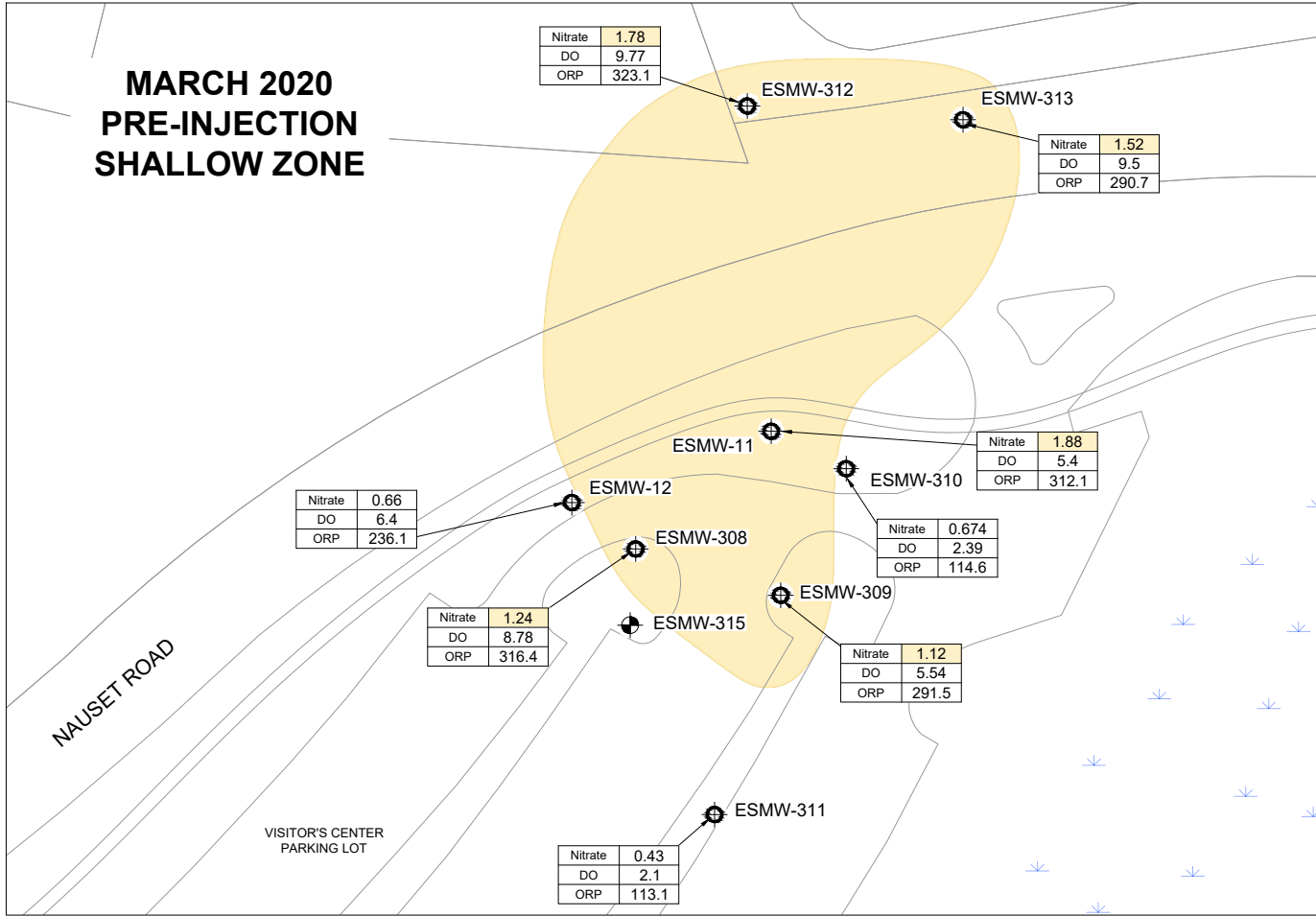


LEGEND



|                                                                                                                                                                                                                                                      |  |                                                                    |                                  |                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------|----------------------------------|----------------------------------------------|
| <div><div><div>verdantas</div><div>PEOPLE FOCUSED FUTURE</div></div><div>273 WEST MAIN STREET<br/>NORTON, MASSACHUSETTS 02766<br/>TEL. 508.226.1800</div></div> |  | <div>TITLE</div> <div>PRB SECTIONS<br/>A-A' thru D-D'</div>        |                                  |                                              |
| <div>PREPARED FOR</div> <div>TOWN OF EASTHAM</div>                                                                                                                                                                                                   |  | <div>DRAWN</div> <div>DMR</div>                                    | <div>CHECKED</div> <div>JN</div> | <div>APPROVED</div> <div>BP</div>            |
| <div>LOCATION</div> <div>NAUSET ROAD<br/>EASTHAM, MASSACHUSETTS</div>                                                                                                                                                                                |  | <div>DATE</div> <div>01/29/2024</div>                              |                                  | <div>PROJECT NUMBER</div> <div>8010-04</div> |
|                                                                                                                                                                                                                                                      |  | <div>FILE</div> <div>EASTHAM LANDFILL JAN2024 [DEC DATA].DWG</div> |                                  |                                              |
|                                                                                                                                                                                                                                                      |  | <div>FIGURE 4</div>                                                |                                  |                                              |

C:\Users\mrsivirina\appdata\local\temp\AcPublish\_10904\Eastham Anaerobic Jan2024 [Dec data].dwg, Tab: PRB SH ANAEROBIC, Plotted: Jun 30, 2024



**LEGEND**

- MONITORING WELL
- COUPLET MONITORING WELL
- DEMONSTRATION PRB
- INJECTION POINT

**NITRATE**

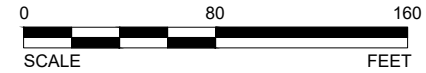
- 1 - 5 mg/L
- 5 - 10 mg/L
- >10 mg/L

**APPROXIMATE AREA OF ANOXIC CONDITIONS**  
DO < 1 mg/L and ORP < 50 mV

**DO < 1 mg/L or ORP < 50 mV**

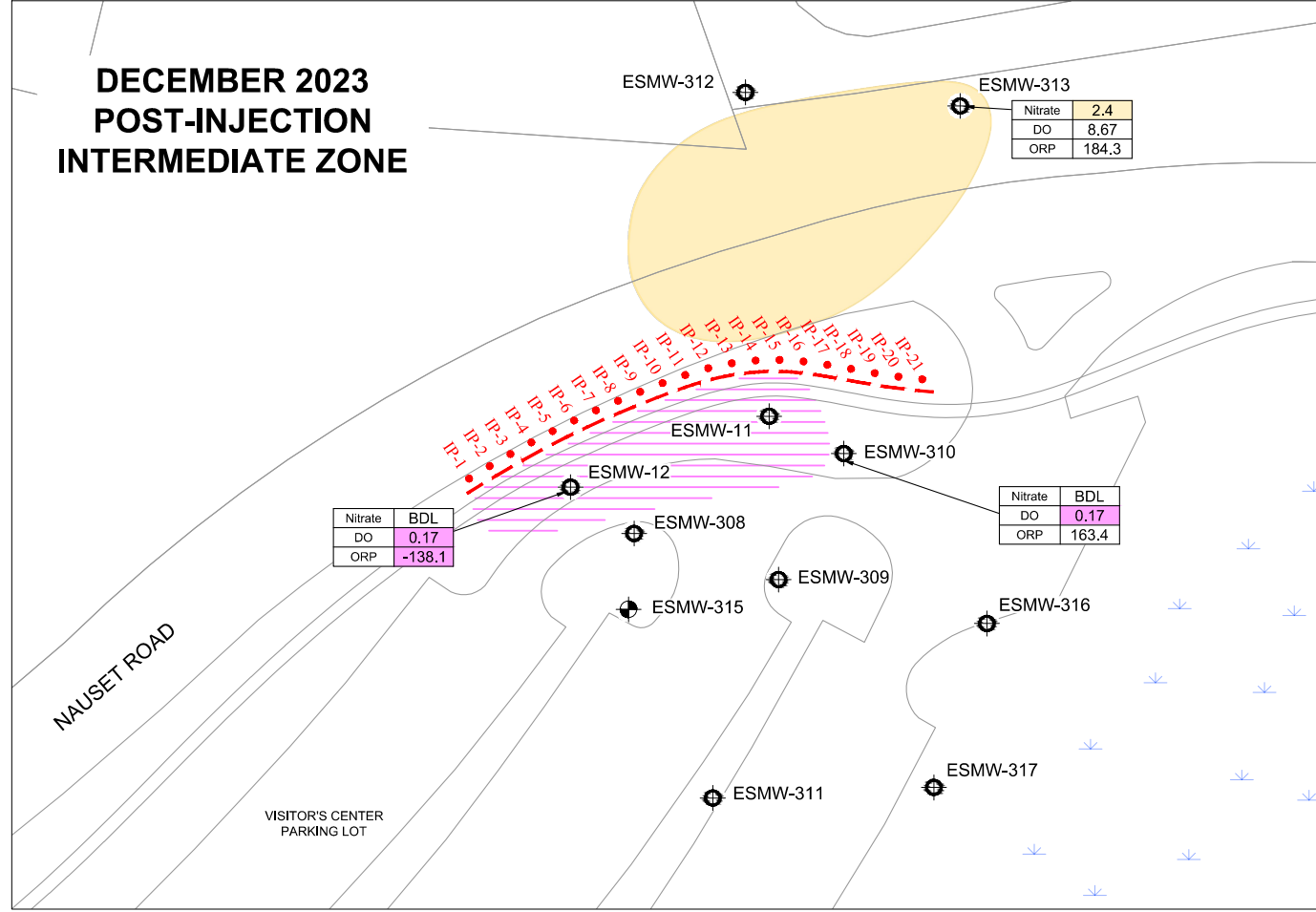
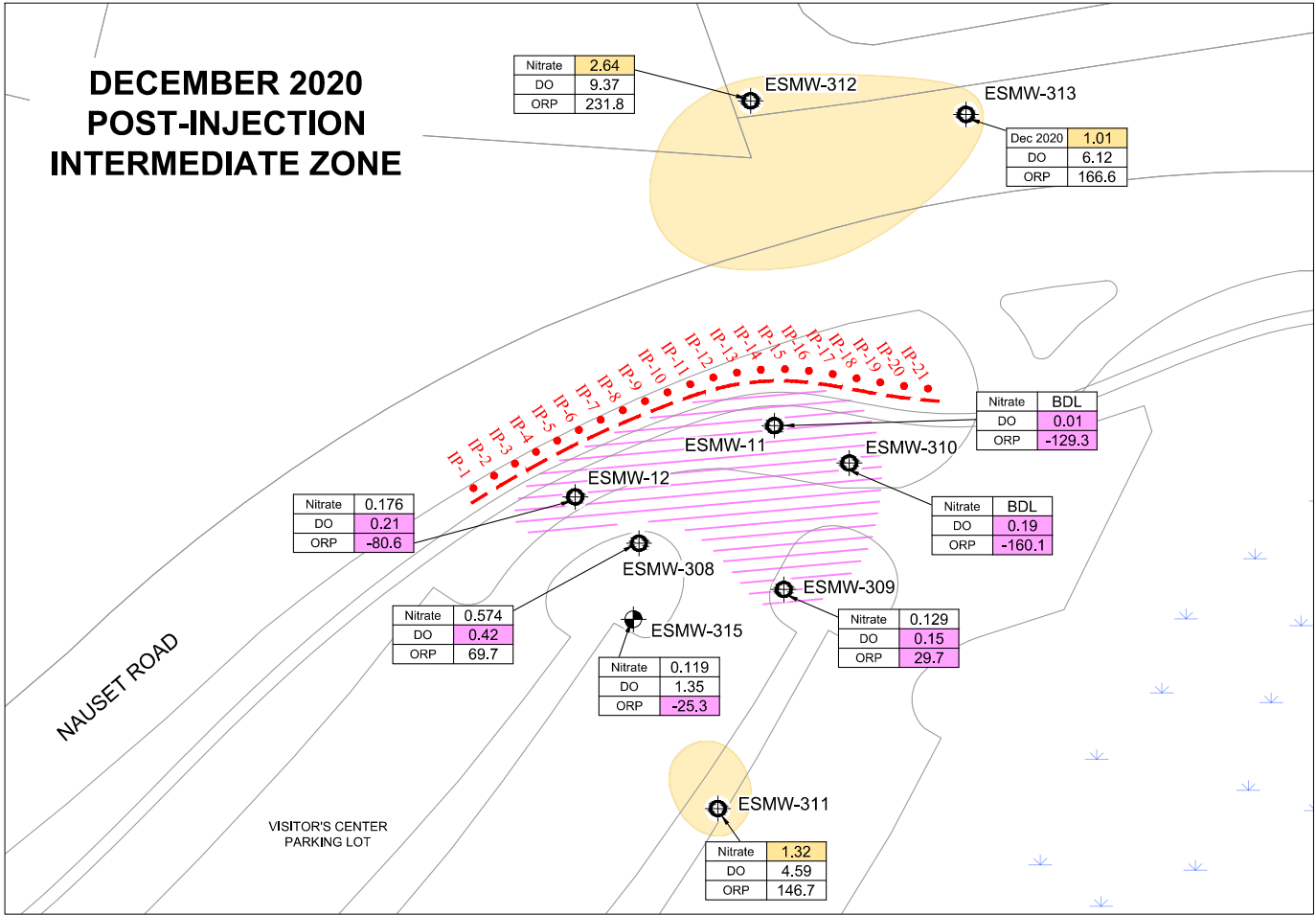
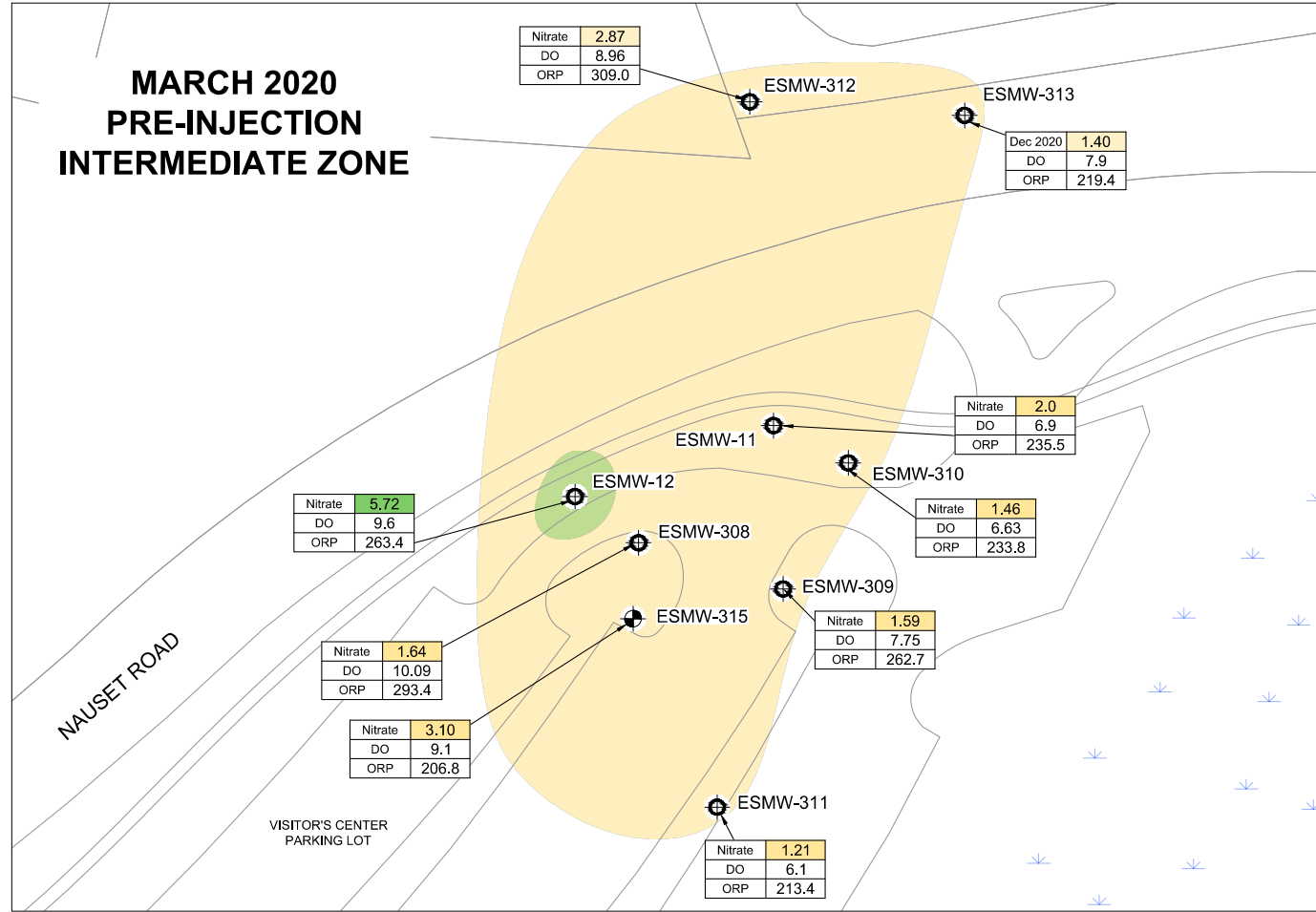
**NITRATE RESULT in GROUNDWATER (SHALLOW ZONE) in mg/L**  
DO = Dissolved Oxygen in mg/L  
ORP = Oxidation Reduction Potential in mV

**BDL = BELOW DETECTION LIMIT**  
**NS = NOT SAMPLED**



|                                                                              |  |                                                                      |               |
|------------------------------------------------------------------------------|--|----------------------------------------------------------------------|---------------|
| <br>273 WEST MAIN STREET<br>NORTON, MASSACHUSETTS 02766<br>TEL. 508.226.1800 |  | <b>PRB DEMONSTRATION AREA<br/>SHALLOW ZONE<br/>ANOXIC CONDITIONS</b> |               |
| PREPARED FOR<br><b>TOWN OF EASTHAM</b>                                       |  | DRAWN<br>DMR                                                         | CHECKED<br>JN |
| DATE<br>01/29/2024                                                           |  | APPROVED<br>BP                                                       |               |
| LOCATION<br>NAUSET ROAD<br>EASTHAM, MASSACHUSETTS                            |  | PROJECT NUMBER<br>8010-04                                            |               |
| FILE<br>EASTHAM ANAEROBIC JAN2024 [DEC DATA].DWG                             |  | <b>FIGURE 5</b>                                                      |               |

\\verdantas.com\ESM\Shared\Graphics By D\_Rolla\8010-01 Eastham Landfill -04 PRB CAD\Eastham Anaerobic Jan2024 [Dec data].dwg, Tab: PRB INT ANAEROBIC, Plotted: Feb 05, 2024



**LEGEND**

- MONITORING WELL
- COUPLET MONITORING WELL
- DEMONSTRATION PRB
- INJECTION POINT

**NITRATE**

- 1 - 5 mg/L
- 5 - 10 mg/L
- >10 mg/L

**APPROXIMATE AREA OF ANOXIC CONDITIONS**  
DO < 1 mg/L and ORP < 50 mV

**DO < 1 mg/L or ORP < 50 mV**

**NITRATE RESULT in GROUNDWATER (INTERMEDIATE ZONE) in mg/L**  
DO = Dissolved Oxygen in mg/L  
ORP = Oxidation Reduction Potential in mV

**BDL = BELOW DETECTION LIMIT**  
NS = NOT SAMPLED

**verdantas**  
PEOPLE FOCUSED FUTURE

273 WEST MAIN STREET  
NORTON, MASSACHUSETTS 02766  
TEL. 508.226.1800

**TITLE**

**PRB DEMONSTRATION AREA  
INTERMEDIATE ZONE  
ANOXIC CONDITIONS**

PREPARED FOR

**TOWN OF EASTHAM**

DATE

01/29/2024

LOCATION

**NAUSET ROAD  
EASTHAM, MASSACHUSETTS**

DRAWN

DMR

CHECKED

JN

APPROVED

BP

PROJECT NUMBER

8010-04

FILE

EASTHAM ANAEROBIC JAN2024 [DEC DATA].DWG

**FIGURE 6**

## TABLES

|         |                                                         |
|---------|---------------------------------------------------------|
| TABLE 1 | PRB PILOT MONITORING WELL INVENTORY AND MONITORING PLAN |
| TABLE 2 | SUMMARY OF WATER LEVEL ELEVATION MEASUREMENTS           |
| TABLE 3 | SUMMARY OF GROUNDWATER ANALYTICAL RESULTS               |

TABLE 1  
PRB PILOT PROJECT  
MONITORING WELL INVENTORY AND MONITORING PLAN

|                                         |                                                                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Groundwater Gauging:</b>             | All wells gauged for depth to groundwater and depth to bottom of the well.                                                         |
| <b>Standard Groundwater Analyses:</b>   | Field Parameters, Total Nitrogen, Ammonia as N, Nitrate as N, Nitrite as N, Dissolved Iron, Dissolved Manganese, Sulfate, Chloride |
| <b>Additional Groundwater Analyses:</b> | Alkalinity, Methane, DOC, Dissolved Arsenic                                                                                        |

| Monitoring Well<br>Location & ID | Screened Interval<br>(feet bgs) | Rationale                            |
|----------------------------------|---------------------------------|--------------------------------------|
| ESMW-312S                        | 20-30                           | Upgradient of PRB                    |
| ESMW-312I                        | 40-50                           | Upgradient of PRB                    |
| ESMW-313S                        | 25-35                           | Upgradient of PRB                    |
| ESMW-313I                        | 45-55                           | Upgradient of PRB                    |
| ESMW-11S                         | 28-38                           | Downgradient of pilot PRB (25 feet)  |
| ESMW-11I                         | 45-55                           | Downgradient of pilot PRB (25 feet)  |
| ESMW-12SR                        | 25-35                           | Downgradient of pilot PRB (25 feet)  |
| ESMW-12SI                        | 45-55                           | Downgradient of pilot PRB (25 feet)  |
| ESMW-308S                        | 22-32                           | Downgradient of pilot PRB (50 feet)  |
| ESMW-308I                        | 42-52                           | Downgradient of pilot PRB (50 feet)  |
| ESMW-309S                        | 21-31                           | Downgradient of pilot PRB (100 feet) |
| ESMW-309I                        | 41-51                           | Downgradient of pilot PRB (100 feet) |
| ESMW-310S                        | 20-30                           | Downgradient of pilot PRB (25 feet)  |
| ESMW-310I                        | 42-52                           | Downgradient of pilot PRB (25 feet)  |
| ESMW-311S                        | 20-30                           | Downgradient of pilot PRB (175 feet) |
| ESMW-311I                        | 40-50                           | Downgradient of pilot PRB (175 feet) |
| ESMW-315I                        | 45-55                           | Downgradient of pilot PRB (75 feet)  |
| ESMW-316S                        | 12-22                           | Downgradient of pilot PRB (100 feet) |
| ESMW-316I                        | 32-42                           | Downgradient of pilot PRB (100 feet) |
| ESMW-317S                        | 13-23                           | Downgradient of pilot PRB (150 feet) |
| ESMW-317I                        | 33-43                           | Downgradient of pilot PRB (150 feet) |

Notes

Field Parameters = Dissolved Oxygen, Oxidation Reduction Potential, pH, Specific Conductivity, Temperature, Turbidity

