PHASE II PERMIT APPLICATION
HYDROGEOLOGIC REPORT FOR
CHESAPEAKE TERRACE RUBBLE LANDFILL

PREPARED FOR:

National Waste Managers, Inc.
2900 Linden Lane
Silver Spring, MD 20910

PREPARED BY:

ADVANCED GeoServices
a Montrose Environmental Group company

1878 Marlton Pike East, Suite 10
Cherry Hill, NJ 08003

PROJECT No. 2018-3854 **June 2020**

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ANNE ARUNDEL COUNTY, MARYLAND

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EXECUTIVE SUMMARY

National Waste Managers, Inc. (NWM) proposes to reclaim approximately 117.5 acres, formerly used for sand and gravel mining, with an engineered state-of-the-art, rubble landfill that will provide air space for Anne Arundel County rubble waste disposal for approximately 12 years. The site consists of a 480-acre parcel located near Odenton, Maryland, as shown on Figure 1. The proposed landfill footprint is approximately 140 acres, as shown on Figure 3.

The landfill is proposed to have 20 cells/subcells, to allow sequential development. The landfill cells will be lined with a state-of-the-art, low-permeability liner system to block leachate (water which contacts the waste) from contacting groundwater. Each cell will be equipped with a leachate collection and removal system, which will convey the leachate through a force main to the on-site leachate storage tanks.

As the landfill achieves final grades, the closure cap will be constructed. By constructing the closure cap as grades are achieved, leachate is reduced, and stormwater can be managed through the series of terraces, downchute, perimeter channels; culverts, and stormwater retention basins.

While there is a general movement in stormwater management to promote infiltration, in the case of landfills, infiltration of stormwater through the waste is undesirable. However, the on-site stormwater controls will attenuate peak runoff rates, so as not to increase the runoff rate discharge leaving the site.

The geology of the site has been defined by field investigations during which the drilling and logging of sixty-two (62) soil borings to depths as great as 280 feet, and installation of monitoring wells in thirty-nine (39) of the borings. The locations of the borings and wells are shown on Figure 4. Boring and well logs are provided in Appendix E for historical borings and Appendix F for Supplemental Field Investigation (SFI) borings. A summary of the monitoring wells construction is provided in Table 1.

The Chesapeake Terrace site is regionally located in the Coastal Plain Physiographic Province in the outcrop area of the Patapsco Formation. Both sand and clay facies of the Potomac Group occur in the vicinity of the site according to the Geologic Map of Anne Arundel County (Glaser, 1976). This group includes the Patapsco Formation. Based on the information obtained during the field investigations, the hydrogeologic conditions in and around the site are dictated by the prominence of a clay layer (labeled in this submission as the Middle Confining Unit (MCU)) separating the remnants of the Upper Patapsco Aquifer from the Lower Patapsco Aquifer. The areas where the MCU is relatively thin (typically <30 ft thick) are referred to as hydrogeologic area A ("Area A"). The areas where the MCU is relatively thick (typically >30 ft thick) is referred to as hydrogeologic Area B.

Monthly water level measurements in the on-site monitoring wells were conducted over four periods:

- Sept 1989 – August 1990
- August 2002 – November 2003
- May 2013 –June 2014
- November 2018, January, 2019, February 2019 and June 2019

The wells were installed over the course of 30 years, and groundwater level readings were taken in the accessible wells in existence at the time of data collection. As wells were constructed, they were added to the list of wells being measured. Over time, several wells have been damaged and no new water level readings have been taken. The Well locations are shown on Figure 4 and depth to groundwater field measurements are shown on Table 3.

To establish existing condition of the groundwater quality, four consecutive quarters of groundwater samples were collected between May 2013 and January 2014 and analyzed for:

- Volatile Organic Carbons (VOCs),
- Metals,
- Chloride,
- Nitrate,
- Phosphate,
- Total Dissolved Solids (TDS),
- Sulfate,
- Total Alkalinity,
- Ammonia,
- Chemical Oxygen Demand (COD), and
- Hardness

Generally, the existing groundwater was within established guidelines for drinking water with the exception of one or more results for Total Arsenic, Cadmium, and Chromium above their respective Maximum Contaminant Levels (MCL), and Total Lead above the USEPA Action Level for Drinking Water. A more detailed analysis of the results has determined that the observed exceedances for the inorganic compounds (Arsenic, Cadmium, Chromium and Lead) are a function of turbidity in the sample and were associated with the sampling technique and do not accurately represent actual water quality. Specifically, high turbidity levels in the samples could result in establishing water quality standards for the project that are higher (i.e. poorer quality) than the actual conditions.

To address the turbidity problems associated with the 2013 and 2014 data, and to provide more current data for establishment of water quality standards in the permit, the MDE requested that NWM perform four (4) additional rounds of groundwater sampling during 2020. NWM is addressing the high turbidity levels by completing all sampling utilizing low flow sampling techniques, and analyzing samples with higher than desired turbidity levels for filtered and unfiltered inorganic concentrations. At the time of this submission NWM has successfully completed two (2) of the four (4) rounds. The third round of sampling has been completed and we are awaiting results. The fourth round is expected to be completed at the end of June or first week of July. Results for the third and fourth rounds will be provided as an Addendum to this submission when data validation and evaluation is completed.

This Phase II Hydrogeologic Report provides more detailed description and information regarding the on-site hydrogeologic conditions.

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1.0 INTRODUCTION

This Phase II Application - Hydrogeologic Report (Report) is being submitted in support of the proposed Chesapeake Terrace Rubble Landfill to be located along Patuxent Road in Odenton, Anne Arundel County, Maryland (Plate1). This project is being developed by National Waste Managers, Inc. (NWM). This Report is the culmination of information compiled since the conception of the project in 1989 and has involved multiple environmental consultants, legal proceedings, and re-interpretations.

1.1 GENERAL PROJECT DESCRIPTION

National Waste Managers, Inc. proposes to reclaim approximately 117.5 acres, formerly used for sand and gravel mining, with an engineered state-of-the-art rubble landfill that will provide air space for rubble waste disposal for approximately 12 years. The site consists of a 480-acre parcel located near Odenton, Maryland, as shown on Plate1. Existing topography and mapped wetland boundaries are presented on Figure 1. The proposed landfill footprint is approximately 140 acres, as shown on Figure 3.

The landfill is proposed to have 20 cells/subcells, to allow sequential development. The landfill cells will be lined with a state-of-the-art, low-permeability liner system to block leachate (water which contacted the waste) from contacting groundwater. Each cell will be equipped with a leachate collection and removal system, which will convey the leachate through a force main to one of the on-site leachate storage tank. Final disposition of the leachate from the storage tank will be detailed in the Phase III Application.

As the landfill achieves final grades, the closure cap will be constructed. The closure cap will also include a low-permeability barrier layer designed and constructed to prevent precipitation from infiltrating into the filled waste material. By constructing the closure cap as grades within cells or portion of cells are achieved the volume of leachate requiring management is reduced. Precipitation falling on the completed cap (i.e., stormwater runoff) is managed through the series of controls and diversion (such as terraces, down-chutes, perimeter channels and culverts) that direct the water to stormwater retention basins situated around the landfill. The stormwater retention basins provide storage and allow the water to be discharged in a limited/controlled fashion. Figure 3 presents the conceptual layout and configuration for the proposed landfill cells and stormwater retention basins. Additional details regarding landfill layout, configuration, closure cap construction and stormwater management will be presented in the Phase III Application.

1.2 PROJECT HISTORY

The first submission of the "Phase 2 Hydrogeologic Report" for the proposed Chesapeake Terrace Rubble Landfill was prepared by Mark Schultz Associate (MSA) and submitted to the Maryland Department of the Environment (MDE) on March 19, 1990. The MDE provided comments on the Phase 2 Report in a letter dated December 29, 1997. MSA responded to these comments in a detailed "*Response to Comments Report"* dated March 23, 1998. The MDE provided final comments on the Phase 2 report in a letter dated August 5, 2002.

The long period of time that elapsed between the first Phase II submission and subsequent revisions and submissions is attributable to the fact in December 1993, Anne Arundel County appealed the inclusion of the proposed landfill in the County's Solid Waste Plan. Without the required local approval, the MDE largely stopped processing the landfill permit application. The Chesapeake Terrace Rubble Landfill was not included in the Anne Arundel County's Solid Waste Plan until April 2001, at which time the review process was reactivated. In the eight (8) years that the application was inactive, the MDE promulgated new regulations governing rubble landfills (COMAR 26.04.07.15).

Considerable field work was conducted in order to generate the data needed to provide comprehensive responses to the MDE's 2002 comments including:

- Fifteen (15) new monitoring wells were installed, surveyed, developed and tested.
- More than 12 months of consecutive water level measurements were taken.
- Soil samples were collected for geotechnical and permeability testing.

The Phase II Addendum presenting the results of the additional investigations was issued to MDE in December 2003.

Phase III Application, submitted in 2006, included the detailed engineering design of the proposed Chesapeake Terrace Rubble Landfill. MDE raised questions regarding the hydrogeology of the site during the review of the Phase III Application. Through a series of MDE comments and responses, the design team worked with MDE to identify outstanding questions regarding the site-specific hydrogeologic concerns. The result of those efforts was development of a scope for additional field investigation referred to as the Supplemental Field Investigations (SFI). The SFI scope of work included the following:

- Advance five (5) boreholes along the approximate boundary between the geologic formations to better define the boundary.
- Advance seven (7) boreholes and install seven monitoring wells at locations designated as permanent perimeter monitoring wells, to provide further information regarding subsurface conditions – formation and groundwater levels.
- Obtain twelve consecutive monthly water level readings in the active wells on the property.
- Provide additional information in some data pockets in a portion of the Site designated as hydrogeologic Area B.
- Install new wells in the general vicinity of damaged Wells MW-12 and MW-13, to allow groundwater level readings to be taken for southeast portion of the site.

Prior to the completion of the SFI field activities, Anne Arundel County denied renewal of the Special Exception Permit. With the denial of this permit extension, MDE could no longer review the applications. As such, a report summarizing the SFI activities was not submitted to MDE for review at that time. However, the work to obtain twelve consecutive months of groundwater levels readings and four quarters of groundwater quality data was continued in order to have the data requested by MDE, if the project were allowed to continue.

NWM challenged the denial in court and the denial was reversed on appeal in October 2018. Since that time, Advanced GeoServices Corp, a Montrose Environmental Group company (Montrose AGC) has worked to compile a revised Phase II Application Report for submission to MDE to include

the results of the SFI, and additional information obtained since resumption of the permitting process.

1.3 RECENT MDE ENGAGEMENT

The design team met with MDE on November 2, 2018 to review the project status and solicit input from MDE regarding the path forward. During that meeting, MDE representatives requested two months of additional groundwater level readings in the on-site wells in light of the historically record-breaking high levels of rain recorded for 2018 in the region. That data was collected on November 29, 2018 and January 10, 2019, and is also included in this report (Table 4).

A working meeting was held with MDE on February 11, 2019, to provide an update and discuss the design and data items being completed by Montrose AGC. The issues discussed related to the following items:

- Maximum Groundwater Levels – A discussion occurred regarding whether to use regional or site-specific wells. The water levels measured in United States Geological Survey (USGS) observation wells was previously used to develop maximum potentiometric groundwater levels in each hydrogeologic area of the site. Because site-specific groundwater level readings coincided with wet years, including late 2018 and January 2019 which are associated with record-breaking rainfall in the Mid-Atlantic region, we have utilized the maximum recorded groundwater levels from site-specific wells as the Highest Observed or Predicted Water Elevations to satisfy the requirements of COMAR Sec. 26.04.07.15(A)(4)(b).
- Unconfined Groundwater in Southwest Portion of the Site – The landfill design being proposed in February 2019 planned to fully penetrate the unconfined water bearing zone (remnants of the Upper Patapsco Aquifer) in the southwest portion of the site. Issues discussed in the February 11, 2019 meeting included vertical barriers (clay dams and cutoff walls) to prevent the lateral movement of the unconfined groundwater into the waste disposal area. As discussed below, the current design does not penetrate the unconfined water bearing zone, and therefore there is no longer a need for a vertical barrier.
- Lower Patapsco Groundwater Levels - Determination of the groundwater levels in the Lower Patapsco Aquifer beneath the Site was previously estimated based upon USGS observation wells, screened in that formation and one private residential water supply well on a neighboring property. As part of the SFI, four deep groundwater monitoring wells (PMW-11, 12, 13 and 23), which will be part of the future permanent perimeter groundwater quality monitoring, were installed in the Lower Patapsco Aquifer. Evaluation of groundwater levels from those wells have been used to determine the groundwater levels in the Lower Patapsco Aquifer, which is referred to in this Phase II Application as the “confined water bearing zone” (See Section 5).
- Historic Groundwater Level Readings - Some of the historical groundwater level readings were suspect when compared to other results. To determine if the suspect results were erroneous, we completed a statistical analysis for outliers. Results of the evaluation are provided in Section 4.2.

Since February 11, 2019 NWM has been involved in continuing discussions with the MDE regarding additional information required to support the permitting process and modifications to the landfill layout. A summary of the additional information and modifications are as follows:

- Additional Groundwater Level Readings – MDE requested and NWM agreed to collect additional depth to groundwater levels. Those measurements were collected on February 15, 2019 and June 27, 2019.
- Additional Groundwater Sampling – In December 2019, the MDE requested that NWM collect four (4) additional rounds of groundwater data. The first two (2) events have been completed and are included in this Phase II Application. Field sampling for the third event was completed in May 2020, and the results are undergoing data validation and evaluation. The fourth event is scheduled for late June or early July 2020. Results for the third and fourth events will be provided as an addendum to this application when they are reviewed and evaluated.
- As described in greater detail below, the proposed design will no longer penetrate the unconfined water bearing zone. The bottom of the proposed cells will be > 3 feet above the highest observed/predicted groundwater level for the unconfined water bearing zone. Because of this design modification neither a slurry wall nor a "clay dam" will be required to control the lateral flow of water in the unconfined water bearing zone.

More detailed explanations for these changes are provided in this report.

1.4 DESIGN TEAM QUALIFICATIONS

The professionals who were the primary author is of this Report are:

- Paul G. Stratman, P.G., P.E., is the project geologist providing interpretation of the geologic logs and water levels readings, previous Site specific reports, and relevant publications regarding regional geologic and hydrogeologic conditions.
- Veronica E. Foster, P.E.., supervised the Supplemental Field Investigation (SFI), during the employ of Golder Associates Inc., prior to joining Montrose AGC and continues to be the project team leader and primary author.

The resumes of these personnel are provided in Appendix A.

2.0 GENERAL SITE DESCRIPTION

2.1 LOCATION

The proposed Chesapeake Terrace Rubble Landfill Site is located in western Anne Arundel County between the Patuxent and Little Patuxent Rivers. Plate 1 includes a portion of the United States Geological Survey (USGS) Topographic Quadrangle Map showing the location of the property relative to the surrounding area. Plate 2 includes an aerial map of the parcel showing the parcel relative to the nearby and regional development.

The parcel of land which contains the Chesapeake Terrace Rubble Landfill is approximately 480 acres (see Figure 1). The parcel is bordered on the northeast by Patuxent Road, on the west by the Amtrak railroad tracks, and on the southwest by Conway Road. The boundary of the proposed rubble fill area within the property is shown on Figure 3. The total proposed fill area is approximately 140 acres.

2.2 TOPOGRAPHY, DRAINAGE AND FEATURES

2.2.1 On-Site

A topographic base map of the site is shown on Figure 1. This map shows natural drainage features, wetlands, the 100-year flood plain, property lines, and forested areas. Extensive surface mining for sand and gravel has taken place in the northwestern portion of the proposed landfill area. The results of this past mining activity is the surface is uneven and barren. There are no on-site structures, utility pipelines, storage tanks, or water supply wells.

A ridge with elevations up to 196 feet (ft) above mean sea level (amsl) is located on and adjacent to the southern property line. The land surface across the site slopes north from this ridge toward the Little Patuxent River which is at an elevation of approximately 60 ft amsl. The vast majority of surface water from the site drains to the northeast toward the Little Patuxent River. The extreme western corner of the property drains to the west toward the Patuxent River.

2.2.2 Localized

The topography beyond the property can be viewed on Figure 2, which shows profiles in four directions through the site. These profiles are taken from GoogleEarth® so the elevations are +/-5-ft amsl. The value of these profiles is that they show the relative elevations of the site compared to the surrounding communities, from 3 to 5 miles from the site. The data shows that the site is located along a localized high-point created by the Little Patuxent and Patuxent River valleys. The areas north, west and east are at lower elevations than the southern portions of the site. The elevations beyond the southern limits of the site generally slope downward to the Patuxent River. This means that surface water is generally not running onto the site from off-site sources.

2.3 FLOODPLAIN ANALYSIS

2.3.1 Historical Floodplain Analysis

J. A. Chisholm, P.E. performed a detailed evaluation of the 100-year flood plain evaluation. His evaluation is described in a letter to the Applicant dated October 14, 2003 (see Appendix B for complete letter and attached exhibits). His evaluation is summarized below:

Mr. Chisholm noted that the site is adjacent to the Little Patuxent River approximately 30,000 feet (approximately 5.7 miles) upstream from the confluence of the Little Patuxent River with the Patuxent River. The 100-year flood plain limit shown upon the exhibits submitted to the MDE with the March 1990 Phase II Report was derived from the FEMA (Federal Emergency Management Agency) Anne Arundel County FIRM Panels 24 and 25 dated May 2, 1983. These panels showed the Little Patuxent River adjacent to the Chesapeake Terrace site. The footprint of the landfill is located above elevation 80, approximately 5 feet above the influence of the 100-year floodplain.

The July 18, 1985 FEMA Flood Insurance Study for Anne Arundel County, Maryland provided additional insight as to the methodology utilized for determination of the water surface for the 100-year flood level. Specifically *"For the Little Patuxent River, flood-flow frequency data were based on a statistical analysis of stage-discharge records covering 31 and 45 year periods at gage stations operated by the USGS (reference 7)."* The closest upstream gage station is located at Savage, Maryland (USGS01594000). Also included in the Flood Insurance Study were various floodway data tables. Table 4 of the Little Patuxent River Flood Insurance Study provided cross section and velocity data for two points adjacent to the Chesapeake Terrace site, specifically Cross Sections H and I (Exhibit D in Appendix B).

Typically, proposed land use (Zoning) is used to determine 100-year flood plain impacts. In Mr. Chisholm's professional opinion, since the original 1983 study was prepared, the zoning within the watershed has not significantly changed. Considerable construction and development has occurred within the watershed; however, the original study parameters would likely have utilized zoning, <u>not</u> the land use, in developing the 100-year flood elevations.

Mr. Chisholm also sourced stream flow statistics (Exhibits B and C in Appendix B) for the Little Patuxent River stream gage station at Savage, Maryland (USGS 01594000). While not immediately adjacent to the Chesapeake Terrace site, the data should be indicative of what is happening within the entire watershed. For instance, if the flows at Savage increased by "x" then it should be reasonable to assume the downstream response would be similar. Mr. Chisholm reviewed the annual mean stream flow rate (Exhibit B in Appendix B) in cfs from 1976 to 1990 versus the time period from 1991-2001 and determined that an increase of approximately 7 percent was indicated by the data. As a conservative approach, Mr. Chisholm suggested a 50 percent increase in the potential 100- year storm event flows due to development within the last twenty years.

From Cross Sections H and I it was determined (utilizing the continuity equation: Q=AV) that a 100 year storm event resulted in a flow of approximately 22,000 - 23,000 cfs. Flow was projected through Cross Sections H and I by increasing the water surface elevation in 1-foot increments. It was found that an increase of two feet to the water surface elevation would provide an increase of approximately 50 percent to base 100-year flow (see Exhibit A in Appendix B). A three-foot increase in elevation effectively doubles the capacity of the floodplain.

It was concluded that the proposed elevations for Chesapeake Terrace Rubble Landfill operations are located above the influence of any 100-year FEMA flood plain limits within the adjacent Little Patuxent River.

2.3.2 Updated FEMA Maps

In 2012, FEMA updated the National Flood Insurance Program, Flood Insurance Rate Maps (FIRM) for Anne Arundel County, as a result of increase in frequency and severity of recent storm events. Map number 24003C0136E shows the extent of the site and the flood boundaries near the site. Plate 3 includes excerpts of this map, amended to include the site boundary for the Chesapeake Terrace Rubble Landfill.

Montrose AGC reviewed this map to discern whether it merits adjustment to the historical analysis performed by Mr. Chisholm, which also served as the basis for other permitting in Maryland. Zone AE, where base flood elevations were determined, is located along Patuxent Road and Little Patuxent River beyond it. The flood elevation in the vicinity of the site is designated between 71 and 73 ft msl. The floodplain elevations presented on the attached Figures shows the FEMA 2012 updated elevations.

While these elevations are higher than those identified in Mr. Chisholm's study, it does not affect the conclusion of his study: the landfill is being developed at elevations above 75 ft msl in the existing conditions. In the vicinity of Patuxent Road, the proposed elevations of the landfill perimeter access road range from 80 ft msl (in the eastern limits) to 100 ft msl (near the Amtrak rail lines).

The conceptual landfill base (or bottom) grades are provided on Figure 3. As the Phase III Permit Application is still in progress, these grades may be adjusted as that design effort progresses. However, a minimum of 3-feet will be maintained between highest predicted groundwater elevations and the proposed bottom Landfill grades.

3.0 REGIONAL GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

3.1 INTRODUCTION

The Chesapeake Terrace Site (site) is located in the Coastal Plain Physiographic Province in the west central portion of Anne Arundel County. Hydrogeologic resources of Anne Arundel County have been the subject of detailed evaluations conducted by the Maryland Geologic Survey (MGS) that have been relied upon for development of this discussion of the regional hydrogeologic setting. The primary studies utilized are:

- MGS Report of Investigation No. 46 "Evaluation of the Water Supply Potential of Aquifers in the Potomac Group of Anne Arundel County, Maryland", (F. Mack and G. Achmad, 1986);
- MGS Administrative Report 09-02-04 "Hydrogeologic Data for the Coastal Plain Sediments Northwest of Fort Meade Maryland" (A. Staley, et.al., 2009); and,
- MGS Geologic Map of Anne Arundel County (Glaser, 1976).

A site-specific discussion of geologic and hydrogeologic conditions is provided in Section 5.0.

3.2 GEOMORPHOLOGY

The Coastal Plain deposits are unconsolidated to semi-consolidated sedimentary deposits. The Coastal Plain extends east to the Atlantic Ocean and west to the Piedmont Physiographic Province. Coastal Plain deposits are comprised of materials eroded and transported from upstream sources and typically deposited by water below sea level and along rivers. The size and gradation of the sediments comprising coastal plain deposits can range from clays to coarse gravel to boulders, depending on the energy associated with the depositional environment. The uniformity of the deposits can range from vertically and laterally significant homogeneous deposits to highly variable localized heterogeneous deposits.

The separation between the Coastal Plain and the Piedmont Physiographic Provinces ("Fall Line") is mapped as being within Howard County approximately 10 miles northwest of the site (Plate 4). Coastal plain deposits in the west central portion of Anne Arundel County thicken from northwest to southeast beginning at nearly zero feet thick at the border with Howard County to approximately 1,800 feet thick in the vicinity of Annapolis. Plates 5 and 6 present cross-sections from MGS Investigation No. 46. Based on those cross-sections the surfaces of the units comprising the Coastal Plain deposits dip from northwest to southeast at an average rate of approximately 80 feet/mile.

3.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Geologic Map of Anne Arundel County (Glaser, 1976) identifies the vicinity of the site as being predominantly Lower Cretaceous sediments of the Potomac Group, with non-conforming contacts of Quaternary Terrace and Alluvial deposits. (See Plate 8). Based on MGS Investigation 46, at the site crystalline bedrock is >800 below ground surface (bgs). In this region the Potomac Group soils are reported to be over-consolidated as a result of the weight of a substantial thickness of overlying soils that have since been eroded away. As a result of that over-consolidation, Potomac Group soils are generally denser/stiffer-harder than the quaternary deposits.

3.3.1 Potomac Group

Within Anne Arundel County the Potomac Group is described as being very complex. Because formations of the group were deposited under fluvial and lacustrine conditions sand, silt, and clay layers are commonly limited in lateral extent. Consequently, a boring log taken at a given point may very well not be applicable to sediments at the same stratigraphic level a few hundred feet in either direction (MGS, 1969). Despite that potential for variability, as a hydrogeologic resource the Potomac Group is commonly discussed in terms of three distinct formations. These are the Patuxent Formation, Arundel Formation and Patapsco Formation, as described below.

3.3.1.1 Patuxent Formation

The Patuxent Formation represents the bottom (oldest) of the Potomac Group and has a non-conforming contact with the saprolitic surface of the underlying crystalline bedrock. Lithologically the Patuxent is comprised of white or light gray to orange-brown, moderately sorted sands and subrounded quartz gravels; silts and clays subordinate, predominantly pale gray. The Patuxent Formation yields relatively large quantities of water (MGS Administrative Report 09-02-04 (A. Staley, et. al., 2009)). The Patuxent Formation is a regionally significant source of groundwater and is, therefore, locally referred to as the Patuxent Aquifer. (For consistency, we will utilize the term "Patuxent Aquifer" going forward when discussing the Patuxent Formation). Based on figures contained in Administrative Report 09-02-04, the upper surface of the Patuxent Aquifer in the vicinity of the proposed Chesapeake Terrace Landfill is on the order of elevation -450 ft amsl. Thickness of the Patuxent Aquifer in the vicinity of the site is mapped between 100 to 200 feet.

3.3.1.2 Arundel Formation

The Arundel Formation (referred to as the Arundel Clay Formation in some publications) directly overlies the Patuxent aquifer, and functions as a hydraulic separating layer between the Patuxent and Patapsco Aquifers. MGS Administrative Report 09-02-04 (A. Staley, et. al., 2009) estimates the top of the Arundel Formation in the vicinity of the project site to be on the order of elevation -300 ft amsl, with a typical thickness on the order of 200 feet. The Arundel Formation outcrops approximately 5 miles northeast of the project site.

3.3.1.3 Patapsco Formation

The Patapsco Formation is the uppermost member of the Potomac Group, and is typically discussed in terms of the Lower Patapsco Aquifer and the Upper Patapsco Aquifer separated by a confining layer. Descriptions of each follow:

Lower Patapsco Aquifer
The Lower Patapsco Aquifer, overlies the Arundel Formation. The Lower Patapsco Aquifer is one of the primary sources of water in the Glen Burnie and Severndale areas. MGS Report of Investigation No. 46 maps (F. Mack and G. Achmad, 1986) the outcrop of the top of the Lower Patapsco Aquifer at approximately 2 miles northeast of the site. The same document shows the top of the Lower Patapsco Aquifer in the vicinity of the site on the order of elevation -50 ft. amsl.

Middle Confining Unit/Transition Zone
A low permeability layer separates the Lower Patapsco Aquifer from the Upper Patapsco Aquifer. Where this layer is described as a "clay" (or predominantly clay) in the boring logs we have

designated this layer as the Middle Confining Unit (MCU). Beginning where intervals below the MCU are described as including intervals that are predominantly "silt" or "sand" we designated all deeper deposits (even if they transitioned back to clay or predominantly clay) as Transition Zone (TZ). MGS Report of Investigation No. 46 (F. Mack and G. Achmad, 1986) states that the confining layer is over 100 feet thick in Severndale and over 200 feet thick in Annapolis. Figures contained in MGS Administrative Report 09-02-04 (A. Staley, et. al., 2009), indicate the confining layer to be on the order of 80 ft. thick in the general vicinity of the site. Based on a top of the Upper Patapsco Aquifer (see below) at elevation -50 ft. amsl, as a general expectation the top of the MCU should be on the order of elevation +30 ft. amsl.

Upper Patapsco Aquifer

The Upper Patapsco Aquifer (UPA) represents the uppermost permeable water bearing zone within the Potomac Group. The UPA is comprised of laterally and vertically significant deposits of permeable materials (primarily sand) that collectively serve as a source of potable water in the County. The Upper Patapsco Aquifer is described as one of the best water bearing formations in Anne Arundel County, but it is much more limited in areal extent than the Lower Patapsco and Patuxent Aquifers (MGS Report of Investigation No. 46). The MGS Report of Investigation No. 46 shows the outcrop for the Upper Patapsco Aquifer on and immediately northwest of the project site. With the unit gone approximately ½ mile west of the site. Administrative Report 09-02-04 (A. Staley, et. al., 2009) shows the surface of the Upper Patapsco Aquifer on the order of elevation +120 ft. amsl.

The Upper Patapsco Aquifer can be under confined conditions where an Upper Confining Layer (UCL) is still present and separating it from the overlying Magothy Formation. Based on information presented in Administrative Report 09-02-04 (A. Staley, et. al., 2009), the top of the confining layer in the vicinity of the site is encountered at or around elevation +150 ft. msl.

3.3.2 Magothy Formation

The Magothy Formation (aka Magothy Aquifer) overlies the Potomac Group, it is reported to be hydraulically connected in varying degrees from place to place with the underlying Patapsco aquifer. It consists of 40 to 60 ft. of loose, white, cross-bedded, "sugary", lignitic sands and dark gray, laminated silty clays; white to orange-brown, iron-stained, subrounded quartzose gravels (MGS Report of Investigation No. 46). The same report shows the outcrop of the Magothy Aquifer immediately southeast of the project site. The Geologic Map of Anne Arundel County (J. Glaser, 1976) shows the Magothy Formation being present in the south east area of the site, which coincides with the highest topographic surface.

3.3.3 Quaternary Deposits

The Patuxent River and Little Patuxent River are situated southwest and east/northeast of the Site, respectively (see Plate 1). The Geologic Map of Anne Arundel County (Glaser, 1976) identifies Quaternary Terrace and Alluvial deposits within the valleys along both rivers.

A) Patuxent River Terraces - The Patuxent River Terrace deposits (terrace deposits) are described on the Geologic Map of Anne Arundel County as tan or brown interbedded sands and gravels with lesser amounts of silty clay. The terrace deposits can also contain cobbles and boulders. Terrace thicknesses average 25 feet, but range from 3 to 60 feet. Many sand beds are predominantly clean and

represent one of the most important construction materials in the County. Based on the Geologic mapping it appears that the former quarry operations conducted at the Site were targeting materials in the terrace deposits.

B) Alluvium – The Quaternary Alluvium (alluvium) are described on the Geologic Map of Anne Arundel County (Glaser, 1976) as poorly sorted interbedded sand and silty clay with subordinate gravel. Organic matter is common. Thicknesses range from 3 to 15 feet. The alluvium is found in the modern flood plains of both rivers.

3.4 RESIDENTIAL WELL SURVEY

Pursuant to the requirements of COMAR Section 26.04.07.15(A)(3) a survey was conducted of the production wells within ½ mile of the site boundary. There is no public water service in this area; therefore, all of the residences within ½ mile of the property boundary obtain their water supply from wells, or, for a few residences, springs.

The well inventory included every address within ½ mile of the site. Locations of the wells are shown on Plate 7 and specifications for the wells are provided in Table 2. Geologic cross-sections depicting the lithology described on the driller's logs for the wells identified in 2003 and bordering the site were previously developed by Mark Schultz Associates (MSA) in 2003. These cross-sections are provided in Appendix C. Grade elevations for the cross-sections are estimated from county topographic maps (2-foot contour interval). The locations of the cross-section lines are shown in Appendix C. In addition to the cross-sections presented on Plate 7, where appropriate the site cross-sections shown on Figures 5 through 11 have been extended to the edge of the property to show the screened interval for the closest residential wells relative to the site subsurface conditions.

The well inventory was conducted by performing a well record search and door-to-door field survey in 1989. The field survey was updated in 2003 by reviewing MGS well records which were current through March 2001 and by physically checking for new residential construction (which implies a well installation). Wells installed prior to 1969 were not required to be permitted. No records or construction details are available for these wells. If the residents were home at the time of the field survey then they were asked the depth of their well. These reported depths are included in Table 2; however, it should be noted that these reported well depths were not verifiable.

In 2019, another well search was conducted through the Anne Arundel County Health Department (AAC HD) for all wells within ¾ mile of the center of the site. Some new wells were identified, but some previously identified wells were missing from the list provided by the AAC HD. Available well completion reports for all the wells located by the historical surveys and the 2019 data search are included as Appendix C.

There is a new residential neighborhood south-southeast of the site and they appear to have a neighborhood-specific wells, designated as Wells 89 and 90, on Plate 7. These wells are situated >1/2 mile from the facility.

3.5 PROJECTED GROUNDWATER USE

The regional groundwater demand will differ from year-to-year based on numerous variables, including but not limited to, the following:

- Rainfall (e.g., wet year or dry year)
- Development (e.g., residential vs. commercial, increased development)
- Impervious surface coverage (i.e., affects recharge)
- Public utility wells (e.g., their continued viability)

Groundwater continues to be a primary source for drinking water in the coastal plain along the entire east coast. As a result, water utilities and state/county authorities monitor development and water allocation (i.e., maximum allowed withdrawal of groundwater) permitting.

In 2007, the MGS, in cooperation with the Anne Arundel County (AAC) Department of Public Works (DPW), conducted an evaluation of groundwater withdrawals through 2044. The study indicated that the water demand in the region had increased 20-fold since the early 1900s. Much of the water being used by AAC DPW comes from the Patapsco Aquifers. Continued development could result in groundwater drawdown, which could make some of the water supply wells ineffective as they would be above the reduced groundwater levels.

Despite the foregoing, this Study concluded that the Patapsco Aquifers could continue to provide water for consumption, but there may be the need to install new wells to reach the lowered groundwater levels.

3.6 SITE WETLANDS

Wetlands were identified on the property during the initial field investigations, generally located along the floodplains and a few are located within the proposed landfill footprint. Figure 1 shows the site map with the mapped jurisdictional wetlands. The site, as described previously, was subject to historical surface mining activities, creating low spots where water ponded and wetlands were created. Those located within the limits of disturbance were delineated and a permit for filling those wetlands was obtained from the United States Army Corps of Engineers and MDE. Permit extensions have been obtained since October 2018. A copy of the wetland mapping report, permits and extensions of the permits is provided in Appendix M.

4.0 SUMMARY OF SITE INVESTIGATIONS

Multiple site-specific hydrogeologic field investigations have been conducted since 1988 in support of the Chesapeake Terrace Rubble Landfill. The hydrogeologic investigations conducted prior to 2010 were performed under the direct supervision of a Mark Shultz Associates (MSA) geologist. The Supplemental Field Investigation (SFI) was conducted during 2013-2014, under the supervision of Veronica E. Foster, PE, while during the employ of Golder Associates Inc. and now with AGC/Montrose. The hydrogeologic compilation included in this 2020 Phase II Permit Application submission was developed by Paul Stratman, P.E., P.G. a professional engineer and professional geologist with 35+ years of experience employed with Montrose AGC.

4.1 SOIL BORINGS AND MONITORING WELLS

The geology of the site has been defined through the drilling and logging of sixty-two (62) soil borings to depths as great as 280 feet and installation of monitoring wells in thirty-nine (39) of the borings. The locations of the borings and wells are shown on Figure 4. Boring and well logs are provided in Appendix E for historical borings and Appendix F for SFI borings. A summary of the monitoring well construction is provided in Table 1.

Split spoon soil samples were collected at 2.5 and/or 5-foot intervals in each of the borings advanced prior to 2010. Split spoon soil samples were taken every 5-feet or every 10-feet in borings advanced as part of the SFI. Over 1,000 split spoon soil samples have been collected.

The field geologist for each investigation completed a boring log for each boring based on a visual and physical examination of the soil samples in accordance with ASTM-D2488 (1962). To confirm soil descriptions in borings developed before 2010, select soil samples with a variety of textures were submitted to a geotechnical laboratory (Hardin-Kight, Inc.) for testing for textural classification as well as determination of liquid limit, plastic limit and plasticity index. There was good correlation between laboratory classification and the field descriptions of the soil samples. The laboratory testing results are provided in Appendix G.

Standard Penetration Tests (SPTs) were performed during the installation of all of the borings in accordance with ASTM-DI586-84 (1984). The SPT blow counts are recorded on the boring logs in Appendices E and F.

4.2 GROUNDWATER LEVEL READINGS

Monthly water level measurements in the on-site monitoring wells were conducted over four (4) periods:

- Sept 1989 – August 1990 (11 events)
- August 2002 – November 2003 (16 events)
- May 2013 –June 2014 (13 events)
- November 2018, January, 2019, February 2019 and June 2019 (4 events)

Water level measurements are also being collected as part of the four (4) groundwater sampling events being completed during 2020.

The groundwater monitoring wells were installed over the course of 30 years, and groundwater level readings were taken in the accessible wells in existence at the time of data collection. As wells were constructed, they were added to the list of wells being measured. Over time, several wells have been damaged or lost and no new water level readings have been taken. The Well locations are shown on Figure 4 and depth to groundwater field measurements are shown on Table 3.

The Monitoring Well groundwater elevations were calculated utilizing the elevation of the inner casing (Table 1) and the depth to water readings (Table 3), and are provided on Table 4. Table 5A is a graphical presentation of groundwater elevations over time for the unconfined water bearing zone (Unconfined WBZ). Table 5B presents groundwater elevations over time for the confined water bearing zone (Confined WBZ), and also includes wells screened within the MCU. Both tables also include plots of actual and average monthly rainfall data.

4.2.1 Unconfined Water Bearing Zone (Unconfined WBZ)

Wells grouped within the classification of Unconfined WBZ are the wells screened above the MCU. Most of the Unconfined WBZ wells are screened within a permeable interval that is directly influenced by/connected to infiltrating surface water. This means that no low-permeability soil layers were identified between the ground surface and the screened interval. Exceptions to this criteria were identified in Wells MW-3, MW-6, MW-19, MW-25, and MW-29. At these five (5) well locations, a clay layer was identified between the screened interval and the ground surface, although the screened interval is above the top of the MCU. These wells are classified as “unconfined/semi-confined” on Tables 4 and 5A. The specific conditions for each are summarized as follows:

- MW-3 (boring B-13): The clay layer was approximately 5 feet thick (approx. elev. 65 to 70 ft amsl) with saturated sand identified at elevation 71 +/- ft. amsl (see Section E-E’ of Figure 9). The MW-3 screened interval was set at elevation 30 to 40 ft. amsl. The average water level reading in MW-3 is approximately elevation 67.5 ft. amsl, although water levels in MW-3 approach elevation 70 (see highest observed/predicted groundwater level on Figure 12). The saturated sand identified on the boring B-13 log at elevation 71 +/- ft. amsl appears to be interconnected or semi-connected with the Unconfined WBZ.
- MW-6 (boring B-15): The clay layer was 1.3 feet thick (approx. elev. 80.4 to 81.7 ft. amsl) with wet sand identified beginning at the ground surface, at roughly elevation 99.7 +/- ft. amsl (see Section D-D’ on Figure 8 and Section F-F’ on Figure 10). The screened interval in MW-6 was set at elevation 54 to 64 ft. amsl. The average water level reading in MW-6 is approximately elevation 72.5 ft. amsl. Based on the relationship between the water levels observed in MW-6 and the top of the clay layer, the wet sand above the clay layer is a localized perched zone on top of the clay layer. Based upon topographic conditions the perched zone is sustained by poorly defined surface drainage in the immediate vicinity of the well.
- MW-19: The clay layer was 12 feet thick and was classified as being part of the UCL that separates the UPA from the Magothy Formation. The clay extended from the ground surface (elev. 133.6 ft. amsl) to approx. elev. 121.6 ft. amsl (See Section A-A’ on Figure 5 and Section G-G’ on Figure 11). The MW-19 screened interval was set at elevation 104 to 114 ft. amsl. Average water level reading in MW-19 is approximately elevation 111 ft. amsl.
- MW-25: The MW-25 boring log identifies a layer of wet sand from the ground surface (elev. 114.4 +/- ft. amsl) to a depth of 21 ft. bgs. The wet sand layer is underlain by

a 10 ft. thick layer of silt and clay.(elev. 83 to 93 ft. amsl)(see Section F-F' on Figure 10). The MW-25 screened interval was set at elevation 67 to 77 ft. amsl. The average water level reading in MW-25 is approximately elev. 79 ft. amsl. The difference in elev. between the MW-25 water levels and the wet sand above the silt and clay layer suggests that the wet sand is a localized perched zone supported by the clayey silt and clay layer. Based on topographic conditions in the vicinity of MW-25, it appears that the localized perched zone is sustained by poor surface water drainage, including a topographic depression immediately adjacent to the well.