DOC = Dissolved Organic Carbon

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID         | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| BUTTONBUSH POND |                 | 12/07/2023 | 12.51                      | 1.90                     | 10.61                               |
|                 |                 | 08/28/2023 | 12.51                      | 1.27                     | 11.24                               |
|                 |                 | 06/02/2023 | 12.51                      | 1.22                     | 11.29                               |
|                 |                 | 03/08/2023 | 12.51                      | 0.55                     | 11.96                               |
| ESMP-1          |                 | 12/07/2023 | 15.72                      | 4.60                     | 11.12                               |
|                 |                 | 08/28/2023 | 15.72                      | NM                       |                                     |
|                 |                 | 03/08/2023 | 15.72                      | 2.59                     | 13.13                               |
| ESMP-3          |                 | 12/07/2023 | 17.32                      | NM                       |                                     |
|                 |                 | 08/28/2023 | 17.32                      | NM                       |                                     |
|                 |                 | 03/08/2023 | 17.32                      | DRY                      |                                     |
| ESMW-1S         | 40-50'          | 12/07/2023 | 48.43                      | 37.76                    | 10.67                               |
| ESMW-1I         | 60-70'          | 12/07/2023 | 48.61                      | 38.09                    | 10.52                               |
| ESMW-1D         | 100-110'        | 12/07/2023 | 48.60                      | 39.61                    | 8.99                                |
| ESMW-2S         | 40-50'          | 12/07/2023 | 45.23                      | 37.29                    | 7.94                                |
|                 |                 | 08/28/2023 | 45.23                      | 36.77                    | 8.46                                |
|                 |                 | 06/02/2023 | 45.23                      | 35.80                    | 9.43                                |
|                 |                 | 03/08/2023 | 45.23                      | 35.28                    | 9.95                                |
| ESMW-2I         | 60-70'          | 12/07/2023 | 44.93                      | 36.71                    | 8.22                                |
|                 |                 | 08/28/2023 | 44.93                      | 36.35                    | 8.58                                |
|                 |                 | 06/02/2023 | 44.93                      | 35.41                    | 9.52                                |
|                 |                 | 03/08/2023 | 44.93                      | 34.96                    | 9.97                                |
| ESMW-2D         | 100-110'        | 12/07/2023 | 44.55                      | 37.06                    | 7.49                                |
|                 |                 | 08/28/2023 | 44.55                      | 36.65                    | 7.90                                |
|                 |                 | 06/02/2023 | 44.55                      | 35.84                    | 8.71                                |
|                 |                 | 03/08/2023 | 44.55                      | 35.27                    | 9.28                                |
| ESMW-3S         | 35-45'          | 12/07/2023 | 50.53                      | 41.25                    | 9.28                                |
|                 |                 | 08/28/2023 | 50.53                      | 40.35                    | 10.18                               |
|                 |                 | 06/02/2023 | 50.53                      | 39.29                    | 11.24                               |
|                 |                 | 03/08/2023 | 50.53                      | 39.01                    | 11.52                               |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-3I   | 70-80'          | 12/07/2023 | 50.73                      | 41.77                    | 8.96                                |
|           |                 | 08/28/2023 | 50.73                      | 41.07                    | 9.66                                |
|           |                 | 06/02/2023 | 50.73                      | 39.92                    | 10.81                               |
|           |                 | 03/08/2023 | 50.73                      | 39.65                    | 11.08                               |
| ESMW-3D   | 110-120'        | 12/07/2023 | 50.71                      | 42.09                    | 8.62                                |
|           |                 | 08/28/2023 | 50.71                      | 41.43                    | 9.28                                |
|           |                 | 06/02/2023 | 50.71                      | 40.46                    | 10.25                               |
|           |                 | 03/08/2023 | 50.71                      | 40.11                    | 10.60                               |
| ESMW-4S   | 38-48'          | 12/07/2023 | 55.53                      | 45.540                   | 9.99                                |
| ESMW-4I   | 60-70'          | 12/07/2023 | 55.48                      | 46.59                    | 8.89                                |
| ESMW-4D   | 100-110'        | 12/07/2023 | 55.51                      | 46.50                    | 9.01                                |
| ESMW-11S  | 28-38'          | 12/07/2023 | 28.10                      | 20.06                    | 8.04                                |
|           |                 | 08/29/2023 | 28.10                      | 19.20                    | 8.90                                |
|           |                 | 06/02/2023 | 28.10                      | 18.08                    | 10.02                               |
|           |                 | 03/08/2023 | 28.10                      | 17.27                    | 10.83                               |
| ESMW-11I  | 45-55'          | 12/07/2023 | 30.08                      | 20.14                    | 9.94                                |
|           |                 | 08/29/2023 | 30.08                      | 19.54                    | 10.54                               |
|           |                 | 06/02/2023 | 30.08                      | 18.59                    | 11.49                               |
|           |                 | 03/08/2023 | 30.08                      | 18.10                    | 11.98                               |
| ESMW-12S  | 45-55'          | 12/07/2023 | 34.82                      | 24.00                    | 10.82                               |
|           |                 | 08/28/2023 | 34.82                      | 23.40                    | 11.42                               |
|           |                 | 06/02/2023 | 34.82                      | 22.49                    | 12.33                               |
|           |                 | 03/08/2023 | 34.82                      | 22.02                    | 12.80                               |
| ESMW-12SR | 25-35'          | 12/07/2023 | 34.12                      | 24.20                    | 9.92                                |
|           |                 | 06/02/2023 | 34.12                      | 22.33                    | 11.79                               |
|           |                 | 03/08/2023 | 34.12                      | 21.60                    | 12.52                               |
| ESMW-10IS | 39-49'          | 12/07/2023 | 44.12                      | 35.75                    | 8.37                                |
|           |                 | 08/28/2023 | 44.12                      | 34.00                    | 10.12                               |
|           |                 | 06/02/2023 | 44.12                      | 32.97                    | 11.15                               |
|           |                 | 03/08/2023 | 44.12                      | 32.65                    | 11.47                               |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-101I | 59-69'          | 12/07/2023 | 44.64                      | 35.93                    | 8.71                                |
|           |                 | 08/28/2023 | 44.64                      | 35.29                    | 9.35                                |
|           |                 | 06/02/2023 | 44.64                      | 34.23                    | 10.41                               |
|           |                 | 03/08/2023 | 44.64                      | 33.81                    | 10.83                               |
| ESMW-101D | 79-89'          | 12/07/2023 | 44.57                      | 35.84                    | 8.73                                |
|           |                 | 08/28/2023 | 44.57                      | 35.17                    | 9.40                                |
|           |                 | 06/02/2023 | 44.57                      | 34.12                    | 10.45                               |
|           |                 | 03/08/2023 | 44.57                      | 33.66                    | 10.91                               |
| ESMW-102S | 13-23'          | 12/07/2023 | 24.47                      | 17.31                    | 7.16                                |
|           |                 | 08/28/2023 | 24.47                      | 16.85                    | 7.62                                |
|           |                 | 06/02/2023 | 24.47                      | 16.12                    | 8.35                                |
|           |                 | 03/08/2023 | 24.47                      | 15.55                    | 8.92                                |
| ESMW-103S | 27-37'          | 12/07/2023 | 37.79                      | 30.32                    | 7.47                                |
|           |                 | 08/28/2023 | 37.79                      | 30.22                    | 7.57                                |
|           |                 | 06/02/2023 | 37.79                      | 29.43                    | 8.36                                |
|           |                 | 03/08/2023 | 37.79                      | 28.87                    | 8.92                                |
| ESMW-103I | 47-57'          | 12/07/2023 | 37.19                      | 30.66                    | 6.53                                |
|           |                 | 08/28/2023 | 37.19                      | 30.30                    | 6.89                                |
|           |                 | 06/02/2023 | 37.19                      | 29.50                    | 7.69                                |
|           |                 | 03/08/2023 | 37.19                      | 28.93                    | 8.26                                |
| ESMW-103D | 67-77'          | 12/07/2023 | 37.21                      | 30.69                    | 6.52                                |
|           |                 | 08/28/2023 | 37.21                      | 30.43                    | 6.78                                |
|           |                 | 06/02/2023 | 37.21                      | 29.50                    | 7.71                                |
|           |                 | 03/08/2023 | 37.21                      | 28.88                    | 8.33                                |
| ESMW-104S | 19-29'          | 12/07/2023 | 27.43                      | 23.70                    | 3.73                                |
|           |                 | 08/28/2023 | 27.43                      | 23.15                    | 4.28                                |
|           |                 | 06/02/2023 | 27.43                      | 22.18                    | 5.25                                |
|           |                 | 03/08/2023 | 27.43                      | 21.39                    | 6.04                                |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-105S | 29-39'          | 12/07/2023 | 40.82                      | NM                       |                                     |
|           |                 | 08/28/2023 | 40.82                      | 32.45                    | 8.37                                |
|           |                 | 06/02/2023 | 40.82                      | 31.35                    | 9.47                                |
|           |                 | 03/08/2023 | 40.82                      | 30.67                    | 10.15                               |
| ESMW-206S | 27-37'          | 12/07/2023 | 39.73                      | 32.45                    | 7.28                                |
|           |                 | 08/28/2023 | 39.73                      | 32.13                    | 7.60                                |
|           |                 | 06/02/2023 | 39.73                      | 31.35                    | 8.38                                |
|           |                 | 03/08/2023 | 39.73                      | 30.45                    | 9.28                                |
| ESMW-206I | 47-57'          | 12/07/2023 | 39.74                      | 32.50                    | 7.24                                |
|           |                 | 08/28/2023 | 39.74                      | 32.10                    | 7.64                                |
|           |                 | 06/02/2023 | 39.74                      | 31.32                    | 8.42                                |
|           |                 | 03/08/2023 | 39.74                      | 30.74                    | 9.00                                |
| ESMW-206D | 67-77'          | 12/07/2023 | 39.60                      | 32.38                    | 7.22                                |
|           |                 | 08/28/2023 | 39.60                      | 31.99                    | 7.61                                |
|           |                 | 06/02/2023 | 39.60                      | 31.21                    | 8.39                                |
|           |                 | 03/08/2023 | 39.60                      | 30.60                    | 9.00                                |
| ESMW-301S | 20-30'          | 12/07/2023 | 33.20                      | 25.70                    | 7.50                                |
|           |                 | 08/28/2023 | 33.20                      | 25.49                    | 7.71                                |
|           |                 | 06/02/2023 | 33.20                      | 22.47                    | 10.73                               |
|           |                 | 03/08/2023 | 33.20                      | 23.81                    | 9.39                                |
| ESMW-301I | 40-50'          | 12/07/2023 | 33.25                      | 25.68                    | 7.57                                |
|           |                 | 08/28/2023 | 33.25                      | 25.23                    | 8.02                                |
|           |                 | 06/02/2023 | 33.25                      | 24.36                    | 8.89                                |
|           |                 | 03/08/2023 | 33.25                      | 23.74                    | 9.51                                |
| ESMW-301D | 60-70'          | 12/07/2023 | 33.13                      | 25.85                    | 7.28                                |
|           |                 | 08/28/2023 | 33.13                      | 25.40                    | 7.73                                |
|           |                 | 06/02/2023 | 33.13                      | 24.72                    | 8.41                                |
|           |                 | 03/08/2023 | 33.13                      | 24.13                    | 9.00                                |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-302S | 11-21'          | 12/07/2023 | 21.40                      | 16.74                    | 4.66                                |
|           |                 | 08/28/2023 | 21.40                      | 16.52                    | 4.88                                |
|           |                 | 06/02/2023 | 21.40                      | 15.69                    | 5.71                                |
|           |                 | 03/08/2023 | 21.40                      | 14.99                    | 6.41                                |
| ESMW-302I | 31-41'          | 12/07/2023 | 21.33                      | 15.00                    | 6.33                                |
|           |                 | 08/28/2023 | 21.33                      | 14.70                    | 6.63                                |
|           |                 | 06/02/2023 | 21.33                      | 14.13                    | 7.20                                |
|           |                 | 03/08/2023 | 21.33                      | 13.47                    | 7.86                                |
| ESMW-302D | 51-61'          | 12/07/2023 | 21.13                      | 14.76                    | 6.37                                |
|           |                 | 08/28/2023 | 21.13                      | 14.44                    | 6.69                                |
|           |                 | 06/02/2023 | 21.13                      | 13.80                    | 7.33                                |
|           |                 | 03/08/2023 | 21.13                      | 13.21                    | 7.92                                |
| ESMW-303S | 15-25'          | 12/07/2023 | 27.97                      | 19.41                    | 8.56                                |
|           |                 | 08/28/2023 | 27.97                      | 18.73                    | 9.24                                |
|           |                 | 06/02/2023 | 27.97                      | 17.92                    | 10.05                               |
|           |                 | 03/08/2023 | 27.97                      | 17.16                    | 10.81                               |
| ESMW-303I | 30-40'          | 12/07/2023 | 28.16                      | 20.99                    | 7.17                                |
|           |                 | 08/28/2023 | 28.16                      | 20.35                    | 7.81                                |
|           |                 | 06/02/2023 | 28.16                      | 19.19                    | 8.97                                |
|           |                 | 03/08/2023 | 28.16                      | 18.39                    | 9.77                                |
| ESMW-303D | 50-60'          | 12/07/2023 | 27.92                      | 21.69                    | 6.23                                |
|           |                 | 08/28/2023 | 27.92                      | 21.32                    | 6.60                                |
|           |                 | 06/02/2023 | 27.92                      | 20.57                    | 7.35                                |
|           |                 | 03/08/2023 | 27.92                      | 19.95                    | 7.97                                |
| ESMW-304S | 12-22'          | 12/07/2023 | 22.84                      | 14.20                    | 8.64                                |
|           |                 | 08/28/2023 | 22.84                      | 13.70                    | 9.14                                |
|           |                 | 06/02/2023 | 22.84                      | 12.78                    | 10.06                               |
|           |                 | 03/08/2023 | 22.84                      | 11.94                    | 10.90                               |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-305S | 25-35'          | 12/07/2023 | 40.71                      | 34.69                    | 6.02                                |
|           |                 | 08/28/2023 | 40.71                      | 34.43                    | 6.28                                |
|           |                 | 06/02/2023 | 40.71                      | 33.59                    | 7.12                                |
|           |                 | 03/08/2023 | 40.71                      | 32.96                    | 7.75                                |
| ESMW-305I | 40-50'          | 12/07/2023 | 40.77                      | 34.75                    | 6.02                                |
|           |                 | 08/28/2023 | 40.77                      | 34.42                    | 6.35                                |
|           |                 | 06/02/2023 | 40.77                      | 33.67                    | 7.10                                |
|           |                 | 03/08/2023 | 40.77                      | 33.03                    | 7.74                                |
| ESMW-305D | 60-70'          | 12/07/2023 | 40.36                      | 34.45                    | 5.91                                |
|           |                 | 08/28/2023 | 40.36                      | 34.15                    | 6.21                                |
|           |                 | 06/02/2023 | 40.36                      | 33.44                    | 6.92                                |
|           |                 | 03/08/2023 | 40.36                      | 32.80                    | 7.56                                |
| ESMW-306S | 20-30'          | 12/07/2023 | 30.23                      | 20.60                    | 9.63                                |
|           |                 | 08/28/2023 | 30.23                      | 25.59                    | 4.64                                |
|           |                 | 06/02/2023 | 30.23                      | 20.56                    | 9.67                                |
|           |                 | 03/08/2023 | 30.23                      | 24.21                    | 6.02                                |
| ESMW-306I | 35-45'          | 12/07/2023 | 29.91                      | 25.34                    | 4.57                                |
|           |                 | 08/28/2023 | 29.91                      | 25.15                    | 4.76                                |
|           |                 | 06/02/2023 | 29.91                      | 24.75                    | 5.16                                |
|           |                 | 03/08/2023 | 29.91                      | 24.04                    | 5.87                                |
| ESMW-306D | 55-65'          | 12/07/2023 | 29.33                      | 24.47                    | 4.86                                |
|           |                 | 08/28/2023 | 29.33                      | 24.30                    | 5.03                                |
|           |                 | 06/02/2023 | 29.33                      | 23.68                    | 5.65                                |
|           |                 | 03/08/2023 | 29.33                      | 23.10                    | 6.23                                |
| ESMW-307S | 25-35'          | 12/07/2023 | 34.18                      | 30.78                    | 3.40                                |
|           |                 | 08/28/2023 | 34.18                      | 30.76                    | 3.42                                |
|           |                 | 06/02/2023 | 34.18                      | 30.60                    | 3.58                                |
| ESMW-307I | 40-50'          | 12/07/2023 | 34.10                      | 30.70                    | 3.40                                |
|           |                 | 08/28/2023 | 34.10                      | 30.69                    | 3.41                                |
|           |                 | 06/02/2023 | 34.10                      | 30.52                    | 3.58                                |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-307D | 60-70'          | 12/07/2023 | 34.45                      | 30.10                    | 4.35                                |
|           |                 | 08/28/2023 | 34.45                      | 31.09                    | 3.36                                |
|           |                 | 06/02/2023 | 34.45                      | 30.93                    | 3.52                                |
| ESMW-308S | 22-32'          | 12/07/2023 | 33.87                      | 24.02                    | 9.85                                |
|           |                 | 08/28/2023 | 33.87                      | 23.28                    | 10.59                               |
|           |                 | 06/02/2023 | 33.87                      | 22.13                    | 11.74                               |
|           |                 | 03/08/2023 | 33.87                      | 24.40                    | 9.47                                |
| ESMW-308I | 42-52'          | 12/07/2023 | 33.68                      | 23.84                    | 9.84                                |
|           |                 | 08/28/2023 | 33.68                      | 23.26                    | 10.42                               |
|           |                 | 06/02/2023 | 33.68                      | 22.35                    | 11.33                               |
|           |                 | 03/08/2023 | 33.68                      | 21.84                    | 11.84                               |
| ESMW-309S | 21-31'          | 12/07/2023 | 32.28                      | 22.31                    | 9.97                                |
|           |                 | 08/28/2023 | 32.28                      | 21.57                    | 10.71                               |
|           |                 | 06/02/2023 | 32.28                      | 20.42                    | 11.86                               |
|           |                 | 03/08/2023 | 32.28                      | 19.65                    | 12.63                               |
| ESMW-309I | 41-51'          | 12/07/2023 | 31.90                      | 22.08                    | 9.82                                |
|           |                 | 08/28/2023 | 31.90                      | 21.50                    | 10.40                               |
|           |                 | 06/02/2023 | 31.90                      | 20.53                    | 11.37                               |
|           |                 | 03/08/2023 | 31.90                      | 20.08                    | 11.82                               |
| ESMW-310S | 20-30'          | 12/07/2023 | 30.27                      | 20.34                    | 9.93                                |
|           |                 | 08/29/2023 | 30.27                      | 19.63                    | 10.64                               |
|           |                 | 06/02/2023 | 30.27                      | 18.40                    | 11.87                               |
|           |                 | 03/08/2023 | 30.27                      | 17.59                    | 12.68                               |
| ESMW-310I | 42-52'          | 12/07/2023 | 30.31                      | 20.42                    | 9.89                                |
|           |                 | 08/29/2023 | 30.31                      | 19.85                    | 10.46                               |
|           |                 | 06/02/2023 | 30.31                      | 18.92                    | 11.39                               |
|           |                 | 03/08/2023 | 30.31                      | 18.40                    | 11.91                               |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID   | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-----------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-311S | 20-30'          | 12/07/2023 | 33.89                      | 23.95                    | 9.94                                |
|           |                 | 08/28/2023 | 33.89                      | 23.15                    | 10.74                               |
|           |                 | 06/02/2023 | 33.89                      | 22.22                    | 11.67                               |
|           |                 | 03/08/2023 | 33.89                      | 21.38                    | 12.51                               |
| ESMW-311I | 40-50'          | 12/07/2023 | 33.89                      | 24.24                    | 9.65                                |
|           |                 | 08/28/2023 | 33.89                      | 23.71                    | 10.18                               |
|           |                 | 06/02/2023 | 33.89                      | 22.82                    | 11.07                               |
|           |                 | 03/08/2023 | 33.89                      | 22.25                    | 11.64                               |
| ESMW-312S | 20-30'          | 12/07/2023 | 36.39                      | 26.15                    | 10.24                               |
|           |                 | 08/28/2023 | 36.39                      | 25.71                    | 10.68                               |
|           |                 | 06/02/2023 | 36.39                      | 24.44                    | 11.95                               |
|           |                 | 03/08/2023 | 36.39                      | 23.62                    | 12.77                               |
| ESMW-312I | 40-50'          | 12/07/2023 | 36.36                      | 26.30                    | 10.06                               |
|           |                 | 08/28/2023 | 36.36                      | 25.71                    | 10.65                               |
|           |                 | 06/02/2023 | 36.36                      | 24.70                    | 11.66                               |
|           |                 | 03/08/2023 | 36.36                      | 24.20                    | 12.16                               |
| ESMW-313S | 25-35'          | 12/07/2023 | 32.92                      | 22.97                    | 9.95                                |
|           |                 | 08/29/2023 | 32.92                      | 22.18                    | 10.74                               |
|           |                 | 06/02/2023 | 32.92                      | 20.96                    | 11.96                               |
|           |                 | 03/08/2023 | 32.92                      | 20.14                    | 12.78                               |
| ESMW-313I | 45-55'          | 12/07/2023 | 33.05                      | 22.98                    | 10.07                               |
|           |                 | 08/29/2023 | 33.05                      | 22.36                    | 10.69                               |
|           |                 | 06/02/2023 | 33.05                      | 22.35                    | 10.70                               |
|           |                 | 03/08/2023 | 33.05                      | 20.85                    | 12.20                               |
| ESMW-314S | 35-45'          | 12/07/2023 | 51.86                      | 41.38                    | 10.48                               |
|           |                 | 08/28/2023 | 51.86                      | 40.66                    | 11.20                               |
|           |                 | 06/02/2023 | 51.86                      | 39.58                    | 12.28                               |
|           |                 | 03/08/2023 | 51.86                      | 39.09                    | 12.77                               |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 2**  
**SUMMARY OF**  
**WATER LEVEL ELEVATION MEASUREMENTS**  
**Eastham PRB Study**  
**Eastham, MA**

| Well ID           | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|-------------------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| ESMW-314I         | 50-60'          | 12/07/2023 | 51.83                      | 41.33                    | 10.50                               |
|                   |                 | 08/28/2023 | 51.83                      | 40.64                    | 11.19                               |
|                   |                 | 06/02/2023 | 51.83                      | 39.50                    | 12.33                               |
|                   |                 | 03/08/2023 | 51.83                      | 39.05                    | 12.78                               |
| ESMW-315I         | 45-55'          | 12/07/2023 | 33.83                      | 24.02                    | 9.81                                |
|                   |                 | 08/29/2023 | 33.83                      | 23.42                    | 10.41                               |
|                   |                 | 06/02/2023 | 33.83                      | 22.52                    | 11.31                               |
|                   |                 | 03/08/2023 | 33.83                      | 22.05                    | 11.78                               |
| ESMW-316S         | 12-22'          | 12/07/2023 | 28.06                      | 18.61                    | 9.45                                |
|                   |                 | 08/29/2023 | 28.06                      | 17.72                    | 10.34                               |
|                   |                 | 06/02/2023 | 28.06                      | 17.20                    | 10.86                               |
|                   |                 | 03/08/2023 | 28.06                      | 16.46                    | 11.60                               |
| ESMW-316I         | 32-42'          | 12/07/2023 | 27.95                      | 19.76                    | 8.19                                |
|                   |                 | 08/29/2023 | 27.95                      | 19.00                    | 8.95                                |
|                   |                 | 06/02/2023 | 27.95                      | 18.86                    | 9.09                                |
|                   |                 | 03/08/2023 | 27.95                      | 17.07                    | 10.88                               |
| ESMW-317S         | 13-23'          | 12/07/2023 | 30.06                      | 20.56                    | 9.50                                |
|                   |                 | 08/28/2023 | 30.06                      | 19.72                    | 10.34                               |
|                   |                 | 06/02/2023 | 30.06                      | 19.20                    | 10.86                               |
|                   |                 | 03/08/2023 | 30.06                      | 19.45                    | 10.61                               |
| ESMW-317I         | 50-60'          | 12/07/2023 | 29.91                      | 21.85                    | 8.06                                |
|                   |                 | 08/28/2023 | 29.91                      | 21.13                    | 8.78                                |
|                   |                 | 06/02/2023 | 29.91                      | 20.01                    | 9.90                                |
|                   |                 | 03/08/2023 | 29.91                      | 19.16                    | 10.75                               |
| MINISTER'S PIEZ   |                 | 12/07/2023 | 15.08                      | 4.82                     | 10.26                               |
|                   |                 | 08/28/2023 | 15.08                      | NM                       |                                     |
| MOLL'S NORTH PIEZ |                 | 12/07/2023 | 20.25                      | NM                       |                                     |
|                   |                 | 08/28/2023 | 20.25                      | NM                       |                                     |
| MOLLS SOUTH PIEZ  |                 | 12/07/2023 | 14.52                      | 5.88                     | 8.64                                |
|                   |                 | 08/28/2023 | 14.52                      | NM                       |                                     |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

TABLE 2  
SUMMARY OF  
WATER LEVEL ELEVATION MEASUREMENTS  
Eastham PRB Study  
Eastham, MA

| Well ID          | Screen Interval | Date       | Casing Elevation<br>(feet) | Depth to Water<br>(feet) | Corrected Water Elevation<br>(feet) |
|------------------|-----------------|------------|----------------------------|--------------------------|-------------------------------------|
| SCHOOLHOUSE PIEZ |                 | 12/07/2023 | 15.14                      | 3.32                     | 11.82                               |
|                  |                 | 08/28/2023 | 15.14                      | NM                       |                                     |

Notes: NM - Not Measured  
NA - Not Applicable  
ND - Not Detected

**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|          |            | In Situ                  |        |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|----------|------------|--------------------------|--------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|--------|----------|---------|-------|---------|------------|--|
|          |            | Water Quality Parameters |        |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |        | Anions   |         | Other |         |            |  |
| Well ID  | Date       | pH                       | ORP    | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron  | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|          |            | su                       | mV     | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L   | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-11S |            |                          |        |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|          | 08/29/2023 | 6.50                     | -127.8 | 0.34 | 14.5    | 726         | 1.1                 | <0.20   | 1.1    | <0.11   | 0.020   | 245000   | 17500     | 36.0    | NS     | 87.6     | <2.0    | 39.4  | NS      | 364        |  |
|          | 05/31/2023 | 6.54                     | -117   | 0.28 | 14      | 1061        | 1.2                 | <0.20   | 1.2    | <0.11   | <0.010  | 176.0    | 14.7      | 0.0317  | NS     | 93.3     | <2.0    | 48.3  | NS      | 337        |  |
|          | 03/08/2023 | 6.51                     | -129.1 | 0.55 | 12.5    | 1658        | 1.2                 | <0.20   | 1.2    | <0.11   | <0.010  | 249      | 18.4      | 0.0284  | NS     | 302      | <2.0    | 83.6  | NS      | 194        |  |
|          | 09/07/2022 | 6.78                     | -100.2 | 0.03 | 14.9    | 1310        | 1.5                 | <0.20   | 1.5    | <0.11   | 0.012   | 216      | 15.9      | 0.0214  | NS     | 126      | <2.0    | 140   | 18700   | 355        |  |
|          | 06/01/2022 | 6.47                     | -95.9  | 0.80 | 12.5    | 1290        | 1.9                 | <0.20   | 1.9    | <0.11   | <0.010  | 168      | 12.1      | 0.0314  | NS     | 200      | 2.2     | 151   | 15300   | 150        |  |
|          | 03/01/2022 | 6.29                     | -106.9 | 0.3  | 8.7     | 781         | 1.4                 | <0.20   | 1.4    | <0.11   | <0.010  | 151      | 10.8      | 0.0283  | NS     | 59.5     | 3.1     | 112   | 6610    | 205        |  |
|          | 12/16/2021 | 6.01                     | -59.7  | 0.01 | 14.0    | 860         | 1.4                 | <0.20   | 1.4    | <0.11   | <0.010  | 133      | 11        | 0.0332  | NS     | 65.8     | <10     | 85.9  | 2810    | 173        |  |
|          | 09/13/2021 | 6.19                     | -85    | 0.80 | 13.8    | 1224        | 1.3                 | <0.20   | 1.3    | <0.11   | <0.010  | 244.0    | 18.1      | 0.0362  | NS     | 89.1     | <3.0    | 339   | 485     | 255        |  |
|          | 06/23/2021 | 6.98                     | -124.0 | 0.0  | 14.2    | 1214        | 1.0                 | <0.20   | 1.0    | <0.11   | <0.010  | 263      | 16.5      | 0.0271  | NS     | 73.0     | <2.0    | 151   | 184     | 340        |  |
|          | 03/17/2021 | NM                       | NM     | NM   | NM      | NM          | 1.2                 | <0.150  | 1.22   | <0.100  | <0.050  | 126      | 7.61      | 0.0330  | NS     | 85       | <10     | 210   | 2.53    | 284        |  |
|          | 12/08/2020 | 6.27                     | -143.1 | 0    | 11.8    | 795         | 1.2                 | <0.075  | 1.25   | <0.100  | <0.050  | 89.3     | 8.10      | 0.026   | NS     | 85       | <10     | 110   | 2.16    | 247        |  |
|          | 06/11/2020 | 6.16                     | -8.0   | 0.32 | 14.6    | 431.9       | 1.1                 | <0.075  | 1.11   | <0.100  | <0.050  | 0.933    | 0.125     | <0.005  | NS     | 35       | 32      | 76    | NS      | 115        |  |
|          | 03/09/2020 | 5.3                      | 312.1  | 5.4  | 12.8    | 889         | 1.9                 | 0.086   | <0.300 | 1.88    | <0.050  | 0.291    | NS        | <0.005  | NS     | 240      | <10     | <2.0  | NS      | 7.20       |  |
|          | 12/04/2019 | 5.45                     | 244.0  | 6.81 | 12.4    | 279.4       | 2.1                 | 0.085   | <0.300 | 2.09    | <0.050  | <0.050   | NS        | <0.005  | NS     | 65       | <10     | <1.0  | <1.00   | 9.5        |  |
|          | 09/17/2019 | 5.6                      | 260    | 8.1  | 14.3    | 179         | 1.6                 | <0.075  | <0.300 | 1.66    | <0.050  | <0.050   | NS        | NS      | NS     | 37       | <10     | NS    | NS      | NS         |  |
|          | 06/14/2019 | 5.7                      | 167    | 5.5  | 12.5    | 157         | NS                  | NS      | NS     | 1.66    | NS      | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |  |
|          | 05/21/2019 | 5.3                      | 172.1  | 2.6  | 12.0    | 205         | 2.27                | <0.10   | NS     | 1.94    | <0.010  | <0.100   | NS        | NS      | NS     | 40.4     | 11.0    | NS    | NS      | NS         |  |
|          | 12/19/2017 | 5.68                     | NM     | 5.45 | 10.91   | 344         | NS                  | <0.075  | <0.300 | 1.68    | <0.050  | <0.050   | 0.019     | NS      | <0.030 | 73       | 11      | <1.0  | NS      | NS         |  |
|          | 04/28/2017 | NM                       | NM     | NM   | NM      | NM          | NS                  | <0.075  | <0.300 | 3.72    | <0.050  | 0.14     | 0.046     | <0.005  | 0.044  | NS       | NS      | <1.0  | NS      | NS         |  |
|          | 06/01/2016 | 6.02                     | 74     | 6.52 | NM      | 170.0       | NS                  | 0.176   | 0.33   | 1.71    | <0.500  | <0.100   | <10       | NS      | 0.28   | <0.05    | 11.3    | 31.7  | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen  
 \* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 ND - Not Detected (Lab)  
 \*Dup - duplicate sample

12/15/2023 Page 1 of 25  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|          |            | In Situ                  |        |      |         |             | Laboratory Analyses |         |       |         |         |          |           |         |       |          |         |       |         |            |  |
|----------|------------|--------------------------|--------|------|---------|-------------|---------------------|---------|-------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|          |            | Water Quality Parameters |        |      |         |             | Nitrogen            |         |       |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID  | Date       | pH                       | ORP    | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN   | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|          |            | su                       | mV     | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L  | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-111 |            |                          |        |      |         |             |                     |         |       |         |         |          |           |         |       |          |         |       |         |            |  |
|          | 08/29/2023 | 6.64                     | -104.6 | 0.38 | 13.0    | 279         | <0.30               | 0.35    | 0.23  | <0.11   | 0.025   | 30100    | 666       | 21.2    | NS    | 47.0     | 2.8     | 5.4   | NS      | 78.7       |  |
| Dup      | 08/29/2023 | NM                       | NM     | NM   | NM      | NM          | <0.30               | NS      | <0.20 | <0.11   | 0.023   | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 05/31/2023 | 6.55                     | -99.2  | 6.46 | 13.2    | 314         | 1.1                 | <0.20   | 0.72  | 0.39    | <0.010  | 19.6     | 0.815     | 0.0148  | NS    | 43.8     | 10.6    | 2.0   | NS      | 54.8       |  |
| Dup      | 05/31/2023 | NM                       | NM     | NM   | NM      | NM          | 1.3                 | NS      | 0.88  | 0.4     | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 03/08/2023 | 6.59                     | -98.3  | 0.10 | 12.3    | 293.7       | 0.89                | <0.20   | 0.51  | 0.38    | <0.010  | 17.5     | 0.792     | 0.0201  | NS    | 45.4     | 11.8    | 1.6   | NS      | 42.0       |  |
| Dup      | 03/08/2023 | NM                       | NM     | NM   | NM      | NM          | 0.93                | NS      | 0.54  | 0.39    | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 09/07/2022 | 6.77                     | -25.2  | 0.13 | 13.8    | 305.2       | 0.73                | <0.20   | 0.73  | <0.11   | 0.014   | 23.2     | 0.912     | 0.0195  | NS    | 45.9     | 2.6     | 4.2   | 5390    | 36.5       |  |
| Dup      | 09/07/2022 | NM                       | NM     | NM   | NM      | NM          | 0.63                | NS      | 0.63  | <0.11   | 0.017   | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 06/01/2022 | 6.30                     | -47.7  | 1.09 | 12.4    | 254.3       | <0.90               | <0.20   | <0.80 | 0.63    | <0.010  | 14.4     | 0.533     | 0.0178  | NS    | 43.3     | 11.9    | 5.6   | 1640    | 27.0       |  |
| Dup      | 06/01/2022 | NM                       | NM     | NM   | NM      | NM          | 2.5                 | NS      | 1.9   | 0.59    | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 03/01/2022 | 6.36                     | -110.9 | 0.40 | 11.1    | 282.9       | 0.95                | <0.20   | 0.71  | 0.24    | <0.010  | 16.2     | 1.09      | 0.0074  | NS    | 34.1     | 3.0     | 9.1   | 3700    | 46.5       |  |
| Dup      | 03/01/2022 | NM                       | NM     | NM   | NM      | NM          | 0.90                | NS      | 0.67  | 0.23    | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 12/16/2021 | 6.18                     | 48.9   | 0.18 | 13.0    | 266.0       | <0.30               | <0.20   | 0.29  | <0.11   | <0.010  | 17.1     | 1.06      | 0.0206  | NS    | 42.5     | 14.9    | 4.9   | 1940    | 35.5       |  |
| Dup      | 12/16/2021 | NM                       | NM     | NM   | NM      | NM          | <0.30               | <0.20   | 0.23  | <0.11   | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 09/13/2021 | 6.2                      | -85    | 0.66 | 13.4    | 265         | <0.30               | <0.20   | <0.20 | <0.11   | <0.010  | 16.9     | 1.56      | 0.0130  | NS    | 41.6     | 2.6     | 13.2  | 1080    | 35.5       |  |
| Dup      | 09/13/2021 | 6.2                      | -85    | 0.66 | 13.4    | 265         | <0.30               | NS      | <0.20 | <0.11   | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 06/23/2021 | 6.91                     | -116.0 | 0.13 | 13.7    | 280.1       | 0.47                | <0.20   | 0.25  | 0.22    | <0.010  | 17.8     | 1.39      | 0.0221  | NS    | 43.3     | 8.7     | 4.9   | 91.9    | 43.0       |  |
| Dup      | 06/23/2021 | NM                       | NM     | NM   | NM      | NM          | 0.52                | NS      | 0.27  | 0.25    | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 03/17/2021 | NM                       | NM     | NM   | NM      | NM          | 1.9                 | <0.375  | 1.94  | <0.100  | <0.050  | 4.73     | 0.497     | <0.005  | NS    | 36       | <10     | 220   | 27.0    | 104        |  |
| Dup      | 03/17/2021 | NM                       | NM     | NM   | NM      | NM          | 2.2                 | NS      | 2.2   | <0.100  | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|          | 12/08/2020 | 6.58                     | -129.3 | 0.01 | 11.3    | 405.2       | 0.49                | 0.079   | 0.494 | <0.100  | <0.050  | 17.2     | 2.50      | 0.0170  | NS    | 34       | <10     | 11    | 129     | 136        |  |
| Dup      | 12/08/2020 | NM                       | NM     | NM   | NM      | NM          | 0.35                | NS      | 0.352 | <0.100  | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time. \* ESMW-12S is an intermediate depth well.  
 NS - Not Sampled (lab) NM - Not Measured (field) ND - Not Detected (Lab)  
 NU - Data Not Usable TKN - Total Kjeldahl Nitrogen  
 DOC - Dissolved Organic Carbon DO - Dissolved Oxygen \*Dup - duplicate sample