- MW-29: A clay and silt layer was identified from 7 ft. to 12 ft. bgs during installation of MW-19 (approx. elev. 88 to 93 ft. amsl). The sand above the clay and silt layer was identified as "wet" (see Section D1-D1' of Figure 8). The screened interval was set at elevation 77 to 87 ft amsl. Average water level reading in MW-29 is approximately elevation 96 ft amsl, indicating an interconnection between the water interval above and below the clay layer.

4.2.2 Confined Water Bearing Zone (Confined WBZ)

Confined WBZ and Transition Zone (TZ) wells are both screened below the MCU. The Confined wells are those wells screened within the LPA. The TZ wells were not deep enough to penetrate the more permeable soils of the LPA; although, groundwater levels in the TZ wells exhibit data consistent with levels and trends observed in the Confined wells, suggesting an interconnection.

4.2.3 Middle Confining Unit Well Pairs (MCU Well Pairs)

Wells MW-23, MW-26, and MW-31 were screened within the MCU. Wells MW-23, MW-26, and MW-31 were each part of a well pair where the paired wells (Wells MW-24, MW-27, and MW-30, respectively) were screened above the MCU for the purpose of evaluating the separation provided by the MCU. The vertical distance between the top of the deeper and bottom of the shallower screened intervals for the MW-23/MW-24, MW26/MW-27, and MW-30/MW-31 well pairs were 29 ft, 37 ft, and 27 ft, respectively. As shown on Tables 4 and 5B, water levels in MW-23, MW-26 and MW-31, were dry or nearly dry at the time of installation, but recovered to levels consistent with their corresponding shallower well over a period of 6 or 7 months after installation (April/May 2003 through November 2003). Based on our interpretation of the data, the wells screened within the MCU do not provide groundwater elevations that are temporally adequate for development of groundwater contour maps. For that reason, and because each well is co-located with an unconfined well, we did not utilize MW-23, MW-26, or MW-31 for development of groundwater contour maps.

Well MW-9 was paired with well MW-14. Well MW-9 was screened in a zone identified as silt and sand that defined the bottom of the MCU and the start of the TZ. Well MW-14 was screened 8 to 18 feet below the bottom of the MW-9 screen, also within a zone described as silt and sand. Both wells were installed in July 1989. The material separating the two screened intervals, based on the boring log representing both wells (B-5) shows two intervals of very stiff to hard clay, each approximately 2 feet thick and a 1.3 ft thick layer of sand. As shown on Table 5B, MW-9 produced water levels between elevation 67.5 and 70.5 during the monthly monitoring events between August 2002 and November 2003. These levels were consistently on the order of 4 feet higher than water levels in MW-14, but 25 feet lower than closest unconfined well (MW-29), suggesting that water in MW-9 is isolated from the screened interval for MW-14. The depth to groundwater in MW-9 was not measured again until 16 years later (November 2018), when the groundwater elevation was just

1.9 ft below the top of inner casing for the flush mount well (nearly 30 feet high that historic levels). The 3 subsequent depth to water measurements were 17.1 ft, 0.3 ft and 25.0 ft, all within a period of 6 months. At the same time, depth to water readings in co-located MW-14 had 7.1 feet of variability and elevations similar to those elevations observed in 2002/2003. The above observations suggest that the MW-9 water levels are representative of the Unconfined WBZ or MW-9 has become damaged or otherwise compromised. We have utilized MW-9 for development of the Unconfined WBZ potentiometric surfaces shown on Figures 12-14.

4.3 GROUNDWATER CONTOUR MAPS

COMAR 26.04.07.15(A)(4)(a) requires development of separate groundwater contour maps for each distinct water bearing formation occurring within 50 feet of the anticipated lowest elevation of the refuse cell floor. These water surface elevations shall represent the following:

- An elevated groundwater condition;
- A depressed groundwater condition; and,
- The highest observed or predicted water elevations.

As described in greater detail in Section 5.0, groundwater beneath the site occurs as part of either an unconfined water bearing zone (Unconfined WBZ) or confined water bearing zone (Confined WBZ). The Unconfined WBZ is the near surface saturated zone and includes permeable intervals associated with remnants of the Upper Patapsco Aquifer (UPA). The Confined WBZ is the water bearing zone situated within and associated with the Lower Patapsco Aquifer. Some boring logs identified isolated pockets of wet or saturated soils on top of a low permeability zone. These perched zones do not appear to be laterally or vertically significant and are not part of the Unconfined WBZ. Wet or saturated intervals identified in the soil boring logs are presented on the cross-sections for consideration during the engineering design.

Groundwater Contour Maps presenting the highest observed groundwater elevated and depressed condition for the Unconfined WBZ are presented on Figures 12, 13 and 14, respectively. Groundwater Contour Maps presenting the highest observed groundwater elevated and depressed condition for the Confined WBZ are presented on Figures 15, 16 and 17, respectively. The data sets selected for the required groundwater conditions (except as noted on Table 4) are:

	Elevated GW Cond.	**Depressed GW Cond.**
Unconfined WBZ	June 27, 2019	Sept 26, 2002 and Dec 6, 2013
Confined WBZ	March 24, 2014	November 29, 2018

For the highest observed or predicted water elevations we utilized the highest reading for each individual well. During selection of the data several data points were identified that appeared to represent outliers relative to other measurements for the same locations. The data identified as possible outliers were:

Well	Date	Elevation	Reason
MW-3	04/21/14	79.92	The water level is more than 10 feet higher than the previous month (69.20) and more than 9 feet higher than the following month (70.12).
MW-9	11/29/18 1/10/19 2/15/19 6/27/19 1/29/20 3/23/20	97.71 82.41 99.21 74.49 NR NR	Water level readings for MW-9 have been highly variable when compared to historic results and surrounding wells. The water level elevation in MW-9 on November 29, 2018 was 97.71 ft. amsl (1.79' below the ground surface). This reading is 28.34 ft. above the average water level elevation for all previous readings (69.37 ft. amsl) and 27.29 above the highest record water elevation for all previous readings (70.42 ft. amsl (05/28/03)).

Well	Date	Elevation	Reason
MW-16	5/28/13	116.75	Levels in this well have historically been predictable +/-2.5-foot. The 14-foot elevation difference in the May 2013 is uncharacteristic. Further, the same elevation was reported in the field for MW-17 for the same date.
PMW-18	5/28/14	46.55	A fifteen foot drop from the preceding month followed by a sixteen foot increase the following month, suggests an error in the field reading.

Each of the four (4) wells were evaluated to determine if the observed results represented a statistical outlier relative to other data points for the same well.

Wells MW-3 and MW-16 were both evaluated utilizing Rosner's Outlier Test and a 1% significance level (99% certainty). The evaluation concluded that the suspect values for both wells are statistical outliers; therefore, the corresponding values have been removed from the corresponding data set for each well.

Wells MW-9 and PMW-18 were evaluated utilizing Dixon's Outlier Test on a 1% significance level. The evaluation concluded that the suspect value for PMW-18 is an outlier at a 1% level of significance. The evaluation concluded that the suspect data for Well MW-9 are outliers at a 5% level of significance, but are not considered outliers at a 1% level of significance. Copies of the analysis are provided in Appendix O.

Based on the statistical evaluation the following data use decisions have been made for presentation of groundwater surfaces:

- Well MW-3: The April 21, 2014 unconfined groundwater elevation has been disregarded from evaluation of the Highest Observed/Predicted groundwater surfaces, and the next highest value (70.12 ft. amsl (May 28, 2014)) was utilized.

- Well MW-9: The groundwater elevations collected in MW-9 since November 2018 are not defined by the statistical analysis as an outlier at a 99% level of certainty when compared to data collected between August 2002 and November 2003.

Despite the results of the statistical analysis, qualitatively the data suggests that MW-9 may have become compromised and the most current readings suspect, however; until additional evaluation can be performed to document it has been compromised the associated water level reading are retained as part of the data set. At the direction of MDE, we have utilized the highest observed groundwater reading from February 15, 2019 (99.21 ft. amsl) for development of the Highest Observed/Predicted Unconfined WBZ groundwater surface. The water level reading from September 26, 2002 (67.63 ft. amsl) and June 27, 2019 (74.49 ft. amsl) have or not been utilized for the depressed and elevated groundwater conditions, respectively, based on the professional judgement of the Professional Geologist.

- Well MW-16: The groundwater level reported for Well MW-16 on May 28, 2013 (116.75 ft. amsl) has been discarded and replaced with the next highest measurements of 104.51 ft. amsl obtained on June 27, 2019.

- Well PMW-18: The suspected outlier for Well PMW-18 has been discarded from the depressed groundwater mapping and replaced with the next lowest groundwater elevation (58.83 ft. amsl (November 29, 2018).

4.4 GROUNDWATER QUALITY SAMPLING AND TESTING

4.4.1 2013-2014 Groundwater Sampling

Four rounds of groundwater quality sampling and testing were conducted during 2013 and 2014 by Golder Associates (Golder). That sampling effort utilized a combination of sampling techniques based on the yield of the wells. These consisted of bailer, “low yield” (i.e. volume purging) and low flow sampling techniques. The analytical results are summarized in Tables 8A – 8D. Field parameters for the first, second and fourth sampling events, are provided on Tables 8E-1 through 8E-3. Field data from the third sampling event, performed during September and October 2013, could not be located by Golder for inclusion in this Report.

A review of the 2013-2014 laboratory analytical results for inorganic compounds (i.e. metals) suggests elevated concentrations of arsenic, cadmium, chromium and lead. However, a closer comparison of those results with field turbidity readings identifies a correlation between elevated inorganic results and turbidity, and that the elevated turbidity is most pronounced in those samples collected utilizing bailers and the low yield techniques (See Table 8F).

Based on concerns about data quality and the fact that the 2013-2014 data was now over six (6) years old it was determined by the MDE that the 2013-2014 data may not be acceptable for development of water quality standards for the project. Therefore, MDE requested that NWM complete four (4) additional rounds of groundwater sampling. Data associated with the 2013-2014 groundwater sampling is provided in the report for information purposes, but will not be utilized for development of water quality standard, unless specifically approved by the MDE.

4.4.2 2020 Groundwater Sampling

Four (4) rounds of groundwater sampling are being conducted in 2020. All 2020 sampling is being performed utilizing low flow sampling techniques to minimize the potential for elevated turbidity experienced during the 2013-2014 sampling. In addition, when higher than desired turbidity

readings (>100 ntu during the first event and >50 ntu during subsequent events) are identified during sampling a filtered sample for inorganics analysis is also being collected to help identify the fraction of the total results that can be attributed to turbidity.

The evaluation of groundwater quality, presented in Section 6.0 was prepared utilizing results from the two completed 2020 events (January and March) and will be revised utilizing the results of the third and fourth events as soon as they are completed and the results validated.

4.5 FIELD SLUG TESTING

In April and May 2003, fifteen (15) monitoring wells were installed in order to address MDE concerns that were largely related to soil stability issues and potential impacts on the Unconfined WBZ in the southern portion of the site. Fourteen (14) pumping tests and three (3) slug tests were conducted in order to define the hydraulic conductivity of the subsurface materials. Results are provided in Appendices G and H, respectively. Soil samples were collected for geotechnical analysis.

5.0 SITE GEOLOGY AND HYDROGEOLOGY

5.1 INTRODUCTION

As described above, the site has been subject to multiple subsurface investigations for the purpose of defining the site-specific geologic and hydrogeologic conditions. Those investigations have confirmed that unconsolidated deposits associated with the cretaceous Potomac Group are the predominant geologic and hydrogeologic units beneath the site. However, quaternary deposits and remnants of the Magothy Formation represent a significant portion of the surficial geology. Plate 8 presents a graphical profile of the geologic units identified at the site.

Hydrologically, we have identified two primary water bearing zones on the site. These are referred to as the unconfined water bearing zone (Unconfined WBZ), and the confined water bearing zone (Confined WBZ). The Confined WBZ represents the deeper Lower Patapsco Aquifer which exhibits a vertically upward hydraulic gradient across the entire site. The MCU separates the Upper and Lower Patapsco Aquifers (UPA and LPA, respectively). The Unconfined WBZ is the shallower of the two zones, and represents the remnants of the UPA and saturated quaternary terrace and alluvial deposits.

The Unconfined WBZ exists as a perched zone over the MCU in the western portions of the site where the surface of the MCU is present at or above elevation 70+/- ft amsl (see Figure 18). The Unconfined WBZ becomes part of the regional surficial water table when the MCU is below elevation 70 +/- ft amsl. Hard boundaries for the perched portion of the Unconfined WBZ exist at outcrops of the contact between the UPA and MCU along the railroad right-of-way, located along the west boundary of the site, and at the area of exposed MCU at the ground surface towards the north. To the east, the contact between the bottom of the UPA and the top of the MCU dip below elevation 70 and becomes part of the regional surficial water table found in the quaternary alluvial deposits in the floor of the Little Patuxent River valley.

For discussion purposes, it is beneficial to consider the site as two separate areas. These areas are designated as Areas A and B. Area A represents those portions of the site connected to the regional surface water table. Area B represents those portions of the site where the Unconfined WBZ is perched atop the MCU and vertically separated from the Confined WBZ. Additionally, within Area A, the potentiometric surface of the Confined WBZ protrudes into the regional surface water table (i.e., discharges vertically into the Quaternary deposits/remnants of the UPA), while the potentiometric surface of the Confined WBZ exists within the MCU in Area B.

A map presenting the site surficial geology, and a line representing the estimated contact between “Area A” and “Area B” is presented on Figure 4A. As shown thereon, surficial geology in Area A is predominantly quaternary terrace and alluvial deposits, while surficial deposits in Area B are cretaceous deposits that include the upper members of the Potomac Group and Magothy Formation.

Cross-sections are presented on Figures 5 through 11. The cross-sections present our interpretation of the subsurface conditions including correlation with the relevant hydrogeologic units and soil lithology. A summary of observations and data obtained from the investigations, and our interpretations are provided in the following sections.

5.2 QUARTERNARY DEPOSITS

Investigation activities identified quaternary terrace and alluvial deposits throughout Area A. Quaternary deposits were not present within Area B. This is consistent with the Geologic Map of Anne Arundel County (Glaser, 1976), that identifies these geologically more recent deposits along the Patuxent and Little Patuxent Rivers. The distinction between terrace deposits and alluvial deposits is made based on elevation/topography, with the older Quaternary-Pleistocene terrace deposits encountered at higher elevations and the Quaternary-Holocene alluvial deposits encountered in and near the lower flood plain areas.

Terrace deposits were encountered at the ground surface in fifteen (15) borings. Terrace deposits overlain by alluvial deposits were identified at PMW-18. The bottom elevation of the terrace deposits ranges between 63.6 ft amsl and 119.2 ft amsl. The bottom surface of the terrace deposits represents the maximum depth of erosion into the Potomac Group, prior to the quaternary deposition. Where encountered, the terrace deposits sit directly on the sand deposits associated with the UPA, except at borings B-3 (MW-10), B-5 (MW-9/MW-14), B-101, B-102, and PMW-18, where the terrace deposits lay directly on the MCU. The terrace deposits exhibit a higher degree of vertical variability relative to the Patapsco Formation. In most locations, the primary matrix material associated with the terrace deposits was described as sand, silt or a varying combination of both, and the deposits commonly exhibit interlayering with clay or gravel ranging from a couple of inches to about a foot. Thicknesses of the terrace deposits ranged from 4 feet (B-7) to 30 feet (B-14).

The quaternary alluvial deposits are typically associated with the floodplain areas, and are outside of the footprint of the proposed landfill. Two borings (B-4 [MW-1/11] and PMW-18) were completed into the alluvial deposits. Alluvial deposits were 13.5 ft. thick at Boring B-4 and 10 ft thick at boring PMW-18, with bottom elevations at 53.6 ft. amsl and 68.5 ft. amsl, respectively. The alluvial deposits at boring B-4 sit directly on the MCU. At PMW-18, the boring was interpreted as having 10 ft of alluvial deposits sitting on top of 10 ft. of terrace deposits, which in turn sits directly on the MCU.

Dry or moist conditions were noted in the quaternary deposits on the boring logs for borings B-12, 13, and 15, and PMW-6 and 28. At each of these locations, the quaternary deposits are underlain by sandy soils classified as being part of the UPA. The remaining borings identified a wet or saturated condition in one or more sample intervals within the quaternary deposits or at the base of the quaternary deposits.

Well MW-1 is the only well fully screened within the alluvial deposits (7.5 ft. to 13 ft. bgs). Well MW-1 is paired with MW-11 which is screened in the transition zone beneath a 12.5 ft. thick interval of the MCU. As presented on Table 4, the potentiometric surface measured in Well MW-1 is consistently in the interval between elevation 64.15 ft. amsl and 72.56 ft. amsl. The potentiometric surface for MW-11 is consistently lower than those measured in MW-1, between elevations between 62.97 ft and 67.89 ft amsl. The smallest and largest differential between the MW-1 and MW-11 was 0.46 ft (July 11, 1990) and 6.68 ft (December 23, 2002), respectively.

The terrace deposits at boring MW-30 are 11 ft deep and described as very fine-medium sand with no mention of silt or clay. Well MW-30 is screened within the UPA and interconnected with the terrace deposits (11 ft. to 21 ft bgs). The screened interval is a 10 ft thick layer of sand at the top of the UPA described as wet coarse sand with zero to little clay. The screened interval lies above a plastic silt. During installation of MW-30 a wet interval was logged at the base of the terrace

deposits (elevation 104 ft. amsl). The water levels measured in MW-30 since the time of installation have ranged between 100.54 ft. amsl (December 6, 2013) and 107.66 ft. amsl (June 23, 2003). When compared to nearby MW-25 (approx. 220 ft. southeast of MW-30) which is screened at 37 ft. to 47 ft. bgs (elevation 67 to 77 ft. amsl), beneath the plastic silts observed at both locations and immediately above the MCU, the depths to water in MW-30 are on the order of 25 ft. higher in elevation. The marked difference in groundwater levels is the result of Well MW-30 being screened above the lower permeability plastic silt layer while Well MW-25 is screened in a sand layer beneath the plastic silt layer.

5.3 MAGOTHY FORMATION

The Magothy formation is the uppermost cretaceous unit encountered during the field investigations. Remnants of the Magothy were encountered from the ground surface to depths ranging between 5 and 33 ft. bgs in the western most portions of the site. The materials identified as belonging to the Magothy were typically loose to medium dense (SPT=5-30 bpf) sand and silty sand. The Ground surface elevations at the borings where the Magothy was observed ranged from elevation 149.3 ft. to 180 ft. amsl. Thicknesses ranged from 5 ft (B-23 and PMW-12) to 33 ft. (B-21). The bottom elevation of the Magothy ranged between elevation 137.7 ft amsl (MW-21) and 173 ft. amsl (B-26).

The material classified as belonging to the Magothy was typically described as moist on the boring logs, but was noted to be wet in borings B-21, 22, 27, 28, and 107, and MW-21. In those locations where wet conditions were encountered they were immediately underlain by lower permeability zones, creating a localized perched zone. Because of its limited aerial extent in the vicinity of the site and topographic relief, the Magothy does not represent a groundwater source in this area of the county. Based on the lowest interpreted bottom elevation of 137.7, none of the private wells located within ½ mile of the site are screened in the remnants of the Magothy Formation.

5.4 PATAPSCO FORMATION

As described in Section 3, the Patapsco Formation represents the uppermost unit within the Potomac Group and consists from top to bottom of 4 subunits. These subunits are the Upper Confining Layer (UCL), Upper Patapsco Aquifer (UPA), Middle Confining Unit (MCU), and Lower Patapsco Aquifer (LPA). Information regarding the occurrence, hydrogeologic characteristics and geotechnical properties of each subunit at the site are provided below.

5.4.1 Upper Confining Layer (UCL)

Administrative Report 09-02-04 (A. Staley, et. al., 2009) states that a confining layer is present between the bottom of the Magothy Formation and the top of the Upper Patapsco Aquifer. We have designated this confining layer as the “Upper Confining Layer” (UCL), although the UPA was not identified to be under confined conditions at the site. The same reference presents the top of the UCL in the vicinity of the site as being at or around elevation 160 ft. amsl.

A layer of predominantly clay material, and interpreted as representing the UCL, was logged at thicknesses between 10 and 52 feet in all the borings where the Magothy Formation was identified except at boring location B-28 (MW-15). The UCL was identified at the ground surface at borings B-24, MW-19, and PMW-23. The top of the UCL, where it was not exposed at the ground surface and subject to erosion was encountered at elevations between 138 and 172 ft amsl. The bottom of

the UCL was consistently between elevations 118 and 133 ft. amsl, except at boring B-21 where the bottom of the UCL was delineated to be elevation 95 ft amsl.

The UCL was typically described as a stiff to very stiff (SPT N=9-30 bpf) gray clay with maroon, red or pink mottling/variegations. The clay contains varying amounts of very fine sand and, in several borings, was interlayered with layers described as predominantly silt and/or clay. In boring B-27, a transition between layers of sand and silt, and clay and silt were observed. As a result of the limited lateral extent and because the UPA is exposed at the ground surface over the majority of the site, the UCL does not represent a confining unit for the UPA at the site.

5.4.2 Upper Patapsco Aquifer (UPA)

5.4.2.1 Occurrence

Site investigation activities have identified intervals of sand in the upper most zone of the Potomac Group corresponding stratigraphically with the UPA. The interval was present over the majority of the site but occurs at various elevations and thicknesses. The surface of the UPA was identified in some portions of the Site to be in direct-contact with the overlying UCL; in some areas to be exposed at the ground surface; in other areas to form a non-conforming contact with quaternary deposits; and in some areas the UPA was totally absent. The boring logs typically describe the UPA as a poorly graded sand, sometimes with pockets or lenses of silt and clayey silt.

- Conforming Contact w/ Upper Confining Layer: The sands designated as comprising the UPA and logged as having a conforming interface with the UCL, and sitting on the MCU, provide the total thickness of the UPA. The total thickness of the UPA was identified in 16 borings (B-1, 11, 21-24, 26-28, and 107, MW-19-21, and PMW-12, 13 and 23). Those borings were located in the portion of the site designated as Area B, except boring B-11. In the borings located in Area B, the top of the UPA was encountered between elevations 95 and 139 ft. amsl, and the bottom was delineated between elevations 65 and 102 ft amsl. Total thickness of the UPA in Area B ranged from 5 ft (B-21) to 61 ft (B-20), with an average thickness of 31.5 feet. The observed top elevations are consistent with published information discussed in Section 3, except at boring B-21 where the UCL appears incised approximately 30 feet into the UPA relative to nearby borings. The average thickness was less than half of the anticipated thickness, and the interface with the MCU was 30 to 70 feet higher than expected. Cross-sections (presented on Figures 5 through 11) provide views of the UPA.

  The only other boring where the UPA was identified as having a conforming contact with an overlying unit was at boring B-11. Boring B-11 is located along the western portion of the site in the area designated as Area A, and is the closest Area A boring to the Area B borings where the total thickness of the UPC was present. The top of the UPA in boring B-11 was elevation 132.9 ft. amsl and the bottom was elevation 44.4 ft. amsl, for a total thickness of 88.5 feet. The top of the UPA at boring B-11 is consistent with elevations observed in the south end of Area B; however, the overall thickness at boring B-11 is 50 feet thicker and more consistent with the anticipated thickness.

- Exposed Upper Patapsco Outcrops: Remnants of the UPA are exposed at the ground surface as presented on Figure 4A. The limits shown on Figure 4A are delineated utilizing the results of test borings and monitoring wells at 20 locations, and results of a field reconnaissance in 2019. The UPA outcrop area is situated entirely within the portion of the Site referred to as Area B. The UPA outcrop surface areas are highly disturbed and consistent with the quarry operations reported to have occurred at the Site. The remaining thickness of UPA materials in the outcrop area varies from 5 to 38 feet, with an average thickness of 21 feet. Bottom elevations range from 88 ft. amsl to 118.5 ft. amsl, with an average elevation of 103.4 ft. amsl. Contours representing the interface between the bottom of the UPA and top of the MCU is provided on Figure 18. As shown on Figure 18, the bottom of the UPA in the outcrop area slopes from northwest to southeast. Cross-sections A-A', B-B', D-D', D1-D1', and G-G' include portions of the UPA outcrop area.

- Non-Conforming Contact with Quaternary Deposits: The top of the UPA has a non-conforming contact with quaternary terrace and alluvial deposits in borings B-7/MW-12, B12/MW-4, B-13/MW-3, B-14/MW-5, B-15/MW-6, B-18, MW-25, MW-30/31, PMW-6, and PMW-28. The elevation of the non-conforming interface between the top of the sand and overlying Quaternary deposits varies between 119.2 ft amsl (PMW-28) and 74 ft amsl (B-12/MW-4). The significant relief is a result of erosion associated with the Little Patuxent River. The thickness of the UPA remaining varied between 5 ft (MW-25) and 60 ft (PMW-28).

- Upper Patapsco Aquifer Absent: The northeastern boundary of the UPA truncates as it outcrops above the existing ground surface and where it has been eroded by the geologic predecessors of Little Patuxent Creek that has incised the upper portions of the Potomac Formation into MCU. Permeable materials coinciding with the elevations of the UPA sands (i.e., bottom elevations above 65 ft amsl) were absent in borings B-3, 4, 5, 101 and 102, MW-28 and 29, and PMW-18 and 19. These nine (9) borings are located in the northern portion of the Site.

5.4.2.2 Hydrogeologic Significance and Properties

Groundwater within the UPA occurs in an unconfined condition on the surface of the MCU (Unconfined WBZ). Water level elevation records for the Unconfined WBZ monitoring wells (denoted as UC and UC/SC) are shown in Table 4. Groundwater contour maps for the Unconfined WBZ are presented for the Highest Observed/Predicted, Elevated, and Depressed conditions on Figures 12, 13, and 14, respectively. The Unconfined WBZ groundwater flow direction follows the surface of the MCU and is consistent in all three mapped conditions. Specifically, flow occurs in a southeasterly direction in Area B and then bends towards the east-northeast when it reaches Area A. In the transition from Area B to Area A, the hydraulic gradient increases to >0.02 ft/ft, which coincides with a sharp drop in the top of MCU surface. At the base of the sharp drop in the top of the MCU, the gradients decrease to <0.01 ft/ft.

The surface of the Unconfined WBZ is on the order of 15 to 40 ft above the surface of the MCU within Area A, and 5 to 15 ft in Area B. Area A has a vertically and laterally significant Unconfined WBZ that occurs in permeable materials associated with the UPA and Quaternary deposits. The Unconfined WBZ within Area A is sustained by lateral flow from Area B, infiltration within the low

lying areas and floodplain for the Little Patuxent River, and vertically upward flow from the Confined WBZ.

The thinnest intervals of the Unconfined WBZ occur at the upgradient edge of Area B, along the common property boundary with the railroad right-of-way (ROW) containing the Amtrak railroad tracks (borings MW-17, 18 and 19). A comparison of existing topographic conditions in the railroad ROW shows that the top of the MCU is at or just a few feet below the elevation of the railroad tracks. The Unconfined WBZ, outcrops in the face of the railroad embankment, eliminating all or most of the interconnection with areas on the opposite side of the railroad ROW, meaning that recharge of the Unconfined WBZ in Area B is dependent on on-site surface water infiltration. The proposed landfill footprint will cut off the majority of infiltration sustaining the Unconfined WBZ in Area B. Recharge of the Unconfined WBZ will continue outside the waste disposal area.

The elevation of the landfill liner must be maintained a minimum of three feet above the highest observed/predicted water table elevations shown on Figure 12.

Site investigation activities in 2003 included pumping tests on Wells MW-3, MW-4 and MW-5 (see Appendix G for pumping test data). Analyses of the test data were performed by comparing recovery water level measurements to Cooper-Jacob type curves in the AQTESOLV 3.5 software package (Hydrosolve, 2003). Data plots and type curve matches are provided in Appendix G. Transmissivity values of 1,420, 1,415 and 1,110 ft^2/day were calculated from the analyses.

Based on the water table contour maps, the average hydraulic gradient (*i*) across Area A averages of 0.009 ft./ft. The rate of groundwater flow can be calculated from Darcy's Law as given in the following equation:

$$V = [(T)(i)]/[(b)(n)]$$

Where: V = average linear velocity
T = transmissivity = 1,300 ft^2/day (average from MWs-3, 4, 5 pumping tests)
i= hydraulic gradient = 0.009 ft./ft.
b = aquifer thickness = 25 feet (maximum)
n = effective porosity= 0.3 (typical value for fine-medium sand)

Using these input variables the average linear velocity of groundwater in the water-bearing zone in Area A is approximately 15.6 ft/day. This is equivalent to approximately one mile per year.

5.4.2.3 Potential Receptors of the Unconfined WBZ

Results of the residential/potable well survey, summarized on Table 2, identified four wells along Conway Road (residential wells 40, 43, 46 and 48) screened in the Unconfined WBZ. These would be considered cross-gradient or down-gradient based on the groundwater contours for the Unconfined WBZ. None of the wells on Collins Avenue or Lucinda Lane are shown to be screened in the Unconfined WBZ. One well along 5th Ave (residential well 23) and two (2) wells along Patuxent Road at the north end of the Site (residential wells 13 and 14) are screened in the Unconfined WBZ, but are up-gradient or cross-gradient from the proposed landfill footprint. Only one residential well in the Unconfined WBZ is located downgradient of Area A. This well (residential well 27 on Table 2) is an unpermitted dug well. It is located approximately 1,000 feet downgradient of the proposed landfill footprint (also see Section 7.0).

5.4.3 Middle Confining Unit (MCU)/Transition Zone (TZ)

5.4.3.1 Occurrence

The MCU consists of an interval of very low permeability clay ($K<<1x10^{-7}$ cm/sec) that underlies the UPA over most of the site. Based on the site investigations, the surface of the MCU ranges from 115 ft. amsl at the north end of Area B to 35ft. amsl at the southeast end of Area A (see Figure 18). The MCU is uniform in consistency throughout most of the upper interval beneath the UPA, but transitions with depth to include zones containing increased amounts of silt and sand. We have designated the lower portion of the MCU as the Transition Zone (TZ).

The surface of the MCU is presented on Figure 18 and isopach contours representing the thicknesses of the MCU are presented Figure 19. As shown on Figure 19, thicknesses of the MCU in Area B are typically on the order of 40 to 100 feet thick. Thickness of the MCU in Area A is typically in the range of 5 to 10 feet thick. In Area A the Transition Zone contained significantly greater amounts of silt and sand relative to Area B which can be described as predominantly silty Clay and clayey Silt.

5.4.3.2 Hydrogeologic Significance and Properties

Permeability values for the MCU have been derived from three sources, a literature review, lab testing, and in-situ slug testing. The permeabilities derived fall in the same range:

- 3.5×10^{-9} cm/sec (derived from the literature)
- 4.2×10^{-9} cm/sec (derived from laboratory testing of site samples)
- 5.9×10^{-9} cm/sec (derived from in-situ slug tests)

The sources for these three permeability values are described below.

A. Literature Review

According to Mack and Achmad (1986), the vertical permeability of the confining bed between the Upper and Lower Patapsco Aquifers is 3.5×10^{-9} cm/sec.

B. Lab Testing

Shelby tubes are typically used to collect undisturbed clay samples for permeability testing; however, the hard nature of the clay under Area B made it impossible to advance Shelby tubes into the clay. In order to conduct laboratory permeability tests, a hand-carved sample of clay was collected from the area where the MCU is exposed at the ground surface (Figure 4).

The hand-carved sample of the clay was collected by Hardin-Kight geotechnical engineers at the location of well MW-28 at a depth of two feet (see Figure 4). Lab tests classified the soil sample to be a CH clay, as defined by the Unified Soil Classification System (USCS) (see Appendix G). Based upon the grain size analysis of the sample, the material contains more than 95% fines passing the #200 screen with 60% of the material smaller than 0.002 mm. With 60% clay and 35% silt, the soils is defined as a Clay per the United States Department of Agriculture (USDA)

textural classification. Samples taken during the SFI from the deep borings confirm the CL, CH, and CL-ML soil classification of the Patapsco clay collected from the Patapsco formation. The results of the geotechnical laboratory testing associated with samples obtained during the SFI are also provided in Appendix G.

The blow counts for the Soil Penetration Test (SPT) boring for well MW-28 showed the clay at 2-feet to have an N-value of 30 to 40 blows per foot indicating a hard condition. The SPT-values were recorded for the deep borings advanced during the SFI, as well. The N-values ranged from 30 to 67 in the SFI deep borings.

A falling-head rising-tail permeability test was conducted on the sample collected from MW-28, according to American Society for Testing and Materials (ASTM) Method D-5084 protocols. This method is designed to measure the hydraulic conductivity of saturated porous material using a flexible wall permeameter. The permeameter test showed the clay sample to have a saturated hydraulic conductivity of 4.2×10^{-9} cm/sec (see final page of Appendix G).

C. In-Situ Slug Tests

Well MW-23 was installed in the approximate center of Area B and screened in the MCU. The top of the sand filter pack for the 10-foot screen was set 25-feet below the top of the MCU(see Appendix E for well log). Samples of the silty clay in the screened zone were analyzed by the Hardin-Kight geotechnical lab and determined to be Unified Soil Classification CL (a silt-clay mixture) by ASTM –D422- (see Appendix G for soil analysis).

Two similar wells (MW-26 and MW-31) were installed within Area B. The log for Well MW-26 indicates that the well was set in silty clay while the log for Well MW-31 indicates a silt-clay mixture.

Every effort was made to achieve direct contact between the well screen and the clay. The clay wells were drilled and flushed with clean water to eliminate borehole effects and immediately purged after installation to prevent fines from settling out in the screen zone.

Slug tests on the wells were begun on April 28, 2003, and the wells had still not fully recovered at the time of the water level measurement on November 8, 2003. The water level data and slug test analysis input data are provided in Table 6. Analysis of the slug test data was performed with the AQTESOLV 3.5 software package (Hydrosolve, 2003) using the Hvdrosolve (1951) solution (see Appendix I). Hydraulic conductivities derived from analyses of the slug test data were as follows:

- MW-23: 5.9×10^{-9} cm/sec
- MW-26: 5.6×10^{-9} cm/sec
- MW-31: 9.1×10^{-9} cm/sec

In summary, several sources of information indicate that the hydraulic conductivity of the MCU under Area B is less than 1.0×10^{-8} cm/sec.

5.4.3.3 Rate of Migration

The rate of migration and time of travel for groundwater through the clay can be estimated from Darcy's Law according to the following equation:

$$V = [(K)\ (I)]/(n)]$$

Where: V = average linear velocity
K = hydraulic conductivity = 2.8×10^{-5} ft/day (1×10^{-8} cm/sec)
I = hydraulic gradient = 0.3 = 40 feet difference in maximum groundwater surface above and below the clay divided by 140-foot clay thickness
n = effective porosity= 0.5 (typical value for clay)

Using these conservative input variables the average linear velocity through the MCU is on the order of 1.7×10^{-5} ft/day, or 0.006 ft/year. This translates into a time of travel of many hundreds of years for groundwater to migrate through the MCU.

5.4.4 Lower Patapsco Aquifer (LPA)

5.4.4.1 Occurrence

The total depth of the MCU/TZ was fully penetrated in only one boring (B-4) prior to the SFI completed in 2013/14. To determine the site-specific depths of the MCU and Transition Zone, four deep borings were advanced and permanent groundwater monitoring wells were installed during the SFI in 2013/14. Wells were subsequently installed in these borings (PMW-11, 12, 13, and 23), and are slated to be part of the permanent perimeter monitoring wells during the operation and post-closure periods of the landfill. From these borings, the bottom of the MCU in Area B ranges from +4 ft. amsl (PMW-23) to -96.5 ft. amsl (PMW-13).

Driller's logs for the residential wells along the south side of the property indicate that the MCU extends to -60 ft. amsl along the southern edge of the site (see Plate 7 for well locations and Table 7 for Water Level readings in well AA94-3264 in 2003). The driller's logs for residential wells east of Area B (along Collins Avenue) show the presence of predominantly clayey units (i.e. the MCU) to -20 ft. msl (see regional cross-section BB-BB' in Appendix D).

5.4.4.2 Hydrogeologic Significance and Properties

Prior to 2013, water level measurements were made in a residential well adjacent to Area B (well AA943264) to determine the potentiometric surface in the Lower Patapsco Aquifer at the site. This residential well is located approximately 100-feet east of the landfill property line and is assigned map location #68 on Plate 7 and Table 2, and is shown on residential well cross-section AA-AA' in Appendix D. As shown on Table 7, the well is screened below the clay confining bed in the elevation interval from -68 to -73 ft. amsl. A series of water level measurements were made in well AA94-3264 from September through November 2003 (see Table 7). The highest elevation recorded was 61.32 ft. amsl. Historic high water levels and water levels in the period of record for well AA943264 (Sep-Nov 2003) are provided in Table 7.

During the SFI conducted in 2013/2014, four deep wells were installed into the Lower Patapsco Aquifer. Twelve consecutive monthly water level readings were taken in these four wells from May 2013 through June 2014 and additional water level readings were taken between November 2018 and June 2019. The water level readings are in Table 4, with the readings plotted against time in Table 5B. The maximum and minimum groundwater elevations in these wells are 69.84 ft. and 50.30 ft. amsl, respectively. The line delineating Area A/B represents the point where the potentiometric surface of the Confined WBZ extends above the surface of the MCU. The highest observed/predicted groundwater surface for the Confined WBZ is shown on Figure 15. Generally, the water in the Confined WBZ flows from elevation 70 ft. amsl in the northeast to elevation 55 ft amsl in southwest, at an average hydraulic gradient of 0.0039 ft/ft. The vertical separation between the potentiometric surface of the Confined WBZ and top of the MCU ranges from 0 feet along Area A/B line to 40 feet.

5.5 GROUNDWATER CONSIDERATIONS DURING CONSTRUCTION

The proposed landfill configuration is presented on Figure 3. As shown, the design footprint consists of the development of disposal areas in the portion of the Site designated as Area A and development of disposal areas in the portion designated as Area B. Design details will be developed and presented in the Phase III Application, however groundwater conditions identified during development of the Phase II will dictate a number of design restrictions. Those considerations are as follows:

5.5.1 Groundwater Separation

COMAR Section 26.04.07.16.C (6)(a), requires that the separation between the highest observed/predicted groundwater surface and the bottom of waste be equal to or greater than 3 feet.

The maximum observed/predicted groundwater surface is the surface of the Unconfined WBZ. As shown on Figure 12, maximum observed/predicted groundwater surface within the footprint of the proposed disposal cells range between elevations 69 ft. to 80 ft. amsl in Area A and between 78 ft. and 117 ft. amsl in Area B. The lowest bottom of sump elevations within the cells in Area A will range from 72 ft. amsl to elevation 80 ft amsl. The lowest bottom of sump elevations within the cells in Area B will range from 82 ft. amsl to 120 ft amsl. An isopach map presenting the thickness of the unsaturated soil interval between the bottom of the cell and highest observed/predicted groundwater surface is presented on Figure 20.

5.5.2 Groundwater Management - During Construction

The excavations required to construct the proposed landfill cells will extend from the ground surface to no closer than 3 feet above the top of the Unconfined WBZ. Therefore, active dewatering of the Unconfined WBZ is not anticipated during landfill cell construction.

5.5.3 Impact of Perched Water Control Measures on Residential Wells and Wetlands

There are thirty residential wells located south and east of the Chesapeake Terrace site (along Conway and Collins Roads), downgradient of the site for the groundwater flow in the Unconfined WBZ (see Plate 7). The vast majority of these wells (and all of the recently installed wells) are screened in the Lower Patapsco Aquifer (below the MCU) rather than in the Unconfined WBZ above

the MCU. Only two wells, installed prior to 1984 at 2944 and 2987 Conway Road, are screened in the perched aquifer. This indicates that the perched aquifer is a marginal water supply.

Construction of the proposed landfill in Area B will reduce the area of infiltration available to recharge the Unconfined WBZ, which in turn will reduce the amount of water available to sustain the two water supply wells 2944 and 2987 Conway Road. The applicant is on the record as being willing to bear the cost of replacing the wells at 2944 and 2987 Conway Road, if future recharge is not capable of sustaining their continued use. Replacement wells would be screened below the MCU in the Lower Patapsco Aquifer.

In addition to the commitment to replace the adjacent private water supply wells screened within perched zone, monitoring wells have been installed along the southern side of Area B (Wells MW-15 and MW-16 on Figure 4). The purpose of these wells is to establish baseline water levels prior to the start of landfill construction in order to quantify the impact of site activities on the perched water table. These wells, and others wells to be installed as part of the long-term groundwater monitoring program (to be identified as part of the Phase III Permit Application), will be part of the perimeter groundwater monitoring network associated with this site, from which water level readings and water quality samples will be obtained.

Construction of the landfill will result in the modification of surface water drainage patterns through cutting and filling. The proposed grading activities will include filling within 1.71 acres of disturbed, isolated wetlands that are not subject to jurisdiction under the Clean Water Act, and filling of 3.66 acres that are subject to jurisdiction under the Clean Water Act. The applicant has secured a permit from the Army Corps of Engineers (Permit No. CENAB-1991-01204-M18) for the proposed wetlands filling/disturbance. The applicant has also secured a MDE Water Quality Certification (91-WQ-0516).

6.0 GROUNDWATER QUALITY

6.1 GENERAL INFORMATION

COMAR 26.04.07.15 requires that the Phase II Application for Rubble Landfills include a discussion of the chemical quality of groundwater in aquifers beneath the site for the following chemical parameters:

pH	Alkalinity	Hardness
Chloride	Specific Conductance	Nitrate
Chemical Oxygen Demand	Arsenic	Barium
Cadmium	Chromium	Zinc
Lead	Mercury	Volatile Priority Pollutants

Subsurface investigation activities have identified two aquifers beneath the Site. They are the Unconfined WBZ that represents the remnants of the Upper Patapsco Aquifer and saturated Quaternary deposits, and the Confined WBZ representing the Lower Patapsco Aquifer and the Transition Zone below the MCU. Eighteen (18) wells screened in the Unconfined WBZ, and nine (9) wells in the Confined WBZ are accessible for the 2020 groundwater sampling.

The groundwater quality for both water bearing zones are discussed below. The data utilized to develop these discussions are from the first two (2) of four (4) groundwater sampling events requested by MDE in December 2019. Sampling for the third event was completed during May 2020 and we are awaiting those results to perform the required validation and evaluation. The fourth event is scheduled for the last week of June and first week of July 2020. The discussions presented below will be modified, as appropriate, based on the results of the remaining sampling events, and provided as an Addendum to this Phase II Application.

As discussed in Section 4.4, groundwater sampling data collected by Golder in 2013 and 2014 is being excluded from the development of groundwater quality criteria because of turbidity concerns associated with that sampling.

6.2 SAMPLING PROCEDURES

All the 2020 groundwater samples were collected using “low-flow sampling techniques”, as outlined by the United States Environmental Protection Agency (USEPA) recommended procedures (i.e., Low Flow (Minimal Drawdown) Groundwater Sampling Procedures, EPA/540/S-95/504, April 1996, and Use of Low-Flow Methods for Groundwater Purging and Sampling: An Overview, US EPA Region 9, Quick Reference Advisory, December 1995).

6.2.1 Well Purging

Groundwater sampling performed by Montrose AGC in 2020, was completed following low-flow sampling techniques at purge rates between 75 ml/min and 240 ml/min. All wells had a starting water column >5 ft. In all locations purging and sampling was performed utilizing a submersible pump and dedicated tubing, except at MW-10, where a deflection in the well casing prevented use of the submersible pump. For MW-10, a peristaltic pump with dedicated tubing was utilized. Both techniques utilized either a Horiba flow through cell with specific conductance, dissolved oxygen, temperature, ORP, turbidity and pH meters or a YSI ProPlus flow-through cell with specific

conductance, dissolved oxygen, temperature, ORP and pH meters and a LaMotte 2020T turbidity meter. Purge sheets containing the field parameters measured during the 2020 groundwater sampling events are provided in Tables 10C-1 and 10-C-2.

6.2.2 Field Parameters

During low-flow purging, the field parameters were monitored in-line with a flow-through cell. Measurements were collected approximately every three (3) to five (5) minutes until the parameters stabilized based on three consecutive readings within the following ranges:

- Temperature: /- 10%
- pH: - 0.1 Standard Units
- Conductivity: +/- 3%
- ORP: - 10 mV
- DO: - 10% (or +/- 0.1 mg/L if less than 1.0 mg/L)
- Turbidity: /- 10%

6.2.3 Sample Collection

Once the wells reached appropriate stabilization criteria, the purge line was detached from the water quality meter and the samples were collected in laboratory supplied containers. VOCs were collected first and the remaining samples were then collected. The following Quality Assurance/ Quality Control QA/QC samples collected during the 2020 groundwater sampling events were:

- Three (3) blind duplicates at a frequency of one (1) per 10 primary samples.
- Three (3) matrix spike/matrix spike duplicates (MS/MSD) were collected at a frequency of one (1) per 10 primary samples.
- One (1) field equipment rinsate blank per day when sampling with the submersible pump.
- One (1) trip blank per day of VOC sample shipment.

The collected samples were preserved on ice in standard sample coolers at approximately four (4) degrees Celsius. During the 2020 groundwater sampling events, samples for nitrate, chloride, sulfate and total dissolved solids were shipped under chain-of-custody procedures via an overnight courier to the laboratory to ensure these analyses occurred before the analytical hold times expired. The remaining samples were kept on ice and shipped via laboratory courier under chain-of-custody procedures.

6.3 SAMPLE ANALYSIS

Samples analysis and the corresponding Method performed during the 2020 sampling was as follows:

- VOCs; 8260B/8260C
- TAL Metals (with Mercury); 6020/6020B (excluding aluminum)
- Chloride/Sulfate; 300.028D – (MOD)
- TDS; 2540C
- Total Alkalinity; 2320B

- Ammonia; SM4500-NH3H/EPA 350.1
- COD; 5220D
- Hardness as Calcium Carbonate; 2340C

All samples were shipped to Test America Analytical Laboratories.

6.4 GROUNDWATER RESULTS

Results for the 2020 Sampling are presented by well and water bearing zone on Table 10A - Unconfined WBZ, Table 10A - Confined WBZ, Table 10B - Unconfined WBZ, and Table 10B - Confined WBZ. The associated Groundwater Quality Feld Parameters are presented on Table 10C-1 through 10C-2.

A summary of results by groundwater zone for the parameters specifically required by COMAR 26.04.07.15 are presented in the table on the following page. The Confined WBZ results include the results of wells screened within the transition zone and the Lower Patapsco Aquifer.

6.4.1 Groundwater Quality - Unconfined WBZ

Metals analysis for the COMAR 26.04.07.15 Parameters identified total concentrations of arsenic, barium, chromium, lead and zinc above their corresponding reporting limits, but all below their corresponding screening level. The total concentrations demonstrate that low flow sampling techniques can successfully be utilized for groundwater sampling, even at very low recharge wells.

Future groundwater sampling should be conducted utilizing low flow sampling techniques with emphasis placed on minimizing to the maximum extent possible the disturbance of solids in the wells.

Sampling for Volatile Organic Compounds (VOCs) detected two (2) compounds in the Unconfined WBZ above their corresponding reporting limits. Those compounds were acetone and chloroform. The highest observed acetone result was 6.4 µg/L. Although there is not a MCL for acetone, for comparison purposes, when compared against the USEPA Regional Screening Level (RSL) for tap water (14,000 µg/L) the observed result was significantly below. The highest observed chloroform result was 1.8 µg/L. The chloroform screening level is 80 µg/L.

6.4.2 Groundwater Quality - Confined WBZ

Metals analysis for the COMAR 26.04.07.15 Parameters detected total concentrations of barium, chromium, lead and zinc above their respective reporting limits, although none was above its corresponding screening levels. Similar to the 2020 Unconfined WBZ groundwater sampling, low flow sampling techniques were successfully utilized in all the Confined WBZ wells.

Sampling for Volatile Organic Compounds (VOCs) detected two (2) compounds in the Confined WBZ above their corresponding reporting limits. The compounds were cis-1,2-DCE and PCE. PCE was detected at 7 µg/L in Well MW-14 in the January/February 2020 sampling event. During the March 2020 sampling event, PCE was detected at 3.6 µg/L in MW-14. The cis-1,2-DCE was detected above the reporting limit in MW-14 during the January/February 2020 sampling event.

Sample Summary Table
2020 Groundwater Sampling

					Unconfined WBZ Wells				Confined WBZ Wells			
Parameter	CAS	MDE MCL Criteria	Screening Criteria Notes	Unit	Total Number of Samples Analyzed	Total Number of Detections Above Reporting Limit	Highest Observed Result	Detections Above Screening Criteria	Total Number of Samples Analyzed	Total Number of Detections	Highest Observed Result	Detections Above Screening Criteria
Volatile Organic Compounds												
Acetone	67-64-1	NS		ug/L	36	2	6.4	NS	18	0	ND	NS
Chloroform	67-66-3	80	TTHM	ug/L	36	4	1.8	0	18	0	ND	0
cis-1,2-Dichloroethene	156-59-2	70	P	ug/L	36	0	ND	0	18	1	1.9	0
Tetrachloroethene	127-18-4	5	P	ug/L	36	0	ND	0	18	2	7	1
Total Metals												
Arsenic	7440-38-2	10	P	ug/L	36	2	8.5	0	18	0	ND	0
Barium	7440-39-3	2000	P	ug/L	36	36	130	0	18	17	43.5	0
Cadmium	7440-43-9	5	P	ug/L	36	0	ND	0	18	0	ND	0
Chromium	7440-47-3	100	P	ug/L	36	7	6.3	0	18	5	9.3	0
Lead	7439-92-1	15	AL	ug/L	36	14	3.5	0	18	7	5.5	0
Mercury	7439-97-6	2	P	ug/L	36	0	ND	0	18	0	ND	0
Zinc	7440-66-6	5000	S	ug/L	36	18	284	0	18	10	411	0
General Chemistry												
Alkalinity, Total	ALK	NS		mg/L	36	15	23.8	NS	18	9	50.3	NS
Chemical Oxygen Demand	COD	NS		mg/L	36	2	26.6	NS	18	3	28.8	NS
Chloride	16887-00-	250	S	mg/L	36	36	6.81	0	18	18	3.41	0
Hardness, Calcium Carbonate	HARDCA	NS		mg/L	36	35	58	NS	18	14	50	NS
Nitrate as N	14797-55-	10	P	mg/L	36	18	1.01	0	18	5	0.39	0

Notes:

P - EPA Primary MCL, S - EPA Secondary MCL, AL - EPA Action Level, RE - No MCL but recommended level by EPA

TTHM - Total Trihalomethanes includes the sum of Bromodichloromethane, Bromoform, Dibromochloromethane and Chloroform

mg/L - milligrams per liter

ug/L - micrograms per liter

ND- - Below Reporting Limit

NS - No Standard

7.0 POTENTIAL FOR MOVEMENT OF POLLUTANTS INTO THE WATERS OF THE STATE

The landfill will have a low-permeability liner with a leachate collection system to allow collection and removal of water which has come in contact with the waste, also known as leachate. Further, the leachate is removed from the cells through a series of in-cell pipes, pumps and conveyance pipes to transfer the leachate from the landfill into on-site leachate storage tanks. This low permeability liner and leachate collection system is required by COMAR regulations (see Section 12.0). This coupled with the system of monitoring wells shown on the cell base concept plan (Figure 3) will provide the hydraulic isolation and pollutant detection monitoring required by the Maryland Department of the Environment for rubble landfills.

The site is underlain by the MCU that has a permeability that is an order of magnitude less than that required for the low-permeability landfill liner. The thickness and depth of the MCU varies between Area A and Area B, with the MCU being on the order of 50 ft lower in Area A than Area B. In addition, the thickness of the MCU decreases from greater than 50 ft in Area B to less than 10 ft in Area A. Downgradient of Area B (south and east of the site), most water supply wells are screened below the MCU which affords them a very high degree of protection against impacts from the proposed waste disposal activities. The few wells screened in the perched zone above MCU will be downgradient of proposed permanent monitoring wells.

Downgradient of Areas A (northeast of the site), there appears to be only one domestic well located directly downgradient, specifically, an unpermitted dug well located over 1,000 feet downgradient. Monitoring wells will be located between this well and the landfill.

Stormwater at the site will be collected in stormwater detention basins. The proposed outfalls from the basins will drain to established waterways. Best Management Practices (BMP) water quality facilities will be provided for all storm water management discharge ponds.

These factors contribute to a high level of confidence that controls installed as part of the landfill construction will prevent pollutants associated with the proposed landfill from entering waters of the state.

8.0 TECHNIQUE FOR PREDICTION OF HIGHEST POTENTIOMETRIC SURFACE ELEVATIONS

COMAR 26.04.07.15(A)(4)(a) requires development of groundwater contour maps presenting the elevated, depressed, and highest observed or predicted groundwater condition for each distinct water bearing formation occurring within 50 feet of the anticipated lowest elevation of the refuse cell floor. The most important of these when designing the landfill bottom elevations, is the highest observed or predicted groundwater condition because it represents the closest the groundwater surface will likely come to the bottom of the landfill.

Initial attempts to predict the highest groundwater surface for the Chesapeake Terrace Rubble Landfill were made by trying to develop a correlation between on-site water levels and United States Geological Survey (USGS) observation wells in the vicinity of the site. That initial attempt identified four USGS wells, all screened within the Lower Patapsco Aquifer. The wells were located on the order of 8 to 13 miles from the Site, as shown on Figure 2.

After a review of the regional geology, it was determined that this technique was not an appropriate method of predicting the highest groundwater potentiometric surface at the Chesapeake Terrace site, for the following reasons:

- The USGS wells were all screened in the Lower Patapsco Aquifer;
- The USGS wells are under confined conditions;
- The USGS wells are too far away from the site;
- The MCU thins to the extent that it does not represent a confining layer in and east of Area A; and,
- The Unconfined WBZ at the site is directly the influence of localized infiltration and hydrologic conditions of the Little Patuxent River.

For the reasons cited above, the attempt to develop a correlation between the USGS wells and the Site wells was dropped. Instead, we are utilizing a composite of the highest observed groundwater level on a well by well basis. The basis for this decision are that we have actual site groundwater reading for the site beginning as early as September 1989, that also includes data collected during periods of higher than average precipitation.

As discussed in Section 4.2, the groundwater level readings were taken during periods of higher than average rainfall in 1989-1990, 2002-2003, 2013-2014, and 2018-2019. In fact, the rainfall during 2018 (for much of the eastern seaboard) was at record-breaking high levels. The table below provides annual rainfall with “normal” rainfall for the monitoring period (for Baltimore, Maryland):

Year	1989	2002/2003	2013/2014	2018
Actual Rainfall *	51.88	39.60/62.66	42.93/52.58	71.82
Normal Rainfall (1981-2010) *	41.88	41.88	41.88	41.88

*Based upon data obtained from NOAA.

Appendix K includes a table from NOAA, showing the monthly rainfall from 1871 through March 2019 for Baltimore, Maryland. The yellow-shaded months are those during which groundwater level readings were taken. The green-shaded values represent the “normal” monthly rainfall values.

Prior to 2018, 2003 was the wettest year on record for rainfall in the Baltimore area. The groundwater water levels in the on-site monitoring wells were relatively consistent over the monitored periods. Having measured the water levels during the wettest two years on record, it is Montrose AGC's' opinion that utilizing a composite of all the highest measured groundwater levels for each well represents a conservatively high potentiometric surface suitable for landfill design.

9.0 GEOTECHNICAL CONSIDERATIONS

9.1 SOIL STABILITY AND DIFFERENTIAL SETTLEMENT

9.1.1 Considerations

The MDE letter of August 5, 2002 asked for an evaluation of the stability of the soils under the proposed landfill area, in particular, the stability of the clay layers that underlie the western portion of the site. The specific MDE comments relating to stability were as follows:

- *There may be the need for specific information on "distinct strata" that underlie the site, in order to verify that the design of the landfill will remain stable after construction.*

- *Parts of the site, Area B in particular, are underlain by fine-grained materials of variable occurrence and consistency. Clays often exhibit greater porosity and plasticity than coarser sediment, and may subsequently be compressed to a greater extent than silt or sands when subjected to dewatering, vibration caused by traffic, and/or long- term increased loading such as would be expected under the proposed landfill area. Please evaluate the extent to which these areas may be subject to differential settlement due to these factors, model the extent to which differential settlement may occur, and include any necessary engineering correction in the final design for the landfill cell. In particular, please insure that the liner and leachate collection system will not be subject to undue deflective stress, suffer damage, or exhibit a decrease in performance due to changes in grade. Methods used to perform the requested analysis and all pertinent data should be included.*

- *The subsurface evaluation should provide sufficient information for a stability analysis to be performed on the proposed design, if one has not already been performed.*

9.1.2 Standard Penetration Testing

The geology of the site has been defined through advancing and logging of sixty-two soil borings, with Soil Penetration Testing (SPTs) to depths as great as 240 feet. Split-spoon samples were collected at 2.5, 5-foot, or 10-foot intervals in these borings. Over 1,000 SPT samples were collected and described by visual/physical examination in accordance with ASTM-D2488.

The split spoon samples were collected in accordance with the Standard Penetration Tests protocols in ASTM Specification DI586-84 (1984). The number of hammer blows required to drive the sampler is shown in the boring logs in Appendices D and E.

The SPT resistance (N) value is the sum of the middle two 6-inch blow counts for a 2-foot split spoon. At depth, in all of the hydrogeologic areas, the N-values ranged between 30 and 70, typically with values greater than 50. In hydrogeologic Area A where subsurface materials consist of sandy deposits these high blow counts indicate densities adequate for heavy loadings.

For saturated fine-gained soils (i.e. clay and silt), the N-blow counts can be used to estimate the relative firmness of the material. The following are approximate qualitative evaluations of fine-grained soil (USDI, 1974):

N	Consistency
2 to 4	Soft
4 to 8	Medium
8 to 15	Firm
15 to 30	Very firm
Above 30	Hard

Hardin-Kight Associates, Inc., a geotechnical engineering firm, was retained to evaluate the stability of the soils under the proposed landfill area (particularly in the areas underlain by clay) and to conduct soil engineering testing.

Prior to performance of laboratory geotechnical testing, Hardin-Kight, Inc. reviewed the Standard Penetration Test (SPT) borings data and the results of prior laboratory tests performed on samples of the clay. Hardin-Kight noted that N-values for the clay ranged from 40 to >100 blows/foot. Based on these data, Hardin-Kight concluded the clayey soils underlying the proposed base of the landfill were extremely dense and the high N-values indicated that settlement would not be an issue. Therefore, the rubble landfill would remain stable after construction. Jack Hardin, P.E. concluded that the character of the clay as indicated by the existing Standard Penetration Test Borings was adequate to *"insure that the liner and leachate collection system will not be subject to undue deflective stress, suffer damage, or exhibit a decrease in performance due to change in grade.*" (See Appendix G)

9.1.3 Consolidation and Unconfined Compressive Strength Testing

Consolidation and unconfined compressive strength tests were performed by Hardin-Kight in order to confirm conclusions based on SPT boring data. In order to conduct laboratory tests, Hardin-Kight collected a hand-carved sample of clay at a location where the top of the clay surface had been exposed by mining.

The hand carved sample was collected at the location of Well MW-28 at a depth of two feet (see Figure 4). The blow counts for the SPT boring for well MW-28 showed the clay at 2-feet to have an N-value of 30 to 40 blows per foot indicating a hard condition. This N-value was actually less than the N-values in borings advanced to the depth of the proposed base of the landfill.

Hardin-Kight conducted one-dimensional consolidation testing on the clay sample in accordance with ASTM D-2435 and unconfined compressive strength testing in accordance with ASTM D- 2166. In addition, Hardin-Kight conducted grain size distribution and index test in accordance with ASTM methodologies (see Appendix G). The test results indicated the soil tested was CH (fat clay) in accordance with the unified Soil Classification System (ASTM D-2487). The one-dimensional consolidation test results indicated that the clay had a pre-consolidation pressure of 5.4 tons per square foot. The initial void ratio and porosity were 0.499 and 0.333, respectively. The unconfined compressive strength was determined to be 10,594 pounds per square foot or 5.3 tons per square foot.

Hardin-Kight stated that the sample tested was a very hard clay. The test results showed that the clay soil would exhibit insignificant settlement when loaded to less than 5.4 tons pre- consolidation pressure. The unconfined compressive strength indicated that the clay soils will support the anticipated loads with a factor of safety of at least two against bearing failure. For a 100 foot thickness of rubble, Hardin-Kight estimated the loads to be roughly 4 tons per square foot.

Hardin-Kight stated in their report (see Appendix G) that the SPT boring data indicated that most of the clays present on site are harder than the clay represented by the lab tests. It was concluded that the test results indicate that the soils will be stable and are "ideal for the proposed use." Based on the SPT boring data it was expected that the materials at the base of the rubble fill would have load bearing characteristics that were superior to the clay tested.

The value of this testing and the potential impact on the geotechnical stability of the future landfill and associated support systems will be described in detail in the Phase III Permit Application.

9.2 IMPACT OF PERCHED GROUNDWATER ON LINER STABILITY

The MDE letter of August 5, 2002 asked for an evaluation of the potential impact of perched groundwater on liner stability. Specifically, MDE was concerned about long term stability as it related to original design plans calling for excavation of the proposed disposal cells in Area B through the Unconfined WBZ and into the MCU. A geotechnical engineering firm was retained to evaluate the MDE concerns and eventually produced recommendations to construct a “clay dam” around the waste disposal area in Area B.

Since that time the design has been modified to eliminate excavation through the Unconfined WBZ, and therefore construction of the clay dam or any other perimeter vertical barrier in Area B is no longer necessary.

10.0 ECOLOGICAL CONSIDERATIONS

In its August 5, 2002 review letter the MDE made reference to comments received from other individuals and agencies related to endangered species that may be present near the site. The MDE stated that,

> *We anticipate that to properly address these issues, the occurrence of the identified species in the area will require further definition, and means to protect any species that exist in areas which may be impacted by the intended activities must be proposed. Please contact DNR concerning these issues, and keep us advised of your activities to address the issues raised*

On August 20, 2002, shortly after receipt of the MDE comment letter, McCarthy & Associates wrote a letter (for the applicant) to the Maryland Department of Natural Resources (DNR) Wildlife and Heritage Division requesting a meeting to discuss the proposed rubble landfill as it relates to endangered species and non-tidal wetlands of special state concern. A copy of the McCarthy & Associates letter is included in Appendix L.

Mr. McCarthy followed up the letter with numerous phone calls to the DNR requesting a meeting. DNR did not respond until October 21, 2003 more than a year after the initial request for a meeting. DNR's response letter is enclosed in Appendix L. The letter concludes that protection measures for rare species habitats should be addressed during the detailed engineering design (Phase 3 Application).

Comments from other individuals/agencies made reference to the Patuxent Ponds Park which is located immediately east of the property boundary along Patuxent Road. The ponds are located several hundred feet northeast of the proposed landfill boundary. According to the conceptual design, stormwater collected from the facility will be directed away from the ponds. BMP water quality facilities will be provided for stormwater management ponds. The proposed outfalls will drain to established waterways which are not identified to be the habitat of species of concern. The drainage area for the Patuxent Ponds is approximately 150 acres in extent. The landfill area will occupy less than 5 acres in this drainage area.

During operation of the landfill, water that formerly entered the perched zone and ultimately discharged to the Little Patuxent River will be collected in a surface water drainage system that will direct the flow to the Little Patuxent River after temporarily detaining the water in stormwater management ponds following storm events. The stormwater management ponds are designed to attenuate peak discharges from the site, spreading the discharge over a longer time-period than allowing direct, uncontrolled discharge.

11.0 GROUNDWATER APPROPRIATION PERMIT

The MDE's letter of August 5, 2002 asked whether landfill operations would require a groundwater appropriation permit. The inquiry was prompted in relation to an original landfill design that proposed excavation of the waste disposal cells through the Unconfined WBZ and into the MCU in Area B. For a variety of reasons the Applicant is no longer proposing to excavate the cells through the Unconfined WBZ, and therefore dewatering of the Unconfined WBZ within Area B is no longer necessary.

Water management during construction will be limited to managing precipitation that falls within open excavation/construction areas to the extent necessary to perform construction, plus any zones of saturated soil soils that may be encountered during excavation. The quantity of water removal required is expected to be minimized to the maximum extent practicable, by creating surface water diversions around active excavations and allowing water falling within the active excavations to infiltrate. The volume of water is expected to remain below the 5,000 gpd annual average rate that would trigger the need for an appropriation permit. If, after the construction sequencing plan is finalized, the average annual quantity is determined to exceed the trigger for a permit then the permit will be prepared and submitted.

12.0 CONCEPTUAL LANDFILL DESIGN

The conceptual landfill design is based on the predicted highest groundwater elevations described in previous sections of this report. In accordance with **COMAR** 26.04.07.16, a liner system has been designed with a barrier to prevent liquid (i.e., leachate) from the landfill getting into the underlying substrate and groundwater. The liner system is anticipated to contain the following components:

- A subgrade preparation layer, with a thickness of 2-feet and a maximum permeability of 1×10^{-7} cm/sec (or equivalent)
- A geosynthetic liner, with a minimum thickness of 50 mils and permeability not more than 1×10^{-10} cm/sec
- A leachate collection layer
- A 2-foot thick protective cover layer to protect the underlying materials from damage by equipment, vectors, or the elements.

The landfill will be separated into twenty (20) cells/subcells. Each cell will be graded at two percent (2%) minimum slope (or another slope indicated by geotechnical evaluation during the Phase III design effort) to a sump where a submersible pump in a leachate riser pipe will be provided. Each sump elevation will be set as required to maintain at least three (3) feet separation from the predicted highest groundwater elevations to the bottom of the subbase.

The preliminary subgrade grading plan is provided on Figure 3, and includes the orientation of the landfill cells and cell sumps. The perimeter access road, stormwater management ponds, leachate force main, and storage areas are shown on Figure 4. Separate designations are provided for permanent groundwater monitoring wells depending upon whether they are screened above and below the clay confining bed.

The leachate collection and removal system includes the following components:

- Leachate collection layer across the floor of the landfill, with a minimum slope of 2%.
- Sump at the low spot in the landfill.
- Sump pumps located in the sump to convey leachate up the leachate riser pipe to a force main co-located with the perimeter road.
- Leachate storage tanks for holding the collected leachate before it is trucked off-site for treatment or treated on-site before discharge.

The Phase III Application will include detailed engineering drawings and supporting calculations for the design of the liner system and leachate collection and removal system.

Sediment control, perimeter ditches, and stormwater management pond design will be per AASCD requirements.

13.0 REFERENCES

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TABLES

TABLE 1
CHESAPEAKE TERRACE
MONITORING WELL CONSTRUCTION SUMMARY

Well	Boring No.	Date Drilled	Current Status	Elevations (ft msl)		Screened Intervals		Interval Monitored
				PVC	Ground	Depth (ft)	Elevation (ft msl)	
MW-1	B-4	7/13/89	DTW	73.03	73.5	7.5 to 13	61 to 66	UC
MW-3	B-13	7/18/89	I	84.89	85.1	45.3 to 55	30 to 40	UC/SC
MW-4	B-12	7/22/89	A	98.71	97.0	36 to 46	51 to 61	UC
MW-5	B-14	7/25/89	A	104.51	104.7	44 to 54	51 to 61	UC
MW-6	B-15	8/10/89	A	99.58	99.7	35.7 to 46	54 to 64	UC/SC
MW-9	B-5	7/14/89	DTW	99.50	99.8	53 to 63	37 to 47	MCU/TZ
MW-10	B-3	8/7/89	A	88.40	89.1	45 to 55	34 to 44	CONF/TZ
MW-11	B-4	7/13/89	I	73.82	74.0	28 to 38	36 to 46	CONF/TZ
MW-12	B-7	8/3/89	I	99.40	99.7	29 to 39	61 to 71	UC
MW-13	B-11	8/3/89	I	149.01	147.9	63 to 73	75 to 85	UC
MW-14	B-5	7/20/89	A	99.64	99.7	71 to 81	19 to 29	CONF/TZ
MW-15	B-28	7/14/89	A	169.07	169.0	73 to 83	86 to 96	UC
MW-16	B-26	4/22/91	A	180.60	180.7	75 to 85	96 to 106	UC
MW-17	-	4/23/91	A	118.24	118.0	3 to 8	110 to 115	UC
MW-18	-	4/8/03	A	125.93	126.0	10.5 to 21	105 to 115	UC
MW-19	-	4/10/03	A	133.03	133.6	20 to 30	104 to 114	UC/SC
MW-20	-	4/10/03	A	149.54	149.3	47.5 to 58	92 to 102	UC
MW-21	-	4/14/03	A	153.64	153.7	52 to 62	92 to 102	UC
MW-22	-	4/16/03	A	127.00	126.8	26 to 36	91 to 101	UC
MW-23	-	4/16/03	I	124.36	124.3	60 to 70	54 to 64	MCU
MW-24	-	4/17/03	A	125.01	125.0	21 to 31	94 to 104	UC
MW-25	-	4/21/03	A	114.14	114.4	37 to 47	67 to 77	UC/SC
MW-26	-	4/21/03	DTW	110.08	110.1	45 to 55	55 to 65	MCU
MW-27	-	4/21/03	A	110.02	109.9	3 to 8	102 to 107	UC
MW-28	-	4/22/03	A	103.34	103.1	60 to 70	33 to 43	CONF/TZ
MW-29	-	4/24/03	A	99.69	99.9	13 to 23	77 to 87	UC/SC
MW-30	-	4/21/03	A	114.37	114.4	11 to 21	93 to 103	UC
MW-31	-	4/21/03	DTW	115.04	115.0	48 to 58	57 to 67	MCU
PMW-6	-	5/14/13	A	81.50	81.50	10 to 30	51.5 to 71.5	UC
PMW-11	-	4/22/13	A	143.50	143.50	200 to 220	-76.5 to -56.5	CONF
PMW-12	-	5/3/18	A	171.90	171.90	210 to 230	-58.1 to -38.1	CONF
PMW-13	-	5/15/13	A	158.40	158.40	250 to 270	-111.6 to -91.6	CONF
PMW-18	-	5/21/13	A	73.60	73.60	75 to 85	-11.4 to -1.4	CONF/TZ
PMW-19	-	4/18/13	A	103.30	103.30	80 to 90	13.3 to 23.3	CONF/TZ
PMW-23	-	6/5/13	A	164.10	164.10	208 to 228	-63.9 to -43.9	CONF
PMW-28	-	5/17/13	A	139.20	139.20	57 to 77	62.2 to 82.2	UC

Status
A - active
I - inactive, damaged/inaccessible
DTW - Depth to Water Readings Only

Interval Monitored Legend:
UC: Unconfined Water Bearing Zone
UC/SC: Unconfined/Semi-Confined Water Bearing Zone
MCU: Middle Confining Unit
CONF: Confined Water Bearing Zone
CONF/TZ: Confined water Bearing Zone /Transition Zone
MCU/TZL Middle Confining Unit/Transition Zone

TABLE 2
CHESAPEAKE TERRACE
RESIDENTIAL WELLS WITHIN 1/2 MILE OF PROPERTY BOUNDARY

Well	Map	Address	Completion	Total	Screen				Pumping		Level		2019
Permit	No.		Date	Depth	Type	Top	Bot	Dia	Hrs	GPM	Before	After	Search
a	17	2805 5th Avenue	-	-	-	-	-	-	-	-	-	-	
AA742530	18	2811 5th Avenue	11/6/1980	130	PL	125	130	2	1	30	8	20	
AA943366	19	2815 5th Avenue	11/17/1998	137	PL	132	137	2	2	50	20	40	f
AA943176	20	2817 5th Avenue	10/2/1998	123	PL	116	123	2	2	50	10	40	f
AA819687	21	2821 5th Avenue	11/6/1988	125	PL	120	125	2	2	30	16	28	
a	22	2823 5th Avenue	-	-	-	-	-	-	-	-	-	-	
AA815356	23	2825 5th Avenue	9/25/1985	55	PL	50	55	2	1	10	13	20	
a	24	923 Patuxent	-	-	-	-	-	-	-	-	-	-	
AA819405	16	944 Patuxent	10/12/1987	122	PL	115	122	2	2	15	13	17	
a	15	946 Patuxent	-	160(b)	-	-	-	-	-	-	-	-	
a	13	955 Patuxent	-	12(b)	-	-	-	-	-	-	-	-	
AA947373	14	956 Patuxent	-	15(b)	-	-	-	-	-	-	-	-	f
AA742508	12	960 Patuxent	12/4/1980	149	PL	144	149	2	1	30	8	25	
AA887182	11	962 Patuxent	11/29/1991	84	PL	79	84	2	1	20	20	30	f
AA816858	8	963 Patuxent	-	-	-	-	-	-	-	-	-	-	f
a	9	966 Patuxent	-	-	-	-	-	-	-	-	-	-	
a	10	968 Patuxent	-	120(b)	-	-	-	-	-	-	-	-	
a	7	969 Patuxent	-	80(b)	-	-	-	-	-	-	-	-	
AA812032	5	976 Patuxent	8/5/1983	94	PL	89	94	2	1	25	20	30	
AA742841	4	977 Patuxent	3/9/1981	207	PL	202	207	2	1	25	8	15	f
a	6	980 Patuxent	-	375(b)			-						
AA942705	1	981 Patuxent	6/9/1998	87	PL	82	87	2	2	30	30	40	f
a	3	985 Patuxent	-	-	-	-	-	-	-	-	-	-	f
AA943612	2	987 Patuxent	2/5/1999	90	PL	80	90	2	3	20	65	80	f
a	27	1091 Patuxent	-	-	-	-	-	-	-	-	-	-	
a	25	1113 Patuxent	-	-	-	-	-	-	-	-	-	-	f
a	26	1117 Patuxent	-	-	-	-	-	-	-	-	-	-	
AA741300	29	1133 Patuxent	10/16/1979	160	PL	155	160	2	1	25	2	20	
a	28	1135 Patuxent		200(b)	-	-	-	-	-	-	-	-	
a	30	1166 Patuxent		25(b)	-	-	-	-	-	-	-	-	
AA731906	31	1170 Patuxent	8/25/1973	72	PL	67	72	2	1	10	40	48	
AA883690	32	1177 Patuxent	12/8/89	190	PL	185	190	2	1	50	10	30	f
a	34	1179 Patuxent	-	-	-	-	-	-	-	-	-	-	
a	33	1182 Patuxent	-	-	-		-	-	-	-	-	-	f
AA730145	80	1190 Patuxent	-	-	-		-	-	-	-	-	-	g
AA730145	35	1192 Patuxent	8/9/1972	193	PL	188	193	2	1	50	3	12	
AA953469	81	1194 Patuxent	-	-	-		-	-	-	-	-	-	g
AA818761	36	1196 Patuxent	7/30/1987	125	PL	120	125	2	1	10	25	40	
AA942136	37	1198 Patuxent	11/10/1997	115	PL	110	115	2	1	15	30	40	f
AA882615	38	1200 Patuxent	5/11/1989	114	PL	109	114	2	1	20	40	50	f
AA140211	82	1210 Patuxent	-	-	-		-	-	-	-	-	-	g
AA885118	83	1228 Patuxent	-	-	-		-	-	-	-	-	-	g
AA943297	84	1250 Patuxent	-	-	-		-	-	-	-	-	-	g
AA732071	d	? Patuxent	10/9/1973	70	PL	65	70	2	1	20	15	28	
AA810049	66	1122 Brager	1/20/1982	81	PL	76	81	2	1	12	40	50	f
Spring (c)	69A	1124 Brager	-	-	-	-	-	-	-	-	-	-	
Spring (c)	69B	1128 Brager	-	-	-	-	-	-	-	-	-	-	
Spring (c)	69C	1130 Brager	-	-	-	-	-	-	-	-	-	-	
AA816051	53	1201 Collins	4/7/1986	205	PL	200	205	2	1	15	110	130	
AA813754	52	1203 Collins	9/27/1984	182	PL	177	182	2	2	7	95	105	
AA819495	54	1207 Collins	-	-	-	-	-	-	-	-	-	-	
AA160439	85	1211 Collins	-	-	-	-	-	-	-	-	-	-	g
AA811194	55	1214 Collins	12/31/1982	205	PL	200	205	2	1	20	110	120	f
AA130846	86	1215 Collins	-	-	-	-	-	-	-	-	-	-	g
AA742573	56	1221 Collins	11/24/1980	262	PL	257	262	2	1	15	110	120	
AA817406	57	1227 Collins	10/31/1986	215	PL	208	215	2	6	40	140	180	
AA130378	87	1231 Collins	-	-	-	-	-	-	-	-	-	-	g
AA943264	68	1239 Collins	10/31/1998	260	PL	255	260	2	2	25	130	140	f
a	58	1245 Collins	-	-	-	-	-	-	-	-	-	-	f

TABLE 2
CHESAPEAKE TERRACE
RESIDENTIAL WELLS WITHIN 1/2 MILE OF PROPERTY BOUNDARY

Well Permit	Map No.	Address	Completion Date	Total Depth	Screen Type	Screen Top	Screen Bot	Screen Dia	Pumping Hrs	Pumping GPM	Level Before	Level After	2019 Search
AA881020	59	1254 Collins	10/26/1988	350	PL	345	350	2	1	30	160	180	f
a	60	254A Collins	-	-	-	-	-	-	-	-	-	-	
AA811176	61	1255 Collins	12/16/1982	300	PL	295	300	2	1	25	125	140	f
a	62	1257 Collins	-	-	-	-	-	-	-	-	-	-	
a	63	1259 Collins	-	-	-	-	-	-	-	-	-	-	
a	64	1261 Collins	-	-	-	-	-	-	-	-	-	-	
AA810820	65	1264 Collins	3/17/1983	238	PL	231	238	2	2	30	108	130	
AA812492	d	? Collins	3/22/1984	278	PL	271	278	2	2	30	110	130	
AA817406	88	2227 Collins	-	-	-	-	-	-	-	-	-	-	g/d
AA741350	51	2751 Conway	-	-	-	-	-	-	-	-	-	-	f
AA882979	67	2754 Conway	11/18/1989	283	PL	273	283	3	4	150	45	120	f
Spring (c)	70A	2762 Conway	-	-	-	-	-	-	-	-	-	-	f
Spring (c)	70B	2764 Conway	-	-	-	-	-	-	-	-	-	-	
AA812350	50	2774 Conway	10/27/1983	245	PL	225	245	2	4	15	140	150	f
AA742104	89	2801 Conway	-	-	-	-	-	-	-	-	-	-	g
AA945923	90	2801 Conway	-	-	-	-	-	-	-	-	-	-	g
a	49	2860 Conway	-	-	-	-	-	-	-	-	-	-	
AA738073	48	2944 Conway	9/28/1977	105	PL	64	69	2	1	10	75	80	
a	46	2946 Conway	-	-	-	-	-	-	-	-	-	-	
AA733273	45	2947 Conway	8/23/1974	250	PL	240	250	2	4	15	60	80	
a	47	2948 Conway	-	315(b)	-	-	-	-	-	-	-	-	
AA888563	76	2966 Conway	11/24/1992	287	PL	280	287	2	2	60	125	160	f
a	44	2969 Conway	-	-	-	-	-	-	-	-	-	-	
AA819395	43	2973 Conway	-	e	-	-	-	-	-	-	-	-	f
AA739729	41	2975 Conway	10/26/1978	248	PL	243	248	2	1	15	55	60	
AA922014	42	2981 Conway	7/5/1988	240	PL	235	240	2	1	100	60	100	f
AA922014	77	2981 Conway	9/29/1994	250	PL	240	250	3	3	100	66	120	
AA811580	40	2987 Conway	4/15/1983	72	PL	60	72	4	3	18	40	51	
AA921911	78	2989 Conway	2/6/1995	245	PL	240	245	2	1	20	60	80	f
AA940320	39	2993 Conway	4/16/1996	229	PL	224	229	2	1	20	80	90	f
AA810820	91	1264 Lucinda Ln	-	-	-	-	-	-	-	-	-	-	g
AA954054	92	1222 Lucinda Ln.	-	-	-	-	-	-	-	-	-	-	g/d
AA732509	d	? PRIVATE	2/8/1974	140	PL	130	140	3	2	15	73		

Notes:

a. No permit tag on well.
b. Depth reported by resident.
c. Spring reported by resident when interviews were conducted in 1989 and 1990.
d. Well listed because it was idenified as being within 1/2 mile of the site based on a grid search of the MDE's well database; however, the well could not be located in the field, possibly because the grid was incorrectly entered on the completion report or in the database.
e. Depth of well reported to be 30 feet by owner Albert Rollins in 1990; however at the informational hearing on 12/3/01, Mr. Rollins states that his well is 335-feet deep. MDE files have no completion report for a well at 2973 Conway Road.
f. Wells that were found in 2002/2003 well search and found again in the 2019 well seach.
g. New wells that have been found since the 2002/2003 well seach added to list and numbered 80 or higher.