**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|          |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|--------|----------|---------|-------|---------|------------|--|
|          |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |        | Anions   |         | Other |         |            |  |
| Well ID  | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron  | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|          |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L   | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-111 |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|          | 06/11/2020 | 6.31                     | -55.5 | 0.48 | 13.1    | 372.1       | 1.1                 | 0.102   | 0.962  | <0.100  | 0.132   | 7.24     | 0.437     | <0.005  | NS     | 37       | <10     | 39    | NS      | 78.6       |  |
|          | 03/09/2020 | 5.6                      | 235.5 | 6.9  | 12.4    | 231.1       | 2.0                 | 0.083   | <0.300 | 2.00    | <0.050  | 0.120    | NS        | <0.005  | NS     | 46       | <10     | <1.0  | NS      | 15.4       |  |
|          | 12/04/2019 | 5.82                     | 194.1 | 8.21 | 12.1    | 235.6       | 3.4                 | <0.075  | <0.300 | 3.38    | <0.050  | 0.068    | NS        | <0.005  | NS     | 42       | 11      | <1.0  | <1.00   | 15         |  |
|          | 09/17/2019 | 5.8                      | 183   | 7.5  | 12.9    | 199         | 1.8                 | <0.075  | <0.300 | 1.79    | <0.050  | 0.062    | NS        | NS      | NS     | 38       | 11      | NS    | NS      | NS         |  |
|          | 06/14/2019 | 6.1                      | 127   | 9.9  | 13.3    | 203         | NS                  | NS      | NS     | 1.31    | NS      | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |  |
|          | 05/21/2019 | 5.6                      | 114.5 | 7.0  | 12.9    | 215         | 1.55                | <0.10   | NS     | 0.965   | <0.010  | 0.428    | NS        | NS      | NS     | 42.1     | 13.2    | NS    | NS      | NS         |  |
|          | 12/19/2017 | 6.15                     | NM    | 8.13 | 12.06   | 209         | NS                  | <0.075  | <0.300 | 1.25    | <0.050  | <0.050   | <0.010    | NS      | <0.030 | 37       | 14      | <1.0  | NS      | NS         |  |
|          | 04/28/2017 | NM                       | NM    | NM   | NM      | NM          | NS                  | <0.075  | <0.300 | 1.22    | <0.050  | 0.54     | 0.076     | <0.005  | 0.049  | NS       | NS      | <2.0  | NS      | NS         |  |
|          | 06/01/2016 | 6.67                     | -148  | 5.60 | NM      | 242.0       | NS                  | 0.245   | 0.20   | 1.02    | 0.585   | <0.100   | <10       | NS      | 0.086  | <0.05    | 14.5    | 48    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
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\* ESMW-12S is an intermediate depth well.  
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 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|          |            | In Situ                  |        |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |        |          |         |      |         |            |  |
|----------|------------|--------------------------|--------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|--------|----------|---------|------|---------|------------|--|
|          |            | Water Quality Parameters |        |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |        |          | Anions  |      | Other   |            |  |
| Well ID  | Date       | pH                       | ORP    | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron  | Chloride | Sulfate | DOC  | Methane | Alkalinity |  |
|          |            | su                       | mV     | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L   | mg/L     | mg/L    | mg/L | µg/L    | as CaCO3   |  |
| ESMW-12S |            |                          |        |       |         |             |                     |         |        |         |         |          |           |         |        |          |         |      |         |            |  |
|          | 12/06/2023 | 7.10                     | -138.1 | 0.17  | 12.2    | 355.4       | 1.1                 | <0.2    | 1.1    | <0.11   | <0.01   | 43.6     | 0.475     | 0.0391  | NS     | 44       | 11.3    | 1.7  | 10500   | 59.8       |  |
|          | 08/28/2023 | 7.12                     | -173.5 | 0.72  | 14.0    | 345         | 4.2                 | <0.20   | 4.2    | <0.11   | <0.010  | 51000    | 509       | 43.2    | NS     | 51.9     | 11.1    | 1.9  | 17200   | 60.1       |  |
|          | 06/01/2023 | 7.05                     | 151.8  | 0.46  | 13.3    | 513         | 2.9                 | <0.20   | 2.9    | <0.11   | <0.010  | 831.0    | 0.651     | 0.045   | NS     | 55.5     | <2.0    | 14.9 | 19200   | 98.8       |  |
|          | 03/09/2023 | 7.17                     | -188.0 | 0.52  | 12.2    | 570         | 1.5                 | <0.20   | 1.5    | <0.11   | <0.010  | 86.2     | 1.16      | 0.0412  | NS     | 55.6     | <2.0    | 34.7 | 21000   | 91.0       |  |
|          | 12/02/2022 | 7.03                     | -105.4 | 0.44  | 12.3    | 350.2       | 1.6                 | 0.22    | 1.6    | <0.11   | 0.013   | 39.8     | 0.698     | 0.033   | NS     | 57.9     | 9.1     | 6.4  | 3000    | 56.0       |  |
|          | 09/06/2022 | 7.06                     | -151.3 | 0.13  | 13.5    | 444.5       | 2.8                 | <0.20   | 2.8    | <0.11   | <0.010  | 49.5     | 0.928     | 0.0363  | NS     | 70.2     | <2.0    | 15   | 11100   | 53         |  |
|          | 06/02/2022 | 6.82                     | -112.7 | 0.71  | 12.6    | 427.1       | 0.67                | <0.20   | 0.67   | <0.11   | <0.010  | 48.6     | 1.39      | 0.0497  | NS     | 59.9     | <2.0    | 26.4 | 4640    | 38.0       |  |
|          | 03/01/2022 | 7.08                     | -146.2 | 0.34  | 11.7    | 423.6       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 45.8     | 0.719     | 0.0369  | NS     | 67.3     | <2.0    | 18.3 | 934     | 34.5       |  |
|          | 12/16/2021 | 6.37                     | -73.2  | 0.72  | 12.7    | 397.3       | <0.30               | <0.20   | 0.22   | <0.11   | <0.010  | 34       | 2.15      | 0.0306  | NS     | 65.6     | 9.1     | 12.5 | 2540    | 51.0       |  |
|          | 09/13/2021 | 6.50                     | -17.4  | 0.89  | 13.2    | 410.4       | 0.93                | <0.20   | 0.24   | 0.67    | 0.020   | 25.4     | 1.65      | 0.0241  | NS     | 61.8     | 2.4     | 8.6  | 978     | 47.5       |  |
|          | 06/24/2021 | 7.40                     | -94.6  | 0.13  | 13.3    | 433.0       | <0.30               | <0.200  | <0.20  | <0.110  | 0.011   | 38.0     | 2.83      | 0.0251  | NS     | 63.1     | <2.0    | 14.8 | 442     | 71.0       |  |
|          | 03/16/2021 | 6.40                     | -9.3   | 0.00  | 10.9    | 227.3       | <1.5                | <0.075  | <1.50  | 0.190   | <0.050  | 18.1     | 2.93      | 0.0130  | NS     | 56       | <10     | 4.9  | 66.5    | 78.8       |  |
|          | 12/08/2020 | 6.78                     | -80.6  | 0.21  | 11.2    | 396.5       | 0.83                | 0.136   | 0.651  | 0.176   | 0.054   | 20.2     | 3.29      | 0.0150  | NS     | 68       | <10     | 8.3  | 7.29    | 71.8       |  |
|          | 09/09/2020 | 6.54                     | -100.5 | 0.06  | 13.5    | 407.9       | 0.52                | 0.102   | 0.519  | <0.100  | <0.050  | 5.08     | 4.6       | 0.009   | NS     | 70       | <10     | 4.4  | <2.00   | 114        |  |
|          | 06/11/2020 | 6.78                     | -55.2  | 0.55  | 15.6    | 416.9       | 1.2                 | 0.077   | 1.21   | <0.100  | <0.050  | 2.79     | 0.274     | <0.005  | NS     | 63       | 17      | 39   | NS      | 89.8       |  |
|          | 03/09/2020 | 5.7                      | 263.4  | 9.6   | 11.6    | 299.5       | 7.0                 | 0.077   | 1.28   | 5.72    | <0.050  | 0.218    | NS        | <0.005  | NS     | 57       | 10      | <1.0 | NS      | 13.7       |  |
|          | 12/04/2019 | 5.9                      | 200    | 9.90  | 11.7    | 342         | 5.5                 | <0.075  | <0.300 | 5.52    | <0.050  | 0.113    | NS        | <0.005  | NS     | 70       | <10     | <1.0 | <1.00   | 12.7       |  |
|          | 09/17/2019 | 5.8                      | 234    | 8.1   | 13.3    | 270         | 1.2                 | <0.075  | <0.300 | 1.22    | <0.050  | 0.061    | NS        | NS      | NS     | 60       | 12      | NS   | NS      | NS         |  |
|          | 06/14/2019 | 7.0                      | 137    | 9.6   | 13.5    | 245         | NS                  | NS      | NS     | 2.62    | NS      | NS       | NS        | NS      | NS     | NS       | NS      | NS   | NS      | NS         |  |
|          | 05/21/2019 | 5.7                      | 199.0  | 11.8  | 13.6    | 269         | 3.29                | <0.10   | NS     | 2.95    | <0.010  | <0.100   | NS        | NS      | NS     | 53.9     | 12.2    | NS   | NS      | NS         |  |
|          | 12/19/2017 | 6.15                     | NM     | 10.31 | 11.44   | 267         | NS                  | <0.075  | <0.300 | 3.48    | <0.050  | 0.32     | <0.010    | NS      | <0.030 | 48       | 18      | <2.0 | NS      | NS         |  |
|          | 04/28/2017 | NM                       | NM     | NM    | NM      | NM          | NS                  | <0.075  | <0.600 | 5.55    | <0.050  | 6.1      | 0.098     | <0.005  | 0.033  | NS       | NS      | <2.0 | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time. \* ESMW-12S is an intermediate depth well.  
 NS - Not Sampled (lab) NM - Not Measured (field) ND - Not Detected (Lab)  
 NU - Data Not Usable TKN - Total Kjeldahl Nitrogen  
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**TABLE 3  
SUMMARY OF  
GROUNDWATER DATA  
Eastham PRB Study**

|          |            | In Situ                  |        |      |         |             | Laboratory Analyses |         |      |         |         |          |           |         |       |          |         |       |         |            |  |
|----------|------------|--------------------------|--------|------|---------|-------------|---------------------|---------|------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|          |            | Water Quality Parameters |        |      |         |             | Nitrogen            |         |      |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID  | Date       | pH                       | ORP    | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN  | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|          |            | su                       | mV     | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-12S |            |                          |        |      |         |             |                     |         |      |         |         |          |           |         |       |          |         |       |         |            |  |
|          | 06/01/2016 | 6.98                     | -260.6 | 3.76 | NM      | 431.0       | NS                  | 1.13    | 1.22 | 3.74    | 0.563   | 0.39     | 42        | NS      | 0.352 | <0.05    | 14      | 89.8  | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
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 NM - Not Measured (field)  
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12/15/2023 Page 5 of 25  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |        |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
|-----------|------------|--------------------------|--------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|------|---------|------------|--|
|           |            | Water Quality Parameters |        |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       |          | Anions  |      | Other   |            |  |
| Well ID   | Date       | pH                       | ORP    | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC  | Methane | Alkalinity |  |
|           |            | su                       | mV     | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L | µg/L    | as CaCO3   |  |
| ESMW-12SR |            |                          |        |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
|           | 12/06/2023 | 6.76                     | -85.6  | 0.75 | 12.8    | 270.4       | 0.63                | <0.2    | 0.42   | 0.21    | <0.01   | 26.6     | 0.154     | 0.0256  | NS    | 47.6     | 30.8    | 1.4  | 159     | 22.2       |  |
| Dup       | 12/06/2023 | NM                       | NM     | NM   | NM      | NM          | 0.61                | NS      | 0.4    | 0.21    | <0.01   | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 08/28/2023 | 6.91                     | -146.1 | 0.43 | 15.2    | 284         | 0.53                | 0.22    | 0.44   | <0.11   | <0.010  | 33300    | 195       | 27.1    | NS    | 50.3     | 15.2    | 1.4  | 908     | 35.0       |  |
| Dup       | 08/28/2023 | NM                       | NM     | NM   | NM      | NM          | <0.50               | NS      | <0.40  | <0.11   | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 06/01/2023 | 6.75                     | -129   | 0.27 | 19      | 435         | 0.85                | <0.20   | 0.85   | <0.11   | <0.010  | 51.0     | 1.15      | 0.028   | NS    | 52.1     | <2.0    | 11.9 | 4920    | 83         |  |
| Dup       | 06/01/2023 | NM                       | NM     | NM   | NM      | NM          | 0.77                | NS      | 0.77   | <0.11   | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 03/09/2023 | 6.89                     | -151.2 | 0.52 | 12.7    | 439.3       | 1.3                 | <0.20   | 1.3    | <0.11   | <0.010  | 55.5     | 0.709     | 0.0327  | NS    | 51.1     | <2.0    | 11.2 | 4740    | 67.0       |  |
| Dup       | 03/09/2023 | NM                       | NM     | NM   | NM      | NM          | 1.5                 | NS      | 1.5    | <0.11   | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 12/02/2022 | 6.63                     | -86.8  | 1.17 | 12.7    | 242.1       | 0.73                | < 0.20  | 0.44   | 0.28    | < 0.010 | 20.5     | 0.116     | 0.0154  | NS    | 42.6     | 7.7     | 2.9  | 1440    | 33.0       |  |
| Dup       | 12/02/2022 | NM                       | NM     | NM   | NM      | NM          | 0.59                | NS      | 0.28   | 0.30    | 0.011   | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 09/06/2022 | 6.63                     | -84.2  | 0.31 | 14.0    | 244.8       | 2.4                 | 0.71    | 2.3    | 0.12    | <0.010  | 23.9     | 0.175     | 0.023   | NS    | 33.4     | 11.9    | <1.0 | 836     | 8          |  |
|           | 06/02/2022 | 6.64                     | -102.6 | 0.83 | 12.6    | 287.9       | <0.90               | <0.20   | <0.80  | <0.11   | <0.010  | 34.1     | 0.294     | 0.0303  | NS    | 33.2     | 7.1     | 5.3  | 1050    | 31.0       |  |
|           | 03/01/2022 | 6.70                     | -87.6  | 1.30 | 12.2    | 294.7       | <0.30               | <0.20   | 0.21   | <0.11   | <0.010  | 31.9     | 0.305     | 0.018   | NS    | 30.8     | 11.8    | 5.8  | 435     | 32.5       |  |
|           | 12/16/2021 | 6.38                     | -74.8  | 0.01 | 13.4    | 249.7       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 23.5     | 0.278     | 0.0189  | NS    | 35.6     | 8.8     | 2.8  | 308     | 29.5       |  |
|           | 09/13/2021 | 6.38                     | -58.4  | 1.03 | 13.6    | 252.8       | 0.49                | <0.20   | <0.20  | 0.34    | <0.010  | 15.2     | 0.274     | 0.0140  | NS    | 30.2     | 15.8    | 2.0  | 57.2    | 25.5       |  |
|           | 06/24/2021 | 7.33                     | -110.0 | 0.52 | 15.2    | 300.6       | <0.30               | <0.200  | <0.20  | <0.110  | <0.010  | 18.7     | 0.534     | 0.0146  | NS    | 31.6     | 7.5     | 3.3  | 91.6    | 43.0       |  |
|           | 03/16/2021 | 6.15                     | 1.2    | 0.21 | 10.7    | 197.5       | <1.5                | 0.08    | <1.50  | 0.103   | 0.079   | 27.8     | 0.672     | 0.0170  | NS    | 32       | 15      | 3.0  | 58.9    | 66.1       |  |
|           | 12/08/2020 | 6.53                     | -66.9  | 0.47 | 9.8     | 274.0       | 1.2                 | 0.351   | 0.456  | 0.716   | <0.050  | 16.5     | 0.618     | 0.0140  | NS    | 34       | 15      | 1.1  | <2.00   | 39.3       |  |
|           | 09/09/2020 | 6.57                     | -85.3  | 0.60 | 13.5    | 226.8       | 0.66                | 0.102   | 0.310  | 0.353   | 0.050   | 20.5     | 0.919     | 0.013   | NS    | 28       | 13      | 2.2  | <2.00   | 52.7       |  |
|           | 06/11/2020 | 6.42                     | -71.5  | 0.40 | 16.9    | 346.0       | 1.3                 | 0.086   | 1.29   | <0.100  | <0.050  | 15.3     | 0.976     | <0.005  | NS    | 34       | 24      | 24   | NS      | 88.1       |  |
| Dup       | 06/11/2020 | NM                       | NM     | NM   | NM      | NM          | 0.94                | 0.198   | 0.942  | <0.100  | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 03/09/2020 | 5.4                      | 236.1  | 6.4  | 12.1    | 143.4       | 0.66                | <0.075  | <0.300 | 0.66    | <0.050  | 0.056    | NS        | <0.005  | NS    | 25       | 11      | <1.0 | NS      | 7.60       |  |

Notes: (H) - Analyzed out of hold time. \* ESMW-12S is an intermediate depth well.  
 NS - Not Sampled (lab) NM - Not Measured (field) ND - Not Detected (Lab)  
 NU - Data Not Usable TKN - Total Kjeldahl Nitrogen  
 DOC - Dissolved Organic Carbon DO - Dissolved Oxygen \*Dup - duplicate sample

**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|                  |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |        |          |         |       |         |            |
|------------------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|--------|----------|---------|-------|---------|------------|
|                  |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |        | Anions   |         | Other |         |            |
| Well ID          | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron  | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|                  |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L   | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| <b>ESMW-12SR</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |
|                  | 12/04/2019 | 5.7                      | 180   | 9.64 | 12.6    | 197         | 2.1                 | <0.075  | <0.300 | 2.11    | <0.050  | 0.178    | NS        | <0.005  | NS     | 40       | 10      | <1.0  | <1.00   | 5.3        |
|                  | 09/17/2019 | 5.6                      | 217   | 8.3  | 14.5    | 166         | 1.3                 | <0.075  | 0.336  | 1.05    | <0.050  | 0.679    | NS        | NS      | NS     | 31       | 13      | NS    | NS      | NS         |
|                  | 06/14/2019 | 6.2                      | 157   | 7.8  | 12.2    | 166         | NS                  | NS      | NS     | 1.09    | NS      | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |
|                  | 05/21/2019 | 5.4                      | 67.6  | 8.1  | 12.4    | 164         | 0.80                | <0.10   | NS     | 0.428   | <0.010  | 0.431    | NS        | NS      | NS     | 28.9     | 11.0    | NS    | NS      | NS         |
| <b>ESMW-102S</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |
|                  | 12/15/2021 | 5.45                     | 141.1 | 7.79 | 14.0    | 315.2       | 0.81                | <0.20   | <0.20  | 0.81    | <0.010  | NS       | NS        | NS      | NS     | 84.1     | 8.9     | NS    | NS      | NS         |
|                  | 12/07/2020 | 5.93                     | 220.3 | 8.68 | 13.2    | 199.5       | 1.8                 | <0.075  | <0.300 | 1.82    | <0.050  | NS       | NS        | NS      | NS     | 44       | <10     | NS    | NS      | NS         |
|                  | 08/10/2018 | 6.24                     | 161.4 | 8.90 | 17.7    | 207.6       | 1.6                 | <0.150  | 0.716  | NS      | NS      | 0.156    | 0.282     | NS      | <0.030 | 47       | <10     | <1.0  | NS      | NS         |
| <b>ESMW-103S</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |
|                  | 12/15/2021 | 5.80                     | 41.1  | 0.12 | 13.3    | 390.1       | 0.48                | 0.40    | 0.48   | <0.11   | <0.010  | NS       | NS        | NS      | NS     | 98.3     | <10     | NS    | NS      | NS         |
|                  | 12/07/2020 | 6.21                     | -38.2 | 0.45 | 12.8    | 396.6       | 0.49                | 0.246   | 0.493  | <0.100  | <0.050  | NS       | NS        | NS      | NS     | 100      | <10     | NS    | NS      | NS         |
|                  | 09/21/2018 | 6.02                     | 48.5  | 0.61 | 15.1    | 358.2       | NS                  | 0.338   | 0.530  | <0.100  | <0.050  | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |
|                  | 08/09/2018 | NM                       | NM    | NM   | NM      | NM          | 0.74                | 0.246   | 0.743  | NS      | NS      | 6.61     | 0.066     | NS      | <0.030 | 86       | <10     | 3.0   | NS      | NS         |
| <b>ESMW-103I</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |
|                  | 12/14/2021 | 6.14                     | -4.6  | 0.1  | 11.9    | 389.7       | 0.62                | 0.43    | 0.62   | <0.11   | <0.010  | NS       | NS        | NS      | NS     | 96.5     | <2.0    | NS    | NS      | NS         |
|                  | 12/07/2020 | 6.25                     | 25.4  | 8.35 | 11.0    | 363.2       | 1.4                 | 0.283   | 1.45   | <0.100  | <0.050  | NS       | NS        | NS      | NS     | 90       | <10     | NS    | NS      | NS         |
|                  | 09/21/2018 | 6.21                     | 24.6  | 0.23 | 13.8    | 349.9       | NS                  | 0.331   | 0.518  | <0.100  | <0.050  | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |
|                  | 08/09/2018 | 6.72                     | -50.6 | 2.03 | 17.9    | 367.0       | 2                   | 0.362   | 1.54   | NS      | NS      | 16.8     | 1.61      | NS      | <0.030 | 79       | <10     | 4.5   | NS      | NS         |

Notes: (H) - Analyzed out of hold time.  
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 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

ND - Not Detected (Lab)

**TABLE 3  
SUMMARY OF  
GROUNDWATER DATA  
Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|--------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |        | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron  | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L   | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-103D |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|           | 12/13/2021 | NS                       | NS    | NS   | NS      | NS          | NS                  | NS      | NS     | NS      | NS      | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |  |
|           | 11/02/2018 | NM                       | NM    | NM   | NM      | NM          | NS                  | 0.409   | 0.560  | <0.100  | <0.050  | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |  |
|           | 09/21/2018 | 6.45                     | -52.4 | 0.24 | 13.3    | 367.4       | NS                  | 0.384   | 0.483  | 0.119   | <0.050  | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |  |
|           | 08/09/2018 | 6.44                     | -14.8 | 0.87 | 14.8    | 374.2       | *NU                 | 0.330   | <0.300 | NS      | NS      | 19.1     | 0.776     | NS      | <0.030 | 83       | <10     | 2.9   | NS      | NS         |  |
| ESMW-104S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |  |
|           | 12/14/2021 | 6.14                     | 149.6 | 7.39 | 13.1    | 24.6        | <0.30               | <0.20   | <0.20  | 0.21    | <0.010  | NS       | NS        | NS      | NS     | 30.0     | 8.1     | NS    | NS      | NS         |  |
|           | 12/07/2020 | 6.12                     | 89.6  | 4.84 | 12.0    | 323.6       | 1.2                 | <0.075  | <0.300 | 1.16    | <0.050  | NS       | NS        | NS      | NS     | 62       | <10     | NS    | NS      | NS         |  |
|           | 06/09/2020 | 7.04                     | 145.1 | 8.0  | 13.9    | 251.5       | 0.88                | <0.075  | 0.383  | 0.502   | <0.050  | 2.63     | 0.04      | NS      | NS     | 36       | 10      | NS    | NS      | NS         |  |
|           | 03/11/2020 | 7.12                     | 170.2 | 7.02 | 11.6    | 172.1       | 0.57                | <0.075  | <0.300 | 0.567   | <0.050  | 1.76     | NS        | NS      | NS     | 30       | 11      | NS    | NS      | NS         |  |
|           | 12/06/2018 | 6.17                     | 116   | 6.39 | 11.3    | 217         | NS                  | <0.150  | <0.300 | 1.12    | <0.050  | NS       | NS        | NS      | NS     | 35       | <10     | 1.1   | NS      | NS         |  |

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12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|                  |            | In Situ                  |       |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |        |          |         |       |         |            |
|------------------|------------|--------------------------|-------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|--------|----------|---------|-------|---------|------------|
|                  |            | Water Quality Parameters |       |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |        | Anions   |         | Other |         |            |
| Well ID          | Date       | pH                       | ORP   | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron  | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|                  |            | su                       | mV    | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L   | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| <b>ESMW-105S</b> |            |                          |       |       |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |
|                  | 09/08/2022 | 6.64                     | 133.9 | 4.41  | 15.1    | 406.3       | 1.2                 | <0.20   | <0.20  | 1.2     | <0.010  | <0.100   | 0.505     | NS      | NS     | 81.2     | 30.8    | NS    | NS      | NS         |
|                  | 06/02/2022 | 5.43                     | 232.1 | 9.39  | 12.9    | 355.8       | 9.9                 | <0.20   | 0.40   | 9.5     | <0.010  | <0.1     | <0.015    | NS      | NS     | 50.4     | 35.3    | NS    | NS      | NS         |
|                  | 02/28/2022 | 5.45                     | 211.2 | 9.47  | 10.7    | 411.2       | 7.2                 | <0.20   | 0.28   | 6.9     | <0.010  | <0.1     | <0.015    | NS      | NS     | 72.8     | 34.2    | NS    | NS      | NS         |
|                  | 12/14/2021 | 4.99                     | 193.4 | 9.57  | 13.2    | 455.2       | 9.3                 | <0.20   | <0.20  | 9.1     | <0.010  | <0.100   | 0.0182    | NS      | NS     | 80.3     | 43.6    | NS    | NS      | NS         |
|                  | 09/13/2021 | 5.46                     | 148.2 | 5.46  | 13.5    | 584         | 6.2                 | <0.20   | <0.20  | 6.2     | <0.010  | <0.1     | 0.15      | NS      | NS     | 110      | 31.9    | NS    | NS      | NS         |
|                  | 06/25/2021 | 4.81                     | 282.4 | 9.26  | 13.6    | 585         | 13.8                | 0.31    | <0.20  | 13.8    | <0.010  | <0.1     | 0.0588    | NS      | NS     | 121      | 24.1    | NS    | NS      | NS         |
|                  | 03/16/2021 | 6.81                     | 284.3 | 10.26 | 12.2    | 559.0       | 13                  | <0.075  | <0.300 | 13.2    | <0.050  | <0.050   | 0.060     | NS      | NS     | 120      | 20      | NS    | NS      | NS         |
|                  | 12/09/2020 | 5.85                     | 250.9 | 0.52  | 12.5    | 384.9       | 1.4                 | <0.150  | <0.30  | 1.45    | <0.050  | 0.121    | 0.135     | NS      | NS     | 88       | 13      | NS    | NS      | NS         |
|                  | 09/09/2020 | 5.1                      | 294.2 | 9.33  | 14.1    | 464.3       | 21                  | <0.075  | <0.300 | 20.8    | <0.050  | 0.053    | 0.056     | NS      | NS     | 44       | 46      | NS    | NS      | NS         |
|                  | 06/12/2020 | 5.31                     | 209.1 | 9.48  | 13.1    | 418.0       | 17                  | 0.075   | <0.600 | 17.0    | 0.053   | <0.050   | 0.04      | NS      | NS     | 48       | 36      | NS    | NS      | NS         |
|                  | 03/09/2020 | 5.32                     | 298.2 | 9.52  | 13.0    | 438.1       | 42                  | <0.075  | <0.300 | 42.3    | <0.050  | 0.088    | NS        | NS      | NS     | 52       | 31      | NS    | NS      | NS         |
|                  | 12/05/2019 | 5.09                     | 264.1 | 9.76  | 12.9    | 671         | 38                  | 0.133   | <1.50  | 37.6    | <0.050  | <0.050   | NS        | NS      | NS     | 74       | 35      | NS    | NS      | NS         |
|                  | 09/17/2019 | 4.7                      | 336   | 9.5   | 12.9    | 512         | 31                  | <0.075  | <1.5   | 30.9    | <0.050  | 0.226    | NS        | NS      | NS     | 50       | 39      | NS    | NS      | NS         |
|                  | 09/20/2018 | 4.78                     | 232.3 | 9.52  | 13.4    | 533.0       | NS                  | <0.150  | 52.8   | 17.5    | <0.050  | NS       | NS        | NS      | NS     | NS       | NS      | NS    | NS      | NS         |
|                  | 08/09/2018 | 5.33                     | 271.3 | 8.08  | 22.9    | 510.0       | 14                  | <0.150  | <0.300 | NS      | NS      | 5.46     | 0.206     | NS      | <0.030 | 81       | 38      | 1.1   | NS      | NS         |
| <b>ESMW-206S</b> |            |                          |       |       |         |             |                     |         |        |         |         |          |           |         |        |          |         |       |         |            |
|                  | 12/14/2021 | 5.85                     | 160.2 | 8.25  | 13.4    | 302.7       | 1.2                 | <0.20   | <0.20  | 1.2     | <0.010  | NS       | NS        | NS      | NS     | 71.0     | 11.5    | NS    | NS      | NS         |
|                  | 12/07/2020 | 6.19                     | 60.1  | 5.42  | 12.1    | 338.5       | 1.5                 | <0.150  | <0.600 | 1.53    | <0.050  | NS       | NS        | NS      | NS     | 83       | <10     | NS    | NS      | NS         |
|                  | 06/09/2020 | 5.38                     | 355.1 | 7.32  | 14.3    | 347.5       | 1.7                 | <0.075  | <0.300 | 1.70    | <0.050  | 3.68     | 0.068     | NS      | NS     | 68       | <10     | NS    | NS      | NS         |
|                  | 03/11/2020 | 6.83                     | 142.9 | 8.73  | 13.1    | 286.8       | 1.7                 | <0.075  | <0.300 | 1.75    | <0.050  | 0.117    | NS        | NS      | NS     | 88       | <10     | NS    | NS      | NS         |
|                  | 12/06/2018 | 6.23                     | 126   | 9.02  | 11.5    | 318         | NS                  | <0.150  | <0.300 | 1.89    | <0.050  | NS       | NS        | NS      | NS     | 74       | <10     | 318   | NS      | NS         |

Notes: (H) - Analyzed out of hold time.  
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 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
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12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|                  |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |
|------------------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|
|                  |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |
| Well ID          | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|                  |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| <b>ESMW-206I</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|                  | 12/14/2021 | 5.63                     | 126.8 | 3.26 | 12.4    | 333.4       | <0.30               | <0.20   | <0.20  | 0.25    | <0.010  | NS       | NS        | NS      | NS    | 89.3     | 7.9     | NS    | NS      | NS         |
|                  | 12/07/2020 | 5.91                     | 61.1  | 3.93 | 12.0    | 331.8       | 0.54                | <0.075  | <0.300 | 0.54    | <0.050  | NS       | NS        | NS      | NS    | 80       | <10     | NS    | NS      | NS         |
|                  | 06/09/2020 | 6.25                     | 146.7 | 0.79 | 13.6    | 368.6       | 0.68                | <0.075  | <0.300 | 0.681   | <0.050  | 0.641    | 0.242     | NS      | NS    | 83       | <10     | NS    | NS      | NS         |
|                  | 03/11/2020 | 5.52                     | 165.2 | 1.00 | 12.7    | 257.9       | 1.1                 | <0.075  | <0.300 | 1.08    | <0.050  | 0.505    | NS        | NS      | NS    | 88       | <10     | NS    | NS      | NS         |
|                  | 12/06/2018 | 5.89                     | -18.4 | 0.47 | 12.3    | 321         | NS                  | <0.150  | <0.300 | 0.462   | <0.050  | NS       | NS        | NS      | NS    | 81       | <10     | 321   | NS      | NS         |
| <b>ESMW-206D</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|                  | 12/13/2021 | NS                       | NS    | NS   | NS      | NS          | NS                  | NS      | NS     | NS      | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|                  | 06/09/2020 | 7.30                     | 123.2 | 3.52 | 15.1    | 350.5       | 0.35                | <0.075  | 0.347  | <0.100  | <0.050  | 2.87     | 0.034     | NS      | NS    | 82       | 11      | NS    | NS      | NS         |
|                  | 03/11/2020 | 5.96                     | 162.5 | 1.29 | 12.9    | 265.0       | <0.30               | 0.099   | <0.300 | <0.100  | <0.050  | 2.98     | NS        | NS      | NS    | 87       | 12      | NS    | NS      | NS         |
|                  | 12/06/2018 | 6.07                     | -111  | 0.29 | 12.2    | 325         | NS                  | <0.150  | <0.300 | <0.100  | <0.050  | NS       | NS        | NS      | NS    | 79       | <10     | 325   | NS      | NS         |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
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\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-308S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 08/28/2023 | 6.01                     | 41.8  | 1.27 | 14.4    | 355         | <0.50               | 0.21    | <0.40  | <0.11   | <0.010  | 7780     | 3130      | <3.0    | NS    | 63.2     | 11.6    | 2.2   | NS      | 70.7       |  |
|           | 05/31/2023 | 5.67                     | 21.8  | 0.38 | 12.9    | 354         | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 0.862    | 2.08      | <0.003  | NS    | 69.9     | 8.2     | 1.4   | NS      | 46.2       |  |
|           | 03/08/2023 | 5.77                     | 156.2 | 4.52 | 12.6    | 219.4       | 0.89                | <0.20   | <0.20  | 0.89    | <0.010  | <0.1     | 0.959     | <0.003  | NS    | 43.3     | 8.7     | <1.0  | NS      | 24.5       |  |
|           | 09/07/2022 | 5.79                     | 91.6  | 0.25 | 14.4    | 368.1       | <0.30               | <0.20   | <0.20  | <0.11   | 0.01    | 2.17     | 5.33      | <0.003  | NS    | 54       | 9.6     | <1.0  | NS      | 68         |  |
|           | 06/02/2022 | 5.75                     | 150.3 | 1.93 | 12.8    | 294.6       | 0.30                | <0.20   | 0.30   | <0.11   | <0.010  | <0.1     | 3.53      | <0.003  | NS    | 58.7     | 8.4     | 1.8   | NS      | 29.0       |  |
|           | 03/01/2022 | 5.84                     | 181.6 | 2.26 | 12.6    | 319.9       | 0.86                | <0.20   | <0.20  | 0.85    | <0.010  | 0.134    | 2.63      | <0.003  | NS    | 66.6     | 8.2     | 1.3   | NS      | 24.0       |  |
|           | 12/15/2021 | 6.15                     | 153.6 | 7.10 | 13.3    | 265.9       | 0.45                | <0.20   | 0.21   | 0.23    | <0.010  | 0.317    | 3.32      | <0.003  | NS    | 42.8     | 10.2    | 1.1   | NS      | 42.5       |  |
|           | 09/10/2021 | 5.8                      | 33    | 0.5  | 14.5    | 360         | <0.30               | 2.6     | <0.20  | <0.11   | <0.010  | 1.0      | 4.38      | 0.003   | NS    | 45.4     | 21.1    | 2.5   | NS      | 53.5       |  |
|           | 06/24/2021 | 6.32                     | 44.9  | 0.07 | 12.8    | 255.5       | <0.30               | <0.200  | <0.20  | 0.12    | <0.010  | 0.831    | 3.6       | <0.003  | NS    | 34.2     | 13.9    | 1.6   | NS      | 47.5       |  |
|           | 03/16/2021 | 5.86                     | 67.0  | 0.94 | 9.7     | 155.1       | <1.5                | <0.075  | <1.50  | 0.626   | <0.050  | 1.74     | 3.57      | <0.005  | NS    | 24       | 12      | 1.6   | NS      | 55.3       |  |
|           | 12/09/2020 | 5.92                     | -9.8  | 0.12 | 11.7    | 369.8       | 0.56                | <0.075  | 0.555  | <0.100  | <0.050  | 3.74     | 7.23      | <0.005  | NS    | 35       | 35      | <4.0  | NS      | 102        |  |
|           | 09/08/2020 | 6.0                      | -31.3 | 0.29 | 15.3    | 361.0       | 0.42                | <0.075  | 0.418  | <0.100  | <0.050  | 3.18     | 2.41      | <0.005  | NS    | 50       | 28      | 15    | NS      | 58.8       |  |
|           | 06/10/2020 | 5.74                     | 165.0 | 6.39 | 11.7    | 202.1       | 0.45                | <0.075  | <0.300 | 0.447   | <0.050  | <0.050   | 0.02      | NS      | NS    | 38       | <10     | NS    | NS      | NS         |  |
|           | 03/10/2020 | 5.70                     | 316.4 | 8.78 | 12.6    | 146.0       | 1.2                 | <0.075  | <0.300 | 1.24    | <0.050  | 0.196    | NS        | NS      | NS    | 38       | <10     | NS    | NS      | NS         |  |
|           | 12/05/2019 | 5.9                      | 196   | 6.07 | 12.6    | 179         | 0.83                | 0.104   | <0.300 | 0.827   | <0.050  | <0.050   | NS        | NS      | NS    | 36       | <10     | NS    | NS      | NS         |  |
|           | 09/16/2019 | 5.7                      | 217   | 5.5  | 14.0    | 183         | <0.60               | <0.150  | <0.600 | 0.562   | <0.050  | 0.106    | NS        | <0.005  | NS    | 38       | <10     | <1.0  | <1.0    | 12.5       |  |
|           | 06/13/2019 | NM                       | NM    | NM   | NM      | NM          | NS                  | NS      | NS     | 1.09    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/20/2019 | 5.35                     | 103.6 | 9.04 | 12.05   | 199         | 0.96                | 0.12    | NS     | 0.603   | <0.010  | <0.100   | NS        | NS      | NS    | 38.6     | 9.6     | NS    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
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 \* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 ND - Not Detected (Lab)  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
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**TABLE 3**  
**SUMMARY OF**  
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**Eastham PRB Study**

|           |            | In Situ                  |        |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|--------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |        |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP    | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV     | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-308I |            |                          |        |       |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 08/28/2023 | 7.09                     | -122.6 | 1.15  | 13.0    | 300         | 1.0                 | 0.20    | <0.40  | 0.99    | <0.010  | 8260     | 2550      | 17.1    | NS    | 43.8     | 11.8    | <1.0  | NS      | 51.9       |  |
|           | 05/31/2023 | 6.82                     | -135   | 0.36  | 13      | 386         | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 26.0     | 4.67      | 0.0267  | NS    | 39.3     | 3.9     | 12.8  | NS      | 101        |  |
|           | 03/08/2023 | 6.48                     | -77.6  | 0.45  | 12.8    | 454.1       | 0.45                | <0.20   | 0.31   | 0.14    | <0.010  | 25.4     | 7.51      | 0.0152  | NS    | 41.4     | 5.7     | 29.2  | NS      | 103        |  |
|           | 09/07/2022 | 6.19                     | 101.2  | 2.58  | 13.5    | 266.1       | 2.8                 | <0.20   | <0.80  | 2.8     | 0.035   | 0.763    | 1.65      | <0.003  | NS    | 41.9     | 10.6    | <1.0  | NS      | 25.5       |  |
|           | 06/02/2022 | 6.64                     | -73.1  | 0.33  | 12.3    | 317.0       | <0.90               | <0.20   | <0.80  | 0.14    | <0.010  | 8.36     | 5.13      | 0.0142  | NS    | 36.2     | 2.5     | 3.7   | NS      | 82.5       |  |
|           | 03/01/2022 | 6.03                     | 191.4  | 5.41  | 12.3    | 219.2       | 2.9                 | <0.20   | <0.20  | 2.9     | <0.010  | <0.1     | 0.589     | <0.003  | NS    | 36.1     | 7.3     | <1.0  | NS      | 24.5       |  |
|           | 12/15/2021 | 6.00                     | 163.0  | 8.20  | 13.1    | 225.5       | 2.9                 | <0.20   | <0.20  | 2.9     | <0.010  | 0.204    | 0.454     | <0.003  | NS    | 44.8     | 7.8     | <1.0  | NS      | <5.0       |  |
|           | 09/10/2021 | 5.9                      | 96     | 9.9   | 13.4    | 241         | 2.9                 | 0.33    | <0.20  | 2.9     | 0.020   | 0.264    | 0.449     | <0.003  | NS    | 38.2     | 7.5     | <1.0  | NS      | 10.5       |  |
|           | 06/24/2021 | 6.87                     | 101.7  | 4.55  | 13.4    | 214.1       | 0.77                | <0.20   | <0.200 | 0.77    | <0.010  | 0.122    | 0.536     | <0.003  | NS    | 35.1     | 6.1     | 1.1   | NS      | 31.5       |  |
|           | 03/16/2021 | 5.98                     | 89.5   | 4.73  | 11.3    | 120.4       | 1.9                 | <0.075  | <1.50  | 1.89    | <0.050  | 0.497    | 0.537     | <0.005  | NS    | 32       | <10     | <1.0  | NS      | 16.2       |  |
|           | 12/09/2020 | 5.90                     | 69.7   | 0.42  | 11.9    | 244.4       | 0.57                | 0.133   | <0.30  | 0.574   | <0.050  | 0.354    | 0.826     | <0.005  | NS    | 36       | <10     | 1.7   | NS      | 55.9       |  |
|           | 09/08/2020 | 6.4                      | 92.7   | 7.80  | 14.2    | 279.4       | 5.9                 | 0.091   | <0.300 | 5.92    | <0.050  | 0.303    | 1.08      | <0.005  | NS    | 40       | <10     | <1.0  | NS      | 33.9       |  |
|           | 06/10/2020 | 5.77                     | 232.4  | 3.00  | 12.7    | 331.7       | 1.8                 | 0.075   | 1.57   | 0.259   | <0.050  | 1.35     | 0.141     | NS      | NS    | 37       | 26      | NS    | NS      | NS         |  |
|           | 03/10/2020 | 5.94                     | 293.4  | 10.09 | 12.4    | 161.0       | 2.3                 | <0.075  | 0.673  | 1.64    | <0.050  | 0.720    | NS        | NS      | NS    | 40       | 12      | NS    | NS      | NS         |  |
|           | 12/05/2019 | 6.2                      | 127    | 9.65  | 11.8    | 209         | 2.3                 | <0.075  | <0.300 | 2.34    | <0.050  | 0.828    | NS        | NS      | NS    | 34       | 12      | NS    | NS      | NS         |  |
|           | 09/16/2019 | 6.1                      | 150    | 8.5   | 13.1    | 228         | 4.3                 | <0.075  | <0.300 | 4.27    | <0.050  | 0.213    | NS        | <0.005  | NS    | 38       | 12      | <1.0  | <1.0    | 17.5       |  |
| Dup       | 09/16/2019 | NM                       | NM     | NM    | NM      | NM          | 4.2                 | 0.116   | <0.420 | 4.25    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | <1.0  | NS      | NS         |  |
|           | 06/13/2019 | 6.3                      | 89     | 11    | 12.3    | 243         | NS                  | NS      | NS     | 3.04    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/20/2019 | 5.9                      | 40.1   | 8.1   | 13.3    | 262         | 2.75                | <0.10   | NS     | 2.42    | <0.010  | 0.455    | NS        | NS      | NS    | 50.5     | 14.4    | NS    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
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\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

**TABLE 3**  
**SUMMARY OF**  
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|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-309S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 08/28/2023 | 5.55                     | 143.1 | 2.00 | 16.0    | 340.9       | 0.84                | 0.20    | <0.40  | 0.84    | <0.010  | 1120     | 2570      | <3.0    | NS    | 74.0     | 9.6     | 2.9   | NS      | 33.9       |  |
|           | 05/31/2023 | 5.37                     | 93.2  | 1.3  | 13.5    | 568         | 2.0                 | 0.22    | 1.5    | 0.47    | 0.014   | 1.64     | 5.65      | <0.003  | NS    | 134      | 5       | 4.8   | NS      | 49.6       |  |
|           | 03/08/2023 | 5.54                     | 133.7 | 2.30 | 12.1    | 364.3       | 0.84                | <0.20   | <0.20  | 0.84    | <0.010  | 0.586    | 2.52      | <0.003  | NS    | 91.8     | 6.5     | <1.0  | NS      | 14.5       |  |
|           | 12/01/2022 | 5.49                     | 63.5  | 2.63 | 14.8    | 244.8       | 2.2                 | < 0.20  | 0.54   | 1.7     | < 0.010 | 0.582    | 0.921     | <0.003  | NS    | 62.3     | 2.8     | 1.4   | NS      | 5.0        |  |
|           | 09/08/2022 | 5.32                     | 171.2 | 4.02 | 15.5    | 411.1       | 0.9                 | 0.33    | <0.20  | 0.9     | <0.010  | 0.877    | 1.55      | <0.003  | NS    | 105      | 3.6     | <1.0  | NS      | 12.5       |  |
|           | 05/31/2022 | 5.47                     | 140.4 | 3.38 | 12.5    | 425.4       | 3.0                 | <0.20   | <0.20  | 2.8     | <0.010  | 0.698    | 2.24      | <0.003  | NS    | 105      | 7.0     | 2.1   | NS      | < 5.0      |  |
|           | 02/28/2022 | 5.41                     | 150.7 | 2.21 | 12.6    | 370.4       | 1.4                 | <0.20   | <0.20  | 1.2     | <0.010  | 0.684    | 2.51      | 0.0033  | NS    | 90.5     | 5.8     | <1.0  | NS      | 7.0        |  |
|           | 12/16/2021 | 5.61                     | 94.2  | 2.63 | 14.6    | 434.2       | 0.81                | 0.21    | <0.20  | 0.81    | <0.010  | 1.58     | 1.52      | <0.003  | NS    | 107      | 3.6     | <1.0  | NS      | <5.0       |  |
|           | 09/10/2021 | 5.20                     | 141.3 | 3.99 | 14.7    | 423.1       | 1.2                 | <0.20   | <0.20  | 1.2     | 0.017   | 2.08     | 1.19      | <0.003  | NS    | 110      | 3.1     | 1.4   | NS      | 15.5       |  |
|           | 06/23/2021 | 5.71                     | 124.2 | 3.29 | 13.0    | 268.2       | 2.0                 | <0.20   | <0.20  | 2.0     | <0.010  | 1.86     | 0.502     | <0.003  | NS    | 56.2     | 5.6     | <1.0  | NS      | <5.0       |  |
|           | 03/16/2021 | 6.96                     | 132.7 | 2.87 | 11.7    | 188.3       | 0.81                | <0.075  | <0.300 | 0.815   | <0.050  | 2.27     | 0.822     | <0.005  | NS    | 41       | <10     | 1.6   | NS      | 22.5       |  |
|           | 12/08/2020 | 5.87                     | 19.5  | 3.72 | 14.6    | 309.9       | 0.79                | <0.075  | <0.300 | 0.790   | <0.050  | 1.34     | 1.54      | <0.005  | NS    | 71       | <10     | <1.0  | NS      | 16.1       |  |
|           | 09/08/2020 | 6.05                     | 38.0  | 2.43 | 14.9    | 367.7       | 1.4                 | <0.075  | 0.304  | 1.09    | 0.074   | 2.84     | 2.11      | <0.005  | NS    | 83       | 11      | 5.1   | NS      | 39.5       |  |
|           | 06/10/2020 | 5.03                     | 692.9 | 4.66 | 12.1    | 551         | 1.7                 | <0.075  | 0.372  | 1.31    | 0.052   | <0.050   | 0.359     | NS      | NS    | 110      | <10     | NS    | NS      | NS         |  |
|           | 03/10/2020 | 5.61                     | 291.5 | 5.54 | 12.2    | 178.1       | 1.9                 | <0.075  | <0.300 | 1.92    | <0.050  | <0.050   | NS        | NS      | NS    | 45       | 10      | NS    | NS      | NS         |  |
|           | 12/05/2019 | 5.7                      | 227   | 5.89 | 13.5    | 298         | 2.6                 | <0.075  | <0.300 | 2.56    | <0.050  | <0.050   | NS        | NS      | NS    | 64       | <10     | NS    | NS      | NS         |  |
|           | 09/17/2019 | 5.47                     | 248.1 | 6.01 | 13.9    | 325.2       | 3.5                 | <0.075  | <0.300 | 3.54    | <0.050  | <0.050   | NS        | NS      | NS    | 70       | 10      | NS    | NS      | NS         |  |
|           | 06/13/2019 | 5.6                      | 97    | 7.8  | 11.5    | 488         | NS                  | NS      | NS     | 3.82    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/21/2019 | 4.70                     | 173.1 | 6.42 | 11.52   | 410         | 2.56                | <0.10   | NS     | 2.27    | <0.010  | <0.100   | NS        | NS      | NS    | 99.4     | 8.2     | NS    | NS      | NS         |  |

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 NS - Not Sampled (lab)  
 NU - Data Not Usable  
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**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-309I |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 08/28/2023 | 6.63                     | -93.7 | 0.40 | 13.6    | 278.3       | <0.50               | <0.20   | <0.40  | <0.11   | <0.010  | 8010     | 2290      | 12.0    | NS    | 34.6     | 2.9     | 2.4   | NS      | 75.4       |  |
|           | 05/31/2023 | 6.48                     | -24.6 | 0.32 | 12.9    | 251.8       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 3.430    | 1.33      | 0.0056  | NS    | 33.3     | 9.9     | <1.0  | NS      | 54.2       |  |
|           | 03/08/2023 | 6.62                     | -77.4 | 0.30 | 12.3    | 304.5       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 5.16     | 1.95      | 0.0083  | NS    | 36.4     | 8.0     | <1.0  | NS      | 74.5       |  |
|           | 12/01/2022 | 6.42                     | -55.4 | 0.36 | 13.0    | 244.1       | < 0.30              | < 0.20  | < 0.20 | < 0.11  | < 0.010 | 3.39     | 1.27      | 0.0032  | NS    | 41.2     | 11.0    | 1.0   | NS      | 38.0       |  |
|           | 09/08/2022 | 6.40                     | -3.9  | 0.17 | 13.6    | 229.4       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 2.32     | 1.35      | 0.0043  | NS    | 36.3     | 10      | <1.0  | NS      | 37         |  |
|           | 05/31/2022 | 6.31                     | -21.1 | 1.11 | 12.8    | 232.6       | <0.30               | <0.20   | <0.20  | 0.18    | <0.010  | 2.49     | 1.21      | <0.003  | NS    | 36.0     | 12.5    | 1.9   | NS      | 34.0       |  |
|           | 02/28/2022 | 6.60                     | -69.0 | 0.41 | 11.3    | 305.6       | <0.30               | <0.20   | <0.20  | 0.19    | <0.010  | 4.8      | 2.19      | 0.0045  | NS    | 40.3     | 14.4    | <1.0  | NS      | 49.0       |  |
|           | 12/16/2021 | 6.68                     | -78.4 | 0.0  | 13.2    | 325.5       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 5.61     | 2.39      | <0.003  | NS    | 38.6     | 10.5    | <1.0  | NS      | 78.5       |  |
|           | 09/10/2021 | 6.41                     | -33.0 | 0.66 | 13.7    | 264.5       | 0.43                | <0.20   | <0.20  | 0.40    | 0.027   | 2.23     | 1.97      | <0.003  | NS    | 45.2     | 4.5     | 1.1   | NS      | 45.0       |  |
|           | 06/23/2021 | 7.14                     | -80.2 | 0.79 | 12.8    | 292.3       | 0.34                | <0.20   | <0.20  | 0.34    | <0.010  | 2.59     | 1.51      | <0.003  | NS    | 41.0     | 12.0    | 1.4   | NS      | 46.0       |  |
|           | 03/16/2021 | 6.71                     | -25.4 | 0.15 | 11.2    | 300.1       | <1.5                | <0.075  | <1.50  | <0.100  | <0.050  | 9.49     | 1.78      | <0.005  | NS    | 39       | <10     | 2.7   | NS      | 87.7       |  |
|           | 12/08/2020 | 6.50                     | 29.7  | 0.15 | 12.7    | 3485        | <0.30               | <0.075  | <0.300 | 0.129   | <0.050  | 2.70     | 1.46      | <0.005  | NS    | 35       | 13      | 1.6   | NS      | 53.5       |  |
|           | 09/08/2020 | 6.09                     | 161.8 | 5.06 | 20.7    | 205.2       | 0.97                | <0.075  | <0.300 | 0.967   | <0.050  | <0.050   | <0.010    | <0.005  | NS    | 38       | 11      | <1.0  | NS      | 16.6       |  |
|           | 06/10/2020 | 5.83                     | 149.9 | 7.21 | 12.7    | 209.7       | 1.3                 | <0.075  | 0.324  | 0.991   | <0.050  | 0.390    | 0.135     | NS      | NS    | 39       | 11      | NS    | NS      | NS         |  |
|           | 03/10/2020 | 5.91                     | 262.7 | 7.75 | 12.0    | 150.4       | 1.6                 | <0.075  | <0.300 | 1.59    | <0.050  | 0.10     | NS        | NS      | NS    | 37       | 10      | NS    | NS      | NS         |  |
|           | 12/05/2019 | 6.2                      | 141   | 10.0 | 12.6    | 201         | 1.5                 | <0.075  | <0.300 | 1.48    | <0.050  | 0.249    | NS        | NS      | NS    | 36       | 12      | NS    | NS      | NS         |  |
|           | 09/17/2019 | 5.82                     | 154.2 | 7.40 | 12.2    | 188.7       | 1.4                 | <0.150  | <0.300 | 1.39    | <0.050  | 0.483    | NS        | NS      | NS    | 34       | 11      | NS    | NS      | NS         |  |
|           | 06/13/2019 | 6.6                      | 88    | 9.2  | 12.1    | 198         | NS                  | NS      | NS     | 1.14    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/20/2019 | 5.34                     | -55.6 | 4.74 | 13.89   | 213         | 1.45                | <0.10   | NS     | 1.09    | <0.010  | 0.642    | NS        | NS      | NS    | 38.3     | 14.7    | NS    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 DO - Dissolved Oxygen

\*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-310S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 12/06/2023 | 6.30                     | -22.5 | 0.86 | 12.9    | 535         | 1.4                 | 0.66    | 1      | 0.43    | <0.01   | 47.8     | 1.2       | 0.0171  | NS    | 133      | 8.7     | 4     | NS      | 41.5       |  |
|           | 08/29/2023 | 6.18                     | -27.4 | 1.44 | 14.9    | 332.2       | 1.1                 | 0.45    | 0.66   | 0.43    | 0.029   | 29400    | 769       | 12.3    | NS    | 86.3     | 3.6     | 3.0   | NS      | 48.0       |  |
|           | 06/01/2023 | 6.36                     | -47.7 | 2.45 | 15      | 530         | 1.4                 | 0.67    | 0.91   | 0.50    | <0.010  | 56.0     | 1.34      | 0.0147  | NS    | 95       | 2.6     | 6.9   | NS      | 61.9       |  |
|           | 03/09/2023 | 6.17                     | -6.17 | 1.94 | 13.2    | 397.3       | 1.2                 | 0.53    | 0.87   | 0.37    | <0.010  | 21.6     | 0.596     | 0.0133  | NS    | 88.4     | 2.2     | 4.0   | NS      | 43.0       |  |
|           | 12/02/2022 | 6.06                     | -12.9 | 0.84 | 13.5    | 696         | 1.6                 | 0.86    | 1.4    | 0.20    | < 0.010 | 60       | 2.21      | 0.0151  | NS    | 203      | < 2.0   | 3.6   | NS      | 30.0       |  |
|           | 09/07/2022 | 6.39                     | 35.6  | 0.95 | 17.8    | 350.9       | 1.1                 | 0.31    | 0.48   | 0.6     | 0.028   | 21       | 0.882     | 0.0031  | NS    | 67.6     | 4.6     | 2.6   | NS      | 12         |  |
|           | 06/01/2022 | 6.09                     | 11.0  | 1.40 | 12.6    | 333.2       | 1.0                 | 0.39    | 0.80   | 0.24    | <0.010  | 28       | 1.11      | 0.0084  | NS    | 60.6     | < 2.0   | 6.0   | NS      | 36.0       |  |
|           | 03/01/2022 | 5.81                     | 64.3  | 3.19 | 10.4    | 331.1       | 1.2                 | 0.28    | 0.52   | 0.65    | <0.010  | 11.7     | 0.743     | 0.0053  | NS    | 73.1     | 3.5     | 4.5   | NS      | 14.0       |  |
|           | 12/16/2021 | 6.03                     | 25.2  | 1.85 | 14.6    | 550         | 1.1                 | 0.70    | 0.82   | 0.28    | <0.010  | 39       | 1.54      | 0.0128  | NS    | 137      | 4.2     | 3.8   | NS      | 23.0       |  |
|           | 09/13/2021 | 5.9                      | 34    | 1.38 | 16.1    | 276         | 0.77                | 0.49    | 0.57   | 0.20    | <0.010  | 26.1     | 1.12      | 0.0039  | NS    | 52.1     | <3.0    | 18.8  | NS      | 33.5       |  |
|           | 06/23/2021 | 5.57                     | 57.7  | 1.42 | 13.1    | 258.8       | 1.3                 | 0.38    | 0.41   | 0.87    | <0.010  | 12.5     | 0.765     | 0.0031  | NS    | 54.3     | <2.0    | 1.8   | NS      | 13.5       |  |
|           | 03/17/2021 | 7.56                     | 170.4 | 2.44 | 11.6    | 244.3       | 1.4                 | 0.095   | <0.300 | 1.35    | <0.050  | 2.52     | 0.373     | <0.005  | NS    | 59       | <10     | 1.9   | NS      | 12.5       |  |
|           | 12/08/2020 | 6.28                     | 19.9  | 1.31 | 13.6    | 212.6       | 1.0                 | 0.145   | 0.574  | 0.484   | <0.050  | 16.0     | 0.581     | 0.0110  | NS    | 31       | <10     | 4.5   | NS      | 38.7       |  |
|           | 09/08/2020 | 6.25                     | -20.0 | 0.71 | 15.6    | 279.4       | <0.30               | 0.091   | <0.300 | 0.124   | <0.050  | 19.3     | 0.818     | 0.008   | NS    | 43       | 12      | 8.8   | NS      | 61.6       |  |
|           | 06/11/2020 | 6.03                     | 497.5 | 1.86 | 11.9    | 528         | 2.0                 | 0.135   | 1.69   | 0.358   | <0.050  | 34.9     | 1.03      | 0.0190  | NS    | 41       | 23      | 16    | NS      | 124        |  |
|           | 03/09/2020 | 5.88                     | 114.6 | 2.39 | 12.5    | 174.3       | 1.0                 | 0.201   | 0.381  | 0.674   | <0.050  | 5.96     | NS        | <0.005  | NS    | 45       | <10     | 1.7   | NS      | 31.0       |  |
|           | 12/05/2019 | 5.52                     | 149.1 | 0.96 | 13.8    | 219.0       | 0.74                | <0.075  | 0.315  | 0.422   | <0.050  | 4.13     | NS        | <0.005  | NS    | 46       | <10     | 1.8   | 136     | 23.1       |  |
|           | 09/17/2019 | 5.56                     | 120.6 | 1.23 | 14.3    | 213.2       | 1.4                 | <0.075  | 0.303  | 1.10    | <0.050  | 5.2      | NS        | NS      | NS    | 42       | <10     | NS    | NS      | NS         |  |
|           | 06/14/2019 | 5.5                      | 175   | 5.7  | 13.5    | 149         | NS                  | NS      | NS     | 2.22    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/21/2019 | 5.07                     | -9.9  | 3.42 | 11.51   | 176         | 1.77                | <0.10   | NS     | 1.24    | <0.010  | 7.35     | NS        | NS      | NS    | 26.9     | 11.2    | NS    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |        |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|--------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |        |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP    | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV     | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-310I |            |                          |        |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 12/06/2023 | 7.16                     | 163.4  | 0.17 | 12.3    | 382.6       | <0.5                | <0.2    | <0.4   | <0.11   | <0.01   | 67.9     | 0.958     | 0.0322  | NS    | 34.6     | <2      | 36.3  | NS      | 72.2       |  |
|           | 08/29/2023 | 7.11                     | -188.9 | 0.41 | 12.9    | 348         | <0.30               | <0.20   | <0.20  | <0.11   | 0.029   | 73200    | 1390      | 31.6    | NS    | 35.5     | 2.7     | 59.3  | NS      | 95.1       |  |
|           | 06/01/2023 | 6.96                     | -117.5 | 0.38 | 13.2    | 254.9       | 0.40                | <0.20   | 0.40   | <0.11   | <0.010  | 215.0    | 0.54      | 0.0346  | NS    | 39.4     | 14.1    | <1.0  | NS      | 27.7       |  |
|           | 03/09/2023 | 7.10                     | -154.5 | 0.21 | 12.5    | 220.0       | <0.30               | <0.20   | 0.29   | <0.11   | <0.010  | 22       | 0.566     | 0.0363  | NS    | 35.6     | 12.6    | <1.0  | NS      | <10        |  |
|           | 12/02/2022 | 7.16                     | -156.5 | 0.04 | 12.2    | 395.8       | 0.55                | < 0.20  | 0.55   | < 0.11  | < 0.010 | 73.9     | 1.73      | 0.0343  | NS    | 29.7     | < 2.0   | 73.9  | NS      | 41.0       |  |
|           | 09/07/2022 | 7.56                     | -163.5 | 0.02 | 15.3    | 456.7       | <0.30               | <0.20   | <0.20  | <0.11   | 0.021   | 75.9     | 3.46      | 0.0304  | NS    | 32.5     | <2.0    | 82.5  | NS      | 68         |  |
|           | 06/01/2022 | 6.93                     | -125.1 | 0.24 | 12.9    | 262.1       | <0.90               | <0.20   | <0.80  | <0.11   | <0.010  | 23       | 1.13      | 0.0376  | NS    | 39.9     | 13.0    | 1.4   | NS      | 21.5       |  |
|           | 03/01/2022 | 6.86                     | -121.9 | 0.45 | 11.3    | 261.9       | <0.30               | <0.20   | 0.25   | <0.11   | <0.010  | 22       | 0.929     | 0.0364  | NS    | 40.1     | 10.3    | 1.0   | NS      | 28.5       |  |
|           | 12/15/2021 | 6.68                     | -99.8  | 0.0  | 13.2    | 255.3       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 22.7     | 0.888     | 0.0425  | NS    | 43.3     | 5.8     | <1.0  | NS      | 32.0       |  |
|           | 09/13/2021 | 7.0                      | -114   | 0.56 | 14.2    | 410         | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 47.8     | 2.6       | 0.0410  | NS    | 37.9     | <3.0    | 46.1  | NS      | 47.5       |  |
|           | 06/23/2021 | 6.88                     | -140.8 | 0.20 | 12.9    | 260.8       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 24.9     | 1.38      | 0.0311  | NS    | 37.7     | 7.6     | 1.3   | NS      | 25.0       |  |
|           | 03/17/2021 | 7.45                     | -21.6  | 7.84 | 11.8    | 238.2       | <0.30               | <0.150  | <0.300 | <0.100  | <0.050  | 13.8     | 1.34      | 0.0310  | NS    | 34       | <10     | <2.0  | NS      | 51.6       |  |
|           | 12/08/2020 | 7.19                     | -160.1 | 0.19 | 12.1    | 331.1       | 0.38                | <0.075  | 0.377  | <0.100  | <0.050  | 20.7     | 1.75      | 0.0370  | NS    | 49       | <10     | <4.0  | NS      | 57.9       |  |
|           | 09/08/2020 | 6.98                     | -173.4 | 0.0  | 13.9    | 445.0       | 0.57                | <0.075  | 0.566  | <0.100  | <0.050  | 23.3     | 4.33      | 0.031   | NS    | 38       | <10     | 33    | NS      | 167        |  |
|           | 06/11/2020 | 5.57                     | 502.7  | 6.49 | 13.9    | 212.7       | 0.66                | 0.135   | <0.300 | 0.664   | <0.050  | 0.649    | 0.109     | <0.005  | NS    | 34       | 10      | 1.3   | NS      | 20         |  |
|           | 03/09/2020 | 6.01                     | 233.8  | 6.63 | 12.7    | 145.0       | 1.5                 | <0.075  | <0.300 | 1.46    | <0.050  | 0.621    | NS        | <0.005  | NS    | 34       | 11      | <1.0  | NS      | 13.4       |  |
|           | 12/05/2019 | 5.72                     | 171.8  | 7.09 | 11.9    | 195.4       | 1.4                 | <0.075  | <0.300 | 1.45    | <0.050  | 0.584    | NS        | <0.005  | NS    | 34       | 11      | <1.0  | <1.00   | 13.8       |  |
|           | 09/17/2019 | 5.77                     | 162.0  | 8.12 | 12.5    | 190.2       | 1.4                 | <0.075  | <0.300 | 1.35    | <0.050  | 0.306    | NS        | NS      | NS    | 36       | 11      | NS    | NS      | NS         |  |
|           | 06/14/2019 | 6.1                      | 89     | 9.5  | 13.9    | 190         | NS                  | NS      | NS     | 0.840   | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/21/2019 | 5.41                     | -12.4  | 6.41 | 13.28   | 209         | 1.11                | <0.10   | NS     | 0.762   | <0.010  | 0.922    | NS        | NS      | NS    | 41.4     | 11.9    | NS    | NS      | NS         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
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\* ESMW-12S is an intermediate depth well.  
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**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|                  |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |
|------------------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|
|                  |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |
| Well ID          | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|                  |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| <b>ESMW-311S</b> |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|                  | 12/01/2022 | 5.76                     | 105.0 | 1.64 | 13.5    | 251.3       | < 0.30              | < 0.20  | 0.23   | < 0.11  | < 0.010 | 2.94     | 0.623     | NS      | NS    | 61.7     | 2.9     | NS    | NS      | NS         |
|                  | 09/08/2022 | 5.73                     | 136.6 | 4.95 | 18.4    | 211.1       | 1.1                 | 0.25    | <0.20  | 1.1     | <0.010  | 1.11     | 0.24      | NS      | NS    | 43.7     | 3.7     | NS    | NS      | NS         |
|                  | 05/31/2022 | 5.65                     | 86.3  | 2.74 | 13.8    | 337.5       | <0.30               | <0.20   | <0.20  | 0.25    | <0.010  | 7.99     | 1.33      | NS      | NS    | 85.4     | 4.1     | NS    | NS      | NS         |
|                  | 02/28/2022 | 5.57                     | 79.9  | 3.38 | 11.3    | 300.5       | 1.5                 | <0.20   | 0.21   | 1.3     | <0.010  | 5.0      | 0.97      | NS      | NS    | 63.6     | 3.9     | NS    | NS      | NS         |
|                  | 12/14/2021 | 5.21                     | 130.9 | 2.10 | 13.0    | 274         | 0.76                | <0.20   | <0.20  | 0.75    | <0.010  | 1.76     | 0.632     | NS      | NS    | 69.8     | 5.1     | NS    | NS      | NS         |
|                  | 09/10/2021 | 5.44                     | 141.1 | 3.92 | 15.4    | 198.5       | 1.6                 | <0.20   | <0.20  | 1.6     | 0.015   | 1.63     | 0.428     | NS      | NS    | 39.8     | 7.5     | NS    | NS      | NS         |
|                  | 06/24/2021 | 5.28                     | 181.1 | 4.28 | 14.4    | 352.7       | 1.6                 | <0.20   | <0.200 | 1.4     | <0.010  | 2.48     | 1.06      | <0.003  | NS    | 85.3     | 4.6     | NS    | NS      | NS         |
|                  | 03/17/2021 | 7.37                     | 180.4 | 5.24 | 12.3    | 246.2       | 2.3                 | 0.102   | <0.300 | 2.27    | <0.050  | 2.4      | 1.29      | NS      | NS    | 56       | <10     | NS    | NS      | NS         |
|                  | 12/09/2020 | 6.02                     | 117.4 | 1.46 | 12.7    | 188.5       | 1.5                 | 0.098   | 0.515  | 0.951   | <0.050  | 1.32     | 0.594     | NS      | NS    | 34       | 12      | NS    | NS      | NS         |
|                  | 09/08/2020 | 5.6                      | 112.4 | 2.87 | 17.8    | 322.4       | 1.7                 | 0.101   | <0.300 | 1.69    | <0.050  | 3.93     | 1.44      | NS      | NS    | 73       | <10     | NS    | NS      | NS         |
|                  | 06/10/2020 | 5.8                      | 129.1 | 5.2  | 12.7    | 208.8       | 1.1                 | 0.104   | 0.405  | 0.663   | <0.050  | 3.00     | 1.93      | NS      | NS    | 38       | <10     | NS    | NS      | NS         |
|                  | 03/10/2020 | 5.8                      | 113.1 | 2.1  | 13.2    | 188.3       | 0.43                | 0.099   | <0.300 | 0.43    | <0.050  | 6.73     | NS        | NS      | NS    | 33       | <10     | NS    | NS      | NS         |
|                  | 12/05/2019 | 5.80                     | 103.8 | 2.40 | 14.6    | 193.6       | 0.93                | 0.093   | 0.306  | 0.617   | <0.050  | 7.26     | NS        | NS      | NS    | 31       | <10     | NS    | NS      | NS         |
|                  | 09/16/2019 | 5.83                     | 68.4  | 2.49 | 18.1    | 262.9       | 0.96                | 0.117   | 0.354  | 0.611   | <0.050  | 10.3     | NS        | <0.005  | NS    | 49       | <10     | 2.1   | 2.03    | 37.4       |
|                  | 06/13/2019 | 7.1                      | 0.5   | 3.1  | 12.4    | 227         | NS                  | NS      | NS     | 0.576   | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|                  | 05/20/2019 | 5.8                      | 36.7  | 2.5  | 13.4    | 209         | 0.87                | 0.29    | NS     | 0.241   | <0.010  | 9.19     | NS        | 0.0028  | NS    | 32.1     | 11.1    | 4.02  | 3.4     | 40         |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen  
 \* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field) ND - Not Detected (Lab)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023 Page 17 of 25  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-3111 |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 12/01/2022 | 6.17                     | 55.6  | 2.50 | 12.8    | 232.3       | 1.4                 | < 0.20  | 0.20   | 1.2     | < 0.010 | 1.52     | 0.285     | <0.003  | NS    | 41.9     | 9.4     | 1.1   | NS      | 26.5       |  |
|           | 09/08/2022 | 6.25                     | 66.8  | 4.99 | 14.9    | 228.0       | <0.30               | <0.20   | <0.20  | 0.23    | <0.010  | 0.741    | 0.206     | <0.003  | NS    | 41.1     | 9.6     | <1.0  | NS      | 29         |  |
|           | 05/31/2022 | 6.25                     | 47.8  | 4.78 | 14.2    | 240.2       | <0.30               | <0.20   | <0.20  | 0.18    | <0.010  | 3.27     | 0.265     | <0.003  | NS    | 42.7     | 9.4     | 1.5   | NS      | 27.5       |  |
|           | 02/28/2022 | 5.81                     | 68.9  | 2.46 | 12.2    | 246.1       | 0.76                | <0.20   | <0.20  | 0.75    | <0.010  | 1.59     | 0.391     | <0.003  | NS    | 39.5     | 12.9    | <1.0  | NS      | 27.0       |  |
|           | 12/14/2021 | 5.77                     | 88.7  | 0.57 | 13.4    | 233         | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 1.07     | 0.231     | <0.003  | NS    | 41.0     | 16.4    | <1.0  | NS      | 23.0       |  |
|           | 09/10/2021 | 5.81                     | 118.1 | 3.26 | 16.5    | 234.5       | 0.82                | <0.20   | <0.20  | 0.79    | 0.028   | 0.757    | 0.178     | <0.003  | NS    | 44.0     | 14.6    | 1.1   | NS      | 21.0       |  |
|           | 06/24/2021 | 5.65                     | 165.4 | 0.36 | 13.7    | 226.6       | 0.30                | <0.20   | <0.200 | 0.30    | <0.010  | 0.32     | 0.156     | <0.003  | NS    | 39.9     | 11.2    | 1.3   | NS      | 33.0       |  |
|           | 03/17/2021 | 7.46                     | 230.5 | 8.59 | 12.4    | 231.4       | <1.5                | 0.770   | <1.50  | 0.94    | <0.050  | 0.38     | 0.078     | <0.005  | NS    | 43       | <10     | 1.7   | NS      | 20.7       |  |
|           | 12/09/2020 | 6.14                     | 146.7 | 4.59 | 12.4    | 223.5       | 1.3                 | <0.375  | <0.30  | 1.32    | <0.050  | 0.345    | 0.200     | <0.005  | NS    | 43       | <10     | <1.0  | NS      | 22.5       |  |
|           | 09/08/2020 | 5.9                      | 103.7 | 0.61 | 14.2    | 236.0       | <0.30               | <0.075  | <0.300 | 0.227   | <0.050  | 4.12     | 0.179     | <0.005  | NS    | 44       | 11      | 2.6   | NS      | 23.4       |  |
|           | 06/10/2020 | 5.45                     | 323.2 | 6.83 | 13.2    | 227.4       | 1.3                 | <0.075  | <0.300 | 1.29    | <0.050  | 0.339    | 0.065     | NS      | NS    | 36       | 11      | NS    | NS      | NS         |  |
|           | 03/10/2020 | 5.7                      | 213.4 | 6.1  | 12.8    | 212.4       | 1.2                 | <0.075  | <0.300 | 1.21    | <0.050  | 8.22     | NS        | NS      | NS    | 40       | 11      | NS    | NS      | NS         |  |
|           | 12/05/2019 | 5.86                     | 184.2 | 7.75 | 12.4    | 200.7       | 1.6                 | <0.075  | <0.300 | 1.65    | <0.050  | 1.62     | NS        | NS      | NS    | 35       | 12      | NS    | NS      | NS         |  |
|           | 09/16/2019 | 5.77                     | 152.2 | 7.14 | 14.2    | 198.3       | 1.4                 | <0.075  | <0.300 | 1.40    | <0.050  | 0.455    | NS        | <0.005  | NS    | 36       | 12      | <1.0  | <1.0    | 15.7       |  |
| Dup       | 09/16/2019 | NM                       | NM    | NM   | NM      | NM          | 1.4                 | <0.150  | <0.420 | 1.42    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | <1.0  | NS      | NS         |  |
|           | 06/13/2019 | 6.3                      | 96    | 5.6  | 12.8    | 198         | NS                  | NS      | NS     | 1.12    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/20/2019 | 5.9                      | -22.9 | 3.4  | 16.0    | 215         | 1.19                | 0.11    | NS     | 0.840   | <0.010  | 1.69     | NS        | 0.0057  | NS    | 40.5     | 11.3    | 1.22  | <2.0    | 24         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