TABLE 3
CHESAPEAKE TERRACE
MONITORING WELL DEPTH TO WATER MEASUREMENTS

Well ID	HYDRO-GEOLOGIC UNIT MONITORED	TOP OF WELL CASING ELEVATION (FT MSL)[d]	DTW (FT)																
			09/14/89	10/30/89	11/20/89	12/27/89	01/22/90	02/26/90	04/13/90	05/13/90	06/01/90	07/11/90	08/24/90	08/19/02	09/26/02	10/25/02	11/25/02	12/23/02	01/28/03
MW-3	Unconfined WBZ	84.89	17.98	17.54	17.52	17.78	17.58	17.39	17.24	16.54	NR	NR	NR	20.79	21.15	20.58	19.72	19.32	18.80
MW-4	Unconfined WBZ	98.71	28.32	28.22	28.35	28.54	28.43	28.29	28.14	27.29	27.69	28.12	28.16	31.44	31.85	31.81	31.46	31.26	30.78
MW-5	Unconfined WBZ	104.51	33.22	33.33	33.29	33.32	33.25	33.30	33.13	32.50	32.84	32.94	33.11	35.69	35.98	35.92	35.79	35.73	35.45
MW-6	Unconfined WBZ	99.58	26.95	25.92	25.59	26.32	25.96	25.99	25.69	24.95	25.26	26.46	26.76	30.43	30.87	30.83	29.41	28.35	28.08
MW-12	Unconfined WBZ	99.40	18.74	20.74	22.20	22.98	22.94	22.91	22.65	22.22	22.17	23.26	23.33	NR	NR	NR	NR	NR	NR
MW-13	Unconfined WBZ	149.01	73.38	73.38	73.48	73.47	73.42	73.44	73.39	73.21	73.00	72.43	70.35	NR	NR	NR	NR	NR	NR
MW-25	Unconfined WBZ	114.14	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-6	Unconfined WBZ	75.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-28	Unconfined WBZ	141.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-15	Unconfined WBZ	169.07	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	80.45	80.54	80.58	80.67	80.65	NR
MW-16	Unconfined WBZ	180.60	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	81.48	81.63	81.78	81.92	82.04	82.13
MW-17	Unconfined WBZ	118.24	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-18	Unconfined WBZ	125.93	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-19	Unconfined WBZ	133.03	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-20	Unconfined WBZ	149.54	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-21	Unconfined WBZ	153.64	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-22	Unconfined WBZ	127.00	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-23	Isolated	124.36	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-24	Unconfined WBZ	125.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-11	Confined WBZ	145.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-12	Confined WBZ	166.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-13	Confined WBZ	166.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-23	Confined WBZ	163.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-26	Isolated	110.08	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-27	Unconfined WBZ	110.02	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-29	Unconfined WBZ	99.69	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-30	Unconfined WBZ	114.37	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-31	Isolated	115.04	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-1	Unconfined WBZ	73.03	6.08	2.89	2.27	3.78	2.77	3.06	2.33	2.23	2.18	5.44	4.90	8.13	8.88	8.29	3.08	1.67	2.65
MW-9	Isolated	99.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	31.01	31.77	31.91	31.74	31.30	30.63
MW-10	Confined WBZ	88.40	21.82	21.12	20.81	21.30	22.02	21.82	21.59	21.33	21.10	22.17	22.03	26.97	26.59	25.67	24.62	24.45	23.85
MW-11	Confined WBZ	73.82	9.83	8.24	NR	10.69	6.34	6.26	5.94	5.93	5.97	6.69	6.85	10.83	10.85	10.35	9.87	9.14	8.29
MW-14	Confined WBZ	99.64	34.16	33.53	33.10	33.56	34.22	33.27	33.39	33.29	33.09	34.20	34.37	39.51	39.52	38.69	37.90	37.45	36.55
MW-28	Confined WBZ	103.34	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-18	Confined WBZ	73.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
PMW-19	Confined WBZ	109.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NOTES:

1.) DTW = Depth to water, as measured from top of inner casings
2.) FT = Feet
3.) FT MSL = Feet mean sea level
4.) NR = No reading
5.) Readings presented in shaded blocks for MW-3, MW-9, MW-16 and PMW-18 are suspect. See Phase II Application Text Section 4.2 for additional detail.
6.) b = Well not accessible
7.) c = Assumed MW-1 based on depth to bottom of well. MW-11 not found
8.) d = MW TOP OF CASING FROM DEC. 5, 2003, ADDENDUM 2 REPORT BY SCHULTZ, TABLE 1;
PMW TOP OF CASING FROM FROM 2013 GOLDER ASSOCIATES INC. WELL LOGS;
PMW-19 AND PMW-23 TOP OF CASING ESTIMATED TO BE 0.5 FT BELOW GROUND ELEVATION BASED
ON THE WELL CONSTRUCTION LOGS

TABLE 3
CHESAPEAKE TERRACE
MONITORING WELL DEPTH TO WATER MEASUREMENTS

Well ID	HYDRO-GEOLOGIC UNIT MONITORED	TOP OF WELL CASING ELEVATION (FT MSL)[d]	DTW (FT)																
			03/04/03	03/27/03	04/28/03	05/28/03	06/23/03	07/21/03	08/25/03	09/16/03	10/15/03	11/08/03	05/28/13	06/27/13	07/29/13	08/27/13	09/23/13	10/29/13	12/06/13
MW-3	Unconfined WBZ	84.89	17.92	17.05	17.31	17.25	15.89	16.93	17.68	17.99	17.69	17.55	16.10	15.79	16.91	17.40	18.00	17.62	17.53
MW-4	Unconfined WBZ	98.71	30.44	29.61	29.04	28.94	28.00	27.85	28.35	28.57	28.43	28.45	29.55	29.31	29.91	30.21	30.67	30.73	30.80
MW-5	Unconfined WBZ	104.51	35.21	34.85	34.34	34.04	33.49	33.22	33.32	33.37	33.19	33.17	32.03	31.84	32.29	28.53	32.78	32.86	32.99
MW-6	Unconfined WBZ	99.58	NR	25.68	25.77	25.23	24.15	24.70	25.88	25.74	25.04	24.67	26.84	26.80	28.51	29.09	29.73	29.68	29.53
MW-12	Unconfined WBZ	99.40	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-13	Unconfined WBZ	149.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	70.90	71.74	68.86	69.71	72.59	DRY
MW-25	Unconfined WBZ	114.14	NR	NR	35.97	35.36	35.21	34.79	34.55	34.43	34.01	34.35	35.68	35.51	35.82	33.22	36.02	36.14	36.24
PMW-6	Unconfined WBZ	75.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	14.14	14.09	15.79	16.41	17.08	16.19	15.81
PMW-28	Unconfined WBZ	141.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	65.62	65.49	66.08	66.07	66.54	66.76	67.03
MW-15	Unconfined WBZ	169.07	NR	80.70	80.76	80.70	80.53	80.39	80.02	79.58	78.92	79.07	80.24	80.36	80.47	80.47	80.59	80.49	80.56
MW-16	Unconfined WBZ	180.60	82.24	81.96	82.43	81.91	81.54	80.79	79.66	79.02	78.48	78.39	63.85	79.91	80.21	80.02	80.11	80.00	79.87
MW-17	Unconfined WBZ	118.24	NR	NR	1.14	0.83	0.71	1.05	2.20	1.95	1.42	1.12	1.49	1.03	2.95	3.41	3.89	3.04	3.08
MW-18	Unconfined WBZ	125.93	NR	NR	11.04	11.15	9.70	9.65	10.78	11.37	11.41	11.75	14.22	13.65	13.93	14.28	14.57	14.87	15.20
MW-19	Unconfined WBZ	133.03	NR	NR	21.06	20.88	20.05	19.04	19.17	19.50	19.81	20.13	24.45	23.94	23.59	23.75	24.13	24.68	25.12
MW-20	Unconfined WBZ	149.54	NR	NR	44.50	43.65	42.93	41.68	41.17	41.31	41.40	41.69	45.41	NR[b]	44.95	44.81	44.93	45.21	45.45
MW-21	Unconfined WBZ	153.64	NR	NR	55.57	55.31	55.15	54.77	54.19	53.94	53.73	53.72	55.61	55.65	55.67	55.50	55.51	55.53	55.64
MW-22	Unconfined WBZ	127.00	NR	NR	26.39	26.10	25.40	25.20	25.53	25.74	25.64	25.94	27.59	27.45	27.42	27.51	27.69	27.91	28.17
MW-23	Isolated	124.36	NR	NR	67.45	61.04	51.71	42.18	35.32	32.64	30.42	29.07	NR	NR	NR	NR	NR	NR	NR
MW-24	Unconfined WBZ	125.01	NR	NR	17.77	17.19	16.13	15.07	15.02	15.26	15.25	15.57	19.51	19.24	19.13	19.08	19.16	19.32	19.52
PMW-11	Confined WBZ	145.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	82.46	82.48	84.13	84.09	85.47	84.65	85.68
PMW-12	Confined WBZ	166.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	113.52	112.50	114.26	114.19	115.62	114.73	115.82
PMW-13	Confined WBZ	166.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	99.87	99.95	101.76	101.65	103.19	102.23	103.37
PMW-23	Confined WBZ	163.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	104.82	106.51	106.51	107.99	107.10	108.23
MW-26	Isolated	110.08	NR	NR	51.26	44.21	33.61	28.25	23.47	21.00	18.92	17.67	NR	NR	NR	NR	NR	NR	NR
MW-27	Unconfined WBZ	110.02	NR	NR	0.96	0.84	0.81	0.72	1.15	1.19	0.99	0.84	2.19	1.57	2.09	1.49	3.70	1.92	2.71
MW-29	Unconfined WBZ	99.69	NR	NR	3.31	3.19	2.93	2.93	3.18	3.60	3.35	3.17	3.75	3.71	4.03	5.53	6.68	4.87	4.36
MW-30	Unconfined WBZ	114.37	NR	NR	9.27	9.45	6.71	8.23	10.47	11.32	10.88	11.15	12.88	12.21	12.94	13.41	13.74	13.82	13.83
MW-31	Isolated	115.04	NR	NR	NR	51.87	43.38	32.14	25.39	23.43	21.78	21.24	NR	NR	NR	NR	NR	NR	NR
MW-1	Unconfined WBZ	73.03	1.17	1.51	2.13	1.24	1.31	3.04	4.09	2.75	2.24	1.39	3.01	3.39	5.38	6.36	7.64	5.34	3.20
MW-9	Isolated	99.50	29.99	29.51	29.16	29.08	29.10	29.21	29.43	29.56	29.44	29.30	NR	NR	NR	NR	NR	NR	NR
MW-10	Confined WBZ	88.40	23.18	23.15	23.43	23.00	22.44	22.78	23.17	22.98	21.95	21.82	24.32	24.30	25.37	23.78	27.02	26.21	27.06
MW-11	Confined WBZ	73.82	7.61	6.14	6.23	6.74	7.18	7.47	7.57	7.42	7.12	6.41	NR	NR	NR	NR	NR	NR	NR
MW-14	Confined WBZ	99.64	35.90	35.90	36.01	35.94	35.53	35.53	35.59	35.50	35.17	34.22	37.03	36.35	38.25	38.61	39.83	38.82	39.75
MW-28	Confined WBZ	103.34	NR	NR	39.15	38.79	38.20	38.53	38.91	38.74	37.53	37.53	40.08	40.00	41.62	41.73	42.97	42.18	43.07
PMW-18	Confined WBZ	73.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	11.44	11.39	12.97	13.08	14.36	13.51	14.43
PMW-19	Confined WBZ	109.50	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	40.28	40.20	41.64	41.66	42.79	42.43	43.11

NOTES:

1.) DTW = Depth to water, as measured from top of inner casings
2.) FT = Feet
3.) FT MSL = Feet mean sea level
4.) NR = No reading
5.) Readings presented in shaded blocks for MW-3, MW-9, MW-16 and PMW-18 are suspect. See Phase II Application Text Section 4.2 for additional detail.
6.) b = Well not accessible
7.) c = Assumed MW-1 based on depth to bottom of well. MW-11 not found
8.) d = MW TOP OF CASING FROM DEC. 5, 2003, ADDENDUM 2 REPORT BY SCHULTZ, TABLE 1;
PMW TOP OF CASING FROM FROM 2013 GOLDER ASSOCIATES INC. WELL LOGS;
PMW-19 AND PMW-23 TOP OF CASING ESTIMATED TO BE 0.5 FT BELOW GROUND ELEVATION BASED
ON THE WELL CONSTRUCTION LOGS

TABLE 3
CHESAPEAKE TERRACE
MONITORING WELL DEPTH TO WATER MEASUREMENTS

Well ID	HYDRO-GEOLOGIC UNIT MONITORED	TOP OF WELL CASING ELEVATION (FT MSL)[d]	DTW (FT)											
			01/31/14	02/24/14 & 02/28/14	03/24/14	04/21/14	05/28/14	06/16/14	11/29/18	01/10/19	02/15/19	06/27/19	01/29/20	3/23/2020
MW-3	Unconfined WBZ	84.89	16.66	15.92	15.69	4.97	14.77	NR	NR	NR	NR	NR	NR	NR
MW-4	Unconfined WBZ	98.71	NR[b]	29.92	29.45	28.92	28.24	28.32	29.74	28.76	28.40	28.46	30.06	29.83
MW-5	Unconfined WBZ	104.51	32.62	32.43	32.21	31.92	31.39	NR	32.70	32.07	31.57	31.10	32.18	32.02
MW-6	Unconfined WBZ	99.58	27.80	26.45	26.33	25.51	24.97	NR	26.86	26.02	25.38	26.31	27.55	27.04
MW-12	Unconfined WBZ	99.40	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-13	Unconfined WBZ	149.01	DRY	DRY	DRY	DRY	72.35	71.47	NR	NR	NR	NR	NR	NR
MW-25	Unconfined WBZ	114.14	36.06	36.19	36.11	35.43	35.32	35.21	35.86	35.42	34.73	34.16	35.44	35.31
PMW-6	Unconfined WBZ	75.50	14.75	13.49	13.55	12.80	12.09	NR	12.84	12.62	12.30	13.89	14.50	14.13
PMW-28	Unconfined WBZ	141.50	66.46	66.32	66.12	68.42	64.80	NR	66.82	65.30	64.34	63.22	65.65	65.10
MW-15	Unconfined WBZ	169.07	80.57	80.26	80.85	83.00	80.39	80.55	80.40	80.19	79.66	78.31	78.20	78.53
MW-16	Unconfined WBZ	180.60	79.80	80.07	82.22	79.89	79.94	79.75	82.50	79.50	78.76	76.09	76.80	77.22
MW-17	Unconfined WBZ	118.24	1.75	0.08	1.01	0.86	0.50	1.00	0.83	0.79	0.70	2.23	1.74	1.75
MW-18	Unconfined WBZ	125.93	14.46	14.09	13.38	12.43	11.11	11.34	12.40	11.83	11.06	11.39	14.29	14.07
MW-19	Unconfined WBZ	133.03	24.68	24.38	23.19	22.41	20.92	20.50	22.25	21.86	19.84	19.36	23.00	23.33
MW-20	Unconfined WBZ	149.54	45.66	45.65	45.19	44.69	43.64	43.02	44.00	43.07	42.16	41.08	44.08	44.23
MW-21	Unconfined WBZ	153.64	55.61	55.69	55.71	55.47	55.73	55.14	54.30	54.97	54.40	53.26	54.44	54.65
MW-22	Unconfined WBZ	127.00	28.03	27.78	27.43	26.91	26.35	26.25	27.70	26.64	25.45	25.63	27.09	26.95
MW-23	Isolated	124.36	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-24	Unconfined WBZ	125.01	19.55	19.43	19.05	18.54	17.55	17.08	17.75	17.12	16.10	15.03	17.94	18.17
PMW-11	Confined WBZ	145.50	84.73	81.97	81.85	83.05	81.90	82.27	85.85	85.55	83.29	84.02	85.53	84.82
PMW-12	Confined WBZ	166.50	114.87	111.98	111.20	113.13	112.94	112.34	116.20	115.39	113.59	114.13	115.85	115.03
PMW-13	Confined WBZ	166.50	102.42	99.31	99.21	100.58	99.31	99.77	104.00	103.06	101.13	101.80	103.27	102.59
PMW-23	Confined WBZ	163.50	107.28	102.23	104.13	105.47	104.24	104.65	109.80	108.34	105.95	106.68	108.20	107.45
MW-26	Isolated	110.08	NR	NR	NR	NR	NR	NR	NR	13.96	12.44	11.82	NR	13.49
MW-27	Unconfined WBZ	110.02	3.15	1.64	1.60	1.51	0.80	0.50	0.91	NR	0.54	1.26	1.40	1.84
MW-29	Unconfined WBZ	99.69	3.79	3.04	3.37	3.15	3.08	NR	3.34	3.07	3.01	4.35	4.12	3.65
MW-30	Unconfined WBZ	114.37	13.09	12.62	11.98	10.77	9.68	10.07	NR	10.05	10.14	11.63	13.85	13.27
MW-31	Isolated	115.04	NR	NR	NR	NR	NR	NR	15.90	15.23	14.64	15.50	NR	17.79
MW-1	Unconfined WBZ	73.03	2.63	1.58	2.01	1.83	0.47	2.76	1.84	2.18	1.60	4.41	NR	1.65
MW-9	Isolated	99.50	NR	NR	NR	NR	NR	NR	1.79	17.09	0.29	25.01	NR	NR
MW-10	Confined WBZ	88.40	26.17	23.74	23.66	24.71	23.62	23.95	27.11	26.36	24.88	25.69	26.83	26.32
MW-11	Confined WBZ	73.82	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MW-14	Confined WBZ	99.64	38.72	30.49	34.05	35.71	30.85	NR	NR	38.43	31.31	37.51	41.75	36.89
MW-28	Confined WBZ	103.34	42.17	39.62	39.49	40.58	39.52	39.89	43.56	43.46	40.89	41.52	42.88	42.32
PMW-18	Confined WBZ	73.50	13.57	10.83	10.85	11.92	26.95	11.17	14.67	13.78	12.15	13.02	14.17	13.60
PMW-19	Confined WBZ	109.50	42.34	39.71	39.66	40.69	39.66	40.00	43.25	42.57	40.95	NR	43.24	42.41

NOTES:

1.) DTW = Depth to water, as measured from top of inner casings
2.) FT = Feet
3.) FT MSL = Feet mean sea level
4.) NR = No reading
5.) Readings presented in shaded blocks for MW-3, MW-9, MW-16 and PMW-18 are suspect. See Phase II Application Text Section 4.2 for additional detail.
6.) b = Well not accessible
7.) c = Assumed MW-1 based on depth to bottom of well. MW-11 not found
8.) d = MW TOP OF CASING FROM DEC. 5, 2003, ADDENDUM 2 REPORT BY SCHULTZ, TABLE 1;
PMW TOP OF CASING FROM FROM 2013 GOLDER ASSOCIATES INC. WELL LOGS;
PMW-19 AND PMW-23 TOP OF CASING ESTIMATED TO BE 0.5 FT BELOW GROUND ELEVATION BASED
ON THE WELL CONSTRUCTION LOGS

TABLE 4A
CHESAPEAKE TERRACE
MONITORING WELL - GROUNDWATER ELEVATION SUMMARY
UNCONFINED WBZ

Date	MW-1	MW-3	MW-4	MW-5	MW-6	MW-12	MW-13	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	MW-21	MW-22	MW-24	MW-25	MW-27	MW-29	MW-30	PMW-6	PMW-28
Screened Interval (Note 9)	**UC**	**UC/SC**	**UC**	**UC**	**UC/SC**	**UC**	**UC**	**UC**	**UC**	**UC**	**UC**	**UC/SC**	**UC**	**UC**	**UC**	**UC**	**UC/SC**	**UC**	**UC/SC**	**UC**	**UC**	**UC**
09/14/89	66.95	66.91	70.39	71.29	72.63	80.66	75.63	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/30/89	70.14	67.35	70.49	71.18	73.66	78.66	75.63	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/20/89	70.76	67.37	70.36	71.22	73.99	77.20	75.53	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/27/89	69.25	67.11	70.17	71.19	73.26	76.42	75.54	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/22/90	70.26	67.31	70.28	71.26	73.62	76.46	75.59	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/26/90	69.97	67.50	70.42	71.21	73.59	76.49	75.57	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
04/13/90	70.70	67.65	70.57	71.38	73.89	76.75	75.62	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
05/13/90	70.80	68.35	71.42	72.01	74.63	77.18	75.80	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
06/01/90	70.85	NR	71.02	71.67	74.32	77.23	76.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
07/11/90	67.59	NR	70.59	71.57	73.12	76.14	76.58	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/24/90	68.13	NR	70.55	71.40	72.82	76.07	78.66	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/19/02	64.90	64.10	67.27	68.82	69.15	NR	NR	88.62	99.12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/26/02	64.15	63.74	66.86	68.53	68.71	NR	NR	88.53	98.97	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/25/02	64.74	64.31	66.90	68.59	68.75	NR	NR	88.49	98.82	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/25/02	69.95	65.17	67.25	68.72	70.17	NR	NR	88.40	98.68	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/23/02	71.36	65.57	67.45	68.78	71.23	NR	NR	88.42	98.56	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/28/03	70.38	66.09	67.93	69.06	71.50	NR	NR	NR	98.47	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/04/03	71.86	66.97	68.27	69.30	NR	NR	NR	NR	98.36	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/27/03	71.52	67.84	69.10	69.66	73.90	NR	NR	88.37	98.64	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
04/28/03	70.90	67.58	69.67	70.17	73.81	NR	NR	88.31	98.17	117.10	114.89	111.97	105.04	98.07	100.61	107.24	78.17	109.06	96.38	105.10	NR	NR
05/28/03	71.79	67.64	69.77	70.47	74.35	NR	NR	88.37	98.69	117.41	114.78	112.15	105.89	98.33	100.90	107.82	78.78	109.18	96.50	104.92	NR	NR
06/23/03	71.72	69.00	70.71	71.02	75.43	NR	NR	88.54	99.06	117.53	116.23	112.98	106.61	98.49	101.60	108.88	78.93	109.21	96.76	107.66	NR	NR
07/21/03	69.99	67.96	70.86	71.29	74.88	NR	NR	88.68	99.81	117.19	116.28	113.99	107.86	98.87	101.80	109.94	79.35	109.30	96.76	106.14	NR	NR
08/25/03	68.94	67.21	70.36	71.19	73.70	NR	NR	89.05	100.94	116.04	115.15	113.86	108.37	99.45	101.47	109.99	79.59	108.87	96.51	103.90	NR	NR
09/16/03	70.28	66.90	70.14	71.14	73.84	NR	NR	89.49	101.58	116.29	114.56	113.53	108.23	99.70	101.26	109.75	79.71	108.83	96.09	103.05	NR	NR
10/15/03	70.79	67.20	70.28	71.32	74.54	NR	NR	90.15	102.12	116.82	114.52	113.22	108.14	99.91	101.36	109.76	80.13	109.03	96.34	103.49	NR	NR
11/08/03	71.64	67.34	70.26	71.34	74.91	NR	NR	90.00	102.21	117.12	114.18	112.90	107.85	99.92	101.06	109.44	79.79	109.18	96.52	103.22	NR	NR
05/28/13	70.02	68.79	69.16	72.48	72.74	NR	NR	88.83	**116.75**	116.75	111.71	108.58	104.13	98.03	99.41	105.50	78.46	107.83	95.94	101.49	61.36	75.88
06/27/13	69.64	69.10	69.40	72.67	72.78	NR	78.11	88.71	100.69	117.21	112.28	109.09	NR	97.99	99.55	105.77	78.63	108.45	95.98	102.16	61.41	76.01
07/29/13	67.65	67.98	68.80	72.22	71.07	NR	77.27	88.60	100.39	115.29	112.00	109.44	104.59	97.97	99.58	105.88	78.32	107.93	95.66	101.43	59.71	75.42
08/27/13	66.67	67.49	68.50	75.98	70.49	NR	80.15	88.60	100.58	114.83	111.65	109.28	104.73	98.14	99.49	105.93	80.92	108.53	94.16	100.96	59.09	75.43
09/23/13	65.39	66.89	68.04	71.73	69.85	NR	79.30	88.48	100.49	114.35	111.36	108.90	104.61	98.13	99.31	105.85	78.12	106.32	93.01	100.63	58.42	74.96
10/29/13	67.69	67.27	67.98	71.65	69.90	NR	76.42	88.58	100.60	115.20	111.06	108.35	104.33	98.11	99.09	105.69	78.00	108.10	94.82	100.55	59.31	74.74
12/06/13	69.83	67.36	67.91	71.52	70.05	NR	NR	88.51	100.73	115.16	110.73	107.91	104.09	98.00	98.83	105.49	77.90	107.31	95.33	100.54	59.69	74.47
01/31/14	70.40	68.23	NR	71.89	71.78	NR	NR	88.50	100.80	116.49	111.47	108.35	103.88	98.03	98.97	105.46	78.08	106.87	95.90	101.28	60.75	75.04
02/24/14 & 02/28/14	71.45	68.97	68.79	72.08	73.13	NR	NR	88.81	100.53	NR	111.84	108.65	103.89	97.95	99.22	105.58	77.95	108.38	96.65	101.75	62.01	75.18
03/24/14	71.02	69.20	69.26	72.30	73.25	NR	NR	88.22	98.38	117.23	112.55	109.84	104.35	97.93	99.57	105.96	78.03	108.42	96.32	102.39	61.95	75.38
04/21/14	71.20	**79.92**	69.79	72.59	74.07	NR	NR	86.07	100.71	117.38	113.50	110.62	104.85	98.17	100.09	106.47	78.71	108.51	96.54	103.60	62.70	73.08
05/28/14	72.56	70.12	70.47	73.12	74.61	NR	76.66	88.68	100.66	117.74	114.82	112.11	105.90	97.91	100.65	107.46	78.82	109.22	96.61	104.69	63.41	76.70
06/16/14	70.27	NR	70.39	NR	NR	NR	77.54	88.52	100.85	117.24	114.59	112.53	106.52	98.50	100.75	107.93	78.93	109.52	NR	104.30	NR	NR
11/29/18	71.19	NR	68.97	71.81	72.72	NR	NR	88.67	98.10	117.41	113.53	110.78	105.54	99.34	99.30	107.26	78.28	109.11	96.35	NR	62.66	74.68
01/10/19	70.85	NR	69.95	72.44	73.56	NR	NR	88.88	101.10	117.45	114.10	111.17	106.47	98.67	100.36	107.89	78.72	NR	96.62	104.32	62.88	76.20
02/15/19	71.43	NR	70.31	72.94	74.2	NR	NR	89.41	101.84	117.54	114.87	113.19	107.38	99.24	101.55	108.91	79.41	109.48	96.68	104.23	63.2	77.16
06/27/19	68.62	NR	70.25	73.41	73.27	NR	NR	90.76	104.51	116.01	114.54	113.67	108.46	100.38	101.37	109.98	79.98	108.76	95.34	102.74	61.61	78.28
01/29/20	NR	NR	68.65	72.33	72.03	NR	NR	90.87	103.80	116.50	111.64	110.03	105.46	99.20	99.91	107.07	78.70	108.62	95.57	100.52	61.00	75.85
03/23/20	71.38	NR	66.69	72.49	72.54	NR	NR	90.54	103.38	116.49	111.86	109.70	105.31	98.99	100.05	106.84	78.83	108.18	96.04	101.10	61.37	76.40
Highest Recorded	72.56	**79.92**	71.42	75.98	75.43	80.66	80.15	90.87	**116.75**	117.74	116.28	113.99	108.46	100.38	101.80	109.99	80.92	109.52	96.76	107.66	63.41	78.28
Lowest Recorded	64.15	63.74	66.69	68.53	68.71	76.07	75.53	86.07	98.10	114.35	110.73	107.91	103.88	97.91	98.83	105.46	77.90	106.32	93.01	100.52	58.42	73.08
Difference high to low	**8.41**	**16.18**	**4.73**	**7.45**	**6.72**	**4.59**	**4.62**	**4.80**	**18.65**	**3.39**	**5.55**	**6.08**	**4.58**	**2.47**	**2.97**	**4.53**	**3.02**	**3.20**	**3.75**	**7.14**	**4.99**	**5.20**
Average	69.72	67.65	69.39	71.34	72.74	77.21	76.76	88.84	100.77	116.61	113.36	110.99	105.86	98.65	100.26	107.40	78.86	108.55	95.98	102.93	61.25	75.60
Elevated: (06/27/19) for Unconf.; (03/24/14) for Conf. (Note 4)	68.62	70.12	70.25	73.41	73.27	80.66	80.15	90.76	104.51	116.01	114.54	113.67	108.46	100.38	101.37	109.98	79.98	108.76	95.34	102.74	61.61	78.28
Depressed: 09/26/02 and 12/06/13 for Unconf.; 11/29/18 for Conf. (Note 3)	64.15	63.74	66.86	68.53	68.71	76.07 (Note 3)	75.57 (Note 3)	88.53	98.97	115.16	110.73	107.91	104.09	98.00	98.83	105.49	77.90	107.31	95.33	100.54	59.69	74.47

NOTES:

1.) FT MSL = feet above mean sea level

2.) NR = No reading (because the well did not exist on the listed date, could not be found, was inaccessible on the listed date or was missed).

3.) Depressed values are the observed water level elevations on the day when the average water level elevations were lowest for the interval (i.e. Unconfined or Confined), except as noted. For the **unconfined wells** the depressed conditions were observed on September 26, 2002. If the well did not exist on Septmeber 26, 2002, then readings from December 4, 2013 were utilized. For confined wells the depressed water condition occurred on November 29, 2018. If a reading was not available for November 29, 2018 the lowest recorded elevations were utilized.

4.) Elevated values are the observed water level elevations on the day when the average water level elevations were highest for the interval (i.e. Unconfined or Confined). For the **unconfined wells** the elevated conditions were observed on June 27, 2019. For confined wells the elevated condition occurred on March 24, 2014.

5.) **Bold red** readings for MW-9 are statistical outilers at 95% level of certainty, but not at 99% certaininty, therefore these results are retained. Further evalaution is being performed to determine if the condition of the well is compromised.

6.) **Bold red** readings for MW-3, MW-16 and PMW-18 are statistical outliers at 99% level of certainty, Therefore these results are excluded from evaluation of Highest Observed/Predicted, Elevated or Depressed groundwater surfaces and the next highest or lowest values were utilized.

7.) MW-9 is screened in the MCU. Depth to water readings collected from MW-9 since November 2003 are suspect, but did not meet criteria required for exclusion as a statistical outlier. At the request of MDE, the highest observed groundwater elevation for MW-9 was used for developing the Highest Observed/Predicted Unconfined WBZ surface presented on Figure 11.

8.) Wells screened in the Middle Confining Unit (MW-23, 26 and 31) are not used for groundwater surface mapping.

9.) Well Screen Set In: UC - Unconfined Water Bearing Zone (WBZ) UC/SC - Unconfined/Semi-confined WBZ MCU - Middle Confining Unit CONF - Confined WBZ CONF/TZ - Confined/Transition Zone

TABLE 4B
CHESAPEAKE TERRACE
MONITORING WELL - GROUNDWATER ELEVATION SUMMARY
CONFINED WBZ

MW-23	MW-26	MW-31	MW-9	MW-10	MW-11	MW-14	MW-28	PMW-18	PMW-19	PMW-11	PMW-12	PMW-13	PMW-23
MCU	MCU	MCU	MCU/TZ	Conf/TZ	Conf/TZ	Conf/TZ	Conf/TZ	Conf/TZ	Conf/TZ	Conf	Conf	Conf	Conf
NR	NR	NR	NR	66.58	63.99	65.48	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	67.28	65.58	66.11	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	67.59	NR	66.54	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	67.10	63.13	66.08	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	66.38	67.48	65.42	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	66.58	67.56	66.37	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	66.81	67.88	66.25	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	67.07	67.89	66.35	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	67.30	67.85	66.55	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	66.23	67.13	65.44	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	66.37	66.97	65.27	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	68.49	61.43	62.99	60.13	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	67.73	61.81	62.97	60.12	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	67.59	62.73	63.47	60.95	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	67.76	63.78	63.95	61.74	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	68.20	63.95	64.68	62.19	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	68.87	64.55	65.53	63.09	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	69.51	65.22	66.21	63.74	NR	NR	NR	NR	NR	NR	NR
NR	NR	NR	69.99	65.25	67.68	63.74	NR	NR	NR	NR	NR	NR	NR
56.91	58.82	NR	70.34	64.97	67.59	63.63	64.19	NR	NR	NR	NR	NR	NR
63.32	65.87	63.17	70.42	65.40	67.08	63.70	64.55	NR	NR	NR	NR	NR	NR
72.65	76.47	71.66	70.40	65.96	66.64	64.11	65.14	NR	NR	NR	NR	NR	NR
82.18	81.83	82.90	70.29	65.62	66.35	64.11	64.81	NR	NR	NR	NR	NR	NR
89.04	86.61	89.65	70.07	65.23	66.25	64.05	64.43	NR	NR	NR	NR	NR	NR
91.72	89.08	91.61	69.94	65.42	66.40	64.14	64.60	NR	NR	NR	NR	NR	NR
93.94	91.16	93.26	70.06	66.45	66.70	64.47	65.81	NR	NR	NR	NR	NR	NR
95.29	92.41	93.80	70.20	66.58	67.41	65.42	65.81	NR	NR	NR	NR	NR	NR
NR	NR	NR	NR	64.08	NR	62.61	63.26	62.06	69.22	63.04	52.98	66.63	NR
NR	NR	NR	NR	64.10	NR	63.29	63.34	62.11	69.30	63.02	54.00	66.55	58.68
NR	NR	NR	NR	63.03	NR	61.39	61.72	60.53	67.86	61.37	52.24	64.74	56.99
NR	NR	NR	NR	64.62	NR	61.03	61.61	60.42	67.84	61.41	52.31	64.85	56.99
NR	NR	NR	NR	61.38	NR	59.81	60.37	59.14	66.71	60.03	50.88	63.31	55.51
NR	NR	NR	NR	62.19	NR	60.82	61.16	59.99	67.07	60.85	51.77	64.27	56.40
NR	NR	NR	NR	61.34	NR	59.89	60.27	59.07	66.39	59.82	50.68	63.13	55.27
NR	NR	NR	NR	62.23	NR	60.92	61.17	59.93	67.16	60.77	51.63	64.08	56.22
NR	NR	NR	NR	64.66	NR	69.15	63.72	62.67	69.79	63.53	54.52	67.19	61.27
NR	NR	NR	NR	64.74	NR	65.59	63.85	62.65	69.84	63.65	55.30	67.29	59.37
NR	NR	NR	NR	63.69	NR	63.93	62.76	61.58	68.81	62.45	53.37	65.92	58.03
NR	NR	NR	NR	64.78	NR	68.79	63.82	**46.55**	69.84	63.60	53.56	67.19	59.26
NR	NR	NR	NR	64.45	NR	NR	63.45	62.33	69.50	63.23	54.16	66.73	58.85
NR	NR	99.14	**97.71**	61.29	NR	NR	59.78	58.83	66.25	59.65	50.30	62.50	53.70
NR	96.12	99.81	**82.41**	62.04	NR	61.21	59.88	59.72	66.93	59.95	51.11	63.44	55.16
NR	97.64	100.40	**99.21**	63.52	NR	68.33	62.45	61.35	68.55	62.21	52.91	65.37	57.55
NR	98.26	100.00	74.49	62.71	NR	62.13	61.82	60.48	NR	61.48	52.37	64.70	56.82
NR	NR	NR	NR	61.57	NR	57.89	60.46	59.33	66.26	59.97	50.65	63.23	55.30
NR	96.59	97.25	NR	62.08	NR	62.75	61.02	59.90	67.09	60.68	51.47	63.91	56.05
95.29	98.26	100.40	**99.21**	67.59	67.89	69.15	65.81	62.67	69.84	63.65	55.30	67.29	61.27
56.91	58.82	63.17	67.59	61.29	62.97	57.89	59.78	**46.55**	66.25	59.65	50.30	62.50	53.70
38.38	**39.44**	**37.23**	**31.62**	**6.30**	**4.92**	**11.26**	**6.03**	**16.12**	**3.59**	**4.00**	**5.00**	**4.79**	**7.57**
80.63	85.91	90.22	73.18	64.52	66.05	63.74	62.79	59.93	68.02	61.62	52.43	65.00	57.08
(note 8)	(note 8)	(note 8)	(note 8)	64.74	67.89 (note 4)	65.59	63.85	62.65	69.84	63.65	55.30	67.29	59.37
(note 8)	(note 8)	(note 8)	(note 8)	61.29	62.97 (note 3)	57.89 (note 3)	59.78	58.83	66.25	59.65	50.30	62.50	53.70

NOTES:

1.) FT MSL = feet above mean sea level

2.) NR = No reading (because the well did not exist on the listed date, could not be found, was inaccessible on the listed date or was missed).

3.) Depressed values are the observed water level elevations on the day when the average water level elevations were lowest for the interval (i.e. Unconfined or Confined), except as noted. For the unconfined wells the depressed conditions were observed on September 26, 2002. If the well did not exist on Septmeber 26, 2002, then readings from December 4, 2013 were utilized. For confined wells the depressed water condition occurred on November 29, 2018. If a reading was not available for November 29, 2018 the lowest recorded elevations were utilized.

4.) Elevated values are the observed water level elevations on the day when the average water level elevations were highest for the interval (i.e., Unconfined or Confined). For the unconfined wells the elevated conditions were observed on June 27, 2019. For confined wells the elevated condition occurred on March 24, 2014.

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6.) **Bold red** readings for MW-3, MW-16 and PMW-18 are statistical outliers at 99% level of certainty, Therefore these results are excluded from evaluation of Highest Observed/Predicted, Elevated or Depressed groundwater surfaces and the next highest or lowest values were utilized.

7.) MW-9 is screened in the MCU. Depth to water readings collected from MW-9 since November 2003 are suspect, but did not meet criteria required for exclusion as a statistical outlier. At the request of MDE, the highest observed groundwater elevation for MW-9 was used for developing the Highest Observed/Predicted Unconfined WBZ surface presented on Figure 11.

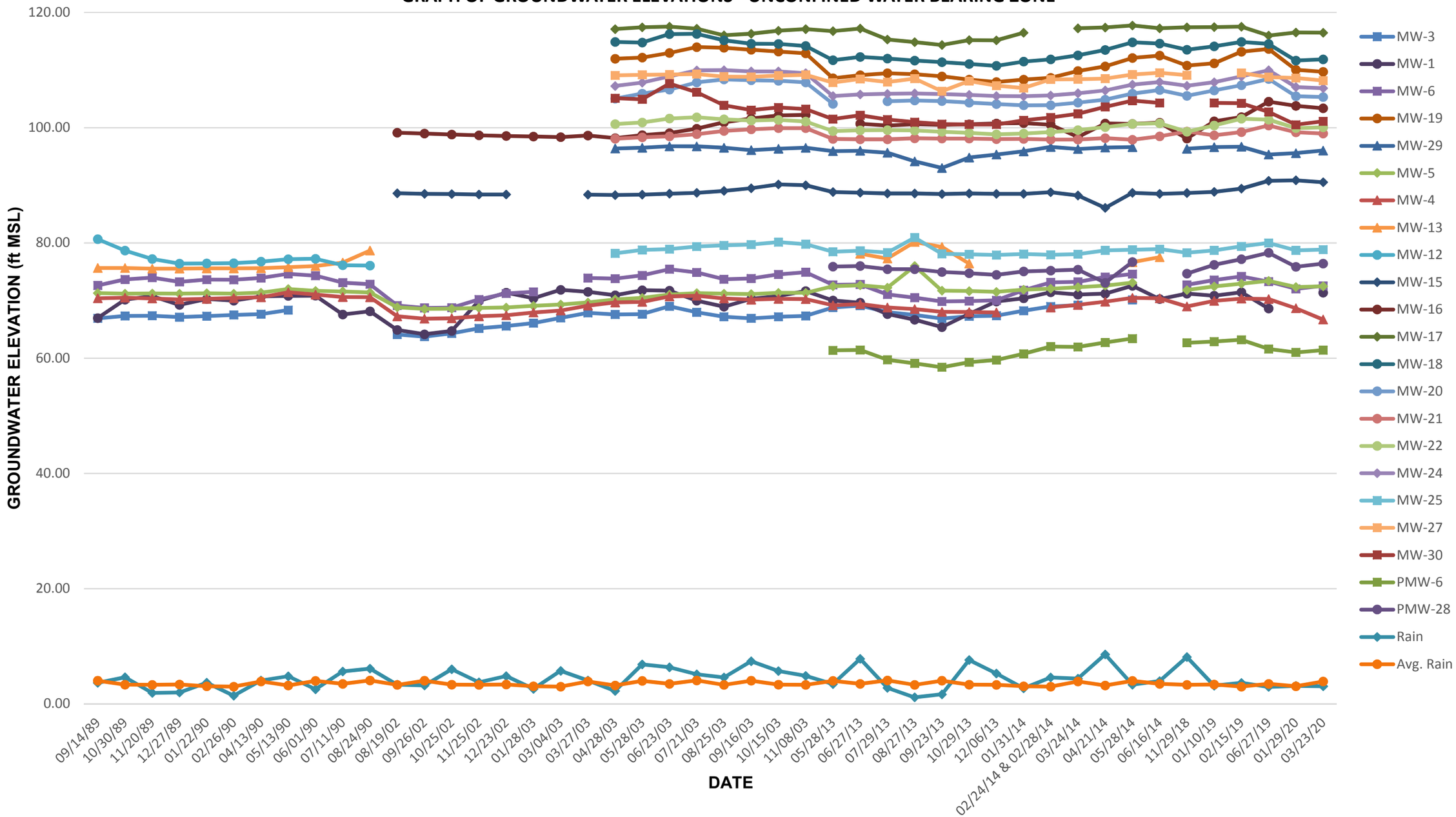
8.) Wells screened in the Middle Confining Unit (MW-23, 26 and 31) are not used for groundwater surface mapping.