| In Situ   |            |                          |       |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |
|-----------|------------|--------------------------|-------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|
|           |            | Water Quality Parameters |       |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |
| Well ID   | Date       | pH                       | ORP   | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|           |            | su                       | mV    | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| ESMW-312S |            |                          |       |       |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|           | 09/09/2022 | 5.45                     | 235.7 | 8.32  | 14.5    | 218.9       | 0.56                | <0.20   | <0.20  | 0.56    | <0.0020 | 0.122    | 0.0386    | NS      | NS    | 41.6     | 10.1    | NS    | NS      | NS         |
| Dup       | 09/09/2022 | NM                       | NM    | NM    | NM      | NM          | 0.55                | NS      | <0.20  | 0.55    | <0.0020 | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 06/01/2022 | 5.35                     | 215.3 | 8.07  | 12.2    | 209.0       | 0.52                | <0.20   | <0.20  | 0.52    | <0.010  | 0.177    | 0.0308    | NS      | NS    | 42.6     | 13.7    | NS    | NS      | NS         |
| Dup       | 06/01/2022 | NM                       | NM    | NM    | NM      | NM          | 0.49                | NS      | <0.20  | 0.49    | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 03/02/2022 | 5.45                     | 233.1 | 8.86  | 10.6    | 222.4       | 2.1                 | <0.20   | <0.20  | 1.9     | <0.010  | 0.445    | 0.0481    | NS      | NS    | 45.2     | 13.4    | NS    | NS      | NS         |
| Dup       | 03/02/2022 | NM                       | NM    | NM    | NM      | NM          | 2.3                 | NS      | 0.25   | 2.0     | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 12/17/2021 | 5.37                     | 199.1 | 9.24  | 12.3    | 235.9       | 3.2                 | NS      | <0.20  | 3.1     | <0.010  | 0.110    | 0.0592    | NS      | NS    | 43.4     | 16.2    | NS    | NS      | NS         |
| Dup       | 12/17/2021 | NM                       | NM    | NM    | NM      | NM          | 2.8                 | NS      | <0.20  | 2.8     | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 09/14/2021 | 5.3                      | 230   | 9.1   | 12.2    | 207         | 1.7                 | <0.20   | <0.20  | 1.6     | <0.010  | 0.312    | 0.0606    | NS      | NS    | 38.8     | 15.2    | NS    | NS      | NS         |
| Dup       | 09/14/2021 | 5.3                      | 230   | 9.1   | 12.2    | 207         | 1.6                 | NS      | <0.20  | 1.6     | <0.010  | NS       | NS        | NS      | NS    | 38.8     | 15.2    | NS    | NS      | NS         |
|           | 06/24/2021 | 5.08                     | 218.4 | 10.80 | 11.7    | 218.5       | 2.0                 | <0.20   | <0.20  | 1.8     | <0.010  | 0.279    | 0.0307    | NS      | NS    | 41.7     | 13.9    | NS    | NS      | NS         |
| Dup       | 06/24/2021 | NM                       | NM    | NM    | NM      | NM          | 1.9                 | NS      | <0.20  | 1.7     | <0.010  | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 03/18/2021 | 5.08                     | 245.4 | 6.86  | 11.1    | 170.1       | 2.2                 | 0.197   | <0.300 | 2.21    | <0.050  | <0.050   | 0.015     | NS      | NS    | 54       | 10      | NS    | NS      | NS         |
| Dup       | 03/18/2021 | NM                       | NM    | NM    | NM      | NM          | 2.3                 | NS      | <0.300 | 2.27    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 12/10/2020 | 5.65                     | 259.4 | 8.31  | 11.7    | 217.9       | 4.6                 | <0.075  | <0.300 | 4.62    | <0.050  | 0.072    | 0.057     | NS      | NS    | 32       | 15      | NS    | NS      | NS         |
| Dup       | 12/10/2020 | NM                       | NM    | NM    | NM      | NM          | 4.7                 | NS      | <0.300 | 4.61    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 09/10/2020 | 5.6                      | 213.5 | 8.46  | 15.5    | 228.9       | 3.0                 | <0.075  | <0.300 | 3.02    | <0.050  | 0.242    | 0.054     | NS      | NS    | 35       | 17      | NS    | NS      | NS         |
| Dup       | 09/10/2020 | NM                       | NM    | NM    | NM      | NM          | 3.0                 | NS      | <0.300 | 3.03    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 06/12/2020 | 4.92                     | 672.1 | 9.82  | 11.2    | 219.9       | 1.8                 | <0.075  | <0.300 | 1.81    | <0.050  | 0.121    | 0.015     | NS      | NS    | 35       | 15      | NS    | NS      | NS         |
| Dup       | 06/12/2020 | NM                       | NM    | NM    | NM      | NM          | 1.8                 | <0.150  | <0.300 | 1.77    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|           | 03/10/2020 | 5.30                     | 323.1 | 9.77  | 12.1    | 171.0       | 1.8                 | <0.075  | <0.300 | 1.77    | <0.050  | 0.230    | NS        | NS      | NS    | 51       | <10     | NS    | NS      | NS         |
| Dup       | 03/10/2020 | NM                       | NM    | NM    | NM      | NM          | 1.8                 | <0.075  | <1.50  | 1.78    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |

Notes: (H) - Analyzed out of hold time. \* ESMW-12S is an intermediate depth well.  
 NS - Not Sampled (lab) NM - Not Measured (field) ND - Not Detected (Lab)  
 NU - Data Not Usable TKN - Total Kjeldahl Nitrogen  
 DOC - Dissolved Organic Carbon DO - Dissolved Oxygen \*Dup - duplicate sample

**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       |          | Anions  |      | Other   |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC  | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L | µg/L    | as CaCO3   |  |
| ESMW-312S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
| Dup       | 12/06/2019 | 6.05                     | 159.4 | 7.15 | 10.7    | 302.3       | 7.9                 | <0.075  | <0.300 | 7.86    | <0.050  | 0.571    | NS        | NS      | NS    | 39       | 12      | NS   | NS      | NS         |  |
|           | 12/06/2019 | NM                       | NM    | NM   | NM      | NM          | 7.9                 | <0.075  | <0.300 | 7.90    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|           | 09/18/2019 | 6.4                      | -82   | 3.5  | 12.6    | 308         | 4.5                 | 0.784   | <0.600 | 4.51    | <0.050  | 1.92     | NS        | NS      | NS    | 42       | 14      | NS   | NS      | NS         |  |
| ESMW-312I |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
|           | 09/09/2022 | 5.79                     | 189.6 | 7.62 | 12.2    | 225.2       | 1.6                 | <0.20   | <0.20  | 1.6     | <0.0020 | <0.100   | 0.0188    | NS      | NS    | 40.1     | 9.9     | NS   | NS      | NS         |  |
|           | 06/01/2022 | 5.73                     | 163.5 | 7.15 | 11.5    | 233.2       | 1.6                 | <0.20   | 0.29   | 1.3     | <0.010  | 0.128    | 0.0221    | NS      | NS    | 48.0     | 10.5    | NS   | NS      | NS         |  |
|           | 03/02/2022 | 5.92                     | 190.9 | 7.12 | 11.3    | 235.5       | 2.6                 | <0.20   | <0.20  | 2.6     | <0.010  | 0.256    | 0.0221    | NS      | NS    | 44.9     | 11.6    | NS   | NS      | NS         |  |
|           | 12/17/2021 | 5.76                     | 174.4 | 7.60 | 11.7    | 234.1       | 2.8                 | NS      | <0.20  | 2.8     | <0.010  | 0.342    | 0.0186    | NS      | NS    | 43.4     | 12.2    | NS   | NS      | NS         |  |
|           | 09/14/2021 | 5.6                      | 176   | 8.9  | 12.2    | 204         | 2.6                 | <0.20   | <0.20  | 2.6     | <0.010  | 0.999    | 0.0734    | NS      | NS    | 32.8     | 18.7    | NS   | NS      | NS         |  |
|           | 06/24/2021 | 5.66                     | 212.2 | 7.13 | 11.7    | 214.6       | 2.2                 | <0.20   | <0.200 | 2.2     | <0.010  | <0.1     | 0.0262    | NS      | NS    | 36.9     | 12.3    | NS   | NS      | NS         |  |
|           | 03/18/2021 | 5.86                     | 177.6 | 6.62 | 11.2    | 166.9       | 2.2                 | <0.075  | <0.300 | 2.20    | <0.050  | 0.152    | 0.033     | NS      | NS    | 50       | 12      | NS   | NS      | NS         |  |
|           | 12/10/2020 | 6.03                     | 231.8 | 9.37 | 11.4    | 249.0       | 2.9                 | <0.075  | 0.332  | 2.64    | <0.050  | <0.050   | 0.011     | NS      | NS    | 48       | 10      | NS   | NS      | NS         |  |
|           | 09/10/2020 | 5.9                      | 147.6 | 8.16 | 13.8    | 258.4       | 4.8                 | <0.075  | <0.300 | 4.77    | <0.050  | 1.15     | 0.044     | NS      | NS    | 41       | <10     | NS   | NS      | NS         |  |
|           | 06/12/2020 | 5.82                     | 219.2 | 6.50 | 11.9    | 223.3       | 1.9                 | <0.075  | <0.300 | 1.90    | <0.050  | 0.185    | 0.06      | NS      | NS    | 40       | 13      | NS   | NS      | NS         |  |
|           | 03/10/2020 | 5.83                     | 309.0 | 8.96 | 11.7    | 173.0       | 2.9                 | 0.118   | <0.300 | 2.87    | <0.050  | 2.44     | NS        | NS      | NS    | 41       | 14      | NS   | NS      | NS         |  |
|           | 12/06/2019 | 5.85                     | 229.1 | 8.32 | 11.0    | 251.6       | 3.1                 | 0.082   | <0.300 | 3.09    | <0.050  | 0.196    | NS        | NS      | NS    | 44       | <10     | NS   | NS      | NS         |  |
|           | 09/18/2019 | 6.1                      | 61    | 6.3  | 11.7    | 254         | 3.1                 | <0.150  | <0.300 | 3.13    | <0.050  | 2.62     | NS        | <0.005  | NS    | 47       | <10     | <1.0 | 2.43    | 26.1       |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|                  |            | In Situ                  |       |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |
|------------------|------------|--------------------------|-------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|
|                  |            | Water Quality Parameters |       |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |
| Well ID          | Date       | pH                       | ORP   | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|                  |            | su                       | mV    | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| <b>ESMW-313S</b> |            |                          |       |       |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|                  | 12/06/2023 | 5.72                     | 257.8 | 5.84  | 11.0    | 372.2       | 18.4                | <0.2    | 0.47   | 17.9    | <0.01   | <0.1     | 0.028     | NS      | NS    | 42.3     | 16.5    | NS    | NS      | NS         |
|                  | 08/29/2023 | 5.45                     | 282.9 | 2.90  | 13.0    | 333.4       | 13.0                | <0.20   | <0.20  | 13.0    | <0.010  | <100     | 71.5      | NS      | NS    | 41.8     | 16.3    | NS    | NS      | NS         |
|                  | 06/01/2023 | 5.60                     | 83    | 9.82  | 14.1    | 225.9       | 2.5                 | <0.20   | <0.20  | 2.5     | <0.010  | <0.10    | <0.015    | NS      | NS    | 41.4     | 15.3    | NS    | NS      | NS         |
|                  | 03/09/2023 | 5.71                     | 169.7 | 8.96  | 11.6    | 243.3       | 3.1                 | <0.20   | <0.20  | 2.9     | <0.010  | 0.13     | <0.015    | NS      | NS    | 45.8     | 10.6    | NS    | NS      | NS         |
|                  | 12/05/2022 | 5.72                     | 221.0 | 7.36  | 12.4    | 270.9       | 7.4                 | < 0.20  | <0.20  | 7.2     | <0.010  | <0.1     | <0.015    | NS      | NS    | 43.1     | 12.9    | NS    | NS      | NS         |
|                  | 09/09/2022 | 6.39                     | 223.8 | 6.90  | 14.6    | 249.5       | 0.96                | <0.20   | 0.27   | 0.69    | <0.0020 | <0.100   | <0.015    | NS      | NS    | 46.9     | 10.9    | NS    | NS      | NS         |
|                  | 06/01/2022 | 5.71                     | 193.5 | 8.03  | 11.5    | 370.6       | 21.1                | <0.20   | 0.39   | 20.7    | <0.010  | <0.1     | <0.015    | NS      | NS    | 34.7     | 12.5    | NS    | NS      | NS         |
|                  | 03/02/2022 | 5.80                     | 150.4 | 8.03  | 11.4    | 267.3       | 5.0                 | <0.20   | 0.23   | 4.8     | <0.010  | 0.161    | <0.015    | NS      | NS    | 38.5     | 12.6    | NS    | NS      | NS         |
|                  | 12/17/2021 | 5.67                     | 153.0 | 5.41  | 13.1    | 242.2       | 1.6                 | NS      | <0.20  | 1.6     | <0.010  | <0.100   | <0.015    | NS      | NS    | 39.1     | 15.5    | NS    | NS      | NS         |
|                  | 09/14/2021 | 5.72                     | 172.5 | 6.24  | 12.2    | 324.9       | 4.8                 | <0.20   | <0.20  | 4.8     | <0.010  | 0.149    | <0.015    | NS      | NS    | 39.5     | 18.2    | NS    | NS      | NS         |
|                  | 06/23/2021 | 5.81                     | 208.3 | 7.64  | 12.0    | 223.7       | 2.9                 | <0.20   | 0.81   | 2.1     | <0.010  | <0.1     | <0.015    | NS      | NS    | 33.0     | 13.3    | NS    | NS      | NS         |
|                  | 03/18/2021 | 7.61                     | 284.6 | 8.47  | 11.3    | 214.9       | 2.7                 | <0.375  | <1.50  | 2.70    | <0.050  | 1.44     | 0.017     | NS      | NS    | 35       | 12      | NS    | NS      | NS         |
|                  | 12/10/2020 | 5.84                     | 256.3 | 7.64  | 10.2    | 471.5       | 26                  | <0.075  | <1.50  | 25.8    | <0.050  | <0.050   | 0.013     | NS      | NS    | 48       | 12      | NS    | NS      | NS         |
|                  | 09/10/2020 | 5.80                     | 209.3 | 6.73  | 11.9    | 364.4       | 23                  | <0.075  | <1.50  | 23.4    | <0.050  | <0.050   | <0.010    | NS      | NS    | 38       | 12      | NS    | NS      | NS         |
|                  | 06/12/2020 | 5.20                     | 699.0 | 10.08 | 11.0    | 163.0       | 0.55                | <0.075  | <0.300 | 0.553   | <0.050  | 0.062    | <0.010    | NS      | NS    | 26       | <10     | NS    | NS      | NS         |
|                  | 03/10/2020 | 5.5                      | 290.7 | 9.5   | 12.7    | 163.6       | 1.5                 | <0.075  | <0.300 | 1.52    | <0.050  | 1.38     | NS        | NS      | NS    | 29       | <10     | NS    | NS      | NS         |
| Dup              | 03/10/2020 | NM                       | NM    | NM    | NM      | NM          | 1.5                 | <0.375  | <1.50  | 1.52    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|                  | 12/06/2019 | 5.84                     | 221.6 | 5.48  | 11.8    | 283.5       | 6.2                 | <0.075  | <0.300 | 6.16    | <0.050  | 0.318    | NS        | NS      | NS    | 36       | <10     | NS    | NS      | NS         |
| Dup              | 12/06/2019 | NM                       | NM    | NM    | NM      | NM          | 6.2                 | <0.075  | <0.300 | 6.21    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|                  | 09/18/2019 | 5.59                     | 264.2 | 8.17  | 11.3    | 168.5       | 1.3                 | 0.091   | <0.300 | 1.29    | <0.050  | 0.156    | NS        | NS      | NS    | 28       | 13      | NS    | NS      | NS         |
|                  | 06/14/2019 | 6.2                      | 164   | 9.8   | 13.0    | 146         | NS                  | NS      | NS     | 0.347   | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |
|                  | 05/21/2019 | 5.4                      | 92.7  | 10.2  | 11.0    | 153         | 0.90                | 0.11    | NS     | 0.390   | <0.010  | 1.04     | NS        | 0.0048  | NS    | 26.7     | 12.9    | 1.22  | <2.0    | 10         |

Notes: (H) - Analyzed out of hold time. \* ESMW-12S is an intermediate depth well.  
 NS - Not Sampled (lab) NM - Not Measured (field) ND - Not Detected (Lab)  
 NU - Data Not Usable TKN - Total Kjeldahl Nitrogen  
 DOC - Dissolved Organic Carbon DO - Dissolved Oxygen \*Dup - duplicate sample

**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-313I |            |                          |       |       |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 12/06/2023 | 5.87                     | 184.3 | 8.67  | 10.9    | 195.9       | 2.4                 | <0.2    | <0.4   | 2.4     | <0.01   | <0.1     | 0.018     | NS      | NS    | 37.3     | 11.8    | NS    | NS      | NS         |  |
|           | 08/29/2023 | 5.60                     | 207.8 | 7.97  | 12.5    | 190.1       | 1.9                 | <0.20   | <0.20  | 1.9     | <0.010  | <100     | <15       | NS      | NS    | 36.6     | 11.5    | NS    | NS      | NS         |  |
|           | 06/01/2023 | 5.76                     | 70    | 7.63  | 12.5    | 209.9       | 1.5                 | <0.20   | <0.20  | 1.5     | <0.010  | <0.10    | 0.0151    | NS      | NS    | 42       | 13.2    | NS    | NS      | NS         |  |
|           | 03/09/2023 | 5.86                     | 136.3 | 7.95  | 11.7    | 197.4       | 1.7                 | <0.20   | <0.20  | 1.7     | <0.010  | <0.1     | 0.0176    | NS      | NS    | 35.9     | 11.2    | NS    | NS      | NS         |  |
|           | 12/05/2022 | 5.88                     | 181.9 | 7.95  | 11.6    | 180.0       | 2.0                 | < 0.20  | <0.20  | 2.0     | <0.010  | 0.45     | 0.0404    | NS      | NS    | 36.6     | 10      | NS    | NS      | NS         |  |
|           | 09/09/2022 | 6.54                     | 193.0 | 10.40 | 13.0    | 178.1       | 12.8                | <0.20   | 11.2   | 1.6     | <0.0020 | 0.11     | 0.0299    | NS      | NS    | 29.4     | 11      | NS    | NS      | NS         |  |
|           | 06/01/2022 | 5.62                     | 159.1 | 8.42  | 11.5    | 190.5       | 2.0                 | <0.20   | <0.20  | 2.0     | <0.010  | 0.109    | 0.0231    | NS      | NS    | 41.5     | 11.3    | NS    | NS      | NS         |  |
|           | 03/02/2022 | 5.75                     | 133.9 | 8.82  | 11.3    | 195.2       | 2.0                 | <0.20   | <0.20  | 2.0     | <0.010  | 0.167    | 0.0202    | NS      | NS    | 35.4     | 12.9    | NS    | NS      | NS         |  |
|           | 12/17/2021 | 5.82                     | 133.7 | 8.59  | 12.1    | 184.7       | 1.3                 | NS      | <0.20  | 1.3     | <0.010  | 0.433    | 0.0341    | NS      | NS    | 35.8     | 12.7    | NS    | NS      | NS         |  |
|           | 09/14/2021 | 5.81                     | 168.6 | 11.52 | 12.2    | 243.0       | 1.6                 | <0.20   | <0.20  | 1.6     | <0.010  | <0.1     | <0.015    | NS      | NS    | 42.5     | 15.7    | NS    | NS      | NS         |  |
|           | 06/23/2021 | 5.67                     | 192.3 | 9.10  | 12.4    | 199.3       | 1.6                 | <0.20   | 0.23   | 1.4     | <0.010  | <0.1     | 0.0283    | NS      | NS    | 39.3     | 10.4    | NS    | NS      | NS         |  |
|           | 03/18/2021 | 7.75                     | 273.9 | 9.07  | 10.7    | 189.0       | 1.0                 | <0.150  | <0.600 | 1.04    | <0.050  | 0.32     | 0.028     | NS      | NS    | 42       | 11      | NS    | NS      | NS         |  |
|           | 12/10/2020 | 5.95                     | 166.6 | 6.12  | 11.3    | 206.9       | 1.0                 | <0.375  | <0.300 | 1.01    | <0.050  | 0.611    | 0.114     | NS      | NS    | 43       | <10     | NS    | NS      | NS         |  |
|           | 09/10/2020 | 5.94                     | 170.5 | 9.51  | 11.8    | 162.5       | 1.5                 | <0.075  | <0.300 | 1.52    | <0.050  | 0.068    | 0.012     | NS      | NS    | 32       | <10     | NS    | NS      | NS         |  |
|           | 06/12/2020 | 5.41                     | 710.7 | 9.18  | 11.6    | 227.1       | 1.7                 | <0.075  | <0.300 | 1.73    | <0.050  | 1.18     | 0.054     | NS      | NS    | 40       | 11      | NS    | NS      | NS         |  |
|           | 03/10/2020 | 5.6                      | 219.4 | 7.9   | 11.8    | 187.3       | 1.4                 | <0.075  | <0.300 | 1.40    | <0.050  | 0.618    | NS        | NS      | NS    | 36       | 11      | NS    | NS      | NS         |  |
|           | 12/06/2019 | 5.87                     | 185.3 | 6.92  | 11.1    | 196.7       | 1.2                 | <0.075  | <0.300 | 1.23    | <0.050  | 0.157    | NS        | NS      | NS    | 35       | <10     | NS    | NS      | NS         |  |
|           | 09/18/2019 | 5.74                     | 187.2 | 8.96  | 11.4    | 171.4       | 1.8                 | <0.075  | <0.300 | 1.75    | <0.050  | 0.192    | NS        | NS      | NS    | 31       | <10     | NS    | NS      | NS         |  |
|           | 06/14/2019 | 6.3                      | 90    | 11.5  | 13.2    | 180         | NS                  | NS      | NS     | 1.36    | NS      | NS       | NS        | NS      | NS    | NS       | NS      | NS    | NS      | NS         |  |
|           | 05/21/2019 | 5.55                     | -86.6 | 5.41  | 11.37   | 201         | 1.43                | <0.10   | NS     | 0.990   | <0.010  | 1.35     | NS        | 0.0028  | NS    | 34.2     | 12.3    | 0.890 | 3.8     | 23         |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
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\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023 Page 22 of 25  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
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**Eastham PRB Study**

|                  |            | In Situ                  |        |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |
|------------------|------------|--------------------------|--------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|
|                  |            | Water Quality Parameters |        |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |
| Well ID          | Date       | pH                       | ORP    | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |
|                  |            | su                       | mV     | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |
| <b>ESMW-314S</b> |            |                          |        |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|                  | 12/10/2020 | 5.77                     | 242.4  | 8.15 | 10.4    | 2299        | 2.0                 | <0.375  | <0.300 | 1.97    | <0.050  | <0.050   | 0.015     | NS      | NS    | 49       | <10     | NS    | NS      | NS         |
|                  | 12/06/2019 | 5.9                      | 171    | 8.60 | 9.5     | 225         | 1.7                 | <0.075  | <0.300 | 1.71    | <0.050  | 0.108    | NS        | NS      | NS    | 45       | <10     | NS    | NS      | NS         |
|                  | 09/18/2019 | 5.81                     | 240.5  | 7.48 | 13.7    | 235.2       | 1.5                 | <0.075  | <0.300 | 1.47    | <0.050  | 1.1      | NS        | NS      | NS    | 51       | <10     | NS    | NS      | NS         |
| <b>ESMW-314I</b> |            |                          |        |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |
|                  | 12/10/2020 | 6.16                     | 140.8  | 0.33 | 11.0    | 292.4       | 1.1                 | <0.750  | 0.595  | 0.470   | <0.050  | 0.118    | 0.545     | NS      | NS    | 65       | <10     | NS    | NS      | NS         |
|                  | 12/06/2019 | 6.9                      | 49     | 4.00 | 10.4    | 274         | 1.7                 | <0.075  | 1.73   | <0.100  | <0.050  | 28.9     | NS        | NS      | NS    | 52       | <10     | NS    | NS      | NS         |
|                  | 09/18/2019 | 6.50                     | -401.9 | 0.18 | 12.5    | 285.2       | 17                  | <0.375  | 17.3   | <0.100  | <0.050  | 13.4     | NS        | NS      | NS    | 55       | <10     | NS    | NS      | NS         |

Notes: (H) - Analyzed out of hold time.  
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\* ESMW-12S is an intermediate depth well.  
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 TKN - Total Kjeldahl Nitrogen  
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12/15/2023  
 Report: MTER T3 GW PARAMETERS  
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**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|            |            | In Situ                  |        |       |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
|------------|------------|--------------------------|--------|-------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|------|---------|------------|--|
|            |            | Water Quality Parameters |        |       |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       |          | Anions  |      | Other   |            |  |
| Well ID    | Date       | pH                       | ORP    | DO    | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC  | Methane | Alkalinity |  |
|            |            | su                       | mV     | mg/L  | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L | µg/L    | as CaCO3   |  |
| ESMW-315I  |            |                          |        |       |         |             |                     |         |        |         |         |          |           |         |       |          |         |      |         |            |  |
| Dup        | 03/08/2023 | 6.86                     | -136.3 | 0.20  | 12.7    | 344.6       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 29.7     | 6.34      | NS      | NS    | 44.8     | 13.7    | NS   | NS      | NS         |  |
|            | 12/01/2022 | 6.84                     | -138.0 | 0.10  | 12.5    | 376.9       | < 0.30              | < 0.20  | < 0.20 | < 0.11  | < 0.010 | 35.2     | 11.5      | 0.0291  | NS    | 42.3     | < 2.0   | 25.0 | NS      | 59.0       |  |
|            | 12/01/2022 | NM                       | NM     | NM    | NM      | NM          | 0.38                | NS      | 0.38   | < 0.11  | < 0.010 | NS       | NS        | NS      | NS    | NS       | NS      | NS   | NS      | NS         |  |
|            | 09/07/2022 | 6.68                     | -92.9  | 0.28  | 13.5    | 371.8       | <0.30               | <0.20   | <0.20  | 0.14    | 0.04    | 19.6     | 9.05      | 0.0229  | NS    | 41.4     | 3.2     | 13.6 | NS      | 71.5       |  |
|            | 06/02/2022 | 6.12                     | 41.4   | 3.56  | 12.7    | 272.6       | <0.30               | <0.20   | <0.20  | <0.11   | <0.010  | 1.52     | 1.22      | <0.003  | NS    | 52.0     | 8.7     | 1.2  | NS      | 48.5       |  |
|            | 02/28/2022 | 6.64                     | -12.2  | 2.91  | 11.3    | 306.9       | 1.2                 | <0.20   | 0.30   | 0.83    | 0.020   | 4.47     | 6.3       | 0.0109  | NS    | 37.3     | 12.2    | 1.8  | NS      | 60.5       |  |
|            | 12/15/2021 | 6.72                     | -71.5  | 0.45  | 11.9    | 322.0       | <0.30               | <0.20   | 0.28   | <0.11   | <0.010  | 1.16     | 5.82      | 0.0037  | NS    | 34.0     | 4.5     | <1.0 | NS      | 98.0       |  |
|            | 09/10/2021 | 6.6                      | -20    | 1.30  | 13.7    | 370         | 0.36                | 0.35    | <0.20  | 0.35    | <0.010  | 0.567    | 3.74      | 0.0036  | NS    | 41.6     | 6.3     | 1.6  | NS      | 77.0       |  |
|            | 06/25/2021 | 6.52                     | 9.90   | 0.29  | 14.3    | 284.5       | <0.30               | <0.20   | <0.20  | 0.15    | <0.010  | 0.613    | 2.09      | 0.004   | NS    | 40.2     | 10.0    | <1.0 | NS      | 61.0       |  |
|            | 03/17/2021 | 6.70                     | 8.2    | 0.22  | 12.2    | 256.6       | <0.30               | <0.075  | <0.300 | <0.100  | <0.050  | 2.01     | 3.45      | 0.0050  | NS    | 32       | <10     | 1.4  | NS      | 154        |  |
|            | 12/09/2020 | 6.52                     | -25.3  | 1.35  | 11.3    | 321.9       | 0.78                | <0.375  | 0.662  | 0.119   | <0.050  | 2.95     | 2.62      | 0.006   | NS    | 38       | <10     | 1.3  | NS      | 105        |  |
|            | 09/09/2020 | 6.6                      | -28.7  | 4.40  | 16.0    | 428.2       | 0.74                | <0.075  | 0.408  | 0.328   | <0.050  | 2.73     | 1.51      | 0.006   | NS    | 36       | <10     | 3.8  | NS      | 150        |  |
|            | 06/11/2020 | 5.68                     | 310.0  | 3.21  | 15.5    | 282.1       | 1.2                 | <0.075  | <0.300 | 1.15    | <0.050  | 1.60     | 0.108     | NS      | NS    | 42       | 11      | NS   | NS      | NS         |  |
|            | 03/10/2020 | 5.7                      | 206.8  | 9.1   | 13.1    | 231.5       | 3.1                 | <0.075  | <0.300 | 3.10    | <0.050  | 5.50     | NS        | NS      | NS    | 41       | 12      | NS   | NS      | NS         |  |
|            | 12/05/2019 | 6.3                      | 118    | 10.20 | 12.5    | 228         | 2.7                 | <0.075  | <0.300 | 2.66    | <0.050  | 2.87     | NS        | NS      | NS    | 38       | 14      | NS   | NS      | NS         |  |
| 09/16/2019 | 6.0        | 33                       | 7.5    | 15.6  | 210     | 2.6         | <0.375              | <1.5    | 2.65   | <0.050  | 1.32    | NS       | NS        | NS      | 34    | 12       | NS      | NS   | NS      |            |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen

\* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 \*Dup - duplicate sample

12/15/2023  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



**TABLE 3**  
**SUMMARY OF**  
**GROUNDWATER DATA**  
**Eastham PRB Study**

|           |            | In Situ                  |       |      |         |             | Laboratory Analyses |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|-----------|------------|--------------------------|-------|------|---------|-------------|---------------------|---------|--------|---------|---------|----------|-----------|---------|-------|----------|---------|-------|---------|------------|--|
|           |            | Water Quality Parameters |       |      |         |             | Nitrogen            |         |        |         |         | Elements |           |         |       | Anions   |         | Other |         |            |  |
| Well ID   | Date       | pH                       | ORP   | DO   | Temp.   | Spec. Cond. | Total Nitrogen      | Ammonia | TKN    | Nitrate | Nitrite | Iron     | Manganese | Arsenic | Boron | Chloride | Sulfate | DOC   | Methane | Alkalinity |  |
|           |            | su                       | mV    | mg/L | Celsius | µs/cm3      | mg/L                | mg/L    | mg/L   | mg/L    | mg/L    | mg/L     | mg/L      | mg/L    | mg/L  | mg/L     | mg/L    | mg/L  | µg/L    | as CaCO3   |  |
| ESMW-316S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 08/29/2023 | 5.82                     | 81.9  | 1.82 | 15.4    | 196.1       | <0.50               | <0.20   | <0.40  | 0.37    | <0.010  | 3870     | 28.9      | <3.0    | NS    | 33.4     | 6.6     | 3.6   | NS      | 32.8       |  |
|           | 05/31/2023 | 6.03                     | 34.1  | 3.15 | 13.5    | 195.5       | <0.90               | <0.20   | <0.80  | 0.63    | <0.010  | 4.86     | 0.0329    | <0.003  | NS    | 34.1     | 6.2     | 2.9   | NS      | 29.1       |  |
|           | 03/09/2023 | 5.96                     | 50.4  | 2.91 | 10.4    | 217.3       | 0.85                | <0.20   | 0.38   | 0.47    | <0.010  | 8.88     | 0.0635    | <0.003  | NS    | 41.2     | 5.5     | 2.4   | NS      | 34.0       |  |
|           | 12/02/2022 | 6.08                     | 43.7  | 2.76 | 12.7    | 241.1       | 0.91                | < 0.20  | 0.24   | 0.67    | < 0.010 | 13.7     | 0.0858    | 0.0045  | NS    | 46.7     | 3.1     | 2.5   | NS      | 34.5       |  |
|           | 09/08/2022 | 6.81                     | -4.6  | 1.68 | 15.2    | 283.2       | <0.30               | 0.21    | <0.20  | 0.19    | <0.010  | 27.6     | 0.151     | 0.0168  | NS    | 44.3     | 6.8     | <1.0  | NS      | 29.5       |  |
|           | 05/31/2022 | 5.97                     | 16.6  | 2.81 | 12.4    | 228.7       | 1.0                 | <0.20   | <0.20  | 1.0     | <0.010  | 13.2     | 0.176     | 0.0045  | NS    | 38.5     | 3.7     | 4.1   | NS      | 32.5       |  |
| ESMW-316I |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 08/29/2023 | 5.73                     | 9.8   | 0.32 | 12.8    | 478.5       | 1.4                 | 1.1     | 1.4    | <0.11   | <0.010  | 18600    | 151       | <3.0    | NS    | 125      | <2.0    | 8.8   | NS      | 39.9       |  |
|           | 05/31/2023 | 5.77                     | 20.8  | 2.31 | 12.7    | 1012        | 2.9                 | 2.1     | 2.9    | <0.11   | <0.010  | 41.4     | 0.324     | <0.003  | NS    | 154      | 6.3     | 6.6   | NS      | 24.2       |  |
|           | 03/09/2023 | 5.67                     | 27.3  | 0.25 | 12.7    | 722         | 1.9                 | 1.6     | 1.9    | <0.11   | <0.010  | 35.9     | 0.293     | <0.003  | NS    | 221      | <2.0    | 4.1   | NS      | 20.0       |  |
|           | 12/02/2022 | 5.89                     | 7.5   | 1.82 | 12.5    | 541         | 2.2                 | 1.5     | 2.2    | < 0.11  | < 0.010 | 37.2     | 0.298     | 0.0042  | NS    | 197      | < 2.0   | 7.2   | NS      | 21.0       |  |
|           | 09/08/2022 | 6.62                     | 8.1   | 0.14 | 13.3    | 781         | 1.9                 | 1.3     | 1.8    | <0.11   | <0.010  | 40       | 0.363     | 0.0066  | NS    | 219      | 2.4     | 4.4   | NS      | <5.0       |  |
|           | 05/31/2022 | 5.66                     | -6.0  | 0.30 | 12.6    | 961         | 2.7                 | 2.0     | 2.7    | <0.11   | <0.010  | 44       | 0.367     | 0.0031  | NS    | 288      | < 2.0   | 8.3   | NS      | 44.0       |  |
| ESMW-317S |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 12/02/2022 | 5.54                     | 69.9  | 5.25 | 13.5    | 193.0       | 0.30                | < 0.20  | < 0.20 | 0.15    | < 0.010 | 5.2      | 0.248     | <0.003  | NS    | 50.5     | < 2.0   | 1.9   | NS      | 15.5       |  |
|           | 05/31/2022 | 5.98                     | -7.3  | 0.72 | 12.0    | 223.6       | 0.56                | <0.20   | 0.31   | 0.24    | 0.012   | 20.5     | 0.3       | <0.003  | NS    | 45.1     | 3.9     | 5.1   | NS      | 21.5       |  |
| ESMW-317I |            |                          |       |      |         |             |                     |         |        |         |         |          |           |         |       |          |         |       |         |            |  |
|           | 12/02/2022 | 6.19                     | -16.0 | 0.39 | 13.1    | 191.8       | 0.98                | 0.70    | 0.98   | < 0.11  | < 0.010 | 24.1     | 0.126     | 0.0055  | NS    | 32.4     | < 2.0   | 7.0   | NS      | 29.5       |  |
|           | 09/06/2022 | 5.97                     | 20.7  | 1.15 | 13.8    | 219.9       | <4.1                | 0.64    | <4.0   | <0.11   | <0.010  | 18       | 0.124     | 0.0188  | NS    | 38.4     | <2.0    | 10.3  | NS      | 12.5       |  |
|           | 05/31/2022 | 5.94                     | -40.4 | 0.28 | 12.1    | 219.2       | 1.2                 | 0.64    | 1.2    | <0.11   | <0.010  | 23.3     | 0.157     | 0.0055  | NS    | 35.2     | < 2.0   | 10.3  | NS      | 31.0       |  |

Notes: (H) - Analyzed out of hold time.  
 NS - Not Sampled (lab)  
 NU - Data Not Usable  
 DOC - Dissolved Organic Carbon  
 DO - Dissolved Oxygen  
 \* ESMW-12S is an intermediate depth well.  
 NM - Not Measured (field)  
 TKN - Total Kjeldahl Nitrogen  
 ND - Not Detected (Lab)  
 \*Dup - duplicate sample

12/15/2023 Page 25 of 25  
 Report: MTER T3 GW PARAMETERS  
 Database: 8010-Eastham2021.a



## APPENDIX A

### PRB SPECIAL USE PERMIT



# United States Department of the Interior

National Park Service  
Cape Cod National Seashore  
99 Marconi Site Road  
Wellfleet, MA 02667

IN REPLY REFER TO:  
L3035

March 12, 2020

Jane Crowley, R.S., M.S., Eastham Health Agent  
Town of Eastham  
2500 State Highway  
Eastham, MA 02642

Dear Ms. Crowley:

We were requested to review and approve your permit application to install a pilot permeable reactive barrier (PRB) at Salt Pond Visitor Center located at 50 Nauset Road, Eastham, MA.

A network of monitoring wells will help determine changes to groundwater quality around the PRB area, which is located in the northeast corner of the Salt Pond Visitor Center parking lot.

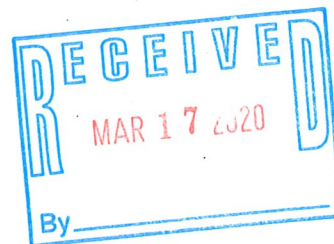
We have enclosed a five-year Special Use Permit to further study the effectiveness of water quality improvement through installation of a pilot PRB to reduce nitrate loading into the impaired water body of Salt Pond embayment. A research permit is pending for this activity.

We appreciate the continued cooperation between your team and the national seashore. We are hopeful that this innovative solution will substantially reduce nutrient pollution to the Salt Pond embayment.

Sincerely,

Brian T. Carlstrom  
Superintendent

cc:  
Town Administrator Jacqui Beebe





## SPECIAL USE PERMIT

Cape Cod National Seashore  
99 Marconi Site Road  
Wellfleet, MA 02667  
Katie Trudeau 508-957-0706



|                                                                                       |                                   |                   |                |
|---------------------------------------------------------------------------------------|-----------------------------------|-------------------|----------------|
| Name<br>Jane Crowley, R.S., M.S., Eastham Health Agent                                |                                   |                   |                |
| Company/Organization<br>Town of Eastham                                               |                                   |                   |                |
| Street Address<br>2500 State Highway                                                  |                                   |                   |                |
| City<br>Eastham                                                                       | State<br>MA                       | Zip Code<br>02642 | Country<br>USA |
| Telephone Number<br>508-240-5900 ext. 3229                                            | Cell Phone Number<br>508-889-2991 |                   |                |
| Fax Number<br>TBD                                                                     |                                   |                   |                |
| Email Address<br><a href="mailto:jcrowley@eastham-ma.gov">jcrowley@eastham-ma.gov</a> |                                   |                   |                |

Park Alpha Code  
CACO  
Type of Use  
9500  
Permit #  
200052

is hereby authorized to use the following described land or facilities in Cape Cod National Seashore:

Installation of permeable reactive barriers (PRB) at Salt Pond Visitor Center located at 50 Nauset Road, Eastham, MA 02642.

The area must be restored to its original condition at the end of the permit.

The permit begins at 12 ☒ am / ☐ pm on 5/23/2020 (mm/dd/yyyy).

The permit expires at 12 ☐ am / ☒ pm on 5/23/25 (mm/dd/yyyy).

SUMMARY OF PERMITTED ACTIVITY: (see attached sheets for additional information and conditions)

The project will occur in a small area of the Salt Pond Visitor Center parking lot adjacent to Nauset Road in Eastham, MA.

Dimensions are:

- 200-foot PRB parallel to Nauset Road (perpendicular to groundwater flow)
- 43-foot vertical injection interval at + 13 to -30-foot elevation (approximately 21 to 64 feet below land surface at the location)
- 10-foot injection point spacing

Person on site responsible for adherence to the terms and conditions of the permit (include contact information)

Jane Crowley, 508-889-2991

Authorizing legislation or other authority

PL 87-126

APPLICATION FEE

PERFORMANCE BOND

LIABILITY INSURANCE

COST RECOVERY

LOCATION FEE

|                                                  |                   |
|--------------------------------------------------|-------------------|
| <input type="checkbox"/> Received                | Amount            |
| <input checked="" type="checkbox"/> Not Required | \$                |
| <input type="checkbox"/> Required                | Amount            |
| <input checked="" type="checkbox"/> Not Required | \$                |
| <input checked="" type="checkbox"/> Required     | Amount            |
| <input type="checkbox"/> Not Required            | \$ 1 mil/\$ 3 mil |
| <input type="checkbox"/> Required                | Amount            |
| <input checked="" type="checkbox"/> Not Required | \$                |
| <input type="checkbox"/> Required                | Amount            |
| <input checked="" type="checkbox"/> Not Required | \$                |

ISSUANCE of this permit is subject to the attached conditions. The undersigned hereby accepts this permit subject to the terms, covenants, obligations, and reservations, expressed or implied herein.

  
PERMITTEE Signature

Title: *Director of Health  
and Environment*

Date: *3/17/20*

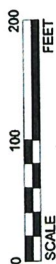
Title: Superintendent

Date:



### LEGEND

- MONITORING WELL  
COUPLET MONITORING WELL  
TRIPLET MONITORING WELL  
PIEZOMETER  
DEMONSTRATION PRB



PREPARED BY



PREPARED FOR

TOWN OF EASTHAM

LOCATION

NAUSET ROAD  
EASTHAM, MASSACHUSETTS

| NAME | DATE | TIME | LOCATION | REMARKS |
|------|------|------|----------|---------|
| ...  | ...  | ...  | ...      | ...     |

PRB DEMONSTRATION AREA  
SITE PLAN

|       |           |                |    |                           |    |
|-------|-----------|----------------|----|---------------------------|----|
| DRAWN | DMR       | CHECKED        | BP | APPROVED                  | DH |
| DATE  | 1/29/2020 | PROJECT NUMBER |    | 8010-04                   |    |
| RTN   | 4-24301   | FILE           |    | EASTHAM LANDFILL 2020.DWG |    |

**FIGURE 1**

### FIGURE 1

## Eastham Salt Pond - PRB Pilot and Groundwater Monitoring Project 2020

### Background

Permeable Reactive Barriers (PRBs) intercept and treat nitrate in groundwater before it reaches downgradient surface waters, converting nitrate to inert Nitrogen gas using emulsified vegetable oil injected into the soil. A PRB pilot project will provide data to assess the effectiveness and applicability of PRBs as an alternative technology to reduce nutrients in the highly impaired Salt Pond in Eastham, MA, where the park's main visitor center is located.

The project need has been established and the over two dozen monitoring wells located inside and outside the park boundary have guided the town and park to isolate this proposed pilot project location after several years of study.

The project will occur in a small area of the Salt Pond Visitor Center parking lot adjacent to Nauset Road in Eastham, MA. Archeological clearances have been done due to the groundwater monitoring wells already installed.

#### Dimensions are:

- 200-foot PRB parallel to Nauset Road (perpendicular to groundwater flow)
- 43-foot vertical injection interval at + 13 to -30-foot elevation (approximately 21 to 64 feet below land surface at the location)
- 10-foot injection point spacing

The goal of this study is to further progress and study the permeable reactive barrier (PRB) project through a pilot PRB to treat nitrate loading into the impaired water body of Salt Pond. This permit application further progresses the research under Permit #CACO-2018-SCI-0013. The construction aspects of the project are outlined PEPC 92625 - Salt Pond PRB Pilot and Groundwater Monitoring Project.

PRB Construction Method (Section 5.3 of Technical Memo, attached). The proposed PRB construction method involves the direct injection of an emulsified vegetable oil (EVO) solution to form the PRB at the specified width (cross gradient), injection radius of influence or "flow through length", and vertical thickness or depth. The EVO is delivered to the location as a 60% emulsified solution in 250-gallon totes that can be offloaded with a forklift. A staging area is set up and marked off with traffic cones and caution tape or temporary fencing. A secondary containment system consisting of a pad with low waterproof walls and bottom is typically placed at the site to house the totes of EVO and other substrate components. The containment pad is also used for setting up dilution mixing and pump systems. Alternatively, a box truck can be mobilized to the site to house all injection tanks and related equipment for a more mobile system. Dilution water is typically obtained from a nearby fire hydrant connected with a backflow preventer and water is carried to the work area with a tanker truck. All work is performed under the service contractor's approved Health and Safety Plan in modified Level D personal protective equipment; consisting of steel toe boots, hard hats, safety glasses, safety vests, gloves and hearing protection when needed.

Once all the substrate and equipment is on-site and the dilution mixing system is in place, a Geoprobe® or similar direct push rig is used to set injection well points at precleared locations. The Geoprobe® machines push steel injection rods with 4-foot or 8-foot slotted screen sections to the design maximum depth of the PRB. The 60 % EVO is diluted to the specified substrate level and mixed with additives including sodium lactate and sodium bicarbonate pH buffer to enhance performance. Delivery lines are connected to the wellheads and a specified volume of EVO substrate is injected to achieve the design radius of influence at each injection point. The rods are then lifted to the next higher interval at the point and the process is repeated. The last injection for each point is completed at the top of the PRB or the water table. This process is typically completed with injection to up to four injection rods simultaneously.

Groundwater samples will be collected and analyzed.

### CONDITIONS OF THIS PERMIT

Failure to comply with any of the terms and conditions of this permit may result in the immediate suspension or revocation of the permit. [36 CFR 1.6(h)]

1. The permittee is prohibited from giving false information; to do so will be considered a breach of conditions and be grounds for revocation: [36 CFR 2.32(a)(3)].
2. This permit may not be transferred or assigned without the prior written consent of the Superintendent.
3. The permittee shall exercise this privilege subject to the supervision of the Superintendent or designee, and shall comply with all applicable Federal, State, county and municipal laws, ordinances, regulations, codes, and the terms and conditions of this permit. Failure to do so may result in the immediate suspension of the permitted activity or the revocation of the permit. All costs associated with clean up or damage repairs in conjunction with a revoked permit will be the responsibility of the permittee.
4. The permittee is responsible for making all necessary contacts and arrangements with other Federal, State, and local agencies to secure required inspections, permits, licenses, etc.
5. The park area associated with this permit will remain open and available to the public during park visiting hours. This permit does not guarantee exclusive use of an area. Permit activities will not unduly interfere with other park visitors' use and enjoyment of the area.
6. This permit may be revoked at the discretion of the Superintendent upon 24 hours' notice.
7. This permit may be revoked without notice if damage to resources or facilities occurs or is threatened, notwithstanding any other term or condition of the permit to the contrary.
8. This permit is made upon the express condition that the United States, its agents and employees shall be free from all liabilities and claims for damages and/or suits for or by reason of any injury, injuries, or death to any person or persons or property of any kind whatsoever, whether to the person or property of the Permittee, its agents or employees, or third parties, from any cause or causes whatsoever while in or upon said premises or any part thereof during the term of this permit or occasioned by any occupancy or use of said premises or any activity carried on by the Permittee in connection herewith, and the Permittee hereby covenants and agrees to indemnify, defend, save and hold harmless the United States, its agents, and employees from all liabilities, charges, expenses and costs on account of or by reason of any such injuries, deaths, liabilities, claims, suits or losses however occurring or damages growing out of the same.
9. Permittee agrees to carry general liability insurance against claims occasioned by the action or omissions of the permittee, its agents and employees in carrying out the activities and operations authorized by this permit. The policy shall be in the amount of \$\_\_\_\_\_ \$ 1 million\_\_\_\_\_ per Occurrence, \$\_\_\_\_\$3 million\_\_\_\_\_ Aggregate and underwritten by a United States company naming the United States of America as **additional insured**. The permittee agrees to provide the Superintendent with a Certificate of Insurance with the proper endorsements prior to the effective date of the permit.
10. Permittee agrees to deposit with the park a bond in the amount of \$\_\_\_\_\_0\_\_\_\_\_ from an authorized bonding company or in the form of cash or cash equivalent, to guarantee that all financial obligations to the park will be met.
11. Costs incurred by the park as a result of accepting and processing the application and managing and monitoring the permitted activity will be reimbursed by the permittee. Administrative costs and estimated costs for activities on site must be paid when the permit is approved. If any additional costs are incurred by the park, the permittee will be billed at the conclusion of the permit. Should the estimated costs paid exceed the actual costs incurred; the difference will be returned to the permittee.
12. The person(s) named on the permit as in charge of the permitted activity on-site must have full authority to make any decisions about the activity and must remain available at all times. He/she shall be responsible for all individuals, groups, vendors, etc. involved with the permit
13. Nothing herein contained shall be construed as binding the Service to expend in any one fiscal year any sum in excess of appropriations made by Congress or administratively allocated for the purpose of this permit for the fiscal year, or to involve the Service in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.
14. If any provision of this permit shall be found to be invalid or unenforceable, the remainder of this permit shall not be affected and the other provisions of this permit shall be valid and be enforced to the fullest extent permitted by law.

***Add additional park specific conditions sequentially.***

### SPECIAL CONDITIONS OF THIS PERMIT

15. At no time will Permittee's activities at the Site interfere with a visitor's enjoyment of the park, except as necessary to conduct the activities contemplated by this Permit. Visitor access to all park facilities, exhibits, resources, etc. will be maintained at all times and the Permittee will not block or obstruct any park walkway, trail, or road, except to the extent necessary to conduct the activities authorized by this Permit.
  - a. Any such need to obstruct access will be communicated to park staff prior to the activity and a safe perimeter established. All construction mobilization will occur in the paved parking area.
16. The Permittee will comply with any and all instructions from official representatives of the NPS.

17. The Permittee shall coordinate the performance of work with the appropriate representative of the National Park Service (NPS). The primary local NPS point of contact for all aspects of this Permit will be Lauren McKean at 508-957-0731. The alternate point of contact is Geoff Sanders at 508-957-0737. In the event of emergency, accident, injury or death, both of the above individuals shall be notified immediately. In addition, Park law enforcement must be contacted at 617-242-5659 prior to the beginning of work or if there is any incident on site.
18. Any injuries to any persons from the activities authorized under this Permit shall be reported immediately to the NPS points of contact. A cell phone is required to be on-Site at all times.
19. Prior to the start of the proposed work, a joint walk-through of the Site with the Permittee and NPS representatives shall be conducted. The walk-through will be conducted in all areas that will be accessed to complete the proposed work. All contractors and subcontractors selected for the permitted work activities must be present for the walk-through.
20. The Permittee shall contact Dig Safe in accordance with standard industry practice for approval of ground-disturbing activity.
21. Proof of Dig Safe approval is required.
22. The Permittee shall be responsible for reviewing park-provided plans and to relocate any proposed monitoring wells in conflict with any underground utilities.
23. The Permittee shall obtain prior archeological approval from NER Regional Archeologist prior to any ground-disturbing activity.
24. Cautionary signs approaching the work zone will be posted that indicate work zone ahead so that visitors and staff are aware; at least one personnel will be at each work active work area at all times. Cones and caution tape shall be used to keep pedestrians away from the work area. Only one active will be active at a time.
25. To prevent pavement damage, there is no drilling authorized on any paved surfaces. The town and the contractor will relocate any proposed monitoring wells off of any paved surfaces or where there are underground utilities that require adjustment in well locations.
26. The driller should provide geoprobe and all-terrain track rigs to access well sites. No drilling holes shall be left excavated; backfill will be completed daily.
27. A NPS representative may observe any or all activities on NPS property, or those activities that are or may be impacting NPS property and resources.
28. The Permittee is responsible for the safety of all Site visitors and shall provide the necessary direction, barricades, detours, and other safety measures to ensure visitor safety. All access restrictions to the work area will be coordinated with the NPS points of contact listed above.
29. Appropriate OSHA personal protective equipment (PPE) must be used by field crews and other on-Site personnel.
30. A copy of all data (e.g., sample results, laboratory results, coordinates, wildlife inventories), documentation (e.g., manifests, field notes, photographs, monitoring results), and reports prepared relating to work performed pursuant to this Permit will be submitted to the NPS points of contact in accordance with the Research Permit.
31. The Permittee and its contractors and subcontractors shall take adequate measures as directed and approved by NPS to prevent, minimize, and mitigate damage to Park resources during all activities conducted pursuant to this Permit. This may include, but is not limited to, restoration, soil conservation and erosion protection measures, landscaping, and repairing roads, trails, signs, etc. Any vegetation damaged or removed will be replaced as

directed by NPS. The Permittee shall restore any injury to NPS property resulting from activities conducted pursuant to this Permit in accordance with NPS, other federal and state requirements, and at the direction of NPS.

32. No waste, dust, or erosion materials shall be allowed to enter natural or manmade water or sewer systems in or on parkland by either direct or indirect action of the Permittee. Any waste or erosion material entering onto parkland shall be removed and the affected property cleaned, stabilized, or restored the day that this condition is discovered, at the direction, and to the satisfaction, of NPS. The Permittee shall take all necessary measures to prevent air, noise, and water pollution by any material and/or equipment used during this permitted activity.
33. Construction equipment, materials, and all other supplies shall be located within the work site and shall be staged in such a way as to allow for the safe use of the area by park visitors, to the extent possible.
34. Other than the immediate work area and the clearly defined safety zone, all sidewalks, walkways, roadways, and trails must remain unobstructed to allow for the reasonable use of these areas by pedestrians, vehicles, and other park users.
35. The Permittee agrees to comply with and be bound by the terms of this Permit and to undertake all actions set forth in this Permit. In any action by the NPS to enforce the terms of this Permit, the Permittee consents to and agrees not to contest the authority or jurisdiction of NPS to issue or enforce this Permit, and agrees not to contest the validity of the Permit or its terms.
36. Good order and proper decorum shall be maintained by those persons conducting and participating in Site activities and public safety and general welfare will not be endangered.
37. All work and investigations on NPS property requires a minimum 48-hour advance notice (business days, Monday-Friday except federal holidays) to the NPS points of contact identified above. The Permittee will provide the NPS a written list of names, with phone and fax numbers, of its points of contact, including points of contact for Permittee's contractors and subcontractors, for activities conducted on the Site pursuant to this Permit.
38. The Permittee and its representatives, agents, contractors, and subcontractors must be apprised of, be familiar with, and comply with, the contents of this Permit. A copy of this Permit will be available on-Site during all phases of the permitted work.
39. This Permit does not grant any property rights, easements, rights-of-way, or any other interest in real property.
40. The National Park Service (NPS) reserves the right to stop any work being performed on the Site pursuant to this Permit should NPS determine that such work has or will negatively impact any NPS resources, which would not reasonably be inherent in the use that the Permittee is entitled to make of the Site pursuant to this Permit.
41. NPS reserves the right to immediately rescind this Permit at any time should any of the Permit conditions be violated, or should the activity in any way interfere with any program of the park, except as expressly authorized by this Permit, or at the discretion of the Park Superintendent.
42. This Permit is issued only for the use of the Site and only for the dates and times specified on the Permit. This Permit does not authorize any use, activity, or purpose other than those expressly described herein.
43. **REGULATORY REQUIREMENTS:** All Site work will be conducted and implemented in accordance with all federal, state, and local laws, regulations and requirements as directed by the NPS, and will be consistent with the NPS mission (*see, e.g., 16 U.S.C. Section 1 et seq.*).
44. The Permittee is responsible for complying with any federal, state, or local requirement to obtain any licenses and/or permits required for the activities conducted pursuant to this Permit, and for obtaining any utility clearances required before the permitted work is commenced.

45. No Member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this Permit or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this grant if made with a corporation for its general benefit.
46. During the performance of this Permit, the Permittee agrees that it will not discriminate against any person because of race, color, religion, sex, or national origin. The Permittee will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, or national origin.
47. ANTI-DEFICIENCY ACT. No provision of this Permit shall be interpreted as or constitute a commitment or requirement that the United States obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. §§ 1341-1344 and 1511-1519, or any other applicable provision of law.
48. This Permit is granted upon the express condition that the United States, its agents and employees, shall be free from all liabilities and claims for damages and/or suits for or by any reason, arising from or related to activities conducted pursuant to this Permit, including any releases of waste materials, injury, or death to any person or property of the Permittee, its contractors, subcontractors, agents or employees, or third parties, from any cause or causes whatsoever while in or upon the Site or any part thereof during the term of this Permit or occasioned by any use of the Site or any activity carried on by the Permittee or its contractors or subcontractors in connection herewith, and the Permittee hereby covenants and agrees to indemnify, defend, save and hold harmless the United States, its agents and employees, from all liabilities, charges, expenses and costs on account of or by reason of any such injuries, deaths, liabilities, claims, suits or losses however occurring, or damages arising from any acts related to this Permit.
49. The United States shall have no liability for any claims or causes of action in any forum regarding any activities conducted pursuant to this Permit, including but not limited to liability for claims or causes of action for property damage, bodily injury, or death caused by Permittee's use of parklands in connection with this Permit. The Permittee assumes liability for all activities, releases, incidents and events caused by or associated with any permitted activity, including any and all releases of Waste Materials into the environment resulting from permitted activities. The Permittee assumes responsibility for costs, repairs, and/or restoration to any areas damaged by such releases and/or discharges, whether those areas are within the permitted area or not.
50. The Permittee shall ensure its liability insurance remains in full force during the entirety of the period covered by this agreement. The Permittee agrees to be fully responsible for the management, performance, use and safety of the Site under this agreement and hereby accepts responsibility and assumes liability for any and all claims arising from the intentional, reckless or negligent actions or omissions of its representatives, employees, agents, contractors or subcontractors directly or indirectly connected with the work performed, or the maintenance or use of the Site, to the extent permitted by law. The Permittee shall, and shall require all of its contractors and subcontractors to:
  - a) Procure public and employee liability insurance from responsible companies with a minimum limitation of \$1,000,000 (one million dollars) per person for any one claim and an aggregate limit of \$3,000,000 (three million dollars) for any number of claims arising from any one incident, or the minimum required by law, if any, whichever amount is greater. The United States of America shall be named as an additional insured on all policies. The Permit number will be included on said policy. All such policies shall specify that the insured shall have no right of subrogation against the United States for payments of any premiums or deductibles thereunder, and such insurance policies shall be obtained by, be for the account of, and be at the insured's sole risk. A copy of the Certificate of Insurance evidencing proper insurance coverage and referencing the Permit number shall be returned to NPS with the executed Permit to the Park Superintendent. No work shall be allowed to proceed under this Permit until the copy of said Certificate of Insurance is provided to the Park Superintendent.
  - b) Pay the United States the full value for all damages to the lands or other property of the United States caused by the Permittee or by the Permittee's employees, agents, contractors, subcontractors, or employees of the contractors or subcontractors.
  - c) Indemnify, save and hold harmless and defend the United States against all fines, claims, damages, losses, judgments, and expenses to the extent permitted by law rising out of, or from any omission or activity in connection with activities conducted under this Permit.

## APPENDIX B

### LABORATORY ANALYTICAL REPORTS

The results set forth herein are provided by SGS North America Inc.

**e-Hardcopy 2.0**  
Automated Report

## Technical Report for

**Verdantas LLC**

Eastham Permeable Reactive Barrier (PRB), Eastham, MA

8010-04; PO#ESM.0008010004.3

SGS Job Number: JD78246

Sampling Date: 12/06/23



Report to:

Verdantas  
273 West Main Street  
Norton, MA 02766  
BPaulsen@esm-inc.com; lflynn@esm-inc.com;  
aboyd@esm-inc.com; dheely@esm-inc.com  
ATTN: Brooke Paulsen

Total number of pages in report: 55



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable unless noted in the narrative, comments or footnotes.

David Chastain  
General Manager

**Client Service contact: Angela Lattanzio 732-329-0200**

Certifications: NJ(12129),NY(10983),CA,CO,CT,FL,HI,IL,IN,KY,LA (120428),MA,MD,ME,MN,NC,NH,NV, AK (UST-103),AZ (AZ0786),PA(68-00408),RI,SC,TX (T104704234),UT,VA,WA,WV

This report shall not be reproduced, except in its entirety, without the written approval of SGS.  
Test results relate only to samples analyzed.