9.) Well Screen Set In: UC - Unconfined Water Bearing Zone (WBZ) UC/SC - Unconfined/Semi-confined WBZ MCU - Middle Confining Unit CONF - Confined WBZ CONF/TZ - Confined/Transition Zone

June 2020

Project 2018-3854

TABLE 5A
CHESAPEAKE TERRACE
GRAPH OF GROUNDWATER ELEVATIONS - UNCONFINED WATER BEARING ZONE



Advanced GeoServices Corp

TABLE 5B
CHESAPEAKE TERRACE
GRAPH OF GROUNDWATER ELEVATIONS - CONFINED WATER BEARING ZONE
(also shows Middle Confining Units Wells)

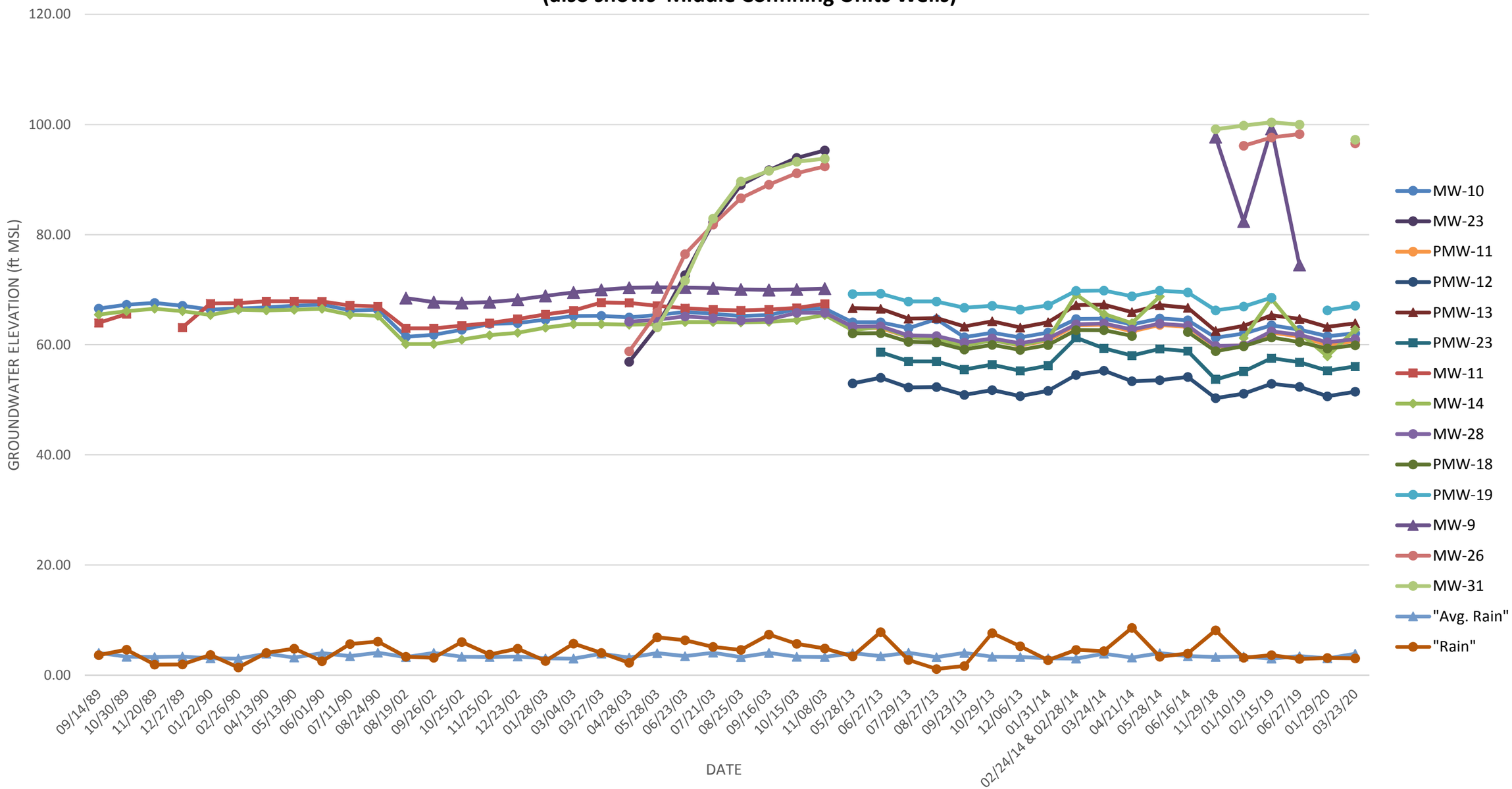


Table 6
Chesapeake Terrace
Slug Test Data for MCU Wells MW-23, MW-26, and MW-31

	PVC Elev.	Projected Statics	
		DTW	Elev.
MW-23	124.36	25	99.36
MW-26	110.08	14	96.08
MW-31	115.04	20	95.04

Date:		4/30/03	5/28/03	6/23/03	7/21/03	8/25/03	9/16/03	9/30/03	10/15/03	11/8/03
Days		0	28	54	82	117	139	153	168	192
MW-23	Elev.	56.91	63.32	72.65	82.18	89.04	91.72	92.83	93.94	95.29
	DTW	67.45	61.04	51.71	42.18	35.32	32.64	31.53	30.42	29.07
	Displacement	42.45	36.04	26.71	17.18	10.32	7.64	6.53	5.42	4.07
MW-26	Elev.	58.82	65.87	76.47	81.83	86.61	89.08	90.05	91.16	92.41
	DTW	51.26	44.21	33.61	28.25	23.47	21.00	20.03	18.92	17.67
	Displacement	37.26	30.21	19.61	14.25	9.47	7.00	6.03	4.92	3.67
MW-31	Elev.	56.24	63.17	71.66	82.90	89.65	91.61	92.42	93.26	93.80
	DTW	58.80	51.87	43.38	32.14	25.39	23.43	22.62	21.78	21.24
	Displacement	38.80	31.87	23.38	12.14	5.39	3.43	2.62	1.78	1.24

	MW-23	MW-26	MW-31
Well Depth	70	55	60
Initial Displacement [S(0)]=	42.45	37.26	38.8
Static Water Column Ht (H)=	45	41	40
Aquifer Sat. Thickness =	12	12	12
Screen Length (L) =	12	12	12
Total Depth Penetration (H)=	12	12	12
Casing Radius [r(c)] =	0.08	0.08	0.08
Well Radius [r(w)] =	0.25	0.25	0.25
Rad Well Skin [r(sk)] =	0.25	0.25	0.25
Por. Filter Pack (n) =	0.2	0.2	0.2

TABLE 7
Chesapeake Terrace
Water Levels in Residential Well AA94-3264
-Screened Below MCU

Date	Depth to Water (feet)	Elevation (ft msl)
9/30/2003	128.57	60.37
10/15/2003	127.68	61.26
11/8/2003	127.95	60.99
11/21/2003	127.62	61.32

TOC Elevation:	188.94
Grade Elevation:	188
Screen Depth (ft):	255-260
Screen Elevation (ft msl	-68 to -73

Table 8A
Chesapeake Terrace
Groundwater Analytical Results - Second Quarter 2013

Sample Location			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28		
Sample Name			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			FDGW_053013			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28		
Sample Date			6/12/2013			6/6/2013			5/29/2013			6/12/2013			5/30/2013			5/30/2013			6/4/2013			5/30/2013			5/30/2013			5/30/2013			5/30/2013			6/4/2013			5/31/2013			6/6/2013			6/4/2013		
N=Normal, FD=Field Duplicate			N			N			N			N			N			N			N			N			FD			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																															
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	< 2.7	U	2.7	100		2.7	< 2.7	U	2.7	13		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	1.8		0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.87	J	0.08	4.5		0.08	4.4		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	1		0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.19	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
n-Propylbenzene	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
o-Xylene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
sec-Butylbenzene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18

Table 8A
Chesapeake Terrace
Groundwater Analytical Results - Second Quarter 2013

Sample Location			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28		
Sample Name			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			FDGW_053013			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28		
Sample Date			6/12/2013			6/6/2013			5/29/2013			6/12/2013			5/30/2013			5/30/2013			6/4/2013			5/30/2013			5/30/2013			5/30/2013			5/30/2013			6/4/2013			5/31/2013			6/6/2013			6/4/2013		
N=Normal, FD=Field Duplicate			N			N			N			N			N			N			N			N			FD			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																															
Aluminum	NS	ug/L	2110		43.8	308		43.8	25300		43.8	1630		43.8	1220		43.8	35800		43.8	1450		43.8	1730		43.8	1750		43.8	12200		43.8	363		43.8	1790		43.8	391		43.8	213		43.8	1370		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	< 1.8	U	1.8	1.8	J	1.8	10.2		1.8	2.3	J	1.8	3.2		1.8	135		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	9		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	27.4		3.8	41.5		3.8	100		3.8	64.1		3.8	36.8		3.8	178		3.8	64.8		3.8	85.4		3.8	85.1		3.8	70.7		3.8	36.6		3.8	22.3		3.8	26.5		3.8	30.4		3.8	64.5		3.8
Beryllium	4	ug/L	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	2.6		0.8	1		0.8	1.5		0.8	2		0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	2.8		2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	18000		196	11300		196	5520		196	24100		196	2720		196	6150		196	1470		196	517		196	542		196	2610		196	2720		196	3820		196	2590		196	1290		196	5200		196
Chromium	100	ug/L	6.3		3.9	25.9		3.9	84.7		3.9	9.2		3.9	4.9	J	3.9	142		3.9	< 3.9	U	3.9	7.2		3.9	7.1		3.9	221		3.9	< 3.9	U	3.9	8.5		3.9	5.2		3.9	< 3.9	U	3.9	7.1		3.9
Cobalt	NS	ug/L	< 3.9	U	3.9	5.6		3.9	7.4		3.9	9.7		3.9	13.8		3.9	32.4		3.9	19.8		3.9	17.9		3.9	17.9		3.9	6.8		3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9
Copper	NS	ug/L	7.5		3.8	18.3		3.8	54.3		3.8	49		3.8	35		3.8	441		3.8	36.2		3.8	24.8		3.8	24.6		3.8	111		3.8	7.9		3.8	10.4		3.8	11.3		3.8	25.2		3.8	< 3.8	U	3.8
Iron	NS	ug/L	2030		119	1460		119	15500		119	4440		119	9460		119	163000		119	5550		119	379		119	354		119	17200		119	265		119	2030		119	239		119	3810		119	17000		119
Lead	NS	ug/L	3.8		1.2	5		1.2	19.1		1.2	2.7		1.2	9.6		1.2	51.9		1.2	1.5		1.2	2.9		1.2	2.8		1.2	11.4		1.2	< 1.2	U	1.2	< 1.2	U	1.2	1.5		1.2	4.7		1.2	< 1.2	U	1.2
Magnesium	NS	ug/L	383		197	1120		197	1990		197	1010		197	2500		197	10900		197	1320		197	844		197	843		197	2250		197	3210		197	4010		197	1590		197	999		197	1840		197
Manganese	NS	ug/L	36.4		8.1	102		8.1	202		8.1	42		8.1	202		8.1	315		8.1	155		8.1	83.1		8.1	83.8		8.1	81.3		8.1	100		8.1	36.5		8.1	21.6		8.1	77.6		8.1	117		8.1
Mercury	2	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	0.52		0.16	1.7		0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Nickel	NS	ug/L	< 4.1	U	4.1	25.7		4.1	42.2		4.1	17.9		4.1	27.3		4.1	18.9		4.1	28.4		4.1	13.5		4.1	13.3		4.1	156		4.1	< 4.1	U	4.1	6.9		4.1	5.8		4.1	7.9		4.1	4.3	J	4.1
Potassium	NS	ug/L	1510		202	1210		202	3890		202	2270		202	764		202	5510		202	692		202	885		202	894		202	2930		202	1180		202	1140		202	1400		202	721		202	1380		202
Selenium	50	ug/L	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	9.9		1.5	1.6	J	1.5	< 1.5	U	1.5	2.3	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.6	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	2010		193	1890		193	1240		193	2630		193	2620		193	1640		193	1580		193	1160		193	1150		193	1890		193	1760		193	1380		193	2380		193	1730		193	4840		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	9.1		3.8	< 3.8	U	3.8	60.1		3.8	12		3.8	< 3.8	U	3.8	264		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	36.6		3.8	< 3.8	U	3.8	4.6	J	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	73.1		19.7	172		19.7	191		19.7	52.4		19.7	68.3		19.7	209		19.7	68.8		19.7	57.3		19.7	58.6		19.7	142		19.7	26.7		19.7	< 19.7	U	19.7	24.1		19.7	41.8		19.7	< 19.7	U	19.7
General Chemistry																																															
Alkalinity, Total	NS	mg/L	41.3		0.79	27.8		0.79	15.8		5	93.1		0.79	< 5	U	5	14		5	< 5	UH	5	< 5	U	5	< 5	U	5	22.3		5	8.2		5	13	H	5	8.8		5	< 0.79	UH	0.79	26.9	H	5
Ammonia	NS	mg/L	< 0.08	U	0.08	< 0.08	U	0.08	0.15		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	35.4		8.7	< 8.7	U	8.7	103		8.7	39.6		8.7	23.1		8.7	560		87.1	< 8.7	U	8.7	12.9		8.7	< 8.7	U	8.7	56		8.7	< 8.7	U	8.7	< 8.7	U	8.7	19		8.7	14.9		8.7	< 8.7	U	8.7
Chloride	NS	mg/L	2.3		0.28	1.5		0.28	0.93		0.28	2.6		0.28	1.5		0.28	1.9		0.28	3.1		0.28	2.3		0.28	2.3		0.28	2.8		0.28	2		0.28	1.8		0.28	4.4		0.28	2.1		0.28	0.9		0.28
Hardness, Calcium Carbonate	NS	mg/L	47.3		1.6	37.4		1.6	29.6	B	8.1	70.9		1.6	118	B	8.1	197	JB	162	13.8		1.6	7.9	B	1.6	5.9	B	1.6	19.7	B	3.2	19.7	B	1.6	33.5		1.6	13.8	B	1.6	15.8		1.6	27.6		1.6
Nitrate as N	10	mg/L	< 0.047	U	0.047	0.083	J	0.047	< 0.047	U	0.047	< 0.047	U	0.047	< 0.047	U	0.047	1.4		0.047	< 0.047	U	0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.29		0.047	0.57		0.047	0.69		0.047	0.12		0.047	< 0.047	U	0.047	< 0.047	U	0.047
Phosphorus (as phosphate)	NS	mg/L	0.14		0.016	< 0.016	U	0.016	< 0.08	U	0.08	2.4		0.032	0.1		0.016	1.3		0.032	1.5		0.016	0.071		0.016	0.054		0.016	0.22		0.016	0.041		0.016	0.28		0.016	0.27		0.016	< 0.016	U	0.016	1.5		0.016
Sulfate	NS	mg/L	3.9	B	0.35	18		0.35	4.7		0.35	13.1	B	0.35	24.6		0.35	20.3		0.35	24.9		0.35	10.3		0.35	9.5		0.35	9		0.35	10.9		0.35	13.2		0.35	4.4	B	0.35	15		0.35	7.5		0.35
Total Dissolved Solids	NS	mg/L	51		8.1	57		8.1	42		8.1	68		8.1	50		8.1	84		8.1	57		8.1	23		8.1	22		8.1	18		8.1	38		8.1	77		8.1	18		8.1	45		8.1	54		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
mg/L - milligrams per liter
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8A
Chesapeake Terrace
Groundwater Analytical Results - Second Quarter 2013

Sample Location			MW-29			MW-30			MW-3			MW-4			MW-4			MW-5			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Name			MW-29			MW-30			MW-3			MW-4			FDGW-060513			MW-5			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Date			6/6/2013			5/31/2013			6/5/2013			6/5/2013			6/5/2013			5/31/2013			6/6/2013			6/4/2013			5/29/2013			5/30/2013			6/4/2013			6/4/2013			6/12/2013			6/5/2013			6/5/2013		
N=Normal, FD=Field Duplicate			N			N			N			N			FD			N			N			N			N			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																															
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	0.28	J	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U*	0.17	< 0.17	U*	0.17	< 0.17	U*	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U*	0.17	< 0.17	U*	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.76	J	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	0.21	J	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	1.5		0.14	0.51	J	0.14	0.41	J	0.14	0.68	J	0.14	0.77	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
n-Propylbenzene	NS	ug/L	< 0.1	U	0.1	0.11	J	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
o-Xylene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
sec-Butylbenzene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18

Table 8A
Chesapeake Terrace
Groundwater Analytical Results - Second Quarter 2013

Sample Location			MW-29			MW-30			MW-3			MW-4			MW-4			MW-5			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Name			MW-29			MW-30			MW-3			MW-4			FDGW-060513			MW-5			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Date			6/6/2013			5/31/2013			6/5/2013			6/5/2013			6/5/2013			5/31/2013			6/6/2013			6/4/2013			5/29/2013			5/30/2013			6/4/2013			6/4/2013			6/12/2013			6/5/2013			6/5/2013		
N=Normal, FD=Field Duplicate			N			N			N			N			FD			N			N			N			N			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																															
Aluminum	NS	ug/L	542		43.8	1250		43.8	52.6		43.8	80.4		43.8	104		43.8	268		43.8	< 438	U	438	48300		438	1220		43.8	8280		43.8	2950		43.8	9550		43.8	2420		43.8	521		43.8	62.2		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 19.1	U	19.1	< 19.1	U	19.1	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	2.7		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 18.2	U	18.2	26.8		18.2	< 1.8	U	1.8	< 1.8	U	1.8	2	J	1.8	2.4	J	1.8	1.9	J	1.8	2.2	J	1.8	< 1.8	U	1.8
Barium	2000	ug/L	22.7		3.8	27.3		3.8	27.8		3.8	47		3.8	42.8		3.8	11		3.8	216		38.5	386		38.5	21.3		3.8	36.5		3.8	40.6		3.8	99.8		3.8	34.6		3.8	14.8		3.8	32.2		3.8
Beryllium	4	ug/L	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 8	U	8	< 8	U	8	< 0.8	U	0.8	< 0.8	U	0.8	1.3		0.8	2.6		0.8	1.2		0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 19.7	U	19.7	< 19.7	U	19.7	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	1070		196	2320		196	2120		196	2210		196	2080		196	2600		196	26100		1960	12100		1960	2090		196	1570		196	1570		196	2390		196	1060		196	4470		196	3180		196
Chromium	100	ug/L	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	4.2	J	3.9	4.2	J	3.9	< 38.7	U	38.7	173		38.7	16.6		3.9	14		3.9	9.8		3.9	43.9		3.9	14.7		3.9	11.4		3.9	< 3.9	U	3.9
Cobalt	NS	ug/L	4.3	J	3.9	< 3.9	U	3.9	< 3.9	U	3.9	4.7	J	3.9	4.7	J	3.9	< 3.9	U	3.9	< 38.8	U	38.8	44.6	J	38.8	< 3.9	U	3.9	8.7		3.9	10.8		3.9	5.2		3.9	7		3.9	< 3.9	U	3.9	< 3.9	U	3.9
Copper	NS	ug/L	9.7		3.8	< 3.8	U	3.8	8.1		3.8	13.7		3.8	14.3		3.8	10.8		3.8	63.5		38.4	107		38.4	17.3		3.8	13.7		3.8	9.8		3.8	18.5		3.8	8.7		3.8	< 3.8	U	3.8	< 3.8	U	3.8
Iron	NS	ug/L	1680		119	1700		119	< 119	U	119	208		119	227		119	166		119	< 1190	U	1190	132000		1190	3150		119	4210		119	5200		119	17300		119	4700		119	497		119	< 119	U	119
Lead	NS	ug/L	1.2	J	1.2	< 1.2	U	1.2	< 1.2	U	1.2	1.5		1.2	1.5		1.2	2.3		1.2	< 11.7	U	11.7	40.2		11.7	6.8		1.2	6.5		1.2	2.7		1.2	10.7		1.2	2.7		1.2	< 1.2	U	1.2	< 1.2	U	1.2
Magnesium	NS	ug/L	679		197	2590		197	2400		197	2940		197	2950		197	1470		197	17400		1970	6280		1970	871		197	761		197	738		197	1130		197	596		197	1040		197	2050		197
Manganese	NS	ug/L	19.8		8.1	25.2		8.1	13.4		8.1	20.9		8.1	22.1		8.1	11.2		8.1	111		80.5	445		80.5	46.2		8.1	41.4		8.1	64.9		8.1	85.1		8.1	46.6		8.1	55.6		8.1	62.3		8.1
Mercury	2	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Nickel	NS	ug/L	12.2		4.1	< 4.1	U	4.1	5.1		4.1	7.7		4.1	5.9		4.1	4.5	J	4.1	48.6	J	41.2	113		41.2	12.9		4.1	11.8		4.1	12.1		4.1	13.6		4.1	9.8		4.1	9		4.1	< 4.1	U	4.1
Potassium	NS	ug/L	1340		202	1600		202	933		202	985		202	985		202	858		202	11000		2020	24200		2020	1520		202	1840		202	1610		202	4850		202	1830		202	706		202	1120		202
Selenium	50	ug/L	< 1.5	U	1.5	< 1.5	U	1.5	1.5	J	1.5	1.6	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 14.5	U	14.5	24.8	J	14.5	< 1.5	U	1.5	< 1.5	U	1.5	2	J	1.5	2.7		1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.5	J	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 40.7	U	40.7	< 40.7	U	40.7	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	5630		193	2680		193	2280		193	2370		193	2550		193	3930		193	25800		1930	13700		1930	2210		193	2890		193	2340		193	9300		193	2500		193	52500		193	1900		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 7.9	U	7.9	< 7.9	U	7.9	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	< 3.8	U	3.8	4.4	J	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 38.4	U	38.4	231		38.4	< 3.8	U	3.8	14.2		3.8	13.8		3.8	74.8		3.8	13.3		3.8	< 3.8	U	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	55.3		19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 197	U	197	222		197	199		19.7	37.8		19.7	22.4		19.7	36.3		19.7	25.4		19.7	< 19.7	U	19.7	< 19.7	U	19.7
General Chemistry																																															
Alkalinity, Total	NS	mg/L	4	JH	0.79	21.4		5	< 5	U	5	5.1		5	< 5	U	5	9.3		5	7.7	H	0.79	< 5	UH	5	< 5	U	5	< 5	U	5	< 5	UH	5	5.4	H	5	2.4	J	0.79	75.4		5	7.1		5
Ammonia	NS	mg/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.14		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	12.9		8.7	37.5		8.7	< 8.7	U	8.7	29.3		8.7	23.1		8.7	31.3		8.7	8.8	J	8.7	10.8		8.7	21.1		8.7	8.8	J	8.7	< 8.7	U	8.7	41.6		8.7	17		8.7	< 8.7	U	8.7	14.9		8.7
Chloride	NS	mg/L	3.2		0.28	1.7		0.28	4.8		0.28	4.2		0.28	4.2		0.28	6.2		0.28	4.1		0.28	1.5		0.28	1.2		0.28	1.8		0.28	1.4		0.28	2.9		0.28	2.4		0.28	7		0.28	3.3		0.28
Hardness, Calcium Carbonate	NS	mg/L	7.9		1.6	17.7	B	1.6	19.7		1.6	19.7		1.6	21.7		1.6	13.8	B	1.6	17.7		1.6	98.5		16.2	17.7	B	1.6	7.9	JB	3.2	69		8.1	69		8.1	11.8		3.2	15.8		1.6	19.7		1.6
Nitrate as N	10	mg/L	< 0.047	U	0.047	< 0.047	U	0.047	0.28		0.047	0.15		0.047	0.16		0.047	0.46		0.047	0.25		0.047	< 0.047	U	0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.25		0.047	< 0.047	U	0.047	0.45		0.047	0.35		0.047	< 0.047	U	0.047
Phosphorus (as phosphate)	NS	mg/L	< 0.016	U	0.016	< 0.032	U	0.032	0.92		0.016	< 0.016	U	0.016	< 0.016	U	0.016	1		0.016	0.02	J	0.016	2.9		0.16	0.43		0.016	0.088		0.016	0.5		0.016	3.5		0.16	1.9		0.032	< 0.016	U	0.016	0.029	J	0.016
Sulfate	NS	mg/L	11.8		0.35	7.6	B	0.35	11.2		0.35	12.7		0.35	13		0.35	4.3	B	0.35	6.4		0.35	4.4		0.35	11.7		0.35	10.2		0.35	7.4		0.35	14.1		0.35	1.9	JB	0.35	49.6		0.35	11.1		0.35
Total Dissolved Solids	NS	mg/L	35		8.1	< 8.1	U	8.1	26		8.1	27		8.1	31		8.1	22		8.1	39		8.1	123		8.1	12		8.1	27		8.1	45		8.1	418		8.1	28		8.1	181		8.1	18		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
mg/L - milligrams per liter
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8B
Chesapeake Terrace
Groundwater Analytical Results - Third Quarter 2013

		Sample Location	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-22			MW-24			MW-25			MW-27			MW-28		
		Sample Name	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-22FD			MW-24			MW-25			MW-27			MW-28		
		Sample Date	7/30/2013			7/31/2013			8/5/2013			8/6/2013			8/5/2013			8/7/2013			8/2/2013			7/31/2013			8/5/2013			8/7/2013			8/7/2013			8/2/2013			8/7/2013			8/1/2013			8/1/2013		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			N			N			N			N			N			FD			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																															
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	110		2.7	1000		2.7	< 2.7	U	2.7	44		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	24		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	0.24	J	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	2.5		0.08	< 0.08	U	0.08	< 0.08	U	0.08	1.7		0.08	4.3		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U*	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U*	0.22	< 0.22	U	0.22	< 0.22	U*	0.22	< 0.22	U*	0.22	< 0.22	U*	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.21	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
n-Propylbenzene	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
o-Xylene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
sec-Butylbenzene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18

Table 8B
Chesapeake Terrace
Groundwater Analytical Results - Third Quarter 2013

		Sample Location	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-22			MW-24			MW-25			MW-27			MW-28		
		Sample Name	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-22FD			MW-24			MW-25			MW-27			MW-28		
		Sample Date	7/30/2013			7/31/2013			8/5/2013			8/6/2013			8/5/2013			8/7/2013			8/2/2013			7/31/2013			8/5/2013			8/7/2013			8/7/2013			8/2/2013			8/7/2013			8/1/2013			8/1/2013		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			N			N			N			N			N			FD			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																															
Aluminum	NS	ug/L	1140		43.8	450		43.8	2890		43.8	8370		43.8	6400		43.8	43300		43.8	2350		43.8	1540		43.8	17500		43.8	175		43.8	185		43.8	112		43.8	942		43.8	54.8		43.8	193		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	< 1.8	U	1.8	< 1.8	U	1.8	7.2		1.8	7.7		1.8	11.5		1.8	166		1.8	< 1.8	U	1.8	< 1.8	U	1.8	30.7		1.8	2	J	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	18.4		3.8	22.4		3.8	111		3.8	199		3.8	54.8		3.8	156		3.8	69.8		3.8	91		3.8	104		3.8	32.9		3.8	31.7		3.8	20.8		3.8	26.6		3.8	32.2		3.8	58.1		3.8
Beryllium	4	ug/L	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	2.2		0.8	0.82	J	0.8	3.9		0.8	1.9		0.8	2.3		0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	4.9		2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	16100		196	21300		196	19400		196	68200		196	4510		196	4940		196	1090		196	820		196	2430		196	2490		196	2360		196	4200		196	2670		196	3160		196	5690		196
Chromium	100	ug/L	< 3.9	U	3.9	12.4		3.9	46.2		3.9	46		3.9	12.3		3.9	207		3.9	10		3.9	18.3		3.9	204		3.9	7.3		3.9	< 3.9	U	3.9	< 3.9	U	3.9	7		3.9	< 3.9	U	3.9	5.5		3.9
Cobalt	NS	ug/L	< 3.9	U	3.9	14.8		3.9	22.1		3.9	15.9		3.9	12.1		3.9	30.3		3.9	22.1		3.9	24.8		3.9	8.7		3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9
Copper	NS	ug/L	< 3.8	U	3.8	7.4		3.8	51.1		3.8	68.8		3.8	16.4		3.8	630		3.8	37.9		3.8	22		3.8	84.7		3.8	17.4		3.8	8.3		3.8	5.2		3.8	7.8		3.8	4.3	J	3.8	< 3.8	U	3.8
Iron	NS	ug/L	754		119	3630		119	11100		119	24600		119	26300		119	255000		119	21000		119	247		119	50200		119	1210		119	232		119	407		119	227		119	432		119	17600		119
Lead	NS	ug/L	1.4	J	1.2	6.5		1.2	7.6		1.2	15.9		1.2	6.6		1.2	57.8		1.2	2.1		1.2	2.4		1.2	19.7		1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2
Magnesium	NS	ug/L	283		197	1940		197	1970		197	1450		197	2600		197	9390		197	1260		197	1160		197	2940		197	3010		197	3100		197	4200		197	1520		197	1150		197	2090		197
Manganese	NS	ug/L	16.8		8.1	410		8.1	689		8.1	97.4		8.1	186		8.1	223		8.1	181		8.1	76.2		8.1	88.6		8.1	81		8.1	80.5		8.1	32.3		8.1	21.6		8.1	81.7		8.1	126		8.1
Mercury	2	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	0.43		0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Nickel	NS	ug/L	5.3		4.1	12.8		4.1	31.5		4.1	25.3		4.1	21.8		4.1	27.1		4.1	20.7		4.1	41.2		4.1	61.3		4.1	5.6		4.1	4.8	J	4.1	< 4.1	U	4.1	7.8		4.1	4.4	J	4.1	< 4.1	U	4.1
Potassium	NS	ug/L	817		202	3510		202	1770		202	3150		202	1100		202	5300		202	655		202	659		202	3790		202	1100		202	1040		202	963		202	1280		202	941		202	1320		202
Selenium	50	ug/L	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.7	J	1.5	< 1.5	U	1.5	8		1.5	2.2	J	1.5	< 1.5	U	1.5	2.7		1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	1930		193	1100		193	1040		193	1750		193	2350		193	2080		193	1920		193	1630		193	2060		193	1820		193	1890		193	1940		193	2390		193	1850		193	4830		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	4.7	J	3.8	< 3.8	U	3.8	18.7		3.8	64.2		3.8	15.3		3.8	385		3.8	< 3.8	U	3.8	< 3.8	U	3.8	130		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	25.1		19.7	118		19.7	178		19.7	96.9		19.7	59.4		19.7	218		19.7	121		19.7	72.6		19.7	69.8		19.7	26.4		19.7	< 19.7	U	19.7	21.6		19.7	< 19.7	U	19.7	47.7		19.7	< 19.7	U	19.7
General Chemistry																																															
Alkalinity, Total	NS	mg/L	36		5	63.5		5	58.5		5	110		5	< 5	U	5	21.4		5	< 5	U	5	< 5	U	5	< 5	U	5	9		5	8.6		5	11.5		5	8.7		5	5		5	32.9		5
Ammonia	NS	mg/L	< 0.08	U	0.08	0.14		0.08	0.55		0.08	< 0.08	U	0.08	0.08	J	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	< 8.7	U	8.7	33.4		8.7	97		8.7	43.7		8.7	19		8.7	53.9		8.7	8.8	J	8.7	10.8		8.7	41.6		8.7	< 8.7	U	8.7	< 8.7	U	8.7	8.8	J	8.7	< 8.7	U	8.7	12.9		8.7	12.9		8.7
Chloride	NS	mg/L	2.3		0.28	0.72		0.28	1	B	0.28	2.5		0.28	1.9	B	0.28	2.3		0.28	2.7		0.28	2.6		0.28	2.9	B	0.28	1.9		0.28	2		0.28	2.8		0.28	4.3		0.28	2		0.28	1		0.28
Hardness, Calcium Carbonate	NS	mg/L	25.6		1.6	67.3		1.6	99		8.1	208		8.1	39.6		8.1	99	J	32.4	19.8		1.6	11.9		1.6	49.5		8.1	21.8		1.6	19.8		1.6	45.5		1.6	13.9		1.6	15.8		1.6	49.5		8.1
Nitrate as N	10	mg/L	< 0.047	U	0.047	0.09	J	0.047	< 0.047	U	0.047	0.058	J	0.047	< 0.047	U	0.047	0.6		0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.41		0.047	0.3		0.047	0.3		0.047	0.49		0.047	0.07	J	0.047	0.05	J	0.047	< 0.047	U	0.047
Phosphorus (as phosphate)	NS	mg/L	0.02	J	0.016	< 0.016	U	0.016	0.26		0.016	0.74		0.016	0.86		0.016	0.29		0.016	1		0.016	1		0.016	0.54		0.016	1.1		0.016	0.57		0.016	2.1		0.032	1.1		0.016	< 0.016	U	0.016	0.75		0.016
Sulfate	NS	mg/L	3.3		0.35	4		0.35	3	B	0.35	12.9		0.35	20.2	B	0.35	18.4		0.35	14.7		0.35	12.5		0.35	7.6	B	0.35	12.7		0.35	13.1		0.35	12.8		0.35	5.6		0.35	9.3		0.35	7.9		0.35
Total Dissolved Solids	NS	mg/L	71		8.1	84		8.1	87		8.1	161		8.1	47		8.1	104		16.2	51		8.1	< 8.1	U	8.1	24		8.1	45		8.1	54		8.1	67		8.1	48		8.1	28		8.1	50		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
mg/L - milligrams per liter
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8B
Chesapeake Terrace
Groundwater Analytical Results - Third Quarter 2013

		Sample Location	MW-29			MW-30			MW-3			MW-4			MW-5			MW-5			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-19			PMW-23			PMW-28			PMW-6		
		Sample Name	MW-29			MW-30			MW-3			MW-4			MW-5			FDGW_073013			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			FDGW_080113			PMW-23			PMW-28			PMW-6		
		Sample Date	7/31/2013			8/5/2013			7/30/2013			7/30/2013			7/30/2013			7/30/2013			7/31/2013			8/8/2013			8/6/2013			8/8/2013			8/1/2013			8/1/2013			8/1/2013			8/7/2013			7/31/2013			7/30/2013		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			FD			N			N			N			N			N			N			FD			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																																			
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	10		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	6.4		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U*	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.14	J	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U*	0.22	< 0.22	U*	0.22	< 0.22	U*	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U*	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	1.5		0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.65	J	0.14	0.75	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.34	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.

Table 8B
Chesapeake Terrace
Groundwater Analytical Results - Third Quarter 2013

		Sample Location	MW-29			MW-30			MW-3			MW-4			MW-5			MW-5			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-19			PMW-23			PMW-28			PMW-6		
		Sample Name	MW-29			MW-30			MW-3			MW-4			MW-5			FDGW_073013			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			FDGW_080113			PMW-23			PMW-28			PMW-6		
		Sample Date	7/31/2013			8/5/2013			7/30/2013			7/30/2013			7/30/2013			7/30/2013			7/31/2013			8/8/2013			8/6/2013			8/8/2013			8/1/2013			8/1/2013			8/1/2013			8/7/2013			7/31/2013			7/30/2013		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			FD			N			N			N			N			N			N			FD			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																																			
Aluminum	NS	ug/L	1910		43.8	2770		43.8	66.4		43.8	203		43.8	91.8		43.8	68.3		43.8	< 43.8	U	43.8	20500		43.8	226		43.8	1220		43.8	3550		43.8	1030		43.8	1190		43.8	351		43.8	201		43.8	218		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	2.8		1.8	3.4		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	3.9		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	32.2		3.8	40.1		3.8	30.4		3.8	47.1		3.8	9.8		3.8	9.6		3.8	22.5		3.8	75		3.8	21		3.8	13.8		3.8	39.9		3.8	24.1		3.8	26.1		3.8	10.6		3.8	35.1		3.8	31.6		3.8
Beryllium	4	ug/L	0.82	J	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	2.1		0.8	< 0.8	U	0.8	< 0.8	U	0.8	1.5		0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	2720		196	2890		196	2700		196	2290		196	2360		196	2370		196	3060		196	963		196	2550		196	1400		196	2440		196	2070		196	1990		196	1080		196	5500		196	3250		196
Chromium	100	ug/L	8.8		3.9	17.6		3.9	< 3.9	U	3.9	5.3		3.9	35.5		3.9	20.9		3.9	< 3.9	U	3.9	29.7		3.9	12		3.9	8.5		3.9	6.1		3.9	7.3		3.9	9.3		3.9	14.8		3.9	24.2		3.9	< 3.9	U	3.9
Cobalt	NS	ug/L	7.6		3.9	< 3.9	U	3.9	< 3.9	U	3.9	4.2	J	3.9	4.7	J	3.9	4.5	J	3.9	< 3.9	U	3.9	12.3		3.9	< 3.9	U	3.9	5.1		3.9	13.1		3.9	< 3.9	U	3.9	< 3.9	U	3.9	8.8		3.9	< 3.9	U	3.9	< 3.9	U	3.9
Copper	NS	ug/L	5.9		3.8	12.6		3.8	4.2	J	3.8	10.7		3.8	10.1		3.8	6.1		3.8	< 3.8	U	3.8	10.1		3.8	7.1		3.8	8.5		3.8	12.3		3.8	8.8		3.8	9.5		3.8	14.1		3.8	4.1	J	3.8	< 3.8	U	3.8
Iron	NS	ug/L	2820		119	8690		119	< 119	U	119	121	J	119	335		119	237		119	< 119	U	119	14800		119	4670		119	1820		119	2360		119	8540		119	8730		119	371		119	294		119	140	J	119
Lead	NS	ug/L	3.1		1.2	4.3		1.2	< 1.2	U	1.2	< 1.2	U	1.2	1.2	J	1.2	< 1.2	U	1.2	< 1.2	U	1.2	6.9		1.2	< 1.2	U	1.2	2.1		1.2	3.4		1.2	1.4	J	1.2	1.5		1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2
Magnesium	NS	ug/L	716		197	2700		197	2540		197	3010		197	1400		197	1390		197	1690		197	921		197	1020		197	605		197	1090		197	616		197	636		197	415		197	1090		197	2080		197
Manganese	NS	ug/L	17.4		8.1	64.3		8.1	14.9		8.1	23.4		8.1	11.6		8.1	12.4		8.1	9.1	J	8.1	40.2		8.1	50.8		8.1	28.3		8.1	84.9		8.1	102		8.1	102		8.1	45.4		8.1	171		8.1	28.8		8.1
Mercury	2	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Nickel	NS	ug/L	17		4.1	< 4.1	U	4.1	5		4.1	9.8		4.1	52.7		4.1	26.4		4.1	< 4.1	U	4.1	21.4		4.1	7.2		4.1	15.9		4.1	15.9		4.1	< 4.1	U	4.1	4.3	J	4.1	22		4.1	16.8		4.1	< 4.1	U	4.1
Potassium	NS	ug/L	2160		202	1930		202	970		202	853		202	807		202	704		202	1070		202	4570		202	1260		202	768		202	1150		202	1100		202	1170		202	716		202	676		202	1160		202
Selenium	50	ug/L	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.8	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.5	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	5400		193	2330		193	2550		193	2040		193	4050		193	3920		193	2430		193	1420		193	1980		193	1620		193	2500		193	5500		193	5530		193	1810		193	17900		193	1820		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	7.5		3.8	16.3		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	40		3.8	< 3.8	U	3.8	< 3.8	U	3.8	6.4		3.8	10		3.8	12.1		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	176		19.7	36.7		19.7	< 19.7	U	19.7	42.1		19.7	< 19.7	U	19.7	20.4		19.7	< 19.7	U	19.7	44.3		19.7	35.3		19.7	20.2		19.7	23.8		19.7	35.1		19.7	36.8		19.7	38.8		19.7	< 19.7	U	19.7	< 19.7	U	19.7
General Chemistry																																																			
Alkalinity, Total	NS	mg/L	5.2		5	14.3		5	5.2		5	5.8		5	10.4		5	5.2		5	8.2		5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	8.7		5	5.5		5	< 5	U	5	41.9		5	6.1		5
Ammonia	NS	mg/L	< 0.08	U	0.08	0.38		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.13		0.08	0.11		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	14.9		8.7	27.2		8.7	< 8.7	U	8.7	< 8.7	U	8.7	< 8.7	U	8.7	< 8.7	U	8.7	< 8.7	U	8.7	14.9		8.7	< 8.7	U	8.7	< 8.7	U	8.7	12.9		8.7	29.3		8.7	23.1		8.7	< 8.7	U	8.7	< 8.7	U	8.7	< 8.7	U	8.7
Chloride	NS	mg/L	2.9		0.28	2.3	B	0.28	4.8		0.28	3.5		0.28	6.1		0.28	5.9		0.28	3.9		0.28	1.6		0.28	1.2		0.28	2		0.28	1.3		0.28	2.2		0.28	2.2		0.28	2.5		0.28	6.6		0.28	3.1		0.28
Hardness, Calcium Carbonate	NS	mg/L	11.9		1.6	29.7		8.1	19.7		1.6	19.7		1.6	33.5		1.6	13.8		1.6	17.8		1.6	9.9	J	8.1	13.9		1.6	7.9		1.6	19.8	J	8.1	29.7		8.1	29.7		8.1	7.9		1.6	25.7		1.6	21.7		1.6
Nitrate as N	10	mg/L	< 0.047	U	0.047	0.047	J	0.047	0.35		0.047	0.079	J	0.047	0.45		0.047	0.38		0.047	0.28		0.047	0.078	J	0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.31		0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.52		0.047	0.21		0.047	0.068	J	0.047
Phosphorus (as phosphate)	NS	mg/L	1.5		0.016	0.35		0.016	0.21		0.016	0.28		0.016	2.2		0.032	0.02	J	0.016	< 0.016	U	0.016	0.31		0.016	0.19		0.016	0.099		0.016	< 0.016	U	0.016	1.2		0.016	< 0.016	U	0.016	1.4		0.016	0.02	J	0.016	0.57		0.016
Sulfate	NS	mg/L	8.3		0.35	5.1	B	0.35	9.6		0.35	12.8		0.35	4.6		0.35	4.4		0.35	5		0.35	17.6		0.35	17		0.35	17		0.35	4.9		0.35	13.5		0.35	14		0.35	3.6		0.35	11.2		0.35	9.7		0.35
Total Dissolved Solids	NS	mg/L	22		8.1	40		8.1	45		8.1	36		8.1	41		8.1	14		8.1	32		8.1	127		8.1	32		8.1	15		8.1	30		8.1	161		8.1	143		8.1	34		8.1	57		8.1	23		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
mg/L - milligrams per liter
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8C
Chesapeake Terrace
Groundwater Analytical Results - Fourth Quarter 2013

Sample Location			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-24			MW-25			MW-27			MW-28		
Sample Name			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			FDGW_93013			MW-25			MW-27			MW-28		
Sample Date			9/24/2013			9/24/2013			9/26/2013			10/1/2013			9/25/2013			9/25/2013			9/25/2013			9/26/2013			9/26/2013			10/1/2013			9/30/2013			9/30/2013			9/30/2013			9/25/2013			9/24/2013		
N=Normal, FD=Field Duplicate			N			N			N			N			N			N			N			N			N			N			N			FD			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																															
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U*	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U*	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U*	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	1700		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	19		2.7	42		2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U*	1.3	< 1.3	U*	1.3	< 1.3	U*	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	0.18	J	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	2		0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.99	J	0.08	5.3		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U*	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.93	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.16	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
n-Propylbenzene	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
o-Xylene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
sec-Butylbenzene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18

Table 8C
Chesapeake Terrace
Groundwater Analytical Results - Fourth Quarter 2013

Sample Location			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-24			MW-25			MW-27			MW-28		
Sample Name			MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			FDGW_93013			MW-25			MW-27			MW-28		
Sample Date			9/24/2013			9/24/2013			9/26/2013			10/1/2013			9/25/2013			9/25/2013			9/25/2013			9/26/2013			9/26/2013			10/1/2013			9/30/2013			9/30/2013			9/30/2013			9/25/2013			9/24/2013		
N=Normal, FD=Field Duplicate			N			N			N			N			N			N			N			N			N			N			N			FD			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																															
Aluminum	NS	ug/L	3480		43.8	646		43.8	14400		43.8	1920		43.8	47200		43.8	43800		43.8	1260		43.8	1660		43.8	5920		43.8	269		43.8	121		43.8	145		43.8	302		43.8	330		43.8	476		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	2	J	1.8	2	J	1.8	14.8		1.8	2.5		1.8	34.2		1.8	104		1.8	1.8	J	1.8	< 1.8	U	1.8	10.2		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	40.5		3.8	29.1		3.8	321		3.8	88.8		3.8	163		3.8	149		3.8	55.4		3.8	90.5		3.8	53.3		3.8	31.8		3.8	15.7		3.8	16.2		3.8	22.9		3.8	39.1		3.8	67.9		3.8
Beryllium	4	ug/L	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	1.1		0.8	2.4		0.8	2.8		0.8	0.97	J	0.8	2.6		0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	13.7		2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	31700		196	12700		196	43300		196	20900		196	4180		196	5660		196	1680		196	454		196	2150		196	2180		196	3250		196	3210		196	2340		196	1350		196	6010		196
Chromium	100	ug/L	6.2		3.9	< 3.9	U	3.9	74.5		3.9	6.6		3.9	60.5		3.9	186		3.9	< 3.9	U	3.9	< 3.9	U	3.9	32.7		3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	14.1		3.9	< 3.9	U	3.9
Cobalt	NS	ug/L	< 3.9	U	3.9	13.2		3.9	29.8		3.9	13		3.9	18.7		3.9	28.3		3.9	17.8		3.9	20.1		3.9	4.5	J	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	4.8	J	3.9	< 3.9	U	3.9
Copper	NS	ug/L	8		3.8	5.7		3.8	85.4		3.8	20.9		3.8	65.4		3.8	485		3.8	14.1		3.8	16.6		3.8	22.1		3.8	4.4	J	3.8	3.9	J	3.8	3.8	J	3.8	< 3.8	U	3.8	41.1		3.8	< 3.8	U	3.8
Iron	NS	ug/L	2570		119	6740		119	29400		119	3940		119	85400		119	207000		119	9430		119	479		119	17000		119	326		119	240		119	245		119	166		119	4980		119	18900		119
Lead	NS	ug/L	5.3		1.2	4.7		1.2	32.5		1.2	3.6		1.2	27.9		1.2	55		1.2	< 1.2	U	1.2	< 1.2	U	1.2	5.9		1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2	1.7		1.2	< 1.2	U	1.2
Magnesium	NS	ug/L	645		197	1320		197	2760		197	1110		197	6070		197	11300		197	1350		197	971		197	2160		197	2830		197	3240		197	3170		197	1410		197	864		197	2280		197
Manganese	NS	ug/L	46.4		8.1	325		8.1	965		8.1	55		8.1	272		8.1	235		8.1	130		8.1	73		8.1	61.9		8.1	71.9		8.1	24.5		8.1	24.8		8.1	19.8		8.1	99.7		8.1	135		8.1
Mercury	2	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	0.54		0.16	0.59		0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Nickel	NS	ug/L	6.7		4.1	7.1		4.1	35.3		4.1	19.7		4.1	43.8		4.1	27.2		4.1	28.1		4.1	13.4		4.1	11.1		4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	14.7		4.1	< 4.1	U	4.1
Potassium	NS	ug/L	1380		202	2210		202	3750		202	1510		202	3500		202	5540		202	784		202	691		202	2110		202	1060		202	963		202	946		202	1210		202	1000		202	1480		202
Selenium	50	ug/L	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	2.1	J	1.5	7.3		1.5	8.4		1.5	2.8		1.5	1.9	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	3.4		1.5	2	J	1.5	< 1.5	U	1.5	1.8	J	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	2160		193	1940		193	1820		193	1400		193	2690		193	1850		193	1720		193	1380		193	2130		193	1590		193	1260		193	1230		193	2300		193	2260		193	5060		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	0.81	J	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	10		3.8	4.2	J	3.8	88.6		3.8	10.7		3.8	96.4		3.8	333		3.8	< 3.8	U	3.8	< 3.8	U	3.8	37.6		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	4.5	J	3.8
Zinc	NS	ug/L	99.8		19.7	113		19.7	359		19.7	40		19.7	108		19.7	180		19.7	58.2		19.7	81.9		19.7	30		19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	192		19.7	< 19.7	U	19.7
General Chemistry																																															
Alkalinity, Total	NS	mg/L	65		0.79	37.6		0.79	57.7		0.79	33.3		5	< 0.79	U	0.79	23.7		0.79	< 0.79	U	0.79	< 0.79	U	0.79	3.3	J	0.79	8.1		5	9.3		5	9.1		5	6.7		5	< 0.79	U	0.79	33.3		0.79
Ammonia	NS	mg/L	< 0.08	U	0.08	< 0.08	U	0.08	0.16		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	32.6		4.8	26.5		4.8	116		4.8	44.8		4.8	102		4.8	56.9		4.8	8.3	J	4.8	12.3		4.8	67.1		4.8	6.3	J	4.8	8.3	J	4.8	18.4		4.8	10.3		4.8	22.5		4.8	20.4		4.8
Chloride	NS	mg/L	2.2	B	0.28	0.98	B	0.28	1.4		0.28	2.4	B	0.28	1.9		0.28	1.9		0.28	2.9		0.28	2.3		0.28	2.9		0.28	1.9	B	0.28	1.8		0.28	1.8		0.28	4.2		0.28	2.4		0.28	1.1	B	0.28
Hardness, Calcium Carbonate	NS	mg/L	77.2		1.6	37.6		1.6	111		1.6	43.6		1.6	25.7		1.6	57.4		1.6	9.9		1.6	4	J	1.6	9.9		1.6	17.8		1.6	17.8		1.6	19.8		1.6	7.9		1.6	5.9		1.6	23.8		1.6
Nitrate as N	10	mg/L	< 0.047	U	0.047	< 0.047	U	0.047	0.19		0.047	0.093	J	0.047	< 0.047	U	0.047	1.1		0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.089	J	0.047	0.28		0.047	< 0.047	UH	0.047	< 0.047	UH	0.047	0.092	JH	0.047	1.5		0.047	< 0.047	U	0.047
Phosphorus (as phosphate)	NS	mg/L	0.74		0.016	0.8		0.016	0.94		0.016	< 0.016	U	0.016	1.8		0.032	1		0.016	0.43		0.016	1.4		0.016	1.4		0.016	2.4		0.032	0.57		0.016	0.032		0.016	0.21		0.016	0.29		0.016	0.58		0.016
Sulfate	NS	mg/L	2.6		0.35	6.1		0.35	6.5		0.35	11.3		0.35	39.3		0.35	21.6		0.35	27		0.35	25.8		0.35	12.7		0.35	9.3		0.35	14		0.35	14		0.35	6.3		0.35	295		1.7	4.9		0.35
Total Dissolved Solids	NS	mg/L	100		8.1	70		8.1	135		8.1	71		8.1	68		8.1	100		8.1	41		8.1	48		8.1	49		8.1	40		8.1	43		8.1	47		8.1	41		8.1	736		16.2	43		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
mg/L - milligrams per liter
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8C
Chesapeake Terrace
Groundwater Analytical Results - Fourth Quarter 2013

Sample Location			MW-29			MW-30			MW-3			MW-3			MW-4			MW-5			MW-6			PMW-11			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Name			MW-29			MW-30			MW-3			FDGW_92713			MW-4			MW-5			MW-6			PMW-11			FDGW_92513			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Date			9/27/2013			10/2/2013			9/27/2013			9/27/2013			9/30/2013			9/30/2013			9/24/2013			9/25/2013			9/25/2013			10/1/2013			9/26/2013			9/30/2013			9/24/2013			10/1/2013			10/1/2013			9/30/2013		
N=Normal, FD=Field Duplicate			N			N			N			FD			N			N			N			N			FD			N			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																																			
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U*	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U*	0.42	< 0.42	U	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42	< 0.42	U*	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U*	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4	< 0.4	U*	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	3.9	J*	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U*	2.3	< 2.3	U	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3	< 2.3	U*	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U*	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	13		2.7	310		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	17		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U*	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U	1.3	< 1.3	U*	1.3	< 1.3	U*	1.3	< 1.3	U*	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U*	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	1.8		0.14	< 0.14	U	0.14	0.23	J	0.14	0.56	J	0.14	0.6	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29

Table 8C
Chesapeake Terrace
Groundwater Analytical Results - Fourth Quarter 2013

Sample Location			MW-29			MW-30			MW-3			MW-3			MW-4			MW-5			MW-6			PMW-11			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Name			MW-29			MW-30			MW-3			FDGW_92713			MW-4			MW-5			MW-6			PMW-11			FDGW_92513			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-28			PMW-6		
Sample Date			9/27/2013			10/2/2013			9/27/2013			9/27/2013			9/30/2013			9/30/2013			9/24/2013			9/25/2013			9/25/2013			10/1/2013			9/26/2013			9/30/2013			9/24/2013			10/1/2013			10/1/2013			9/30/2013		
N=Normal, FD=Field Duplicate			N			N			N			FD			N			N			N			N			FD			N			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																																			
Aluminum	NS	ug/L	1170		43.8	9250		43.8	62.2		43.8	52.7		43.8	103		43.8	110		43.8	< 43.8	U	43.8	1830		43.8	2120		43.8	448		43.8	536		43.8	239		43.8	595		43.8	363		43.8	59		43.8	223		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	2.6		1.8	12.1		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	2.2	J	1.8	2.2	J	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	25.3		3.8	67.5		3.8	27.2		3.8	26.9		3.8	45.9		3.8	9		3.8	22.7		3.8	19.1		3.8	21.1		3.8	20.5		3.8	9.7		3.8	8		3.8	23.7		3.8	10.9		3.8	38.8		3.8	31.5		3.8
Beryllium	4	ug/L	0.9	J	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	0.85	J	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	1220		196	3190		196	2180		196	2310		196	2010		196	2450		196	2520		196	821		196	742		196	2320		196	1160		196	621		196	1800		196	860		196	4200		196	2340		196
Chromium	100	ug/L	6.4		3.9	46.2		3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	6.2		3.9	9		3.9	5.6		3.9	4.5	J	3.9	< 3.9	U	3.9	< 3.9	U	3.9	9.3		3.9	9.8		3.9	5.2		3.9
Cobalt	NS	ug/L	10.5		3.9	4.8	J	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	7.7		3.9	7.7		3.9	< 3.9	U	3.9	5.1		3.9	6.4		3.9	< 3.9	U	3.9	7.2		3.9	< 3.9	U	3.9	< 3.9	U	3.9
Copper	NS	ug/L	6.3		3.8	36.4		3.8	< 3.8	U	3.8	< 3.8	U	3.8	4	J	3.8	6.7		3.8	< 3.8	U	3.8	6.6		3.8	7.1		3.8	< 3.8	U	3.8	4.9	J	3.8	7.7		3.8	4.4	J	3.8	15		3.8	< 3.8	U	3.8	< 3.8	U	3.8
Iron	NS	ug/L	1210		119	30700		119	< 119	U	119	< 119	U	119	< 119	U	119	< 119	U	119	< 119	U	119	3560		119	3780		119	5110		119	1290		119	230		119	7730		119	523		119	< 119	U	119	571		119
Lead	NS	ug/L	< 1.2	U	1.2	17.5		1.2	< 1.2	U	1.2	< 1.2	U	1.2	< 1.2	U	1.2	1.3	J	1.2	< 1.2	U	1.2	2		1.2	1.9		1.2	< 1.2	U	1.2	2.4		1.2	< 1.2	U	1.2	1.3	J	1.2	1.3	J	1.2	< 1.2	U	1.2	< 1.2	U	1.2
Magnesium	NS	ug/L	610		197	3370		197	2450		197	2510		197	2880		197	1370		197	1730		197	378		197	393		197	956		197	558		197	455		197	591		197	353		197	898		197	1910		197
Manganese	NS	ug/L	15.6		8.1	105		8.1	14.8		8.1	15.1		8.1	20.9		8.1	10		8.1	9.9	J	8.1	17.5		8.1	18.2		8.1	49.8		8.1	24.5		8.1	17.2		8.1	77.4		8.1	40.7		8.1	181		8.1	33.2		8.1
Mercury	2	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Nickel	NS	ug/L	19.2		4.1	6.5		4.1	4.6	J	4.1	5		4.1	5.5		4.1	< 4.1	U	4.1	< 4.1	U	4.1	10.6		4.1	11.4		4.1	5.2		4.1	12.5		4.1	9.3		4.1	< 4.1	U	4.1	14.1		4.1	6.5		4.1	< 4.1	U	4.1
Potassium	NS	ug/L	1700		202	2930		202	961		202	1000		202	907		202	777		202	1100		202	1430		202	1460		202	1300		202	697		202	679		202	970		202	732		202	733		202	1270		202
Selenium	50	ug/L	1.6	J	1.5	2.8		1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.5	J	1.5	1.6	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	4140		193	3390		193	2440		193	2520		193	2160		193	4020		193	2580		193	1480		193	1420		193	1630		193	1510		193	1020		193	3310		193	1580		193	5890		193	1710		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	4	J	3.8	64.7		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	9.3		3.8	9.7		3.8	< 3.8	U	3.8	4.3	J	3.8	< 3.8	U	3.8	5.2		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	112		19.7	76.6		19.7	30.8		19.7	36.6		19.7	< 19.7	U	19.7	20.9		19.7	< 19.7	U	19.7	38.3		19.7	37.1		19.7	30.2		19.7	22.3		19.7	< 19.7	U	19.7	38.2		19.7	35.2		19.7	< 19.7	U	19.7	< 19.7	U	19.7
General Chemistry																																																			
Alkalinity, Total	NS	mg/L	2.8	J	0.79	22.8		5	3.7	J	0.79	2.4	J	0.79	5.3		5	6.5		5	7.9		0.79	1.3	J	0.79	1	J	0.79	< 5	U	5	< 0.79	U	0.79	< 5	U	5	6.1		0.79	< 5	U	5	12.4		5	< 5	U	5
Ammonia	NS	mg/L	< 0.08	U	0.08	< 0.08	U	0.08	0.11		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	6.3	J	4.8	138		4.8	10.3		4.8	< 4.8	U	4.8	12.3		4.8	< 4.8	U	4.8	< 4.8	U	4.8	18.4		4.8	26.5		4.8	< 4.8	U	4.8	< 4.8	U	4.8	< 4.8	U	4.8	14.4		4.8	< 4.8	U	4.8	6.3	J	4.8	8.3	J	4.8
Chloride	NS	mg/L	3.1		0.28	1.7		0.28	4.8		0.28	8.9		0.28	4		0.28	5.8		0.28	3.7	B	0.28	1.5		0.28	1.5		0.28	1.3	B	0.28	1.8		0.28	1.2		0.28	2	B	0.28	2.4	B	0.28	6	B	0.28	3.2		0.28
Hardness, Calcium Carbonate	NS	mg/L	4	J	1.6	19.8		1.6	11.9		1.6	13.9		1.6	15.8		1.6	9.9		1.6	13.9		1.6	2	J	1.6	< 1.6	U	1.6	17.8		1.6	5.9		1.6	4	J	1.6	5.9		1.6	2	J	1.6	17.8		1.6	11.9		1.6
Nitrate as N	10	mg/L	< 0.047	UH	0.047	< 0.047	UH	0.047	0.33	H	0.047	< 0.047	UH	0.047	0.073	JH	0.047	0.4	H	0.047	0.34		0.047	0.15		0.047	0.13		0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.24	H	0.047	< 0.047	U	0.047	0.55		0.047	0.14		0.047	0.11	H	0.047
Phosphorus (as phosphate)	NS	mg/L	< 0.016	U	0.016	1.2		0.016	0.34		0.016	0.25		0.016	0.19		0.016	0.032		0.016	0.69		0.016	0.4		0.016	0.74		0.016	0.032		0.016	0.39		0.016	0.22		0.016	0.55		0.016	1.6		0.032	0.65		0.016	0.12		0.016
Sulfate	NS	mg/L	9.8		0.35	5.2		0.35	11.7		0.35	13		0.35	16		0.35	6		0.35	4.5		0.35	16.2		0.35	8.8		0.35	12.7		0.35	23.1		0.35	12.2		0.35	12.4		0.35	1.4	J	0.35	7.1		0.35	10.8		0.35
Total Dissolved Solids	NS	mg/L	35		8.1	25		8.1	40		8.1	43		8.1	55		8.1	31		8.1	40		8.1	26		8.1	21		8.1	39		8.1	43		8.1	13		8.1	57		8.1	24		8.1	47		8.1	30		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
mg/L - milligrams per liter
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8D
Chesapeake Terrace
Groundwater Analytical Results - First Quarter 2014

		Sample Location	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28			MW-29		
		Sample Name	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28			MW-29		
		Sample Date	1/9/2014			1/10/2014			1/14/2014			1/8/2014			1/10/2014			1/9/2014			1/13/2014			1/13/2014			1/14/2014			1/13/2014			1/14/2014			1/13/2014			1/10/2014			1/9/2014			1/8/2014		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			N			N			N			N			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																															
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	50		2.7	130		2.7	< 2.7	U	2.7	45		2.7	< 2.7	U	2.7	12		2.7	< 2.7	U	2.7	52		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	0.1	J	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	1.6		0.08	< 0.08	U	0.08	< 0.08	U	0.08	0.25	J	0.08	1.3		0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	2.8		0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.16	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
n-Propylbenzene	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
o-Xylene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
sec-Butylbenzene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Styrene	100	ug/

Table 8D
Chesapeake Terrace
Groundwater Analytical Results - First Quarter 2014

		Sample Location	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28			MW-29		
		Sample Name	MW-10			MW-14			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27			MW-28			MW-29		
		Sample Date	1/9/2014			1/10/2014			1/14/2014			1/8/2014			1/10/2014			1/9/2014			1/13/2014			1/13/2014			1/14/2014			1/13/2014			1/14/2014			1/13/2014			1/10/2014			1/9/2014			1/8/2014		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			N			N			N			N			N			N			N			N			N			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																															
Aluminum	NS	ug/L	12300		43.8	233		43.8	1480		43.8	6300		43.8	8780		43.8	22300		43.8	535		43.8	1820		43.8	8290		43.8	111		43.8	455		43.8	237		43.8	434		43.8	1140		43.8	563		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	3.2		1.8	< 1.8	U	1.8	2.5		1.8	4.6		1.8	6.9		1.8	62.3		1.8	< 1.8	U	1.8	< 1.8	U	1.8	20.3		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	96.9		3.8	14.2		3.8	63.4		3.8	159		3.8	57		3.8	91.4		3.8	42.3		3.8	72.7		3.8	66.7		3.8	33.2		3.8	15.8		3.8	23.1		3.8	52		3.8	64.7		3.8	19.2		3.8
Beryllium	4	ug/L	1.9		0.8	< 0.8	U	0.8	< 0.8	U	0.8	2.3		0.8	0.96	J	0.8	1.8		0.8	< 0.8	U	0.8	1.9		0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	26000		196	19100		196	12800		196	35400		196	2080		196	4190		196	2220		196	695		196	2050		196	2750		196	3260		196	2320		196	3140		196	5460		196	1020		196
Chromium	100	ug/L	38.9		3.9	11		3.9	16.4		3.9	30.8		3.9	14.3		3.9	112		3.9	< 3.9	U	3.9	4.3	J	3.9	81.5		3.9	6.3		3.9	< 3.9	U	3.9	6		3.9	< 3.9	U	3.9	< 3.9	U	3.9	5.7		3.9
Cobalt	NS	ug/L	11.3		3.9	< 3.9	U	3.9	< 3.9	U	3.9	17.2		3.9	11.2		3.9	14.8		3.9	12.9		3.9	17		3.9	5.8		3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	9.7		3.9
Copper	NS	ug/L	22.4		3.8	< 3.8	U	3.8	7.5		3.8	48.7		3.8	31.2		3.8	287		3.8	5.1		3.8	18.6		3.8	65.9		3.8	11.2		3.8	4.5	J	3.8	4	J	3.8	32.3		3.8	< 3.8	U	3.8	< 3.8	U	3.8
Iron	NS	ug/L	7390		119	3810		119	4090		119	16100		119	17500		119	124000		119	604		119	828		119	45300		119	232		119	670		119	122	J	119	1700		119	18600		119	1040		119
Lead	NS	ug/L	13		1.2	7.2		1.2	3		1.2	12.1		1.2	10.3		1.2	31.8		1.2	3.1		1.2	3.9		1.2	12.8		1.2	2.9		1.2	1.2	J	1.2	1.5		1.2	15		1.2	< 1.2	U	1.2	6.1		1.2
Magnesium	NS	ug/L	964		197	2180		197	1360		197	1420		197	1730		197	8180		197	1380		197	876		197	2350		197	2960		197	2660		197	1520		197	1120		197	2160		197	608		197
Mercury	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Manganese	2	ug/L	40.5		8.1	185		8.1	175		8.1	86.7		8.1	159		8.1	109		8.1	65.6		8.1	78.7		8.1	76.9		8.1	88.9		8.1	25.7		8.1	20.9		8.1	96.7		8.1	132		8.1	15.3		8.1
Nickel	NS	ug/L	19.9		4.1	6.6		4.1	18.8		4.1	27.8		4.1	20.9		4.1	15.4		4.1	45		4.1	10.9		4.1	25.7		4.1	8.2		4.1	< 4.1	U	4.1	6		4.1	< 4.1	U	4.1	< 4.1	U	4.1	16		4.1
Potassium	NS	ug/L	3960		202	5300		202	2100		202	2690		202	984		202	4320		202	926		202	856		202	2410		202	1080		202	918		202	1240		202	947		202	1560		202	1380		202
Selenium	50	ug/L	< 1.5	U	1.5	1.6	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	3.1		1.5	3.9		1.5	1.6	J	1.5	2.2	J	1.5	3.8		1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	1990		193	509		193	1050		193	1490		193	6600		193	1780		193	1630		193	1000		193	2410		193	1710		193	974		193	2390		193	2620		193	4490		193	3880		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	46.1		3.8	< 3.8	U	3.8	7.6		3.8	42.9		3.8	20.1		3.8	196		3.8	< 3.8	U	3.8	< 3.8	U	3.8	65.9		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	4.9	J	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	107		19.7	107		19.7	102		19.7	113		19.7	66.5		19.7	117		19.7	22.9		19.7	52.1		19.7	51.9		19.7	< 19.7	U	19.7	25.4		19.7	< 19.7	U	19.7	55.1		19.7	< 19.7	U	19.7	102		19.7
General Chemistry																																															
Alkalinity, Total	NS	mg/L	34.9		5	63.8		5	45.1		5	78.3		5	< 5	U	5	20.8		5	< 5	U	5	< 5	U	5	< 5	U	5	9.3		5	9.7		5	8.2		5	< 5	U	5	31.9		5	< 5	U	5
Ammonia	NS	mg/L	< 0.08	U	0.08	0.11		0.08	< 0.8	U	0.8	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	58.9		4.8	38.8		4.8	69		4.8	99.2		4.8	40.8		4.8	160		4.8	22.7		4.8	10.6		4.8	44.8		4.8	< 4.8	U	4.8	< 4.8	U	4.8	6.6	J	4.8	< 4.8	U	4.8	18.6		4.8	< 4.8	U	4.8
Chloride	NS	mg/L	2.1		0.28	0.6		0.28	1.1		0.28	2.3		0.28	1.3		0.28	1.9		0.28	33		2.8	18.9		2.8	3.2		0.28	2.2		0.28	1.7		0.28	4.2		0.28	1.9		0.28	0.77		0.28	2.9		0.28
Hardness, Calcium Carbonate	NS	mg/L	80		1.6	68		1.6	38		1.6	120		1.6	12		1.6	60		1.6	12		1.6	4	J	1.6	14		1.6	20		1.6	20		1.6	12		1.6	14		1.6	30		1.6	4	J	1.6
Nitrate as N	10	mg/L	< 0.047	U	0.047	< 0.047	U	0.047	< 0.047	U	0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.65		0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.35		0.047	0.31		0.047	0.5		0.047	0.077	J	0.047	< 0.047	U	0.047	< 0.047	U	0.047	0.095	J	0.047
Phosphorus (as phosphate)	NS	mg/L	0.14		0.016	0.023	J	0.016	0.2		0.016	0.4		0.016	0.36		0.016	0.67		0.016	< 0.016	U	0.016	< 0.016	U	0.016	0.55		0.016	< 0.016	U	0.016	0.17		0.016	< 0.016	U	0.016	< 0.016	U	0.016	0.77		0.016	0.12		0.016
Sulfate	NS	mg/L	2.7		0.35	1.3	J	0.35	2.5		0.35	9.7		0.35	20.1		0.35	9.5		0.35	221		3.5	161		3.5	11.7		0.35	11.8		0.35	10.3		0.35	4.8		0.35	17.9		0.35	5.7		0.35	8.2		0.35
Total Dissolved Solids	NS	mg/L	108		8.1	108		8.1	95		8.1	58		8.1	66		8.1	71		8.1	33		8.1	36		8.1	49		8.1	50		8.1	41		8.1	34		8.1	60		8.1	55		8.1	19		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
mg/L - milligrams per liter
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

Table 8D
Chesapeake Terrace
Groundwater Analytical Results - First Quarter 2014

		Sample Location	MW-3			MW-30			MW-4			MW-5			MW-6			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-23			PMW-28			PMW-28			PMW-6		
		Sample Name	MW-3			MW-30			MW-4			MW-5			MW-6			FDGW-010814			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			FDGW_011314			PMW-28			FDGW_010614			PMW-6		
		Sample Date	1/6/2014			1/14/2014			1/6/2014			1/6/2014			1/8/2014			1/8/2014			1/9/2014			1/8/2014			1/10/2014			1/8/2014			1/9/2014			1/13/2014			1/13/2014			1/6/2014			1/6/2014			1/6/2014		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			FD			N			N			N			N			N			N			FD			N			FD			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Volatile Organic Compounds																																																		
1,1,1,2-Tetrachloroethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
1,1,1-Trichloroethane	200	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
1,1,2,2-Tetrachloroethane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
1,1,2-Trichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,1-Dichloroethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,1-Dichloroethene	7	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,1-Dichloropropene	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
1,2,3-Trichlorobenzene	NS	ug/L	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51	< 0.51	U	0.51
1,2,3-Trichloropropane	NS	ug/L	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42	< 0.42	U	0.42
1,2,4-Trichlorobenzene	70	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
1,2,4-Trimethylbenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
1,2-Dibromo-3-chloropropane	0.2	ug/L	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dibromoethane	0.05	ug/L	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28	< 0.28	U	0.28
1,2-Dichlorobenzene	600	ug/L	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21	< 0.21	U	0.21
1,2-Dichloroethane	5	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,2-Dichloropropane	5	ug/L	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09	< 0.09	U	0.09
1,3,5-Trimethylbenzene	NS	ug/L	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15	< 0.15	U	0.15
1,3-Dichlorobenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
1,3-Dichloropropane	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
1,4-Dichlorobenzene	75	ug/L	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23	< 0.23	U	0.23
2,2-Dichloropropane	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
2-Butanone	NS	ug/L	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3	< 2.3	U	2.3
2-Chloroethyl Vinyl Ether	NS	ug/L	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34	< 0.34	U	0.34
2-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
2-Hexanone	NS	ug/L	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5
4-Chlorotoluene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
4-Methyl-2-pentanone	NS	ug/L	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99	< 0.99	U	0.99
Acetone	NS	ug/L	< 2.7	U	2.7	37		2.7	< 2.7	U	2.7	14		2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7	< 2.7	U	2.7
Acrolein	NS	ug/L	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3	< 1.3	U	1.3
Acrylonitrile	NS	ug/L	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68	< 0.68	U	0.68
Allyl Chloride	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Benzene	5	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Bromobenzene	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Bromochloromethane	NS	ug/L	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27	< 0.27	U	0.27
Bromodichloromethane	NS	ug/L	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12	< 0.12	U	0.12
Bromoform	NS	ug/L	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19	< 0.19	U	0.19
Bromomethane	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Carbon Disulfide	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Carbon Tetrachloride	5	ug/L	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06	< 0.06	U	0.06
Chlorobenzene	100	ug/L	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11	< 0.11	U	0.11
Chloroethane	NS	ug/L	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17	< 0.17	U	0.17
Chloroform	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chloromethane	NS	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
cis-1,2-Dichloroethene	70	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
cis-1,3-Dichloropropene	NS	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Cymene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Dibromochloromethane	NS	ug/L	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Dibromomethane	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
Dichlorodifluoromethane	NS	ug/L	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22	< 0.22	U	0.22
Ethylbenzene	700	ug/L	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1	< 0.1	U	0.1
Hexachlorobutadiene	NS	ug/L	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48	< 0.48	U	0.48
Iodomethane	NS	ug/L	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13	< 0.13	U	0.13
Isopropylbenzene	NS	ug/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
m,p-Xylenes	NS	ug/L	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25	< 0.25	U	0.25
Methyl tert-Butyl Ether	NS	ug/L	1.6		0.14	< 0.14	U	0.14	0.58	J	0.14	0.67	J	0.14	0.76	J	0.14	0.81	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	< 0.14	U	0.14	0.38	J	0.14	0.36	J	0.14	< 0.14	U	0.14	< 0.14	U	0.14
Methylene Chloride	5	ug/L	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18	< 0.18	U	0.18
Naphthalene	NS	ug/L	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29	< 0.29	U	0.29
n-Butylbenzene	NS	ug/L	< 0.14	U	0.14	< 0.14	U	0.