# Table of Contents

-1-

|                                                               |           |
|---------------------------------------------------------------|-----------|
| <b>Section 1: Sample Summary .....</b>                        | <b>3</b>  |
| <b>Section 2: Case Narrative/Conformance Summary .....</b>    | <b>4</b>  |
| <b>Section 3: Summary of Hits .....</b>                       | <b>8</b>  |
| <b>Section 4: Sample Results .....</b>                        | <b>11</b> |
| <b>4.1:</b> JD78246-1: ESMW-310I .....                        | 12        |
| <b>4.2:</b> JD78246-1F: ESMW-310I .....                       | 13        |
| <b>4.3:</b> JD78246-2: ESMW-310S .....                        | 15        |
| <b>4.4:</b> JD78246-2F: ESMW-310S .....                       | 16        |
| <b>4.5:</b> JD78246-3: ESMW-313I .....                        | 18        |
| <b>4.6:</b> JD78246-3F: ESMW-313I .....                       | 19        |
| <b>4.7:</b> JD78246-4: ESMW-313S .....                        | 20        |
| <b>4.8:</b> JD78246-4F: ESMW-313S .....                       | 21        |
| <b>4.9:</b> JD78246-5: ESMW-12S .....                         | 22        |
| <b>4.10:</b> JD78246-5F: ESMW-12S .....                       | 24        |
| <b>4.11:</b> JD78246-6: ESMW-12SR .....                       | 26        |
| <b>4.12:</b> JD78246-6F: ESMW-12SR .....                      | 28        |
| <b>4.13:</b> JD78246-7: ESMW-12SR DUP .....                   | 30        |
| <b>Section 5: Misc. Forms .....</b>                           | <b>31</b> |
| <b>5.1:</b> Certification Exceptions .....                    | 32        |
| <b>5.2:</b> Chain of Custody .....                            | 33        |
| <b>Section 6: GC Volatiles - QC Data Summaries .....</b>      | <b>36</b> |
| <b>6.1:</b> Method Blank Summary .....                        | 37        |
| <b>6.2:</b> Laboratory Control Sample Summary .....           | 38        |
| <b>6.3:</b> Duplicate Summary .....                           | 39        |
| <b>Section 7: Metals Analysis - QC Data Summaries .....</b>   | <b>40</b> |
| <b>7.1:</b> Prep QC MP43602: As,Fe,Mn .....                   | 41        |
| <b>Section 8: General Chemistry - QC Data Summaries .....</b> | <b>51</b> |
| <b>8.1:</b> Method Blank and Spike Results Summary .....      | 52        |
| <b>8.2:</b> Duplicate Results Summary .....                   | 53        |
| <b>8.3:</b> Matrix Spike Results Summary .....                | 54        |
| <b>8.4:</b> Matrix Spike Duplicate Results Summary .....      | 55        |



Sample Summary

Verdantas LLC

Job No: JD78246

Eastham Permeable Reactive Barrier (PRB), Eastham, MA  
Project No: 8010-04; PO#ESM.0008010004.3

| Sample Number | Collected Date | Time By  | Received | Matrix Code | Type                 | Client Sample ID |
|---------------|----------------|----------|----------|-------------|----------------------|------------------|
| JD78246-1     | 12/06/23       | 10:40 ZE | 12/07/23 | AQ          | Ground Water         | ESMW-310I        |
| JD78246-1F    | 12/06/23       | 10:40 ZE | 12/07/23 | AQ          | Groundwater Filtered | ESMW-310I        |
| JD78246-2     | 12/06/23       | 11:40 ZE | 12/07/23 | AQ          | Ground Water         | ESMW-310S        |
| JD78246-2F    | 12/06/23       | 11:40 ZE | 12/07/23 | AQ          | Groundwater Filtered | ESMW-310S        |
| JD78246-3     | 12/06/23       | 11:35 JN | 12/07/23 | AQ          | Ground Water         | ESMW-313I        |
| JD78246-3F    | 12/06/23       | 11:35 JN | 12/07/23 | AQ          | Groundwater Filtered | ESMW-313I        |
| JD78246-4     | 12/06/23       | 12:20 JN | 12/07/23 | AQ          | Ground Water         | ESMW-313S        |
| JD78246-4F    | 12/06/23       | 12:20 JN | 12/07/23 | AQ          | Groundwater Filtered | ESMW-313S        |
| JD78246-5     | 12/06/23       | 13:50 ZE | 12/07/23 | AQ          | Ground Water         | ESMW-12S         |
| JD78246-5F    | 12/06/23       | 13:50 ZE | 12/07/23 | AQ          | Groundwater Filtered | ESMW-12S         |
| JD78246-6     | 12/06/23       | 13:50 JN | 12/07/23 | AQ          | Ground Water         | ESMW-12SR        |
| JD78246-6F    | 12/06/23       | 13:50 JN | 12/07/23 | AQ          | Groundwater Filtered | ESMW-12SR        |
| JD78246-7     | 12/06/23       | 14:00 JN | 12/07/23 | AQ          | Ground Water         | ESMW-12SR DUP    |

## CASE NARRATIVE / CONFORMANCE SUMMARY

2

**Client:** Verdantas LLC

**Job No:** JD78246

**Site:** Eastham Permeable Reactive Barrier (PRB), Eastham, MA

**Report Date** 12/14/2023 6:07:44 P

On 12/07/2023, 7 sample(s), 0 Trip Blank(s), 0 Equip. Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. (SGS) at a temperature of 2.3 °C. The samples were intact and properly preserved, unless noted below. An SGS Job Number of JD78246 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

### GC Volatiles By Method RSK-175

**Matrix:** AQ

**Batch ID:** GAA2947

- All samples were analyzed within the recommended method holding time.
- Sample(s) JD78321-1DUP were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The duplicate RPD(s) for Methane are outside control limits for sample JD78321-1DUP. Probable cause due to sample homogeneity.

### Metals Analysis By Method SW846 6010D

**Matrix:** AQ

**Batch ID:** MP43602

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78217-2MS, JD78217-2MSD, JD78217-2SDL were used as the QC samples for the metals analysis.
- The serial dilution RPD(s) for Arsenic are outside control limits for sample MP43602-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

### General Chemistry By Method EPA 300/SW846 9056A

**Matrix:** AQ

**Batch ID:** GP50947

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78246-4DUP, JD78246-4MS were used as the QC samples for the Chloride, Sulfate, Chloride analysis.

### General Chemistry By Method EPA 351.2/LACHAT

**Matrix:** AQ

**Batch ID:** GP51005

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78420-2DUP, JD78420-2MS were used as the QC samples for the Nitrogen, Total Kjeldahl analysis.

Thursday, December 14, 2023

Page 1 of 4

## General Chemistry By Method EPA 353.2/LACHAT

**Matrix:** AQ

**Batch ID:** GP50912

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78217-2DUP, JD78217-2MS were used as the QC samples for the Nitrogen, Nitrate + Nitrite analysis.
- The matrix spike (MS) recovery(s) of Nitrogen, Nitrate + Nitrite are outside control limits. Spike recovery indicates possible matrix interference.

**Matrix:** AQ

**Batch ID:** GP50920

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78246-4DUP, JD78246-4MS, JD78246-5MS were used as the QC samples for the Nitrogen, Nitrate + Nitrite analysis.
- The matrix spike (MS) recovery(s) of Nitrogen, Nitrate + Nitrite are outside control limits. Spike recovery indicates possible matrix interference.
- The matrix spike (MS) recovery(s) of Nitrogen, Nitrate + Nitrite are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

## General Chemistry By Method EPA353.2/SM4500NO2B

**Matrix:** AQ

**Batch ID:** R207437

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-1 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

**Matrix:** AQ

**Batch ID:** R207438

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-2 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

**Matrix:** AQ

**Batch ID:** R207439

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-3 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

**Matrix:** AQ

**Batch ID:** R207459

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-4 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

**Matrix:** AQ

**Batch ID:** R207460

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-5 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

**Matrix:** AQ

**Batch ID:** R207461

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-6 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

**Matrix:** AQ

**Batch ID:** R207462

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JD78246-7 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

## General Chemistry By Method SM2320 B-11

**Matrix:** AQ

**Batch ID:** GN49049

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78241-1DUP were used as the QC samples for the Alkalinity, Total as CaCO<sub>3</sub> analysis.
- JD78246-2 for Alkalinity, Total as CaCO<sub>3</sub>: Sample was titrated to a final pH of 4.5. Sample received with head space.
- JD78246-1 for Alkalinity, Total as CaCO<sub>3</sub>: Sample was titrated to a final pH of 4.5. Sample received with head space.
- JD78246-6 for Alkalinity, Total as CaCO<sub>3</sub>: Sample was titrated to a final pH of 4.5. Sample received with head space.
- JD78246-5 for Alkalinity, Total as CaCO<sub>3</sub>: Sample was titrated to a final pH of 4.5. Sample received with head space.

## General Chemistry By Method SM4500 A-11

**Matrix:** AQ

**Batch ID:** R207580

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-1 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

**Matrix:** AQ

**Batch ID:** R207581

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-2 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

**Matrix:** AQ

**Batch ID:** R207582

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-3 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

**Matrix:** AQ

**Batch ID:** R207583

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-4 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

**Matrix:** AQ

**Batch ID:** R207584

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-5 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

**Matrix:** AQ

**Batch ID:** R207585

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-6 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

**Matrix:** AQ

**Batch ID:** R207586

- The data for SM4500 A-11 meets quality control requirements.
- JD78246-7 for Nitrogen, Total: Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

## General Chemistry By Method SM4500NH3 H-11LACHAT

**Matrix:** AQ

**Batch ID:** GP51024

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78337-4DUP, JD78337-4MS, JD78337-4MSD were used as the QC samples for the Nitrogen, Ammonia analysis.

### General Chemistry By Method SM4500NO2 B-11

**Matrix:** AQ**Batch ID:** GN48951

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78194-3MS, JD78194-3MSD were used as the QC samples for the Nitrogen, Nitrite analysis.

### General Chemistry By Method SM5310 B-11

**Matrix:** AQ**Batch ID:** GP50927

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD78246-1FMS, JD78246-1FMSD were used as the QC samples for the Dissolved Organic Carbon analysis.

SGS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting SGS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by SGS indicated via signature on the report cover.

## Summary of Hits

**Job Number:** JD78246  
**Account:** Verdantas LLC  
**Project:** Eastham Permeable Reactive Barrier (PRB), Eastham, MA  
**Collected:** 12/06/23



| Lab Sample ID                                       | Client Sample ID | Result/<br>Qual | RL   | MDL | Units | Method               |
|-----------------------------------------------------|------------------|-----------------|------|-----|-------|----------------------|
| <b>JD78246-1</b>                                    | <b>ESMW-310I</b> |                 |      |     |       |                      |
| Alkalinity, Total as CaCO <sub>3</sub> <sup>a</sup> |                  | 72.2            | 5.0  |     | mg/l  | SM2320 B-11          |
| Chloride                                            |                  | 34.6            | 2.0  |     | mg/l  | EPA 300/SW846 9056A  |
| <b>JD78246-1F</b>                                   | <b>ESMW-310I</b> |                 |      |     |       |                      |
| Arsenic                                             |                  | 32.2            | 3.0  |     | ug/l  | SW846 6010D          |
| Iron                                                |                  | 67900           | 100  |     | ug/l  | SW846 6010D          |
| Manganese                                           |                  | 958             | 15   |     | ug/l  | SW846 6010D          |
| Dissolved Organic Carbon                            |                  | 36.3            | 1.0  |     | mg/l  | SM5310 B-11          |
| <b>JD78246-2</b>                                    | <b>ESMW-310S</b> |                 |      |     |       |                      |
| Alkalinity, Total as CaCO <sub>3</sub> <sup>a</sup> |                  | 41.5            | 5.0  |     | mg/l  | SM2320 B-11          |
| Chloride                                            |                  | 133             | 2.0  |     | mg/l  | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia                                   |                  | 0.66            | 0.20 |     | mg/l  | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>b</sup>                      |                  | 0.43            | 0.11 |     | mg/l  | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite                         |                  | 0.43            | 0.10 |     | mg/l  | EPA 353.2/LACHAT     |
| Nitrogen, Total <sup>c</sup>                        |                  | 1.4             | 0.50 |     | mg/l  | SM4500 A-11          |
| Nitrogen, Total Kjeldahl                            |                  | 1.0             | 0.40 |     | mg/l  | EPA 351.2/LACHAT     |
| Sulfate                                             |                  | 8.7             | 2.0  |     | mg/l  | EPA 300/SW846 9056A  |
| <b>JD78246-2F</b>                                   | <b>ESMW-310S</b> |                 |      |     |       |                      |
| Arsenic                                             |                  | 17.1            | 3.0  |     | ug/l  | SW846 6010D          |
| Iron                                                |                  | 47800           | 100  |     | ug/l  | SW846 6010D          |
| Manganese                                           |                  | 1200            | 15   |     | ug/l  | SW846 6010D          |
| Dissolved Organic Carbon                            |                  | 4.0             | 1.0  |     | mg/l  | SM5310 B-11          |
| <b>JD78246-3</b>                                    | <b>ESMW-313I</b> |                 |      |     |       |                      |
| Chloride                                            |                  | 37.3            | 2.0  |     | mg/l  | EPA 300/SW846 9056A  |
| Nitrogen, Nitrate <sup>b</sup>                      |                  | 2.4             | 0.11 |     | mg/l  | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite                         |                  | 2.4             | 0.10 |     | mg/l  | EPA 353.2/LACHAT     |
| Nitrogen, Total <sup>c</sup>                        |                  | 2.4             | 0.50 |     | mg/l  | SM4500 A-11          |
| Sulfate                                             |                  | 11.8            | 2.0  |     | mg/l  | EPA 300/SW846 9056A  |
| <b>JD78246-3F</b>                                   | <b>ESMW-313I</b> |                 |      |     |       |                      |
| Manganese                                           |                  | 18.0            | 15   |     | ug/l  | SW846 6010D          |
| <b>JD78246-4</b>                                    | <b>ESMW-313S</b> |                 |      |     |       |                      |
| Chloride                                            |                  | 42.3            | 2.0  |     | mg/l  | EPA 300/SW846 9056A  |

## Summary of Hits

**Job Number:** JD78246  
**Account:** Verdantas LLC  
**Project:** Eastham Permeable Reactive Barrier (PRB), Eastham, MA  
**Collected:** 12/06/23



| Lab Sample ID                                       | Client Sample ID | Result/<br>Qual | RL   | MDL | Units | Method              |
|-----------------------------------------------------|------------------|-----------------|------|-----|-------|---------------------|
| Nitrogen, Nitrate <sup>b</sup>                      |                  | 17.9            | 1.0  |     | mg/l  | EPA353.2/SM4500NO2B |
| Nitrogen, Nitrate + Nitrite                         |                  | 17.9            | 1.0  |     | mg/l  | EPA 353.2/LACHAT    |
| Nitrogen, Total <sup>c</sup>                        |                  | 18.4            | 1.4  |     | mg/l  | SM4500 A-11         |
| Nitrogen, Total Kjeldahl                            |                  | 0.47            | 0.40 |     | mg/l  | EPA 351.2/LACHAT    |
| Sulfate                                             |                  | 16.5            | 2.0  |     | mg/l  | EPA 300/SW846 9056A |
| <b>JD78246-4F ESMW-313S</b>                         |                  |                 |      |     |       |                     |
| Manganese                                           |                  | 28.0            | 15   |     | ug/l  | SW846 6010D         |
| <b>JD78246-5 ESMW-12S</b>                           |                  |                 |      |     |       |                     |
| Methane                                             |                  | 10500           | 22   |     | ug/l  | RSK-175             |
| Alkalinity, Total as CaCO <sub>3</sub> <sup>a</sup> |                  | 59.8            | 5.0  |     | mg/l  | SM2320 B-11         |
| Chloride                                            |                  | 44.0            | 2.0  |     | mg/l  | EPA 300/SW846 9056A |
| Nitrogen, Total <sup>c</sup>                        |                  | 1.1             | 0.50 |     | mg/l  | SM4500 A-11         |
| Nitrogen, Total Kjeldahl                            |                  | 1.1             | 0.40 |     | mg/l  | EPA 351.2/LACHAT    |
| Sulfate                                             |                  | 11.3            | 2.0  |     | mg/l  | EPA 300/SW846 9056A |
| <b>JD78246-5F ESMW-12S</b>                          |                  |                 |      |     |       |                     |
| Arsenic                                             |                  | 39.1            | 3.0  |     | ug/l  | SW846 6010D         |
| Iron                                                |                  | 43600           | 100  |     | ug/l  | SW846 6010D         |
| Manganese                                           |                  | 475             | 15   |     | ug/l  | SW846 6010D         |
| Dissolved Organic Carbon                            |                  | 1.7             | 1.0  |     | mg/l  | SM5310 B-11         |
| <b>JD78246-6 ESMW-12SR</b>                          |                  |                 |      |     |       |                     |
| Methane                                             |                  | 159             | 0.55 |     | ug/l  | RSK-175             |
| Alkalinity, Total as CaCO <sub>3</sub> <sup>a</sup> |                  | 22.2            | 5.0  |     | mg/l  | SM2320 B-11         |
| Chloride                                            |                  | 47.6            | 2.0  |     | mg/l  | EPA 300/SW846 9056A |
| Nitrogen, Nitrate <sup>b</sup>                      |                  | 0.21            | 0.11 |     | mg/l  | EPA353.2/SM4500NO2B |
| Nitrogen, Nitrate + Nitrite                         |                  | 0.21            | 0.10 |     | mg/l  | EPA 353.2/LACHAT    |
| Nitrogen, Total <sup>c</sup>                        |                  | 0.63            | 0.50 |     | mg/l  | SM4500 A-11         |
| Nitrogen, Total Kjeldahl                            |                  | 0.42            | 0.40 |     | mg/l  | EPA 351.2/LACHAT    |
| Sulfate                                             |                  | 30.8            | 2.0  |     | mg/l  | EPA 300/SW846 9056A |
| <b>JD78246-6F ESMW-12SR</b>                         |                  |                 |      |     |       |                     |
| Arsenic                                             |                  | 25.6            | 3.0  |     | ug/l  | SW846 6010D         |
| Iron                                                |                  | 26600           | 100  |     | ug/l  | SW846 6010D         |
| Manganese                                           |                  | 154             | 15   |     | ug/l  | SW846 6010D         |
| Dissolved Organic Carbon                            |                  | 1.4             | 1.0  |     | mg/l  | SM5310 B-11         |

Summary of Hits

**Job Number:** JD78246  
**Account:** Verdantas LLC  
**Project:** Eastham Permeable Reactive Barrier (PRB), Eastham, MA  
**Collected:** 12/06/23



| Lab Sample ID                  | Client Sample ID | Result/<br>Qual | RL   | MDL | Units | Method              |
|--------------------------------|------------------|-----------------|------|-----|-------|---------------------|
| JD78246-7                      | ESMW-12SR DUP    |                 |      |     |       |                     |
| Nitrogen, Nitrate <sup>b</sup> |                  | 0.21            | 0.11 |     | mg/l  | EPA353.2/SM4500NO2B |
| Nitrogen, Nitrate + Nitrite    |                  | 0.21            | 0.10 |     | mg/l  | EPA 353.2/LACHAT    |
| Nitrogen, Total <sup>c</sup>   |                  | 0.61            | 0.50 |     | mg/l  | SM4500 A-11         |
| Nitrogen, Total Kjeldahl       |                  | 0.40            | 0.40 |     | mg/l  | EPA 351.2/LACHAT    |

- (a) Sample was titrated to a final pH of 4.5. Sample received with head space.  
(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)  
(c) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)



Dayton, NJ

Section 4

4

Sample Results

Report of Analysis

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-310I                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-1                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                                 | Result  | RL    | Units | DF | Analyzed       | By | Method               |
|-----------------------------------------|---------|-------|-------|----|----------------|----|----------------------|
| Alkalinity, Total as CaCO3 <sup>a</sup> | 72.2    | 5.0   | mg/l  | 1  | 12/09/23 13:55 | MK | SM2320 B-11          |
| Chloride                                | 34.6    | 2.0   | mg/l  | 1  | 12/11/23 19:40 | SS | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia                       | < 0.20  | 0.20  | mg/l  | 1  | 12/13/23 17:57 | JD | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>b</sup>          | < 0.11  | 0.11  | mg/l  | 1  | 12/08/23 14:46 | SS | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite             | < 0.10  | 0.10  | mg/l  | 1  | 12/08/23 14:46 | SS | EPA 353.2/LACHAT     |
| Nitrogen, Nitrite                       | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:24 | MP | SM4500NO2 B-11       |
| Nitrogen, Total <sup>c</sup>            | < 0.50  | 0.50  | mg/l  | 1  | 12/13/23 20:28 | SS | SM4500 A-11          |
| Nitrogen, Total Kjeldahl                | < 0.40  | 0.40  | mg/l  | 1  | 12/13/23 20:28 | SS | EPA 351.2/LACHAT     |
| Sulfate                                 | < 2.0   | 2.0   | mg/l  | 1  | 12/11/23 19:40 | SS | EPA 300/SW846 9056A  |

- (a) Sample was titrated to a final pH of 4.5. Sample received with head space.  
(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)  
(c) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-310I                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-1F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

Dissolved Metals Analysis

| Analyte   | Result | RL  | Units | DF | Prep     | Analyzed By | Method                   | Prep Method              |
|-----------|--------|-----|-------|----|----------|-------------|--------------------------|--------------------------|
| Arsenic   | 32.2   | 3.0 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Iron      | 67900  | 100 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Manganese | 958    | 15  | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |

(1) Instrument QC Batch: MA55210  
(2) Prep QC Batch: MP43602

RL = Reporting Limit

4.2  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-310I                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-1F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                  | Result | RL  | Units | DF | Analyzed       | By | Method      |
|--------------------------|--------|-----|-------|----|----------------|----|-------------|
| Dissolved Organic Carbon | 36.3   | 1.0 | mg/l  | 1  | 12/09/23 01:01 | MB | SM5310 B-11 |

RL = Reporting Limit

4.2  
4

## Report of Analysis

|                                                                       |                                |
|-----------------------------------------------------------------------|--------------------------------|
| <b>Client Sample ID:</b> ESMW-310S                                    | <b>Date Sampled:</b> 12/06/23  |
| <b>Lab Sample ID:</b> JD78246-2                                       | <b>Date Received:</b> 12/07/23 |
| <b>Matrix:</b> AQ - Ground Water                                      | <b>Percent Solids:</b> n/a     |
| <b>Project:</b> Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                                |

## General Chemistry

| Analyte                                             | Result  | RL    | Units | DF | Analyzed       | By | Method               |
|-----------------------------------------------------|---------|-------|-------|----|----------------|----|----------------------|
| Alkalinity, Total as CaCO <sub>3</sub> <sup>a</sup> | 41.5    | 5.0   | mg/l  | 1  | 12/09/23 13:55 | MK | SM2320 B-11          |
| Chloride                                            | 133     | 2.0   | mg/l  | 1  | 12/11/23 19:53 | SS | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia                                   | 0.66    | 0.20  | mg/l  | 1  | 12/13/23 17:58 | JD | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>b</sup>                      | 0.43    | 0.11  | mg/l  | 1  | 12/08/23 14:47 | SS | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite                         | 0.43    | 0.10  | mg/l  | 1  | 12/08/23 14:47 | SS | EPA 353.2/LACHAT     |
| Nitrogen, Nitrite                                   | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:27 | MP | SM4500NO2 B-11       |
| Nitrogen, Total <sup>c</sup>                        | 1.4     | 0.50  | mg/l  | 1  | 12/13/23 20:29 | SS | SM4500 A-11          |
| Nitrogen, Total Kjeldahl                            | 1.0     | 0.40  | mg/l  | 1  | 12/13/23 20:29 | SS | EPA 351.2/LACHAT     |
| Sulfate                                             | 8.7     | 2.0   | mg/l  | 1  | 12/11/23 19:53 | SS | EPA 300/SW846 9056A  |

(a) Sample was titrated to a final pH of 4.5. Sample received with head space.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(c) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-310S                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-2F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

Dissolved Metals Analysis

| Analyte   | Result | RL  | Units | DF | Prep     | Analyzed By | Method                   | Prep Method              |
|-----------|--------|-----|-------|----|----------|-------------|--------------------------|--------------------------|
| Arsenic   | 17.1   | 3.0 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Iron      | 47800  | 100 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Manganese | 1200   | 15  | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |

(1) Instrument QC Batch: MA55210  
(2) Prep QC Batch: MP43602

RL = Reporting Limit

4.4  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-310S                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-2F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                  | Result | RL  | Units | DF | Analyzed       | By | Method      |
|--------------------------|--------|-----|-------|----|----------------|----|-------------|
| Dissolved Organic Carbon | 4.0    | 1.0 | mg/l  | 1  | 12/09/23 01:35 | MB | SM5310 B-11 |

RL = Reporting Limit

4.4  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-313I                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-3                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                        | Result  | RL    | Units | DF | Analyzed       | By | Method               |
|--------------------------------|---------|-------|-------|----|----------------|----|----------------------|
| Chloride                       | 37.3    | 2.0   | mg/l  | 1  | 12/11/23 20:06 | SS | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia              | < 0.20  | 0.20  | mg/l  | 1  | 12/13/23 17:59 | JD | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>a</sup> | 2.4     | 0.11  | mg/l  | 1  | 12/08/23 14:48 | SS | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite    | 2.4     | 0.10  | mg/l  | 1  | 12/08/23 14:48 | SS | EPA 353.2/LACHAT     |
| Nitrogen, Nitrite              | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:32 | MP | SM4500NO2 B-11       |
| Nitrogen, Total <sup>b</sup>   | 2.4     | 0.50  | mg/l  | 1  | 12/13/23 20:30 | SS | SM4500 A-11          |
| Nitrogen, Total Kjeldahl       | < 0.40  | 0.40  | mg/l  | 1  | 12/13/23 20:30 | SS | EPA 351.2/LACHAT     |
| Sulfate                        | 11.8    | 2.0   | mg/l  | 1  | 12/11/23 20:06 | SS | EPA 300/SW846 9056A  |

- (a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)  
(b) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-313I                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-3F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

Dissolved Metals Analysis

| Analyte   | Result | RL  | Units | DF | Prep     | Analyzed By | Method                   | Prep Method              |
|-----------|--------|-----|-------|----|----------|-------------|--------------------------|--------------------------|
| Iron      | < 100  | 100 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Manganese | 18.0   | 15  | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |

(1) Instrument QC Batch: MA55210  
(2) Prep QC Batch: MP43602

RL = Reporting Limit

4.6  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-313S                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-4                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                        | Result  | RL    | Units | DF | Analyzed       | By | Method               |
|--------------------------------|---------|-------|-------|----|----------------|----|----------------------|
| Chloride                       | 42.3    | 2.0   | mg/l  | 1  | 12/11/23 19:27 | SS | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia              | < 0.20  | 0.20  | mg/l  | 1  | 12/13/23 18:01 | JD | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>a</sup> | 17.9    | 1.0   | mg/l  | 1  | 12/08/23 16:22 | SS | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite    | 17.9    | 1.0   | mg/l  | 10 | 12/08/23 16:22 | SS | EPA 353.2/LACHAT     |
| Nitrogen, Nitrite              | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:32 | MP | SM4500NO2 B-11       |
| Nitrogen, Total <sup>b</sup>   | 18.4    | 1.4   | mg/l  | 1  | 12/13/23 20:31 | SS | SM4500 A-11          |
| Nitrogen, Total Kjeldahl       | 0.47    | 0.40  | mg/l  | 1  | 12/13/23 20:31 | SS | EPA 351.2/LACHAT     |
| Sulfate                        | 16.5    | 2.0   | mg/l  | 1  | 12/11/23 19:27 | SS | EPA 300/SW846 9056A  |

- (a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)  
(b) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-313S                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-4F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

Dissolved Metals Analysis

| Analyte   | Result | RL  | Units | DF | Prep     | Analyzed By | Method                   | Prep Method              |
|-----------|--------|-----|-------|----|----------|-------------|--------------------------|--------------------------|
| Iron      | < 100  | 100 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Manganese | 28.0   | 15  | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |

(1) Instrument QC Batch: MA55210  
(2) Prep QC Batch: MP43602

RL = Reporting Limit

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12S                                              | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-5                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Method:</b>           | RSK-175                                               |                        |          |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

| Run #  | File ID    | DF  | Analyzed       | By  | Prep Date | Prep Batch | Analytical Batch |
|--------|------------|-----|----------------|-----|-----------|------------|------------------|
| Run #1 | AA105560.D | 200 | 12/08/23 14:26 | TCH | n/a       | n/a        | GAA2947          |
| Run #2 |            |     |                |     |           |            |                  |

| CAS No. | Compound | Result | RL | Units | Q |
|---------|----------|--------|----|-------|---|
| 74-82-8 | Methane  | 10500  | 22 | ug/l  |   |

ND = Not detected  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

# Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12S                                              | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-5                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

## General Chemistry

| Analyte                                             | Result  | RL    | Units | DF | Analyzed       | By | Method               |
|-----------------------------------------------------|---------|-------|-------|----|----------------|----|----------------------|
| Alkalinity, Total as CaCO <sub>3</sub> <sup>a</sup> | 59.8    | 5.0   | mg/l  | 1  | 12/09/23 13:55 | MK | SM2320 B-11          |
| Chloride                                            | 44.0    | 2.0   | mg/l  | 1  | 12/11/23 20:19 | SS | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia                                   | < 0.20  | 0.20  | mg/l  | 1  | 12/13/23 18:02 | JD | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>b</sup>                      | < 0.11  | 0.11  | mg/l  | 1  | 12/08/23 14:58 | SS | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite                         | < 0.10  | 0.10  | mg/l  | 1  | 12/08/23 14:58 | SS | EPA 353.2/LACHAT     |
| Nitrogen, Nitrite                                   | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:32 | MP | SM4500NO2 B-11       |
| Nitrogen, Total <sup>c</sup>                        | 1.1     | 0.50  | mg/l  | 1  | 12/13/23 20:32 | SS | SM4500 A-11          |
| Nitrogen, Total Kjeldahl                            | 1.1     | 0.40  | mg/l  | 1  | 12/13/23 20:32 | SS | EPA 351.2/LACHAT     |
| Sulfate                                             | 11.3    | 2.0   | mg/l  | 1  | 12/11/23 20:19 | SS | EPA 300/SW846 9056A  |

(a) Sample was titrated to a final pH of 4.5. Sample received with head space.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(c) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

4.9  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12S                                              | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-5F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

Dissolved Metals Analysis

| Analyte   | Result | RL  | Units | DF | Prep     | Analyzed By | Method                   | Prep Method              |
|-----------|--------|-----|-------|----|----------|-------------|--------------------------|--------------------------|
| Arsenic   | 39.1   | 3.0 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Iron      | 43600  | 100 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Manganese | 475    | 15  | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |

(1) Instrument QC Batch: MA55210  
(2) Prep QC Batch: MP43602

RL = Reporting Limit

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12S                                              | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-5F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                  | Result | RL  | Units | DF | Analyzed       | By | Method      |
|--------------------------|--------|-----|-------|----|----------------|----|-------------|
| Dissolved Organic Carbon | 1.7    | 1.0 | mg/l  | 1  | 12/09/23 01:47 | MB | SM5310 B-11 |

RL = Reporting Limit

4.10  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12SR                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-6                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Method:</b>           | RSK-175                                               |                        |          |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

| Run #  | File ID    | DF | Analyzed       | By  | Prep Date | Prep Batch | Analytical Batch |
|--------|------------|----|----------------|-----|-----------|------------|------------------|
| Run #1 | AA105562.D | 5  | 12/08/23 14:54 | TCH | n/a       | n/a        | GAA2947          |
| Run #2 |            |    |                |     |           |            |                  |

| CAS No. | Compound | Result | RL   | Units | Q |
|---------|----------|--------|------|-------|---|
| 74-82-8 | Methane  | 159    | 0.55 | ug/l  |   |

ND = Not detected  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12SR                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-6                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                                 | Result  | RL    | Units | DF | Analyzed       | By | Method               |
|-----------------------------------------|---------|-------|-------|----|----------------|----|----------------------|
| Alkalinity, Total as CaCO3 <sup>a</sup> | 22.2    | 5.0   | mg/l  | 1  | 12/09/23 13:55 | MK | SM2320 B-11          |
| Chloride                                | 47.6    | 2.0   | mg/l  | 1  | 12/11/23 20:32 | SS | EPA 300/SW846 9056A  |
| Nitrogen, Ammonia                       | < 0.20  | 0.20  | mg/l  | 1  | 12/13/23 18:07 | JD | SM4500NH3 H-11LACHAT |
| Nitrogen, Nitrate <sup>b</sup>          | 0.21    | 0.11  | mg/l  | 1  | 12/08/23 14:59 | SS | EPA353.2/SM4500NO2B  |
| Nitrogen, Nitrate + Nitrite             | 0.21    | 0.10  | mg/l  | 1  | 12/08/23 14:59 | SS | EPA 353.2/LACHAT     |
| Nitrogen, Nitrite                       | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:32 | MP | SM4500NO2 B-11       |
| Nitrogen, Total <sup>c</sup>            | 0.63    | 0.50  | mg/l  | 1  | 12/13/23 20:33 | SS | SM4500 A-11          |
| Nitrogen, Total Kjeldahl                | 0.42    | 0.40  | mg/l  | 1  | 12/13/23 20:33 | SS | EPA 351.2/LACHAT     |
| Sulfate                                 | 30.8    | 2.0   | mg/l  | 1  | 12/11/23 20:32 | SS | EPA 300/SW846 9056A  |

- (a) Sample was titrated to a final pH of 4.5. Sample received with head space.  
(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)  
(c) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

4.11  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12SR                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-6F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

Dissolved Metals Analysis

| Analyte   | Result | RL  | Units | DF | Prep     | Analyzed By | Method                   | Prep Method              |
|-----------|--------|-----|-------|----|----------|-------------|--------------------------|--------------------------|
| Arsenic   | 25.6   | 3.0 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Iron      | 26600  | 100 | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |
| Manganese | 154    | 15  | ug/l  | 1  | 12/07/23 | 12/08/23 ND | SW846 6010D <sup>1</sup> | SW846 3010A <sup>2</sup> |

(1) Instrument QC Batch: MA55210  
(2) Prep QC Batch: MP43602

RL = Reporting Limit

4.12  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12SR                                             | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-6F                                            | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Groundwater Filtered                             | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                  | Result | RL  | Units | DF | Analyzed       | By | Method      |
|--------------------------|--------|-----|-------|----|----------------|----|-------------|
| Dissolved Organic Carbon | 1.4    | 1.0 | mg/l  | 1  | 12/09/23 02:23 | MB | SM5310 B-11 |

RL = Reporting Limit

4.12  
4

Report of Analysis

|                          |                                                       |                        |          |
|--------------------------|-------------------------------------------------------|------------------------|----------|
| <b>Client Sample ID:</b> | ESMW-12SR DUP                                         | <b>Date Sampled:</b>   | 12/06/23 |
| <b>Lab Sample ID:</b>    | JD78246-7                                             | <b>Date Received:</b>  | 12/07/23 |
| <b>Matrix:</b>           | AQ - Ground Water                                     | <b>Percent Solids:</b> | n/a      |
| <b>Project:</b>          | Eastham Permeable Reactive Barrier (PRB), Eastham, MA |                        |          |

General Chemistry

| Analyte                        | Result  | RL    | Units | DF | Analyzed       | By | Method              |
|--------------------------------|---------|-------|-------|----|----------------|----|---------------------|
| Nitrogen, Nitrate <sup>a</sup> | 0.21    | 0.11  | mg/l  | 1  | 12/08/23 15:00 | SS | EPA353.2/SM4500NO2B |
| Nitrogen, Nitrate + Nitrite    | 0.21    | 0.10  | mg/l  | 1  | 12/08/23 15:00 | SS | EPA 353.2/LACHAT    |
| Nitrogen, Nitrite              | < 0.010 | 0.010 | mg/l  | 1  | 12/07/23 12:32 | MP | SM4500NO2 B-11      |
| Nitrogen, Total <sup>b</sup>   | 0.61    | 0.50  | mg/l  | 1  | 12/13/23 20:34 | SS | SM4500 A-11         |
| Nitrogen, Total Kjeldahl       | 0.40    | 0.40  | mg/l  | 1  | 12/13/23 20:34 | SS | EPA 351.2/LACHAT    |

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)  
(b) Calculated as: (Nitrogen, Total Kjeldahl) + (Nitrogen, Nitrate + Nitrite)

RL = Reporting Limit

## Misc. Forms

5

### Custody Documents and Other Forms

---

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

Parameter Certification Exceptions

Job Number: JD78246  
Account: ESMAN Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

The following parameters included in this report are exceptions to NELAC certification.  
The certification status of each is indicated below.

| Parameter       | CAS# | Method      | Mat | Certification Status                                  |
|-----------------|------|-------------|-----|-------------------------------------------------------|
| Nitrogen, Total |      | SM4500 A-11 | AQ  | SGS is not certified for this parameter. <sup>a</sup> |

(a) Lab cert for analyte not supported by NJDEP, OQA. Only methods/analytes required for reporting by the State of NJ can be certified in NJ. Use of this analyte for compliance must be verified through the appropriate regulatory office.