Table 8D
Chesapeake Terrace
Groundwater Analytical Results - First Quarter 2014

		Sample Location	MW-3			MW-30			MW-4			MW-5			MW-6			MW-6			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			PMW-23			PMW-28			PMW-28			PMW-6		
		Sample Name	MW-3			MW-30			MW-4			MW-5			MW-6			FDGW-010814			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23			FDGW_011314			PMW-28			FDGW_010614			PMW-6		
		Sample Date	1/6/2014			1/14/2014			1/6/2014			1/6/2014			1/8/2014			1/8/2014			1/9/2014			1/8/2014			1/10/2014			1/8/2014			1/9/2014			1/13/2014			1/13/2014			1/6/2014			1/6/2014			1/6/2014		
		N=Normal, FD=Field Duplicate	N			N			N			N			N			FD			N			N			N			N			N			N			FD			N			FD			N		
Parameter	MDE MCL	Unit	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL	Result	LQual	RDL
Total Metals																																																		
Aluminum	NS	ug/L	201		43.8	7240		43.8	453		43.8	188		43.8	< 43.8	U	43.8	< 43.8	U	43.8	2180		43.8	9310		43.8	501		43.8	421		43.8	715		43.8	1500		43.8	1450		43.8	422		43.8	348		43.8	284		43.8
Antimony	6	ug/L	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9	< 1.9	U	1.9
Arsenic	10	ug/L	< 1.8	U	1.8	8.9		1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	2	J	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8	< 1.8	U	1.8
Barium	2000	ug/L	27.4		3.8	51.3		3.8	47.1		3.8	9.7		3.8	23.9		3.8	23		3.8	23.4		3.8	49.3		3.8	7		3.8	7.6		3.8	23.3		3.8	16.6		3.8	17.5		3.8	40.1		3.8	37.9		3.8	28.9		3.8
Beryllium	4	ug/L	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	1.1		0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8	< 0.8	U	0.8
Cadmium	5	ug/L	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2	< 2	U	2
Calcium	NS	ug/L	2140		196	2080		196	2750		196	2230		196	2550		196	2520		196	733		196	2470		196	1030		196	583		196	1450		196	856		196	848		196	3700		196	3650		196	2390		196
Chromium	100	ug/L	5.3		3.9	61.4		3.9	23.6		3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	40.1		3.9	20.1		3.9	< 3.9	U	3.9	5		3.9	9.1		3.9	9.4		3.9	8.7		3.9	47.5		3.9	30.9		3.9	11.5		3.9
Cobalt	NS	ug/L	< 3.9	U	3.9	< 3.9	U	3.9	3.9	J	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9	7.1		3.9	6.8		3.9	4.2	J	3.9	4.8	J	3.9	< 3.9	U	3.9	4.6	J	3.9	4.6	J	3.9	< 3.9	U	3.9	< 3.9	U	3.9	< 3.9	U	3.9
Copper	NS	ug/L	4	J	3.8	68.5		3.8	6		3.8	5.2		3.8	< 3.8	U	3.8	< 3.8	U	3.8	5.8		3.8	6.1		3.8	< 3.8	U	3.8	10.1		3.8	< 3.8	U	3.8	6.1		3.8	5.9		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8
Iron	NS	ug/L	143	J	119	23600		119	340		119	< 119	U	119	< 119	U	119	< 119	U	119	4170		119	7410		119	604		119	302		119	8380		119	2170		119	2020		119	623		119	407		119	393		119
Lead	NS	ug/L	4.6		1.2	14.3		1.2	3.4		1.2	5.8		1.2	1.3	J	1.2	1.2	J	1.2	5.1		1.2	4.2		1.2	1.8		1.2	2.3		1.2	2.1		1.2	2.2		1.2	2.2		1.2	2.6		1.2	2.1		1.2	4		1.2
Magnesium	NS	ug/L	2430		197	2540		197	2950		197	1430		197	1820		197	1870		197	409		197	1320		197	526		197	485		197	575		197	457		197	456		197	1050		197	1030		197	2080		197
Mercury	NS	ug/L	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16	< 0.16	U	0.16
Manganese	2	ug/L	13.8		8.1	49.6		8.1	25.5		8.1	9.5	J	8.1	8.2	J	8.1	8.7	J	8.1	20.3		8.1	54.2		8.1	13.1		8.1	13.8		8.1	72.6		8.1	31.3		8.1	31.1		8.1	182		8.1	178		8.1	21.6		8.1
Nickel	NS	ug/L	5.9		4.1	20.2		4.1	18.6		4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	27.8		4.1	15.4		4.1	8.1		4.1	6.5		4.1	8.2		4.1	9.7		4.1	9		4.1	31		4.1	19.5		4.1	8		4.1
Potassium	NS	ug/L	994		202	2570		202	1080		202	789		202	1220		202	1260		202	1640		202	3100		202	654		202	778		202	918		202	1190		202	1140		202	989		202	941		202	1180		202
Selenium	50	ug/L	< 1.5	U	1.5	1.8	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	1.5	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5	2.1	J	1.5	1.7	J	1.5	< 1.5	U	1.5	< 1.5	U	1.5	< 1.5	U	1.5
Silver	NS	ug/L	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1	< 4.1	U	4.1
Sodium	NS	ug/L	2490		193	4020		193	2400		193	4000		193	2510		193	2720		193	1260		193	1580		193	1320		193	956		193	2130		193	1530		193	1540		193	4030		193	3980		193	1660		193
Thallium	2	ug/L	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79	< 0.79	U	0.79
Vanadium	NS	ug/L	< 3.8	U	3.8	49.1		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	11.5		3.8	17.4		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8	6.6		3.8	6.3		3.8	< 3.8	U	3.8	< 3.8	U	3.8	< 3.8	U	3.8
Zinc	NS	ug/L	< 19.7	U	19.7	56.9		19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	27.1		19.7	41		19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	< 19.7	U	19.7	26.6		19.7	23.9		19.7	21.4		19.7
General Chemistry																																																		
Alkalinity, Total	NS	mg/L	< 5	U	5	15.5		5	12.8		5	12.2		5	11.3		5	11.7		5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	7.5		5	< 5	U	5	< 5	U	5	16		5	15.6		5	5.2		5
Ammonia	NS	mg/L	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08	< 0.08	U	0.08
Chemical Oxygen Demand	NS	mg/L	< 4.8	U	4.8	22.7		4.8	< 4.8	U	4.8	< 4.8	U	4.8	< 4.8	U	4.8	< 4.8	U	4.8	36.8		4.8	22.7		4.8	< 4.8	U	4.8	< 4.8	U	4.8	< 4.8	U	4.8	24.7		4.8	18.6		4.8	< 4.8	U	4.8	< 4.8	U	4.8	< 4.8	U	4.8
Chloride	NS	mg/L	4.7		0.28	0.77		0.28	4.3		0.28	5.8		0.28	3.8		0.28	3.8		0.28	1.3		0.28	0.93		0.28	3.5		0.28	1.1		0.28	1.8		0.28	2.5		0.28	3.3		0.28	5.3		0.28	5.3		0.28	2.9		0.28
Hardness, Calcium Carbonate	NS	mg/L	16		1.6	16		1.6	20		1.6	14		1.6	12		1.6	12		1.6	10		1.6	10		1.6	4	J	1.6	8		1.6	10		1.6	4	J	1.6	2	J	1.6	16		1.6	22		1.6	18		1.6
Nitrate as N	10	mg/L	0.32		0.047	< 0.047	U	0.047	0.17		0.047	0.49		0.047	0.35		0.047	0.29		0.047	0.13		0.047	0.055	J	0.047	< 0.047	U	0.047	0.26		0.047	< 0.047	U	0.047	0.52		0.047	0.54		0.047	0.17		0.047	0.17		0.047	0.083	J	0.047
Phosphorus (as phosphate)	NS	mg/L	< 0.016	U	0.016	0.28		0.016	0.04		0.016	< 0.016	U	0.016	0.023	J	0.016	< 0.016	U	0.016	< 0.016	U	0.016	0.25		0.016	< 0.016	U	0.016	< 0.016	U	0.016	0.1		0.016	0.23		0.016	< 0.016	U	0.016	0.04		0.016	0.044		0.016	0.032		0.016
Sulfate	NS	mg/L	9.4		0.35	9.7		0.35	11.4		0.35	4.3		0.35	4.8		0.35	4.8		0.35	3.4		0.35	14.2		0.35	12.6		0.35	6.1		0.35	13.9		0.35	1.7	J	0.35	2		0.35	6.9		0.35	6.9		0.35	9.2		0.35
Total Dissolved Solids	NS	mg/L	28		8.1	51		8.1	40		8.1	29		8.1	27		8.1	31		8.1	34		8.1	30		8.1	26		8.1	11		8.1	52		8.1	12		8.1	< 8.1	U	8.1	32		8.1	44		8.1	24		8.1

Notes and Abbreviations:

1. Results greater than the MDE MCL are shaded.

* - laboratory sample recovery or precision outside QC limits
B - laboratory blank contamination
H - sample was prepped or analyzed beyond the specified holding time
J - result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
LQual - Laboratory Qualifier
mg/L - milligrams per liter
MDE MCL - Maryland Department of the Environment Maximum Contaminant Level for Chemicals in Drinking Water, Code of Maryland Regulations, accessed at URLs http://www.dsd.state.md.us/comar/comarhtml/26/26.04.01.06.htm and http://www.dsd.state.md.us/comar/getfile.aspx?file=26.04.01.07.htm
QC - quality control
RDL - reporting detection limit
U - non-detect result
ug/L - micrograms per liter

TABLE 8E-1
CHESAPEAKE TERRACE
GROUNDWATER FIELD PARAMETERS
(Second Quarter 2013 Sample Event)

Well ID	Date Sampled	Hydogeological Unit	Sample Method	Temperature [° C]	pH [std]	Specific Conductance [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/L]	Redox Potential [mV]	Volume Purged [liters]	Depth to Water [ft-btoc]
MW-3	6/5/2013	Unconfined WBZ	Low Flow	13.95	4.75	0.065	0.0	10.42	310	12.1	16.29
MW-4	6/5/2013	Unconfined WBZ	Low Flow	16.14	4.83	0.068	0.0	9.79	302	12.0	29.80
MW-5	5/31/2013	Unconfined WBZ	Low Flow	17.28	4.74	0.058	0.0	10.56	270	14.0	32.07
MW-6	6/6/2013	Unconfined WBZ	Low Flow	13.64	4.04	0.055	0.0	9.76	352	13.3	27.38
MW-10	6/12/2013	Confined WBZ/TZ	Conventional - Bailer	14.16	5.70	0.078	206.0	8.49	119	24.5	24.03
MW-14	6/6/2013	Confined WBZ/TZ	Low Flow	17.43	5.51	0.099	4.1	1.54	191	14.9	35.33
MW-15	5/29/2013	Unconfined WBZ	Low Yield	18.83	5.94	0.055	535.0	8.60	195	0.240	80.33
MW-16	6/12/2013	Unconfined WBZ	Conventional - Bailer	16.17	6.73	0.258	309.0	17.67	157	12.5	79.91
MW-17	5/30/2013	Unconfined WBZ	Low Yield	32.64	4.33	0.111	91.1	3.81	302	1.0	1.12
MW-18	5/30/2013	Unconfined WBZ	Conventional - Bailer	15.34	5.02	0.111	>1000	6.55	323	12.5	14.21
MW-19	6/4/2013	Unconfined WBZ	Low Flow	15.48	3.91	0.090	0.0	8.64	393	13.3	24.43
MW-20	5/30/2013	Unconfined WBZ	Low Flow	16.41	3.88	0.074	20.2	11.79	371	NM	45.45
MW-21	5/30/2013	Unconfined WBZ	Low Yield	20.50	4.57	0.058	306.0	2.74	218	NM	55.55
MW-22	5/30/2013	Unconfined WBZ	Low Flow	16.57	4.64	0.072	9.5	7.08	318	NM	27.65
MW-23	6/12/2013	Middle Confining Unit	Low Flow	16.16	4.76	0.030	189.0	3.69	291	38.0	104.92
MW-24	6/4/2013	Unconfined WBZ	Low Flow	15.20	4.76	0.088	77.7	7.52	303	24.0	19.50
MW-25	5/31/2013	Unconfined WBZ	Low Flow	17.92	4.84	0.051	0.0	5.25	260	28.0	35.69
MW-27	6/6/2013	Unconfined WBZ	Low Flow	18.22	4.10	0.071	0.0	0.00	301	10.0	1.85
MW-28	6/4/2013	Confined WBZ/TZ	Low Flow	16.44	6.12	0.150	41.2	0.00	-61	45.0	39.51
MW-29	6/6/2013	Unconfined WBZ	Low Flow	15.59	4.65	0.066	25.7	0.00	221	21.0	3.42
MW-30	5/31/2013	Unconfined WBZ	Low Yield	15.71	4.81	0.069	>1000	0.24	284	5.8	12.59
PMW-6	6/5/2013	Unconfined WBZ	Low Flow	14.83	4.99	0.060	0.0	5.47	275	18.0	14.45
PMW-11	6/4/2013	Confined WBZ	Low Flow	15.51	4.80	0.032	209.0	0.00	75	NM	82.73
PMW-12	5/29/2013	Confined WBZ	Low Flow	17.82	4.86	0.053	0.9	0.00	192	38.0	112.41
PMW-13	5/30/2013	Confined WBZ	Low Flow	18.97	4.56	0.050	62.2	0.00	270	66.6	99.81
PMW -18	6/4/2013	Confined WBZ/TZ	Low Flow	13.00	4.59	0.036	16.6	5.67	296	61.0	11.49
PMW-19	6/4/2013	Confined WBZ/TZ	Low Flow	15.92	5.47	0.081	582.0	0.00	29	83.6	40.38
PMW-28	6/5/2013	Unconfined WBZ	Low Flow	16.00	6.83	0.349	0.0	8.05	96	30.9	NM

WBZ:Water Bearing Zone

TZ: Transition Zone

TABLE 8E-2
CHESAPEAKE TERRACE
GROUNDWATER FIELD PARAMETERS
(Third Quarter 2013 Sample Event)

Well ID	Date Sampled	Hydogeological Unit	Sample Method	Temperature [°C]	pH [std]	Specific Conductance [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/L]	Redox Potential [mV]	Volume Purged [liters]	Depth to Water [ft-btoc]
MW-3	7/30/2013	Unconfined WBZ	Low Flow	14.68	4.43	0.064	0.0	7.31	385	15.0	16.90
MW-4	7/30/2013	Unconfined WBZ	Low Flow	19.74	4.79	0.062	1.9	6.01	324	20.0	29.92
MW-5	7/30/2013	Unconfined WBZ	Low Flow	14.91	3.75	0.057	2.4	4.02	188	32.0	32.31
MW-6	7/31/2013	Unconfined WBZ	Low Flow	14.25	4.97	0.059	0.0	0.53	281	24.0	28.57
MW-10	7/30/2013	Confined WBZ/TZ	Conventional - Bailer	15.30	5.21	0.073	56.3	1.99	106	15.0	25.72
MW-14	7/31/2013	Confined WBZ/TZ	Low Flow	18.83	6.60	0.141	38.1	0.00	-33	8.0	35.33
MW-15	8/5/2013	Unconfined WBZ	Low Yield	23.45	5.77	0.151	286.0	1.92	72	3.0	80.31
MW-16	8/6/2013	Unconfined WBZ	Conventional - Bailer	17.58	6.03	0.145	959.0	9.42	187	20.0	80.40
MW-17	8/5/2013	Unconfined WBZ	Low Yield	24.75	5.62	0.115	51.9	2.39	139	3.4	2.69
MW-18	8/7/2013	Unconfined WBZ	Conventional - Bailer	15.18	5.28	0.101	>999	6.35	286	15.5	14.06
MW-19	8/12/2119	Unconfined WBZ	Low Flow	17.97	4.18	0.076	0.0	6.01	399	11.5	23.51
MW-20	7/31/2013	Unconfined WBZ	Low Flow	15.26	3.95	0.068	5.2	3.26	340	20.0	44.90
MW-21	8/5/2013	Unconfined WBZ	Low Yield	20.49	4.87	0.062	>999	3.66	231	2.0	55.48
MW-22	8/7/2013	Unconfined WBZ	Low Flow	18.83	4.98	0.063	7.3	1.60	281	28.0	27.41
MW-24	8/2/2013	Unconfined WBZ	Low Flow	17.03	4.34	0.081	44.7	1.27	280	18.0	19.12
MW-25	8/7/2013	Unconfined WBZ	Low Flow	16.78	4.89	0.050	6.2	6.01	319	40.0	35.81
MW-27	8/1/2013	Unconfined WBZ	Low Flow	25.25	5.36	0.059	3.9	0.00	200	6.0	2.81
MW-28	8/1/2013	Confined WBZ/TZ	Low Flow	19.86	6.23	0.131	18.6	0.00	-92	36.0	46.80
MW-29	7/31/2013	Unconfined WBZ	Low Flow	18.35	5.11	0.058	55.0	0.00	93	14.0	4.63
MW-30	8/5/2013	Unconfined WBZ	Low Yield	20.28	5.09	0.086	707.0	1.30	81	2.0	12.66
PMW-6	7/30/2013	Unconfined WBZ	Low Flow	15.74	4.74	0.056	2.4	4.93	358	13.5	15.91
PMW-11	8/8/2013	Confined WBZ	Low Flow	17.65	4.78	0.027	382.0	0.00	110	88.0	84.62
PMW-12	8/6/2013	Confined WBZ	Low Flow	18.63	5.20	0.058	16.1	0.00	147	54.0	114.43
PMW-13	8/8/2013	Confined WBZ	Low Flow	19.44	4.44	0.053	9.3	0.00	287	66.0	102.06
PMW -18	8/1/2013	Confined WBZ/TZ	Low Flow	14.72	4.81	0.031	173.0	4.70	346	43.0	13.03
PMW-19	8/1/2013	Confined WBZ/TZ	Low Flow	17.87	5.73	0.076	57.6	0.00	-9	18.0	41.81
PMW-23	8/7/2013	Confined WBZ	Low Flow	18.24	4.44	0.031	8.4	6.10	364	24.0	106.81
PMW-28	7/31/2013	Unconfined WBZ	Low Flow	21.97	6.28	0.135	4.1	6.13	138	28.0	65.78

Notes:

NM = Not measured

TABLE 8E-3
CHESAPEAKE TERRACE
GROUNDWATER FIELD PARAMETERS
(First Quarter 2014 Sampling Event)

Well ID	Date Sampled	Hydogeological Zone	Sample Method	Temperature [°C]	pH [std]	Specific Conductance [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/L]	Redox Potential [mV]	Volume Purged [liters]	Depth to Water [ft-btoc]
MW-3	1/6/2014	Unconfined WBZ	Low Flow	11.28	4.38	0.061	13.9	4.40	350	15.5	16.79
MW-4	1/6/2014	Unconfined WBZ	Low Flow	11.89	4.40	0.065	9.5	4.62	356	20.0	30.41
MW-5	1/6/2014	Unconfined WBZ	Low Flow	12.79	4.59	0.058	3.7	5.51	345	20.0	32.61
MW-6	1/8/2014	Unconfined WBZ	Low Flow	12.29	4.77	0.061	0.3	8.44	362	16.0	27.81
MW-10	1/9/2014	Confined WBZ/TZ	Conventional - Bailer	9.84	6.46	0.140	>1000	4.03	139	14.1	25.93
MW-14	1/10/2014	Confined WBZ/TZ	Low Flow	7.95	6.82	0.163	0.8	1.21	-29	11.0	35.33
MW-15	1/14/2014	Unconfined WBZ	Low Yield	11.01	5.76	0.092	134.0	6.20	68	3.000	79.23
MW-16	1/8/2014	Unconfined WBZ	Conventional - Bailer	10.06	6.55	0.120	>1000	5.12	177	18.0	80.13
MW-17	1/10/2014	Unconfined WBZ	Low Yield	6.04	4.41	0.081	933.0	4.28	405	NM	1.85
MW-18	1/9/2014	Unconfined WBZ	Conventional - Bailer	10.58	5.54	0.106	>1000	5.02	253	12.0	14.71
MW-19	1/13/2014	Unconfined WBZ	Low Flow	13.95	4.12	0.108	6.2	2.59	411	NM	24.87
MW-20	1/13/2014	Unconfined WBZ	Low Flow	13.78	4.20	0.065	4.9	5.65	419	26.0	46.26
MW-21	1/14/2014	Unconfined WBZ	Low Yield	11.76	5.13	0.066	>1000	7.62	266	2.0	55.64
MW-22	1/13/2014	Unconfined WBZ	Low Flow	14.59	5.00	0.071	5.0	7.02	313	28.0	28.21
MW-24	1/14/2014	Unconfined WBZ	Low Flow	14.00	5.11	0.065	5.7	4.22	338	20.0	19.60
MW-25	1/13/2014	Unconfined WBZ	Low Flow	15.23	5.13	0.056	9.2	4.47	328	39.0	36.22
MW-27	1/10/2014	Unconfined WBZ	Low Flow	6.90	4.07	0.091	0.0	2.61	420	6.0	1.50
MW-28	1/9/2014	Confined WBZ/TZ	Low Flow	13.84	6.17	0.143	6.4	0.36	-37	35.0	41.42
MW-29	1/8/2014	Unconfined WBZ	Low Yield	12.79	4.91	0.053	13.4	0.45	212	26.6	4.63
MW-30	1/14/2014	Unconfined WBZ	Low Yield	11.67	5.33	0.072	>1000	4.28	242	2.0	13.31
PMW-6	1/6/2014	Unconfined WBZ	Low Flow	12.86	4.52	0.053	5.1	4.03	341	22.0	14.36
PMW-11	1/9/2014	Confined WBZ	Low Flow	12.10	4.99	0.030	311.0	1.09	131	215.0	84.65
PMW-12	1/8/2014	Confined WBZ	Low Flow	13.28	5.00	0.062	197.0	0.32	150	62.0	114.59
PMW-13	1/10/2014	Confined WBZ	Low Flow	10.95	4.02	0.063	0.0	0.41	37	34.0	102.00
PMW -18	1/8/2014	Confined WBZ/TZ	Low Flow	12.06	4.14	0.037	24.7	5.25	443	30.0	13.24
PMW-19	1/9/2014	Confined WBZ/TZ	Low Flow	13.12	5.40	0.072	18.5	0.68	80	22.0	41.84
PMW-23	1/13/2014	Confined WBZ	Low Flow	13.41	4.60	0.032	24.9	4.61	350	47.0	106.45
PMW-28	1/6/2014	Unconfined WBZ	Low Flow	13.37	4.97	0.065	45.3	5.51	243	28.0	66.51

Notes:

NM = Not measured

TABLE 10A - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location				MW-10			MW-14			MW-28			PMW-11			PMW-12			PMW-13			PMW-13D			PMW-18			PMW-19			PMW-23		
Lab ID				460-202362-11			460-202215-07 460-202362-07			460-202215-09 460-202362-09			460-201978-05			460-201978-11			460-201978-07			460-201978-08			460-202215-06 460-202362-06			460-202362-13			460-202215-02 460-202362-02		
Sample Date				2/4/2020			2/3/2020			2/3/2020			1/29/2020			1/30/2020			1/30/2020			1/30/2020			2/3/2020			2/4/2020			2/3/2020		
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	EPA MCL	Screening																				FD of PMW-13											
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																																	
1,1,1,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2-Trichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropane	0.2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromoethane	0.05	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L		U *	5		U *	5		U *	5		U	5		U	5		U	5		U	5		U *	5		U *	5		U *	5
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acetone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L		U	1	1.9		1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L		U	1	7		1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L		U	1	0.68	J	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Total Metals																																	
Antimony	6	P	ug/L	0.51	J	2	0.76	J	2		U	2		U	2	0.58	J	2	0.97	J	2	0.95	J	2	0.43	J	2		U	2		U	2
Arsenic	10	P	ug/L	0.91	J	2	0.98	J	2		U	2		U	2	0.89	J	2		U	2		U	2		U	2		U	2	2		2
Barium	2000	P	ug/L	4.7		4	26.9		4	37		4	3.7	J	4	40.9		4	8.5		4	9.6		4	7.3		4	16.8		4	31.6		4
Beryllium	4	P	ug/L	0.29	J	0.8		U	0.8	0.28	J	0.8		U	0.8	1.1		0.8		U	0.8		U	0.8		U	0.8	0.28	J	0.8	0.48	J	0.8
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Calcium	NS		ug/L	4650		200	14400		200	8050		200	613		200	3860		200	1010		200	961		200	534		200	1970		200	799		200
Chromium	100	P	ug/L		U	4		U	4	3.9	J	4		U	4	7.9		4	2.7	J	4	2.5	J	4		U	4		U	4	9.2		4
Cobalt	NS		ug/L	2.2	J	4	3.3	J	4		U	4	2.6	J	4	2.4	J	4	4.5		4	4.3		4	2.6	J	4		U	4	2.1	J	4
Copper	1300	AL	ug/L		U	4	4.1		4	17.6		4	2.4	J	4	8.6		4	16.7		4	13.4		4	5.2		4		U	4	11.4		4
Iron	300	S	ug/L	1250		120	6250		120	9940		120		U	120	7670		120	1170		120	1080		120	348		120	4920		120	6020		120
Lead	15	AL	ug/L		U	1.2	4.1		1.2	2		1.2		U	1.2	2.5		1.2	3.3		1.2	3		1.2	0.65	J	1.2		U	1.2	5.5		1.2
Magnesium	NS		ug/L	124	J	200	1920		200	1350		200	256		200	1170		200	508		200	494		200	386		200	507		200	529		200
Manganese	50	S	ug/L	8.3		8	180		8	60.3		8	6.5	J	8	64		8	11.4		8	10.8		8	10.4		8	36		8	20.8		8
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2
Nickel	100	RE	ug/L	4.2		4	4		4	3.5	J	4	4.2		4	6.2		4	10.6		4	9.8		4	3.8	J	4		U	4	4.8		4
Potassium	NS		ug/L	397		200	5750		200	1510		200	551		200	2550		200	721		200	694		200	774		200	1020		200	1840		200
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Sodium	NS		ug/L	2070		200	939		200	2280		200	1610		200	2720		200	1490		200	1490		200	1060		200	1500		200	1580		200
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8	0.19	J	0.8	0.2	J	0.8		U	0.8		U	0.8	0.16	J	0.8
Vanadium	NS		ug/L	1.5	J	4	3.1	J	4	11.3		4		U	4	12.7		4	2.6	J	4	2.4	J	4	1.9	J	4	2.3	J	4	15.9		4
Zinc	5000	S	ug/L		U	16	73.1		16	35.1		16		U	16	411		16	17.4		16	16.2		16		U	16	70		16	16.2		16

TABLE 10A - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location				MW-10			MW-14			MW-28			PMW-11			PMW-12			PMW-13			PMW-13D			PMW-18			PMW-19			PMW-23		
Lab ID				460-202362-11			460-202215-07 460-202362-07			460-202215-09 460-202362-09			460-201978-05			460-201978-11			460-201978-07			460-201978-08			460-202215-06 460-202362-06			460-202362-13			460-202215-02 460-202362-02		
Sample Date				2/4/2020			2/3/2020			2/3/2020			1/29/2020			1/30/2020			1/30/2020			1/30/2020			2/3/2020			2/4/2020			2/3/2020		
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	EPA MCL	Screening																				FD of PMW-13											
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Dissolved Metals																																	
Antimony, Dissolved	6	P	ug/L		NA			NA			NA			U	2		U	2		NA			NA			NA			NA			U	2
Arsenic, Dissolved	10	P	ug/L		NA			NA			NA			U	2		U	2		NA			NA			NA			NA			U	2
Barium, Dissolved	2000	P	ug/L		NA			NA			NA		3.1	J	4	21.8		4		NA			NA			NA			NA		3.8	J	4
Beryllium, Dissolved	4	P	ug/L		NA			NA			NA			U	0.8	0.33	J	0.8		NA			NA			NA			NA			U	0.8
Cadmium, Dissolved	5	P	ug/L		NA			NA			NA			U	2		U	2		NA			NA			NA			NA			U	2
Calcium, Dissolved	NS		ug/L		NA			NA			NA		671		200	4140		200		NA			NA			NA			NA		650		200
Chromium, Dissolved	100	P	ug/L		NA			NA			NA			U	4		U	4		NA			NA			NA			NA			U	4
Cobalt, Dissolved	NS		ug/L		NA			NA			NA		2.2	J	4		U	4		NA			NA			NA			NA			U	4
Copper, Dissolved	1300	AL	ug/L		NA			NA			NA			U	4		U	4		NA			NA			NA			NA			U	4
Iron, Dissolved	300	S	ug/L		NA			NA			NA			U	120	3650		120		NA			NA			NA			NA			U	120
Lead, Dissolved	15	AL	ug/L		NA			NA			NA			U	1.2		U	1.2		NA			NA			NA			NA			U	1.2
Magnesium, Dissolved	NS		ug/L		NA			NA			NA		194	J	200	904		200		NA			NA			NA			NA		286		200
Manganese, Dissolved	50	S	ug/L		NA			NA			NA		4.9	J	8	52.2		8		NA			NA			NA			NA		11		8
Mercury, Dissolved	2	P	ug/L		NA			NA			NA			U	0.2		U	0.2		NA			NA			NA			NA			U	0.2
Nickel, Dissolved	100	RE	ug/L		NA			NA			NA		3.5	J	4		U	4		NA			NA			NA			NA			U	4
Potassium, Dissolved	NS		ug/L		NA			NA			NA		466		200	1370		200		NA			NA			NA			NA		463		200
Selenium, Dissolved	50	P	ug/L		NA			NA			NA			U	10		U	10		NA			NA			NA			NA			U	10
Silver, Dissolved	100	S	ug/L		NA			NA			NA			U	2		U	2		NA			NA			NA			NA			U	2
Sodium, Dissolved	NS		ug/L		NA			NA			NA		1200		200	2180		200		NA			NA			NA			NA		1610		200
Thallium, Dissolved	2	P	ug/L		NA			NA			NA			U	0.8		U	0.8		NA			NA			NA			NA			U	0.8
Vanadium, Dissolved	NS		ug/L		NA			NA			NA			U	4		U	4		NA			NA			NA			NA			U	4
Zinc, Dissolved	5000	S	ug/L		NA			NA			NA			U	16	315		16		NA			NA			NA			NA			U	16
Conventionals																																	
Alkalinity	NS		mg/L	9.1		5	40.8		5	33.4		5		U	5	5.4		5		U	5		U	5		U	5	12.7		5		U	5
Ammonia	NS		mg/L		U	0.1	0.048	J	0.1		U	0.1		U	0.1		U	0.1		U	0.1	0.34		0.1		U	0.1		U	0.1		U	0.1
Chemical Oxygen Demand	NS		mg/L		U	10	12.3		10	28.8		10		U	10		U	10		U	10		U	10		U	10		U	10		U	10
Chloride	250	S	mg/L	3.41		0.12	1.17		0.12	0.85		0.12	1.65		0.12	1		0.12	2.17		0.12	2.19		0.12	1.41		0.12	1.88		0.12	2.72		0.12
Hardness as calcium carbonate	NS		mg/L	14		5	44		5	34		5	6		5	18		5	8		5	10		5		U	5	12		5	18		5
Nitrate as N	10	P	mg/L		U	2		U	0.1		U	0.1	0.14		0.1		U	0.1		U	0.1		U	0.1	0.32		0.1		U	0.1	0.39		0.1
Sulfate	250	S	mg/L	9.62		0.6	6.27		0.6	0.38	J	0.6	4.94		0.6	15.9		0.6	18.6		0.6	17.4		0.6	4.44		0.6	3.59		0.6	3.46		0.6
Total Dissolved Solids	500	S	mg/L	42		10	70		10	85		10	18		10	43		10	13		10	22		10	15		10	34		10	16		10

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
Bromoform, Dibromochloromethane and Chloroform
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10A - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location				EB-01-012920			EB-02-013020			EB-03-013120			EB-04-020320			EB-05-020420			TB-01-013020			TB-02-013120			TB-03-020320		
Lab ID				460-201978-06			460-201978-14			460-202111-08 460-202236-08			460-202215-08 460-202362-08			460-202362-12			460-201978-15			460-202236-09			460-202362-14		
Sample Date				1/29/2020			1/30/2020			1/31/2020			2/3/2020			2/4/2020			1/30/2020			1/31/2020			2/4/2020		
Matrix				Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening		Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Trip Blank			Trip Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																											
1,1,1,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
1,1,2-Trichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropane	0.2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromoethane	0.05	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L		U	5		U	5		U	5		U *	5		U *	5		U	5		U	5		U *	5
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acetone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L		U	1	1.1		1		U	1		U	1		U	1		U	1		U	1		U	1
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Total Metals																											
Antimony	6	P	ug/L		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Arsenic	10	P	ug/L		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Barium	2000	P	ug/L		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Beryllium	4	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		NA			NA			NA	
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Calcium	NS		ug/L	102	J	200	111	J	200	110	J	200		U	200		U	200		NA			NA			NA	
Chromium	100	P	ug/L		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Cobalt	NS		ug/L		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Copper	1300	AL	ug/L		U	4	4.3		4	2.7	J	4		U	4		U	4		NA			NA			NA	
Iron	300	S	ug/L		U	120		U	120		U	120		U	120		U	120		NA			NA			NA	
Lead	15	AL	ug/L		U	1.2		U	1.2		U	1.2		U	1.2		U	1.2		NA			NA			NA	
Magnesium	NS		ug/L		U	200		U	200		U	200		U	200		U	200		NA			NA			NA	
Manganese	50	S	ug/L		U	8		U	8		U	8		U	8		U	8		NA			NA			NA	
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		NA			NA			NA	
Nickel	100	RE	ug/L		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Potassium	NS		ug/L		U	200		U	200		U	200		U	200		U	200		NA			NA			NA	
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		U	10		NA			NA			NA	
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Sodium	NS		ug/L	372		200	487		200	472		200	435		200	382		200		NA			NA			NA	
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		NA			NA			NA	
Vanadium	NS		ug/L		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Zinc	5000	S	ug/L		U	16		U	16		U	16		U	16		U	16		NA			NA			NA	

TABLE 10A - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location			EB-01-012920				EB-02-013020			EB-03-013120			EB-04-020320			EB-05-020420			TB-01-013020			TB-02-013120			TB-03-020320		
Lab ID			460-201978-06				460-201978-14			460-202111-08 460-202236-08			460-202215-08 460-202362-08			460-202362-12			460-201978-15			460-202236-09			460-202362-14		
Sample Date			1/29/2020				1/30/2020			1/31/2020			2/3/2020			2/4/2020			1/30/2020			1/31/2020			2/4/2020		
Matrix			Aqueous				Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening	Equipment Blank				Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Trip Blank			Trip Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Dissolved Metals																											
Antimony, Dissolved	6	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Arsenic, Dissolved	10	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Barium, Dissolved	2000	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Beryllium, Dissolved	4	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Cadmium, Dissolved	5	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Calcium, Dissolved	NS		ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Chromium, Dissolved	100	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Cobalt, Dissolved	NS		ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Copper, Dissolved	1300	AL	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Iron, Dissolved	300	S	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Lead, Dissolved	15	AL	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Magnesium, Dissolved	NS		ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Manganese, Dissolved	50	S	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Mercury, Dissolved	2	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Nickel, Dissolved	100	RE	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Potassium, Dissolved	NS		ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Selenium, Dissolved	50	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Silver, Dissolved	100	S	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Sodium, Dissolved	NS		ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Thallium, Dissolved	2	P	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Vanadium, Dissolved	NS		ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Zinc, Dissolved	5000	S	ug/L	NA			NA			NA			NA			NA			NA			NA			NA		
Conventionals																											
Alkalinity	NS		mg/L	U	5		U	5		U	5		U	5		U	5		NA			NA			NA		
Ammonia	NS		mg/L	U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		NA			NA			NA		
Chemical Oxygen Demand	NS		mg/L	U	10		U	10		U	10		U	10		U	10		NA			NA			NA		
Chloride	250	S	mg/L	U	0.12		U	0.12		U	0.12		U	0.12		U	0.12		NA			NA			NA		
Hardness as calcium carbonate	NS		mg/L	U	5		U	5		U	5		U	5		U	5		NA			NA			NA		
Nitrate as N	10	P	mg/L	U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		NA			NA			NA		
Sulfate	250	S	mg/L	U	0.6		U	0.6		U	0.6		U	0.6		U	0.6		NA			NA			NA		
Total Dissolved Solids	500	S	mg/L	U	10		U	10		U	10	13		10		U	10		NA			NA			NA		

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
Bromoform, Dibromochloromethane and Chloroform
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10A - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location				MW-4			MW-5			MW-6			MW-6-D			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27	
Lab ID				460-202111-02 460-202236-02			460-202111-01 460-202236-01			460-202215-03 460-202362-03			460-202215-04 460-202362-04			460-201978-09			460-201978-10			460-201978-01			460-201978-02			460-201978-03			460-201978-04			460-201978-13			460-202215-01 460-202362-01			460-201978-12			460-202111-06 460-202236-07			460-202362	
Sample Date				1/31/2020			1/31/2020			2/3/2020			2/3/2020			1/30/2020			1/30/2020			1/29/2020			1/29/2020			1/29/2020			1/29/2020			1/30/2020			2/3/2020			1/30/2020			1/31/2020			2/4/2020	
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwa	
Remarks	EPA MCL	Screening											FD of MW-6																																		
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**
Volatiles																																															
1,1,1,2-Tetrachloroethane	NS		ug/L		U *	1		U F1 *	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U *	1		U
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1,2,2-Tetrachloroethane	NS		ug/L		U *	1		U F1 *	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U *	1		U
1,1,2-Trichloroethane	5	P	ug/L		U	1		U F1	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dibromo-3-Chloropropane	0.2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dibromoethane	0.05	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dichloropropane	5	P	ug/L		U	1		U F1	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
2-Butanone (MEK)	NS		ug/L		U	5		U	5		U *	5		U *	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U *	5		U	5		U	5		U *
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
4-Methyl-2-pentanone (MIBK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
Acetone	NS		ug/L		U	5		U	5		U	5		U	5	6.4		5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Carbon tetrachloride	5	P	ug/L		U *	1		U F1 *	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U *	1		U
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Chloroform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1	1.4		1		U	1		U	1	1.8		1	1.1		1		U	1		U	1		U	1		U	1		U
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
cis-1,2-Dichloroethene	70	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Dibromochloromethane	80	TTHM	ug/L		U *	1		U *	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U *	1		U
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Methyl tert-butyl ether	NS		ug/L	0.95	J	1	0.82	J	1	0.54	J	1	0.47	J	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U F1	1		U	1		U	1		U
Tetrachloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U F1	1		U	1		U	1		U
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Trichloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Total Metals																																															
Antimony	6	P	ug/L		U	2	2.2	B	2		U	2		U	2	0.8	J	2	0.6	J	2	0.65	J	2	0.53	J	2	0.55	J	2	0.67	J	2	0.51	J	2	0.59	J	2	0.48	J	2		U	2		U
Arsenic	10	P	ug/L		U	2		U	2		U	2		U	2	8.5		2		U	2	1	J	2		U	2	0.74	J	2	1.1	J	2		U	2		U	2		U	2		U	2		U
Barium	2000	P	ug/L	44.2		4	9.1		4	20.7		4	21.8		4	26		4	113		4	29.5		4	16.2		4	75.2		4	66		4	44.8		4	32.6		4	18.9		4	26.6		4	43.3	
Beryllium	4	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8	1.9		0.8	0.29	J	0.8		U	0.8	1.4		0.8	1.7		0.8	0.26	J	0.8		U	0.8		U	0.8		U	0.8	0.27	J
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Calcium	NS		ug/L	2280		200	2130		200	2340		200	2400		200	4180		200	7380		200	1610		200	3030		200	564		200	826		200	2950		200	2730		200	3710		200	2610		200	1910	
Chromium	100	P	ug/L	3	J	4		U	4		U	4		U	4	5.1		4		U	4	4.6		4		U	4		U	4	4.3		4	2.3	J	4		U	4		U	4	3.3	J	4		U
Cobalt	NS		ug/L	4		4	1.8	J	4		U	4		U	4		U	4	17.7		4	5.6		4		U	4	34.6		4	21.1		4	2.3	J	4		U	4		U	4		U	4	3.4	J
Copper	1300	AL	ug/L	7.5		4	2.8	J	4		U	4		U	4	13.8		4	6.9		4	7.7		4	2.9	J	4	7.2		4	10.8		4	3.7	J	4		U	4	4.3		4	4.9		4	2.5	J
Iron	300	S	ug/L	52.1	J	120		U	120		U	120		U	120	4980		200	847		200	1140		120	2660		120	322		120	2560		120	1670		120	77.2	J	120	342		120	260		120	607		120	513	
Lead	15	AL	ug/L		U	1.2	0.87	J	1.2		U	1.2		U	1.2	2.1		1.2		U	1.2	2.8		1.2		U	1.2	0.57	J	1.2	3.5		1.2		U	1.2		U	1.2		U	1.2	1.5		1.2		U
Magnesium	NS		ug/L	2960		200	1570		200	1910		200	1850		200	847		200	1140		200	879		200	6160		200	1160		200	760		200	4350		200	2940		200	3740		200	1420		200	1380	
Manganese	50	S	ug/L	22.1		8	13.7		8	8.2		8	7.9	J	8	105		8	51.6		8	78.3		8	11.4		8	176		8	96.7		8	86.9		8	69.5		8	24.7		8	11.1		8	99.8	
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U
Nickel	100	RE	ug/L	7.1		4	5.5		4		U	4		U	4	3.2	J	4	22.1		4	9.9		4	4.7		4	15.7		4	14.6		4	9		4	2.7	J	4	3.4	J	4	4.4		4	5.4	
Potassium	NS		ug/L	973		200	798		200	1110		200	1120		200	1920		200	837		200	297		200	1460		200	458		200	935		200	1120		200	1110		200	1060		200	1250		200	754	
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Sodium	NS		ug/L	3430		200	4670		200	2850		200	2840		200	727		200	1860		200	2740		200	1870		200	1910		200	1310		200	2570		200	1480		200	2270		200	2540		200	1690	
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U
Vanadium	NS		ug/L		U	4		U	4		U	4		U	4	8.4		4		U	4	5.6		4		U	4		U	4	4.9		4		U	4	1.8	J	4		U	4	3	J	4		U
Zinc	5000	S	ug/L	15.5	J	16		U	16		U	16		U	16	45.8		16	284		16	27.2		16	30.3		16	67.4		16	50.7		16		U	16		U	16	13.4	J	16	11.7	J	16		U

TABLE 10A - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location				MW-4			MW-5			MW-6			MW-6-D			MW-15			MW-16			MW-17			MW-18			MW-19			MW-20			MW-21			MW-22			MW-24			MW-25			MW-27	
Lab ID				460-202111-02 460-202236-02			460-202111-01 460-202236-01			460-202215-03 460-202362-03			460-202215-04 460-202362-04			460-201978-09			460-201978-10			460-201978-01			460-201978-02			460-201978-03			460-201978-04			460-201978-13			460-202215-01 460-202362-01			460-201978-12			460-202111-06 460-202236-07			460-202362	
Sample Date				1/31/2020			1/31/2020			2/3/2020			2/3/2020			1/30/2020			1/30/2020			1/29/2020			1/29/2020			1/29/2020			1/29/2020			1/30/2020			2/3/2020			1/30/2020			1/31/2020			2/4/2020	
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwa	
Remarks	EPA MCL	Screening											FD of MW-6																																		
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**
Dissolved Metals																																															
Antimony, Dissolved	6	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Arsenic, Dissolved	10	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Barium, Dissolved	2000	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Beryllium, Dissolved	4	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Cadmium, Dissolved	5	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Calcium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Chromium, Dissolved	100	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Cobalt, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Copper, Dissolved	1300	AL	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Iron, Dissolved	300	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Lead, Dissolved	15	AL	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Magnesium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Manganese, Dissolved	50	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Mercury, Dissolved	2	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Nickel, Dissolved	100	RE	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Potassium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Selenium, Dissolved	50	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Silver, Dissolved	100	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Sodium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Thallium, Dissolved	2	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Vanadium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Zinc, Dissolved	5000	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA
Conventionals																																															
Alkalinity	NS		mg/L		U	5		U	5	5.4		5		U	5	8.3		5	13.5		5		U	5	23.8		5		U	5		U	5		U	5	6.5		5	9.9		5	6.8		5		U
Ammonia	NS		mg/L		U	0.1		U	0.1		U	0.1		U	0.1	0.14		0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U F1	0.1		U	0.1		U	0.1		U
Chemical Oxygen Demand	NS		mg/L		U	10		U F1	10		U	10		U	10	26.6		10		U	10	5.2	J	10		U F1	10	4.2	J	10		U	10		U	10		U F1	10		U	10		U	10		U
Chloride	250	S	mg/L	5.62		0.12	6.01	F1	0.24	5.18		0.12	5.22		0.12	1.37		0.12	2.65		0.12	1.62		0.12	2.28		0.12	3.24		0.12	2.62		0.12	3.38		0.12	2.1	F1	0.1	3.36		0.12	3.5		0.12	2.01	
Hardness as calcium carbonate	NS		mg/L	26		5	18		5	14		5	14		5	52		10	30		5	18		5	36		5	14		5	12		5	58		5	18		5	30		5	18		5	12	
Nitrate as N	10	P	mg/L	0.2		0.1	0.39		0.1	0.22		0.1	0.24		0.1		U	0.1		U	0.1		U H	0.1	0.48		0.1		U	0.1		U	0.1	0.47		0.1	0.18		0.1	0.6		0.1	0.073	J	0.1		U
Sulfate	250	S	mg/L	12.7		0.6	5.83		0.6	7.52		0.6	8.38		0.6	5.69		0.6	13.4		0.6	10.7		0.6	13.2		0.6	28.9		0.6	23.8		0.6	25		0.6	15.2	F1	0.6	14.2		0.6	5		0.6	21.7	
Total Dissolved Solids	500	S	mg/L	30		10	27		10	39		10	39		10	46		10		U	10	88		10	45		10	38		10	33		10	55		10	48		10	52		10	28		10	40	

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of Bromodichloromethane,
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10A - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location					MW-29			MW-30			PMW-6			PMW-6D			PMW-28			EB-01-012920			EB-02-013020			EB-03-013120			EB-04-020320			EB-05-020420			TB-01-013020			TB-02-013120			TB-03-020320		
Lab ID				:-10	460-202215-05 460-202362-05			460-202111-05 460-202236-06			460-202111-04 460-202236-04			460-202111-07 460-202236-05			460-202111-03 460-202236-03			460-201978-06			460-201978-14			460-202111-08 460-202236-08			460-202215-08 460-202362-08			460-202362-12			460-201978-15			460-202236-09			460-202362-14		
Sample Date				)	2/3/2020			1/31/2020			1/31/2020			1/31/2020			1/31/2020			1/29/2020			1/30/2020			1/31/2020			2/3/2020			2/4/2020			1/30/2020			1/31/2020			2/4/2020		
Matrix				ter	Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening												FD of PMW-6						Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Trip Blank			Trip Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																																											
1,1,1,2-Tetrachloroethane	NS		ug/L	1		U	1		U *	1		U *	1		U *	1		U *	1		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
1,1,1-Trichloroethane	200	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L	1		U	1		U *	1		U *	1		U *	1		U *	1		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
1,1,2-Trichloroethane	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropane	0.2	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromoethane	0.05	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichlorobenzene	600	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L	5		U *	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U *	5		U *	5		U	5		U	5		U *	5
2-Hexanone	NS		ug/L	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK)	NS		ug/L	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acetone	NS		ug/L	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Benzene	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromomethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L	1		U	1		U *	1		U *	1		U *	1		U *	1		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
Chlorobenzene	100	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		1.1		1	U	1		U	1		U	1		U	1		U	1		U	1
Chloromethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L	1		U	1		U *	1		U *	1		U *	1		U *	1		U	1		U	1		U *	1		U	1		U	1		U	1		U *	1		U	1
Dibromomethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Iodomethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Styrene	100	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Toluene	1000	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Total Metals																																											
Antimony	6	P	ug/L	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Arsenic	10	P	ug/L	2		U	2	0.99	J	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Barium	2000	P	ug/L	4	26.1		4	22		4	26.4		4	27.6		4	49		4		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Beryllium	4	P	ug/L	0.8	1.3		0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		NA			NA			NA	
Cadmium	5	P	ug/L	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Calcium	NS		ug/L	200	1730		200	3230		200	2460		200	2690		200	2560		200	102	J	200	111	J	200	110	J	200		U	200		U	200		NA			NA			NA	
Chromium	100	P	ug/L	4		U	4	3	J	4		U	4		U	4	5.9		4		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Cobalt	NS		ug/L	4	6.4		4	1.7	J	4		U	4		U	4		U	4		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Copper	1300	AL	ug/L	4		U	4	3.7	J	4		U	4		U	4	9.1		4		U	4	4.3		4	2.7	J	4		U	4		U	4		NA			NA			NA	
Iron	300	S	ug/L	120	1010		120	2260		120	100	J	120	143		120	1090		120		U	120		U	120		U	120		U	120		U	120		NA			NA			NA	
Lead	15	AL	ug/L	1.2		U	1.2	0.85	J	1.2		U	1.2		U	1.2	1.9		1.2		U	1.2		U	1.2		U	1.2		U	1.2		U	1.2		NA			NA			NA	
Magnesium	NS		ug/L	200	862		200	2600		200	2010		200	2110		200	1820		200		U	200		U	200		U	200		U	200		U	200		NA			NA			NA	
Manganese	50	S	ug/L	8	24.4		8	55.6		8	12.4		8	13.4		8	31.8		8		U	8		U	8		U	8		U	8		U	8		NA			NA			NA	
Mercury	2	P	ug/L	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		NA			NA			NA	
Nickel	100	RE	ug/L	4	10.9		4	2.8	J	4		U	4		U	4	6.5		4		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Potassium	NS		ug/L	200	1360		200	1880		200	990		200	977		200	1330		200		U	200		U	200		U	200		U	200		U	200		NA			NA			NA	
Selenium	50	P	ug/L	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		NA			NA			NA	
Silver	100	S	ug/L	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		NA			NA			NA	
Sodium	NS		ug/L	200	5080		200	3630		200	3410		200	3560		200	4040		200	372		200	487		200	472		200	435		200	382		200		NA			NA			NA	
Thallium	2	P	ug/L	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		NA			NA			NA	
Vanadium	NS		ug/L	4		U	4	2.3	J	4		U	4		U	4	2.9	J	4		U	4		U	4		U	4		U	4		U	4		NA			NA			NA	
Zinc	5000	S	ug/L	16	57.5		16	26.3		16		U	16		U	16	59.6		16		U	16		U	16		U	16		U	16		U	16		NA			NA			NA	

TABLE 10A - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(January 2020 Sample Event)

Sample Location					MW-29			MW-30			PMW-6			PMW-6D			PMW-28			EB-01-012920			EB-02-013020			EB-03-013120			EB-04-020320			EB-05-020420			TB-01-013020			TB-02-013120			TB-03-020320		
Lab ID				:-10	460-202215-05 460-202362-05			460-202111-05 460-202236-06			460-202111-04 460-202236-04			460-202111-07 460-202236-05			460-202111-03 460-202236-03			460-201978-06			460-201978-14			460-202111-08 460-202236-08			460-202215-08 460-202362-08			460-202362-12			460-201978-15			460-202236-09			460-202362-14		
Sample Date				)	2/3/2020			1/31/2020			1/31/2020			1/31/2020			1/31/2020			1/29/2020			1/30/2020			1/31/2020			2/3/2020			2/4/2020			1/30/2020			1/31/2020			2/4/2020		
Matrix				ter	Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening												FD of PMW-6						Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Trip Blank			Trip Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Dissolved Metals																																											
Antimony, Dissolved	6	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Arsenic, Dissolved	10	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Barium, Dissolved	2000	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Beryllium, Dissolved	4	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Cadmium, Dissolved	5	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Calcium, Dissolved	NS		ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Chromium, Dissolved	100	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Cobalt, Dissolved	NS		ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Copper, Dissolved	1300	AL	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Iron, Dissolved	300	S	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Lead, Dissolved	15	AL	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Magnesium, Dissolved	NS		ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Manganese, Dissolved	50	S	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Mercury, Dissolved	2	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Nickel, Dissolved	100	RE	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Potassium, Dissolved	NS		ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Selenium, Dissolved	50	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Silver, Dissolved	100	S	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Sodium, Dissolved	NS		ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Thallium, Dissolved	2	P	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Vanadium, Dissolved	NS		ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Zinc, Dissolved	5000	S	ug/L			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		
Conventionals																																											
Alkalinity	NS		mg/L	5		U	5	17.8		5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		NA			NA			NA		
Ammonia	NS		mg/L	0.1		U	0.1		U	0.1	0.086	J	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		NA			NA			NA		
Chemical Oxygen Demand	NS		mg/L	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		NA			NA			NA		
Chloride	250	S	mg/L	0.12	3.26		0.12	1.26		0.12	3.49		0.12	3.66		0.12	6.81		0.24		U	0.12		U	0.12		U	0.12		U	0.12		U	0.12		NA			NA			NA		
Hardness as calcium carbonate	NS		mg/L	5	8		5	24		5	24		5	26		5	28		5		U	5		U	5		U	5		U	5		U	5		NA			NA			NA		
Nitrate as N	10	P	mg/L	0.1		U	0.1		U	0.1	0.37		0.1	0.06	J	0.1	0.11		0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		NA			NA			NA		
Sulfate	250	S	mg/L	0.6	18.3		0.6	6.17		0.6	12.4		0.6	12		0.6	7.73		0.6		U	0.6		U	0.6		U	0.6		U	0.6		U	0.6		NA			NA			NA		
Total Dissolved Solids	500	S	mg/L	10	36		10	26		10	28		10	22		10	28		10		U	10		U	10		U	10	13		10		U	10		NA			NA			NA		

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of Bromodichloromethane,
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10B - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				MW-10			MW-14			MW-28			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23		
Lab ID				460-205754-01			460-205754-10			460-205973-07			460-205924-07			460-205844-04			460-205844-01			460-205754-11			460-205973-06			460-205924-05		
				460-206064-01			460-206064-10			460-206064-34			460-206064-26			460-206064-15			460-206064-12			460-206064-11			460-206064-33			460-206064-24		
Sample Date				3/23/2020			3/24/2020			3/27/2020			3/26/2020			3/25/2020			3/25/2020			3/24/2020			3/27/2020			3/26/2020		
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	EPA MCL	Screening																												
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																														
1,1,1,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2-Trichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropane	0.2	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02
1,2-Dibromoethane	0.05	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acetone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L		U	1	3.6		1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Total Metals																														
Antimony	6	P	ug/L	0.74	J	2	0.47	J	2	0.62	J	2		U	2		U	2		U	2		U	2	0.82	J	2		U	2
Arsenic	10	P	ug/L		U	2	0.95	J	2		U	2	0.98	J	2	0.77	J	2	0.81	J	2	1.2	J	2		U	2	0.84	J	2
Barium	2000	P	ug/L	4.1		4	21.3		4	43.5		4	10		4	37.6		4	9.3		4	13.1		4	15.5		4	12.8		4
Beryllium	4	P	ug/L	0.27	J	0.8		U	0.8		U	0.8		U	0.8	1.3		0.8		U	0.8	0.35	J	0.8		U	0.8		U	0.8
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Calcium	NS		ug/L	3760		200	16800		200	7540		200	512		200	3240		200	984		200	710		200	1920		200	681		200
Chromium	100	P	ug/L		U	4		U	4	2.5	J	4	4.9		4	7.1		4	2.8	J	4	3.6	J	4		U	4	9.3		4
Cobalt	NS		ug/L	2.1	J	4	2	J	4		U	4	2.5	J	4	2.4	J	4	4.6		4	3	J	4		U	4		U	4
Copper	1300	AL	ug/L		U	4	2.7	J	4	4.9		4	3.1	J	4	9.6		4	3.7	J	4	7.9		4		U	4	5.2		4
Iron	300	S	ug/L	595		120	2620		120	12900		120	1790		120	7740		120	523		120	1150		120	4540		120	1580		120
Lead	15	AL	ug/L	1.1	J	1.2	2.1		1.2	0.92	J	1.2	1.5		1.2	3.2		1.2	2		1.2	1.8		1.2		U	1.2	3		1.2
Magnesium	NS		ug/L	111	J	200	2730		200	1580		200	266		200	1380		200	518		200	507		200	481		200	383		200
Manganese	50	S	ug/L	6.4	J	8	53.6		8	84.1		8	7.5	J	8	66.2		8	7.7	J	8	19.5		8	33.7		8	17.7		8
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2
Nickel	100	RE	ug/L	4		4	3.3	J	4		U	4	6.3		4	5.9		4	10.6		4	5.8		4		U	4	7.8		4
Potassium	NS		ug/L	360		200	7200		200	1500		200	890		200	2120		200	767		200	962		200	971		200	987		200
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10

TABLE 10B - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				MW-10			MW-14			MW-28			PMW-11			PMW-12			PMW-13			PMW-18			PMW-19			PMW-23		
Lab ID				460-205754-01			460-205754-10			460-205973-07			460-205924-07			460-205844-04			460-205844-01			460-205754-11			460-205973-06			460-205924-05		
				460-206064-01			460-206064-10			460-206064-34			460-206064-26			460-206064-15			460-206064-12			460-206064-11			460-206064-33			460-206064-24		
Sample Date				3/23/2020			3/24/2020			3/27/2020			3/26/2020			3/25/2020			3/25/2020			3/24/2020			3/27/2020			3/26/2020		
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	EPA MCL	Screening																												
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Sodium	NS		ug/L	2070		200	901		200	2600		200	1360		200	1490		200	1510		200	1150		200	1450		200	1690		200
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8	0.19	J	0.8		U	0.8		U	0.8		U	0.8
Vanadium	NS		ug/L		U	4	2.7	J	4	7.2		4	4.2		4	14.4		4	2.9	J	4	4.7		4	1.2	J	4	4.8		4
Zinc	5000	S	ug/L		U	16	65.2		16	22.6		16		U	16	52.6		16		U	16	15.7	J	16	50.7		16		U	16
Dissolved Metals																														
Antimony, Dissolved	6	P	ug/L		NA			NA			U	2		U	2		U	2		NA			U	2		NA			U	2
Arsenic, Dissolved	10	P	ug/L		NA			NA			U	2		U	2		U	2		NA			U	2		NA			U	2
Barium, Dissolved	2000	P	ug/L		NA			NA		44.6		4	4.3		4	21.3		4		NA		7.9		4		NA		4.6		4
Beryllium, Dissolved	4	P	ug/L		NA			NA			U	0.8		U	0.8		U	0.8		NA		0.33	J	0.8		NA			U	0.8
Cadmium, Dissolved	5	P	ug/L		NA			NA			U	2		U	2		U	2		NA			U	2		NA			U	2
Calcium, Dissolved	NS		ug/L		NA			NA		8490		200	523		200	3230		200		NA		748		200		NA		742		200
Chromium, Dissolved	100	P	ug/L		NA			NA			U	4		U	4		U	4		NA			U	4		NA			U	4
Cobalt, Dissolved	NS		ug/L		NA			NA			U	4	2.4	J	4		U	4		NA		3.6	J	4		NA			U	4
Copper, Dissolved	1300	AL	ug/L		NA			NA			U	4	2.2	J	4		U	4		NA		6		4		NA			U	4
Iron, Dissolved	300	S	ug/L		NA			NA		15100		120		U	120	6500		120		NA			U	120		NA			U	120
Lead, Dissolved	15	AL	ug/L		NA			NA			U	1.2		U	1.2		U	1.2		NA			U	1.2		NA			U	1.2
Magnesium, Dissolved	NS		ug/L		NA			NA		1960		200	238		200	1400		200		NA		560		200		NA		354		200
Manganese, Dissolved	50	S	ug/L		NA			NA		97.6		8	5.7	J	8	68.4		8		NA		11.8		8		NA		16.1		8
Mercury, Dissolved	2	P	ug/L		NA			NA			U	0.2		U	0.2		U	0.2		NA			U	0.2		NA			U	0.2
Nickel, Dissolved	100	RE	ug/L		NA			NA			U	4	3.8	J	4		U	4		NA		5.3		4		NA		2.7	J	4
Potassium, Dissolved	NS		ug/L		NA			NA		1600		200	548		200	1180		200		NA		770		200		NA		532		200
Selenium, Dissolved	50	P	ug/L		NA			NA			U	10		U	10		U	10		NA			U	10		NA			U	10
Silver, Dissolved	100	S	ug/L		NA			NA			U	2		U	2		U	2		NA			U	2		NA			U	2
Sodium, Dissolved	NS		ug/L		NA			NA		3230		200	1430		200	1660		200		NA		1280		200		NA		1800		200
Thallium, Dissolved	2	P	ug/L		NA			NA			U	0.8		U	0.8		U	0.8		NA			U	0.8		NA			U	0.8
Vanadium, Dissolved	NS		ug/L		NA			NA		4		4		U	4		U	4		NA			U	4		NA			U	4
Zinc, Dissolved	5000	S	ug/L		NA			NA			U	16		U	16	42.1		16		NA		12.1	J	16		NA			U	16
Conventionals																														
Alkalinity	NS		mg/L	8.5		5	50.3		5	34.5		5		U	5		U	5		U	5		U	5	11.1		5		U	5
Ammonia	NS		mg/L		U F1	0.1		U	0.1	0.14		0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1
Chemical Oxygen Demand	NS		mg/L		U	10	6.3	J	10	20.5		10		U	10		U	10		U	10		U	10		U	10		U	10
Chloride	250	S	mg/L	2.52	F1	0.12	0.98		0.12	0.82		0.12	1.72		0.12	0.95		0.12	2.17		0.12	1.22		0.12	1.72		0.12	2.62		0.12
Hardness as calcium carbonate	NS		mg/L	18		5	50		5	26		5		U	5	14		5		U	5	6		5	6		5		U	10
Nitrate as N	10	P	mg/L		U	0.1	0.094	J	0.1		U	0.1	0.17		0.1		U	0.1		U	0.1	0.29		0.1		U	0.1	0.35		0.1
Nitrate as N (reanalysis)	10	P	mg/L		NA			NA			NA			NA			NA			NA			NA			NA			NA	
Sulfate	250	S	mg/L	13.3	F1	0.6	9.75		0.6	1.88		0.6	5.88		0.6	17.7		0.6	26.4		0.6	9.54		0.6	2.47		0.6	2.91		0.6
Total Dissolved Solids	500	S	mg/L	37		10	88		10	92		10	37		10	56		10	40		10	20		10	40		10	37		10

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of Bromodichloromethane,
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10B - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				EB-01-032420			EB-02-032520			EB-03-032620			EB-04-032720			Trip Blank		
				460-205754-08			460-205844-08			460-205924-03			460-205973-04			460-206064-35		
Lab ID				460-206064-05			460-206064-19			460-206064-22			460-206064-31					
Sample Date				3/24/2020			3/25/2020			3/26/2020			3/27/2020			3/23/2020		
Matrix				Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening		Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																		
1,1,1,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
1,1,2-Trichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropane	0.2	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02
1,2-Dibromoethane	0.05	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5
Acetone	NS		ug/L		U	5		U	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L		U	1		U	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2
Total Metals																		
Antimony	6	P	ug/L		U	2		U	2		U	2		U	2		NA	
Arsenic	10	P	ug/L		U	2		U	2		U	2		U	2		NA	
Barium	2000	P	ug/L		U	4		U	4		U	4		U	4		NA	
Beryllium	4	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		NA	
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		NA	
Calcium	NS		ug/L	117	J	200	99.3	J	200		U	200	106	J	200		NA	
Chromium	100	P	ug/L		U	4		U	4		U	4		U	4		NA	
Cobalt	NS		ug/L		U	4		U	4		U	4		U	4		NA	
Copper	1300	AL	ug/L		U	4		U	4		U	4		U	4		NA	
Iron	300	S	ug/L		U	120		U	120	81.9	J	120		U	120		NA	
Lead	15	AL	ug/L		U	1.2		U	1.2		U	1.2		U	1.2		NA	
Magnesium	NS		ug/L		U	200		U	200		U	200		U	200		NA	
Manganese	50	S	ug/L		U	8		U	8		U	8		U	8		NA	
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		NA	
Nickel	100	RE	ug/L		U	4		U	4		U	4		U	4		NA	
Potassium	NS		ug/L		U	200		U	200		U	200		U	200		NA	
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		NA	

TABLE 10B - CONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				EB-01-032420			EB-02-032520			EB-03-032620			EB-04-032720			Trip Blank		
				460-205754-08			460-205844-08			460-205924-03			460-205973-04			460-206064-35		
Lab ID				460-206064-05			460-206064-19			460-206064-22			460-206064-31					
Sample Date				3/24/2020			3/25/2020			3/26/2020			3/27/2020			3/23/2020		
Matrix				Aqueous			Aqueous			Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening		Equipment Blank			Equipment Blank			Equipment Blank			Equipment Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		NA	
Sodium	NS		ug/L	382		200	412		200	424		200	386		200		NA	
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		NA	
Vanadium	NS		ug/L		U	4		U	4		U	4		U	4		NA	
Zinc	5000	S	ug/L		U	16		U	16		U	16		U	16		NA	
Dissolved Metals																		
Antimony, Dissolved	6	P	ug/L		NA			NA			NA			NA			NA	
Arsenic, Dissolved	10	P	ug/L		NA			NA			NA			NA			NA	
Barium, Dissolved	2000	P	ug/L		NA			NA			NA			NA			NA	
Beryllium, Dissolved	4	P	ug/L		NA			NA			NA			NA			NA	
Cadmium, Dissolved	5	P	ug/L		NA			NA			NA			NA			NA	
Calcium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA	
Chromium, Dissolved	100	P	ug/L		NA			NA			NA			NA			NA	
Cobalt, Dissolved	NS		ug/L		NA			NA			NA			NA			NA	
Copper, Dissolved	1300	AL	ug/L		NA			NA			NA			NA			NA	
Iron, Dissolved	300	S	ug/L		NA			NA			NA			NA			NA	
Lead, Dissolved	15	AL	ug/L		NA			NA			NA			NA			NA	
Magnesium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA	
Manganese, Dissolved	50	S	ug/L		NA			NA			NA			NA			NA	
Mercury, Dissolved	2	P	ug/L		NA			NA			NA			NA			NA	
Nickel, Dissolved	100	RE	ug/L		NA			NA			NA			NA			NA	
Potassium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA	
Selenium, Dissolved	50	P	ug/L		NA			NA			NA			NA			NA	
Silver, Dissolved	100	S	ug/L		NA			NA			NA			NA			NA	
Sodium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA	
Thallium, Dissolved	2	P	ug/L		NA			NA			NA			NA			NA	
Vanadium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA	
Zinc, Dissolved	5000	S	ug/L		NA			NA			NA			NA			NA	
Conventionals																		
Alkalinity	NS		mg/L		U	5		U	5		U	5		U	5		NA	
Ammonia	NS		mg/L		U	0.1		U	0.1		U	0.1		U	0.1		NA	
Chemical Oxygen Demand	NS		mg/L		U	10		U	100		U	10		U	10		NA	
Chloride	250	S	mg/L		U	0.12		U	0.12		U	0.12		U	0.12		NA	
Hardness as calcium carbonate	NS		mg/L		U	5		U	10		U	5		U	5		NA	
Nitrate as N	10	P	mg/L		U	0.1		U	0.1		U	0.1		U	0.1		NA	
Nitrate as N (reanalysis)	10	P	mg/L		NA			NA			NA			NA			NA	
Sulfate	250	S	mg/L		U	0.6		U	0.6		U	0.6		U	0.6		NA	
Total Dissolved Solids	500	S	mg/L		U	10		U	10	28		10	24		10		NA	

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of Bromodichloromethane,
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10B - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				MW-4			MW-5			MW-6			MW-15			MW-16			MW-17			MW-18			MW-18-D			MW-19			MW-20		
Lab ID				460-205754-06			460-205754-09			460-205754-05			460-205844-02			460-205844-03			460-205844-07			460-205844-05			460-205844-06			460-205924-06			460-205924-01		
				460-206064-07			460-206064-09			460-206064-06			460-206064-13			460-206064-14			460-206064-18			460-206064-16			460-206064-17			460-206064-25			460-206064-20		
Sample Date				3/24/2020			3/24/2020			3/24/2020			3/25/2020			3/25/2020			3/25/2020			3/25/2020			3/25/2020			3/26/2020			3/26/2020		
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	EPA MCL	Screening																							FD of MW-18								
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles																																	
1,1,1,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1,2-Trichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropan	0.2	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02
1,2-Dibromoethane	0.05	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5
Acetone	NS		ug/L		U	5		U	5		U	5	4.7	J	5		U	5		U	5		U	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L		U	1		U	1		U	1		U	1	0.84	J	1		U	1		U	1		U	1	1.2		1	0.97	J	1
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L	0.8	J	1	0.48	J	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Total Metals																																	
Antimony	6	P	ug/L	0.96	J	2	0.87	J	2	0.92	J	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Arsenic	10	P	ug/L		U	2		U	2		U	2	4.2		2	0.83	J	2	1.3	J	2		U	2		U	2		U	2	1	J	2
Barium	2000	P	ug/L	49.7		4	11		4	30.7		4	26.6		4	130		4	28.1		4	14.8		4	13.7		4	71.4		4	67.7		4
Beryllium	4	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8	3.5		0.8	0.51	J	0.8		U	0.8		U	0.8	1.5		0.8	1.8		0.8
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Calcium	NS		ug/L	2180		200	2490		200	2790		200	3530		200	2220		200	1540		200	3060		200	2970		200	737		200	657		200
Chromium	100	P	ug/L		U	4		U	4		U	4	5.9		4		U	4	3.7	J	4		U	4		U	4		U	4	3	J	4
Cobalt	NS		ug/L	3.6	J	4		U	4		U	4		U	4	20.5		4	5.4		4		U	4		U	4	36.5		4	22		4
Copper	1300	AL	ug/L	2.2	J	4		U	4		U	4	10.4		4	7.2		4	4.7		4	2.2	J	4		U	4	5.9		4	10.4		4
Iron	300	S	ug/L	274		120	73.4	J	120		U	120	3440		120	397		120	2630		120	160		120	98.8	J	120	1080		120	1010		120
Lead	15	AL	ug/L		U	1.2	2.5		1.2		U	1.2	2.6		1.2	0.66	J	1.2	2.5		1.2		U	1.2		U	1.2		U	1.2	1.9		1.2
Magnesium	NS		ug/L	2730		200	1370		200	1990		200	772		200	1120		200	748		200	5470		200	5320		200	1170		200	724		200
Manganese	50	S	ug/L	19		8	12.5		8	8.4		8	90.3		8	56.1		8	67.6		8	9.8		8	9.7		8	200		8	96.2		8
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2
Nickel	100	RE	ug/L	5.6		4	4.6		4		U	4	4		4	21.3		4	9.9		4	3.2	J	4	2.4	J	4	16.4		4	12.7		4
Potassium	NS		ug/L	990		200	774		200	1260		200	1890		200	711		200	229		200	1480		200	1420		200	472		200	779		200
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2
Sodium	NS		ug/L	3100		200	4040		200	2710		200	869		200	1690		200	2110		200	2080		200	2000		200	1940		200	1320		200
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8
Vanadium	NS		ug/L		U	4		U	4		U	4	6.8		4	1.8	J	4	5.2		4		U	4		U	4		U	4	3.6	J	4
Zinc	5000	S	ug/L		U	16		U	16		U	16	40.5		16	103		16	28.1		16	28.4		16	26.6		16	76.1		16	62.3		16

TABLE 10B - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				MW-4			MW-5			MW-6			MW-15			MW-16			MW-17			MW-18			MW-18-D			MW-19			MW-20		
Lab ID				460-205754-06			460-205754-09			460-205754-05			460-205844-02			460-205844-03			460-205844-07			460-205844-05			460-205844-06			460-205924-06			460-205924-01		
				460-206064-07			460-206064-09			460-206064-06			460-206064-13			460-206064-14			460-206064-18			460-206064-16			460-206064-17			460-206064-25			460-206064-20		
Sample Date				3/24/2020			3/24/2020			3/24/2020			3/25/2020			3/25/2020			3/25/2020			3/25/2020			3/25/2020			3/26/2020			3/26/2020		
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater		
Remarks	EPA MCL	Screening																							FD of MW-18								
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Dissolved Metals																																	
Antimony, Dissolved	6	P	ug/L		NA			NA			NA			U	2		NA			U	2		NA			NA			NA			U	2
Arsenic, Dissolved	10	P	ug/L		NA			NA			NA		3.5		2		NA			U	2		NA			NA			NA			U	2
Barium, Dissolved	2000	P	ug/L		NA			NA			NA		22.1		4		NA		21		4		NA			NA			NA		70.1		4
Beryllium, Dissolved	4	P	ug/L		NA			NA			NA			U	0.8		NA		0.28	J	0.8		NA			NA			NA		1.8		0.8
Cadmium, Dissolved	5	P	ug/L		NA			NA			NA			U	2		NA			U	2		NA			NA			NA			U	2
Calcium, Dissolved	NS		ug/L		NA			NA			NA		3490		200		NA		1520		200		NA			NA			NA		735		200
Chromium, Dissolved	100	P	ug/L		NA			NA			NA			U	4		NA			U	4		NA			NA			NA			U	4
Cobalt, Dissolved	NS		ug/L		NA			NA			NA			U	4		NA		4.9		4		NA			NA			NA		23.2		4
Copper, Dissolved	1300	AL	ug/L		NA			NA			NA		4		4		NA		3.3	J	4		NA			NA			NA		9.8		4
Iron, Dissolved	300	S	ug/L		NA			NA			NA		2270		120		NA		158		120		NA			NA			NA			U	120
Lead, Dissolved	15	AL	ug/L		NA			NA			NA			U	1.2		NA			U	1.2		NA			NA			NA		0.84	J	1.2
Magnesium, Dissolved	NS		ug/L		NA			NA			NA		786		200		NA		669		200		NA			NA			NA		788		200
Manganese, Dissolved	50	S	ug/L		NA			NA			NA		97.2		8		NA		65.2		8		NA			NA			NA		105		8
Mercury, Dissolved	2	P	ug/L		NA			NA			NA			U	0.2		NA			U	0.2		NA			NA			NA			U	0.2
Nickel, Dissolved	100	RE	ug/L		NA			NA			NA		2.7	J	4		NA		8		4		NA			NA			NA		13.4		4
Potassium, Dissolved	NS		ug/L		NA			NA			NA		1890		200		NA			U	200		NA			NA			NA		639		200
Selenium, Dissolved	50	P	ug/L		NA			NA			NA			U	10		NA			U	10		NA			NA			NA			U	10
Silver, Dissolved	100	S	ug/L		NA			NA			NA			U	2		NA			U	2		NA			NA			NA			U	2
Sodium, Dissolved	NS		ug/L		NA			NA			NA		1010		200		NA		2260		200		NA			NA			NA		1430		200
Thallium, Dissolved	2	P	ug/L		NA			NA			NA			U	0.8		NA			U	0.8		NA			NA			NA			U	0.8
Vanadium, Dissolved	NS		ug/L		NA			NA			NA		2.1	J	4		NA			U	4		NA			NA			NA			U	4
Zinc, Dissolved	5000	S	ug/L		NA			NA			NA		34.3		16		NA		25.7		16		NA			NA			NA		57.5		16
Conventionals																																	
Alkalinity	NS		mg/L		U	5		U	5	5.6		5		U	5		U	5		U	5	22.1		5	17.5		5		U	5		U	5
Ammonia	NS		mg/L		U	0.1		U	0.1		U	0.1	0.14		0.1		U F1	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1
Chemical Oxygen Demand	NS		mg/L		U	10		U	10		U	10	26.5		10		U F1	10	766	J	1000		U	10	201	J	500		U	10		U	10
Chloride	250	S	mg/L	5.28		0.12	5.76		0.12	5.18		0.12	1.26		0.12	2.84		0.12	1.29		0.12	3.17		0.12	3.18		0.12	3.11		0.12	2.3		0.12
Hardness as calcium carbonat	NS		mg/L	22		5	16		5	16		5	14		5	10		5		U	5	26		5	26		5	6		5		U	5
Nitrate as N	10	P	mg/L	0.16		0.1	0.63		0.1	0.23		0.1	0.11		0.1		U	0.1		U	0.1	0.83		0.1	0.82		0.1		U	0.1		U	0.1
Nitrate as N (reanalysis)	10	P	mg/L		NA						NA			NA			NA			NA			NA			NA			NA			NA	
Sulfate	250	S	mg/L	16.4		0.6	22.4		0.6	11.2		0.6	10.8		0.6	18.4	F1	0.6	10.6		0.6	10.6		0.6	10.3		0.6	23.3		0.6	17.7		0.6
Total Dissolved Solids	500	S	mg/L	55		10	34		10	48		10	50		10	31		10	101		10	56		10	51		10	48		10	52		10

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10B - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				MW-21			MW-22			MW-24			MW-24-D			MW-25			MW-27			MW-29			MW-30			PMW-6			PMW-6-D			PMW-28			EB-01-032420			EB-02-032	
Lab ID				460-205924-02			460-205924-04			460-205973-01			460-205973-02			460-205973-03			460-205924-08			460-205754-07			460-205973-05			460-205754-02			460-205754-03			460-205754-04			460-205754-08			460-205844	
				460-206064-21			460-206064-23			460-206064-28			460-206064-29			460-206064-30			460-206064-27			460-206064-08			460-206064-32			460-206064-02			460-206064-03			460-206064-04			460-206064-05			460-20606	
Sample Date				3/26/2020			3/26/2020			3/27/2020			3/27/2020			3/27/2020			3/26/2020			3/24/2020			3/27/2020			3/24/2020			3/24/2020			3/24/2020			3/24/2020			3/25/202	
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Aqueous			Aqueous	
Remarks	EPA MCL	Screening											FD of MW-24																		FD of PMW-6						Equipment Blank			Equipment E	
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**
Volatiles																																									
1,1,1,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1,1-Trichloroethane	200	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1,2,2-Tetrachloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1,2-Trichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1-Dichloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,1-Dichloroethene	7	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2,3-Trichloropropane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dibromo-3-Chloropropan	0.2	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U
1,2-Dibromoethane	0.05	P	ug/L		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U	0.02		U
1,2-Dichlorobenzene	600	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dichloroethane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,2-Dichloropropane	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
1,4-Dichlorobenzene	75	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
2-Butanone (MEK)	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
2-Hexanone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
4-Methyl-2-pentanone (MIBK	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
Acetone	NS		ug/L		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U	5		U
Acrylonitrile	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Benzene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromochloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromodichloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromoform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Bromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Carbon disulfide	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Carbon tetrachloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Chlorobenzene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Chloroethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Chloroform	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Chloromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
cis-1,2-Dichloroethene	70	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
cis-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Dibromochloromethane	80	TTHM	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Dibromomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Ethylbenzene	700	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Iodomethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Methyl tert-butyl ether	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Methylene Chloride	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Styrene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Tetrachloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Toluene	1000	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
trans-1,2-Dichloroethene	100	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
trans-1,3-Dichloropropene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
trans-1,4-Dichloro-2-butene	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Trichloroethene	5	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Trichlorofluoromethane	NS		ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Vinyl acetate	NS		ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Vinyl chloride	2	P	ug/L		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U	1		U
Xylenes, Total	10000	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Total Metals																																									
Antimony	6	P	ug/L		U	2		U	2		U	2	0.73	J	2	0.61	J	2	0.63	J	2	1	J	2	0.7	J	2	0.96	J	2	0.96	J	2		U	2		U	2		U
Arsenic	10	P	ug/L		U	2	0.83	J	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2	0.99	J	2		U	2		U
Barium	2000	P	ug/L	37.1		4	31.7		4	18.6		4	20.5		4	24.4		4	30.7		4	38.6		4	23.7		4	27.1		4	30.1		4	51.4		4		U	4		U
Beryllium	4	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8	1.4		0.8		U	0.8		U	0.8		U	0.8	0.31	J	0.8		U	0.8		U
Cadmium	5	P	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Calcium	NS		ug/L	2700		200	2240		200	4190		200	4820		200	2640		200	1530		200	1990		200	3600		200	2700		200	2920		200	2670		200	117	J	200	99.3	J
Chromium	100	P	ug/L		U	4	3.4	J	4	4.2		4		U	4		U	4		U	4	2.6	J	4		U	4		U	4		U	4	6.3		4		U	4		U
Cobalt	NS		ug/L	2.5	J	4		U	4		U	4		U	4	1.7	J	4	3.4	J	4	7		4		U	4		U	4		U	4		U	4		U	4		U
Copper	1300	AL	ug/L	2.5	J	4		U	4	2.2	J	4		U	4		U	4		U	4		U	4		U	4		U	4	2.5	J	4		U	4		U	4		U
Iron	300	S	ug/L	283		120	457		120	333		120	126		120	1020		120	1110		120	763		120	1300		120		U	120		U	120	1330		120		U	120		U
Lead	15	AL	ug/L		U	1.2		U	1.2	1	J	1.2		U	1.2	0.94	J	1.2		U	1.2	0.77	J	1.2	0.59	J	1.2		U	1.2		U	1.2	2.1		1.2		U	1.2		U
Magnesium	NS		ug/L	3700		200	2970		200	5390		200	5340		200	1270		200	1170		200	919		200	2520		200	1890		200	2070		200	1940		200		U	200		U
Manganese	50	S	ug/L	71.3		8	70.6		8	22.4		8	20.2		8	13.5		8	88.4		8	26.3		8	31.2		8	10.5		8	10.8		8	24.1		8		U	8		U
Mercury	2	P	ug/L		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U	0.2		U
Nickel	100	RE	ug/L	7.2		4	3.1	J	4	5.2		4		U	4	3.2	J	4	5.3		4	12.7		4		U	4		U	4		U	4	4.1		4		U	4		U
Potassium	NS		ug/L	1080		200	1140		200	1130		200	1190		200	1190		200	640		200	1390		200	1740		200	862		200	1000		200	1560		200		U	200		U
Selenium	50	P	ug/L		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U	10		U
Silver	100	S	ug/L		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		U
Sodium	NS		ug/L	2280		200	2160		200	2050		200	1990		200	2170		200	1390		200	5260		200	2560		200	2820		200	3190		200	3880		200	382		200	412	
Thallium	2	P	ug/L		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U	0.8		U
Vanadium	NS		ug/L	1.4	J	4	2.6	J	4	1.3	J	4		U	4	3.1	J	4		U	4		U	4	1.9	J	4		U	4		U	4	5.4		4		U	4		U
Zinc	5000	S	ug/L		U	16		U	16		U	16		U	16		U	16		U	16	75.3		16	21.6		16		U	16		U	16	62.7		16		U	16		U

TABLE 10B - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				MW-21			MW-22			MW-24			MW-24-D			MW-25			MW-27			MW-29			MW-30			PMW-6			PMW-6-D			PMW-28			EB-01-032420			EB-02-032	
Lab ID				460-205924-02			460-205924-04			460-205973-01			460-205973-02			460-205973-03			460-205924-08			460-205754-07			460-205973-05			460-205754-02			460-205754-03			460-205754-04			460-205754-08			460-20584	
				460-206064-21			460-206064-23			460-206064-28			460-206064-29			460-206064-30			460-206064-27			460-206064-08			460-206064-32			460-206064-02			460-206064-03			460-206064-04			460-206064-05			460-20606	
Sample Date				3/26/2020			3/26/2020			3/27/2020			3/27/2020			3/27/2020			3/26/2020			3/24/2020			3/27/2020			3/24/2020			3/24/2020			3/24/2020			3/24/2020			3/25/202	
Matrix				Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Groundwater			Aqueous			Aqueous	
Remarks	EPA MCL	Screening											FD of MW-24																		FD of PMW-6						Equipment Blank			Equipment E	
Parameter	Criteria	Criteria	**Units**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**
Dissolved Metals																																									
Antimony, Dissolved	6	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	2		NA			NA
Arsenic, Dissolved	10	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	2		NA			NA
Barium, Dissolved	2000	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		38.3		4		NA			NA
Beryllium, Dissolved	4	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	0.8		NA			NA
Cadmium, Dissolved	5	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	2		NA			NA
Calcium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		2660		200		NA			NA
Chromium, Dissolved	100	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	4		NA			NA
Cobalt, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	4		NA			NA
Copper, Dissolved	1300	AL	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	4		NA			NA
Iron, Dissolved	300	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	120		NA			NA
Lead, Dissolved	15	AL	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	1.2		NA			NA
Magnesium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		1770		200		NA			NA
Manganese, Dissolved	50	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		10.9		8		NA			NA
Mercury, Dissolved	2	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	0.2		NA			NA
Nickel, Dissolved	100	RE	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		3.1	J	4		NA			NA
Potassium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		1060		200		NA			NA
Selenium, Dissolved	50	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	10		NA			NA
Silver, Dissolved	100	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	2		NA			NA
Sodium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		4020		200		NA			NA
Thallium, Dissolved	2	P	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	0.8		NA			NA
Vanadium, Dissolved	NS		ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA			U	4		NA			NA
Zinc, Dissolved	5000	S	ug/L		NA			NA			NA			NA			NA			NA			NA			NA			NA			NA		55.9		16		NA			NA
Conventionals																																									
Alkalinity	NS		mg/L		U	5	8.2		5	13.7		5	14.9		5	7.3		5		U	5		U	5	11.1		5	5.6		5		U	5		U	5		U	5		U
Ammonia	NS		mg/L		U	0.1		U	0.1		U	0.1		U F1	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U	0.1		U
Chemical Oxygen Demand	NS		mg/L		U	10		U	10		U	10		U	10		U	10		U F1	10		U	10		U	10		U	10		U	10		U	10		U	10		U
Chloride	250	S	mg/L	4.04		0.12	1.89		0.12	2.81		0.12	2.85		0.12	3.33		0.12	1.8	F1	0.12	3.93		0.12	1.67		0.12	3.18		0.12	3.26		0.12	6.64		0.6		U	0.12		U
Hardness as calcium carbonat	NS		mg/L	16		5	14		5	30		5	28		5	8		5	6		5	14		5	16		5	20		5	18		5	18		5		U	5		U
Nitrate as N	10	P	mg/L	0.41		0.1	0.077	J	0.1	1.01		0.1	1.02		0.1		U	0.