Certification exceptions shown are based on the New Jersey DEP certifications. Applicability in other states may vary. Please contact your laboratory representative if additional information is required for a specific regulatory program.



**SGS North America Inc. - Dayton**  
2235 Route 130, Dayton, NJ 08810  
TEL. 732-329-0200 FAX: 732-329-3499/3480  
[www.sgs.com/ehsusa](http://www.sgs.com/ehsusa)

E

5.2

SGS

## CHAIN OF CUSTODY

**SGS North America Inc. - Dayton**  
2235 Route 130, Dayton, NJ 08810  
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[www.sgs.com/ehsusa](http://www.sgs.com/ehsusa)

[illegible]

## JD78246: Chain of Custody

Page 2 of 3

## SGS Sample Receipt Summary

**Job Number:** JD78246

**Client:** VERNDANTA

**Project:** EASTHAM PERMEABLE REACTIVE BAR

**Date / Time Received:** 12/7/2023 10:05:00 AM

**Delivery Method:** FED EX

**Airbill #'s:** 6455 9822 9676

**Cooler Temps (Raw Measured) °C:** Cooler 1: (0.1); Cooler 2: (2.3);

**Cooler Temps (Corrected) °C:** Cooler 1: (0.1); Cooler 2: (2.3);

**Cooler Security**
Y or N
Y or N

- |                                                                                        |                                                                                    |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1. Custody Seals Present: <input checked="" type="checkbox"/> <input type="checkbox"/> | 3. COC Present: <input checked="" type="checkbox"/> <input type="checkbox"/>       |
| 2. Custody Seals Intact: <input checked="" type="checkbox"/> <input type="checkbox"/>  | 4. Smpl Dates/Time OK <input checked="" type="checkbox"/> <input type="checkbox"/> |

**Cooler Temperature**
Y or N

- |                                                                                         |           |
|-----------------------------------------------------------------------------------------|-----------|
| 1. Temp criteria achieved: <input checked="" type="checkbox"/> <input type="checkbox"/> |           |
| 2. Cooler temp verification: _____                                                      |           |
| 3. Cooler media: _____                                                                  | Ice (Bag) |
| 4. No. Coolers: _____                                                                   | 2         |

**Quality Control Preservation**
Y or N
N/A

- |                                                                                                                       |  |
|-----------------------------------------------------------------------------------------------------------------------|--|
| 1. Trip Blank present / cooler: <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |  |
| 2. Trip Blank listed on COC: <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>    |  |
| 3. Samples preserved properly: <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>  |  |
| 4. VOCs headspace free: <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>         |  |

**Sample Integrity - Documentation**
Y or N

- |                                                                                                     |  |
|-----------------------------------------------------------------------------------------------------|--|
| 1. Sample labels present on bottles: <input checked="" type="checkbox"/> <input type="checkbox"/>   |  |
| 2. Container labeling complete: <input checked="" type="checkbox"/> <input type="checkbox"/>        |  |
| 3. Sample container label / COC agree: <input checked="" type="checkbox"/> <input type="checkbox"/> |  |

**Sample Integrity - Condition**
Y or N

- |                                                                                               |        |
|-----------------------------------------------------------------------------------------------|--------|
| 1. Sample recvd within HT: <input checked="" type="checkbox"/> <input type="checkbox"/>       |        |
| 2. All containers accounted for: <input checked="" type="checkbox"/> <input type="checkbox"/> |        |
| 3. Condition of sample: _____                                                                 | Intact |

**Sample Integrity - Instructions**
Y or N
N/A

- |                                                                                                         |                                     |
|---------------------------------------------------------------------------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: <input checked="" type="checkbox"/> <input type="checkbox"/>            |                                     |
| 2. Bottles received for unspecified tests: <input type="checkbox"/> <input checked="" type="checkbox"/> |                                     |
| 3. Sufficient volume recvd for analysis: <input checked="" type="checkbox"/> <input type="checkbox"/>   |                                     |
| 4. Compositing instructions clear: <input type="checkbox"/> <input type="checkbox"/>                    | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: <input type="checkbox"/> <input type="checkbox"/>                      | <input checked="" type="checkbox"/> |

|                    |                 |                 |                        |
|--------------------|-----------------|-----------------|------------------------|
| Test Strip Lot #s: | pH 1-12: 231619 | pH 12+: 203117A | Other: (Specify) _____ |
|--------------------|-----------------|-----------------|------------------------|

Comments

SM089-03  
Rev. Date 12/7/17

JD78246: Chain of Custody

Page 3 of 3

## GC Volatiles

### QC Data Summaries

---

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: JD78246  
Account: ESMMAN Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Sample     | File ID    | DF | Analyzed | By  | Prep Date | Prep Batch | Analytical Batch |
|------------|------------|----|----------|-----|-----------|------------|------------------|
| GAA2947-MB | AA105549.D | 1  | 12/08/23 | TCH | n/a       | n/a        | GAA2947          |

The QC reported here applies to the following samples: Method: RSK-175

JD78246-5, JD78246-6

| CAS No. | Compound | Result | RL   | Units | Q |
|---------|----------|--------|------|-------|---|
| 74-82-8 | Methane  | ND     | 0.11 | ug/l  |   |

6.1.1  
6

Laboratory Control Sample Summary

Job Number: JD78246  
Account: ESMMAN Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Sample      | File ID    | DF | Analyzed | By  | Prep Date | Prep Batch | Analytical Batch |
|-------------|------------|----|----------|-----|-----------|------------|------------------|
| GAA2947-LCS | AA105546.D | 1  | 12/08/23 | TCH | n/a       | n/a        | GAA2947          |

The QC reported here applies to the following samples: Method: RSK-175

JD78246-5, JD78246-6

| CAS No. | Compound | Spike<br>ug/l | LCS<br>ug/l | LCS<br>% | Limits |
|---------|----------|---------------|-------------|----------|--------|
| 74-82-8 | Methane  | 11            | 10.9        | 99       | 50-150 |

\* = Outside of Control Limits.

Duplicate Summary

Job Number: JD78246  
Account: ESMAN Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Sample       | File ID    | DF | Analyzed | By  | Prep Date | Prep Batch | Analytical Batch |
|--------------|------------|----|----------|-----|-----------|------------|------------------|
| JD78321-1DUP | AA105564.D | 1  | 12/08/23 | TCH | n/a       | n/a        | GAA2947          |
| JD78321-1    | AA105563.D | 1  | 12/08/23 | TCH | n/a       | n/a        | GAA2947          |

The QC reported here applies to the following samples: Method: RSK-175

JD78246-5, JD78246-6

| CAS No. | Compound | JD78321-1<br>ug/l | DUP<br>Q ug/l | Q | RPD   | Limits |
|---------|----------|-------------------|---------------|---|-------|--------|
| 74-82-8 | Methane  | 0.11              | 0.14          |   | 24* a | 20     |

(a) Outside of in house control limits.

\* = Outside of Control Limits.



## Metals Analysis

### QC Data Summaries

7

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JD78246  
Account: ESMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
Matrix Type: AQUEOUS

Methods: SW846 6010D  
Units: ug/l

Prep Date: 12/07/23

| Metal      | RL    | IDL | MDL | MB<br>raw | final |
|------------|-------|-----|-----|-----------|-------|
| Aluminum   | 200   | 9.2 | 150 |           |       |
| Antimony   | 6.0   | 2.8 | 4.7 |           |       |
| Arsenic    | 3.0   | 2.6 | 2.8 | -1.4      | <3.0  |
| Barium     | 200   | .2  | 13  |           |       |
| Beryllium  | 1.0   | .2  | .5  |           |       |
| Bismuth    | 20    | 2.5 | 8.6 |           |       |
| Boron      | 100   | 1.8 | 10  |           |       |
| Cadmium    | 3.0   | .4  | 1   |           |       |
| Calcium    | 5000  | 13  | 99  |           |       |
| Cerium     | 100   |     |     |           |       |
| Chromium   | 10    | .7  | 2   |           |       |
| Cobalt     | 50    | .6  | 2.6 |           |       |
| Copper     | 10    | .7  | 5.9 |           |       |
| Iron       | 100   | 3.3 | 32  | 1.2       | <100  |
| Lead       | 3.0   | 2   | 1.8 |           |       |
| Lithium    | 50    | 1.5 | 7.3 |           |       |
| Magnesium  | 5000  | 25  | 140 |           |       |
| Manganese  | 15    | .1  | 1.4 | 0.10      | <15   |
| Molybdenum | 20    | .6  | 3.6 |           |       |
| Nickel     | 10    | .8  | 1.7 |           |       |
| Phosphorus | 50    | 7   | 18  |           |       |
| Potassium  | 10000 | 35  | 200 |           |       |
| Selenium   | 10    | 3.6 | 4.9 |           |       |
| Silicon    | 200   | 2.2 | 32  |           |       |
| Silver     | 10    | .6  | 6.1 |           |       |
| Sodium     | 10000 | 14  | 570 |           |       |
| Strontium  | 10    | .1  | 2.7 |           |       |
| Sulfur     | 50    | 3.7 | 45  |           |       |
| Thallium   | 10    | 5.2 | 1.8 |           |       |
| Tin        | 10    | 1.4 | 3.7 |           |       |
| Titanium   | 10    | .8  | 2.5 |           |       |
| Tungsten   | 50    | 1.3 | 40  |           |       |
| Vanadium   | 50    | .5  | 1.8 |           |       |

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: JD78246  
Account: ESMMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
Matrix Type: AQUEOUS

Methods: SW846 6010D  
Units: ug/l

Prep Date: 12/07/23

| Metal     | RL | IDL | MDL | MB<br>raw | final |
|-----------|----|-----|-----|-----------|-------|
| Zinc      | 20 | .3  | 6.9 |           |       |
| Zirconium | 10 | .5  | 4.1 |           |       |

Associated samples MP43602: JD78246-1F, JD78246-2F, JD78246-3F, JD78246-4F, JD78246-5F, JD78246-6F

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

## 7.1.2

Account: ESMMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

Methods: SW846 6010D  
Units: ug/l

Prep Date: 12/07/23

| Metal      | JD78217-2<br>Original MS |       | Spike lot<br>MPSPK2 | % Rec | QC<br>Limits |
|------------|--------------------------|-------|---------------------|-------|--------------|
| Aluminum   | anr                      |       |                     |       |              |
| Antimony   | anr                      |       |                     |       |              |
| Arsenic    | 2.8                      | 1920  | 2000                | 95.9  | 75-125       |
| Barium     | anr                      |       |                     |       |              |
| Beryllium  | anr                      |       |                     |       |              |
| Bismuth    |                          |       |                     |       |              |
| Boron      | anr                      |       |                     |       |              |
| Cadmium    | anr                      |       |                     |       |              |
| Calcium    | anr                      |       |                     |       |              |
| Cerium     |                          |       |                     |       |              |
| Chromium   | anr                      |       |                     |       |              |
| Cobalt     | anr                      |       |                     |       |              |
| Copper     | anr                      |       |                     |       |              |
| Iron       | 3330                     | 27600 | 25000               | 97.1  | 75-125       |
| Lead       | anr                      |       |                     |       |              |
| Lithium    |                          |       |                     |       |              |
| Magnesium  | anr                      |       |                     |       |              |
| Manganese  | 459                      | 2360  | 2000                | 95.1  | 75-125       |
| Molybdenum |                          |       |                     |       |              |
| Nickel     | anr                      |       |                     |       |              |
| Phosphorus |                          |       |                     |       |              |
| Potassium  | anr                      |       |                     |       |              |
| Selenium   | anr                      |       |                     |       |              |
| Silicon    |                          |       |                     |       |              |
| Silver     | anr                      |       |                     |       |              |
| Sodium     | anr                      |       |                     |       |              |
| Strontium  |                          |       |                     |       |              |
| Sulfur     |                          |       |                     |       |              |
| Thallium   | anr                      |       |                     |       |              |
| Tin        |                          |       |                     |       |              |
| Titanium   |                          |       |                     |       |              |
| Tungsten   |                          |       |                     |       |              |
| Vanadium   | anr                      |       |                     |       |              |

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JD78246  
 Account: ESMMAN - Verdantas LLC  
 Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
 Matrix Type: AQUEOUS

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 12/07/23

| Metal | JD78217-2<br>Original MS | Spikelet<br>MPSPK2 | % Rec | QC<br>Limits |
|-------|--------------------------|--------------------|-------|--------------|
|-------|--------------------------|--------------------|-------|--------------|

Zinc anr

Zirconium

Associated samples MP43602: JD78246-1F, JD78246-2F, JD78246-3F, JD78246-4F, JD78246-5F, JD78246-6F

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JD78246  
 Account: ESMAN - Verdantas LLC  
 Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
 Matrix Type: AQUEOUS

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 12/07/23

| Metal      | JD78217-2<br>Original | MSD   | SpikeLot<br>MPSPK2 | % Rec | MSD<br>RPD | QC<br>Limit |
|------------|-----------------------|-------|--------------------|-------|------------|-------------|
| Aluminum   | anr                   |       |                    |       |            |             |
| Antimony   | anr                   |       |                    |       |            |             |
| Arsenic    | 2.8                   | 1840  | 2000               | 91.9  | 4.3        | 20          |
| Barium     | anr                   |       |                    |       |            |             |
| Beryllium  | anr                   |       |                    |       |            |             |
| Bismuth    |                       |       |                    |       |            |             |
| Boron      | anr                   |       |                    |       |            |             |
| Cadmium    | anr                   |       |                    |       |            |             |
| Calcium    | anr                   |       |                    |       |            |             |
| Cerium     |                       |       |                    |       |            |             |
| Chromium   | anr                   |       |                    |       |            |             |
| Cobalt     | anr                   |       |                    |       |            |             |
| Copper     | anr                   |       |                    |       |            |             |
| Iron       | 3330                  | 26200 | 25000              | 91.5  | 5.2        | 20          |
| Lead       | anr                   |       |                    |       |            |             |
| Lithium    |                       |       |                    |       |            |             |
| Magnesium  | anr                   |       |                    |       |            |             |
| Manganese  | 459                   | 2260  | 2000               | 90.1  | 4.3        | 20          |
| Molybdenum |                       |       |                    |       |            |             |
| Nickel     | anr                   |       |                    |       |            |             |
| Phosphorus |                       |       |                    |       |            |             |
| Potassium  | anr                   |       |                    |       |            |             |
| Selenium   | anr                   |       |                    |       |            |             |
| Silicon    |                       |       |                    |       |            |             |
| Silver     | anr                   |       |                    |       |            |             |
| Sodium     | anr                   |       |                    |       |            |             |
| Strontium  |                       |       |                    |       |            |             |
| Sulfur     |                       |       |                    |       |            |             |
| Thallium   | anr                   |       |                    |       |            |             |
| Tin        |                       |       |                    |       |            |             |
| Titanium   |                       |       |                    |       |            |             |
| Tungsten   |                       |       |                    |       |            |             |
| Vanadium   | anr                   |       |                    |       |            |             |

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JD78246  
 Account: ESMMAN - Verdantas LLC  
 Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
 Matrix Type: AQUEOUS

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 12/07/23

| Metal | JD78217-2<br>Original MSD | Spike lot<br>MPSPK2 | % Rec | MSD<br>RPD | QC<br>Limit |
|-------|---------------------------|---------------------|-------|------------|-------------|
|-------|---------------------------|---------------------|-------|------------|-------------|

Zinc anr

Zirconium

Associated samples MP43602: JD78246-1F, JD78246-2F, JD78246-3F, JD78246-4F, JD78246-5F, JD78246-6F

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JD78246  
 Account: ESMAN - Verdantas LLC  
 Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
 Matrix Type: AQUEOUS

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 12/07/23 12/07/23

| Metal      | BSP Result | Spike lot MPSPK2 | % Rec | QC Limits | BSP Result | Spike lot MPSPK2 | % Rec | QC Limits |
|------------|------------|------------------|-------|-----------|------------|------------------|-------|-----------|
| Aluminum   | anr        |                  |       |           |            |                  |       |           |
| Antimony   | anr        |                  |       |           |            |                  |       |           |
| Arsenic    | 1950       | 2000             | 97.5  | 80-120    | 1900       | 2000             | 95.0  | 80-120    |
| Barium     | anr        |                  |       |           |            |                  |       |           |
| Beryllium  | anr        |                  |       |           |            |                  |       |           |
| Bismuth    |            |                  |       |           |            |                  |       |           |
| Boron      | anr        |                  |       |           |            |                  |       |           |
| Cadmium    | anr        |                  |       |           |            |                  |       |           |
| Calcium    | anr        |                  |       |           |            |                  |       |           |
| Cerium     |            |                  |       |           |            |                  |       |           |
| Chromium   | anr        |                  |       |           |            |                  |       |           |
| Cobalt     | anr        |                  |       |           |            |                  |       |           |
| Copper     | anr        |                  |       |           |            |                  |       |           |
| Iron       | 25100      | 25000            | 100.4 | 80-120    | 24600      | 25000            | 98.4  | 80-120    |
| Lead       | anr        |                  |       |           |            |                  |       |           |
| Lithium    |            |                  |       |           |            |                  |       |           |
| Magnesium  | anr        |                  |       |           |            |                  |       |           |
| Manganese  | 2020       | 2000             | 101.0 | 80-120    | 1970       | 2000             | 98.5  | 80-120    |
| Molybdenum |            |                  |       |           |            |                  |       |           |
| Nickel     | anr        |                  |       |           |            |                  |       |           |
| Phosphorus |            |                  |       |           |            |                  |       |           |
| Potassium  | anr        |                  |       |           |            |                  |       |           |
| Selenium   | anr        |                  |       |           |            |                  |       |           |
| Silicon    |            |                  |       |           |            |                  |       |           |
| Silver     | anr        |                  |       |           |            |                  |       |           |
| Sodium     | anr        |                  |       |           |            |                  |       |           |
| Strontium  |            |                  |       |           |            |                  |       |           |
| Sulfur     |            |                  |       |           |            |                  |       |           |
| Thallium   | anr        |                  |       |           |            |                  |       |           |
| Tin        |            |                  |       |           |            |                  |       |           |
| Titanium   |            |                  |       |           |            |                  |       |           |
| Tungsten   |            |                  |       |           |            |                  |       |           |
| Vanadium   | anr        |                  |       |           |            |                  |       |           |

Login Number: JD78246  
Account: ESMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

Methods: SW846 6010D  
Units: ug/l

12/07/23

Zirconium

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: JD78246  
 Account: ESMMAN - Verdantas LLC  
 Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
 Matrix Type: AQUEOUS

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 12/07/23

| Metal      | JD78217-2<br>Original | SDL 1:5 | %DIF     | QC<br>Limits |
|------------|-----------------------|---------|----------|--------------|
| Aluminum   | anr                   |         |          |              |
| Antimony   | anr                   |         |          |              |
| Arsenic    | 2.80                  | 0.00    | 100.0(a) | 0-10         |
| Barium     | anr                   |         |          |              |
| Beryllium  | anr                   |         |          |              |
| Bismuth    |                       |         |          |              |
| Boron      | anr                   |         |          |              |
| Cadmium    | anr                   |         |          |              |
| Calcium    | anr                   |         |          |              |
| Cerium     |                       |         |          |              |
| Chromium   | anr                   |         |          |              |
| Cobalt     | anr                   |         |          |              |
| Copper     | anr                   |         |          |              |
| Iron       | 3330                  | 3330    | 0.1      | 0-10         |
| Lead       | anr                   |         |          |              |
| Lithium    |                       |         |          |              |
| Magnesium  | anr                   |         |          |              |
| Manganese  | 459                   | 449     | 2.1      | 0-10         |
| Molybdenum |                       |         |          |              |
| Nickel     | anr                   |         |          |              |
| Phosphorus |                       |         |          |              |
| Potassium  | anr                   |         |          |              |
| Selenium   | anr                   |         |          |              |
| Silicon    |                       |         |          |              |
| Silver     | anr                   |         |          |              |
| Sodium     | anr                   |         |          |              |
| Strontium  |                       |         |          |              |
| Sulfur     |                       |         |          |              |
| Thallium   | anr                   |         |          |              |
| Tin        |                       |         |          |              |
| Titanium   |                       |         |          |              |
| Tungsten   |                       |         |          |              |
| Vanadium   | anr                   |         |          |              |

SERIAL DILUTION RESULTS SUMMARY

Login Number: JD78246  
 Account: ESMMAN - Verdantas LLC  
 Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

QC Batch ID: MP43602  
 Matrix Type: AQUEOUS

Methods: SW846 6010D  
 Units: ug/l

Prep Date: 12/07/23

| Metal | JD78217-2<br>Original SDL 1:5 | %DIF | QC<br>Limits |
|-------|-------------------------------|------|--------------|
|-------|-------------------------------|------|--------------|

Zinc anr

Zirconium

Associated samples MP43602: JD78246-1F, JD78246-2F, JD78246-3F, JD78246-4F, JD78246-5F, JD78246-6F

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

7.1.4

7

## General Chemistry

### QC Data Summaries

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Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: JD78246  
Account: ESMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Analyte                                | Batch ID        | RL    | MB<br>Result | Units | Spike<br>Amount | BSP<br>Result | BSP<br>%Recov | QC<br>Limits |
|----------------------------------------|-----------------|-------|--------------|-------|-----------------|---------------|---------------|--------------|
| Alkalinity, Total as CaCO <sub>3</sub> | GN49049         | 5.0   | 0.0          | mg/l  | 50              | 52.0          | 104.0         | 90-110%      |
| Alkalinity, Total as CaCO <sub>3</sub> | GN49049         |       |              | mg/l  | 250             | 261           | 104.4         | 90-110%      |
| Chloride                               | GP50947/GN49090 | 2.0   | 0.0          | mg/l  | 80              | 83.0          | 103.8         | 90-110%      |
| Dissolved Organic Carbon               | GP50927/GN49099 | 1.0   | 0.0          | mg/l  | 10              | 10.1          | 101.0         | 90-110%      |
| Nitrogen, Ammonia                      | GP51024/GN49231 | 0.20  | 0.0          | mg/l  | 1               | 1.00          | 100.0         | 80-120%      |
| Nitrogen, Nitrate + Nitrite            | GP50912/GN49025 | 0.10  | 0.0          | mg/l  | 2               | 1.98          | 99.0          | 90-110%      |
| Nitrogen, Nitrate + Nitrite            | GP50920/GN49025 | 0.10  | 0.0          | mg/l  | 2               | 1.96          | 98.0          | 90-110%      |
| Nitrogen, Nitrite                      | GN48951         | 0.010 | 0.0          | mg/l  | 0.04            | 0.037         | 92.5          | 90-110%      |
| Nitrogen, Total Kjeldahl               | GP51005/GN49227 | 0.20  | 0.18         | mg/l  | 3               | 2.97          | 99.0          | 90-110%      |
| Sulfate                                | GP50947/GN49090 | 2.0   | 0.0          | mg/l  | 80              | 81.8          | 102.3         | 90-110%      |

Associated Samples:

Batch GN48951: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GN49049: JD78246-1, JD78246-2, JD78246-5, JD78246-6

Batch GP50912: JD78246-1, JD78246-2, JD78246-3

Batch GP50920: JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GP50927: JD78246-1F, JD78246-2F, JD78246-5F, JD78246-6F

Batch GP50947: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6

Batch GP51005: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GP51024: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6

(\*) Outside of QC limits

8.1

8

DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: JD78246  
Account: ESMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Analyte                     | Batch ID        | QC Sample | Units | Original Result | DUP Result | RPD | QC Limits |
|-----------------------------|-----------------|-----------|-------|-----------------|------------|-----|-----------|
| Alkalinity, Total as CaCO3  | GN49049         | JD78241-1 | mg/l  | 56.6            | 56.7       | 0.2 | 0-10%     |
| Chloride                    | GP50947/GN49090 | JD78246-4 | mg/l  | 42.3            | 42.1       | 0.5 | 0-20%     |
| Nitrogen, Ammonia           | GP51024/GN49231 | JD78337-4 | mg/l  | 1.7             | 1.7        | 0.0 | 0-33%     |
| Nitrogen, Nitrate + Nitrite | GP50912/GN49025 | JD78217-2 | mg/l  | 0.049           | 0.0        | 0.0 | 0-20%     |
| Nitrogen, Nitrate + Nitrite | GP50920/GN49025 | JD78246-4 | mg/l  | 17.9            | 17.8       | 0.6 | 0-20%     |
| Nitrogen, Total Kjeldahl    | GP51005/GN49227 | JD78420-2 | mg/l  | 0.0             | 0.0        | 0.0 | 0-20%     |
| Sulfate                     | GP50947/GN49090 | JD78246-4 | mg/l  | 16.5            | 16.2       | 1.8 | 0-20%     |

Associated Samples:

Batch GN49049: JD78246-1, JD78246-2, JD78246-5, JD78246-6  
Batch GP50912: JD78246-1, JD78246-2, JD78246-3  
Batch GP50920: JD78246-4, JD78246-5, JD78246-6, JD78246-7  
Batch GP50947: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6  
Batch GP51005: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6, JD78246-7  
Batch GP51024: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6  
(\*) Outside of QC limits

8.2

8

MATRIX SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: JD78246  
Account: ESMMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Analyte                     | Batch ID        | QC Sample  | Units | Original Result | Spike Amount | MS Result | %Rec      | QC Limits |
|-----------------------------|-----------------|------------|-------|-----------------|--------------|-----------|-----------|-----------|
| Chloride                    | GP50947/GN49090 | JD78246-4  | mg/l  | 42.3            | 80           | 124       | 102.1     | 80-120%   |
| Dissolved Organic Carbon    | GP50927/GN49099 | JD78246-1F | mg/l  | 36.3            | 10           | 47.4      | 111.0     | 66-128%   |
| Nitrogen, Ammonia           | GP51024/GN49231 | JD78337-4  | mg/l  | 1.7             | 1            | 2.7       | 100.0     | 75-131%   |
| Nitrogen, Nitrate + Nitrite | GP50912/GN49025 | JD78217-2  | mg/l  | 0.049           | 2            | 2.3       | 115.0N(a) | 90-110%   |
| Nitrogen, Nitrate + Nitrite | GP50920/GN49025 | JD78246-5  | mg/l  | 0.0             | 2            | 1.7       | 85.0N(a)  | 90-110%   |
| Nitrogen, Nitrate + Nitrite | GP50920/GN49025 | JD78246-4  | mg/l  | 17.9            | 2            | 19.5      | 80.0(b)   | 90-110%   |
| Nitrogen, Nitrite           | GN48951         | JD78194-3  | mg/l  | 0.0             | 0.04         | 0.037     | 92.5      | 22-140%   |
| Nitrogen, Total Kjeldahl    | GP51005/GN49227 | JD78420-2  | mg/l  | 0.0             | 3            | 2.9       | 96.7      | 90-110%   |
| Sulfate                     | GP50947/GN49090 | JD78246-4  | mg/l  | 16.5            | 80           | 98.8      | 102.9     | 80-120%   |

Associated Samples:

Batch GN48951: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GP50912: JD78246-1, JD78246-2, JD78246-3

Batch GP50920: JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GP50927: JD78246-1F, JD78246-2F, JD78246-5F, JD78246-6F

Batch GP50947: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6

Batch GP51005: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GP51024: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(a) Spike recovery indicates possible matrix interference.

(b) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

83

88

MATRIX SPIKE DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: JD78246  
Account: ESMMAN - Verdantas LLC  
Project: Eastham Permeable Reactive Barrier (PRB), Eastham, MA

| Analyte                  | Batch ID        | QC Sample  | Units | Original Result | Spike Amount | MSD Result | RPD | QC Limit |
|--------------------------|-----------------|------------|-------|-----------------|--------------|------------|-----|----------|
| Dissolved Organic Carbon | GP50927/GN49099 | JD78246-1F | mg/l  | 36.3            | 10           | 47.5       | 0.2 | 20%      |
| Nitrogen, Ammonia        | GP51024/GN49231 | JD78337-4  | mg/l  | 1.7             | 1            | 2.7        | 0.0 | 14%      |
| Nitrogen, Nitrite        | GN48951         | JD78194-3  | mg/l  | 0.0             | 0.04         | 0.037      | 0.0 | 20%      |

Associated Samples:

Batch GN48951: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6, JD78246-7

Batch GP50927: JD78246-1F, JD78246-2F, JD78246-5F, JD78246-6F

Batch GP51024: JD78246-1, JD78246-2, JD78246-3, JD78246-4, JD78246-5, JD78246-6

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits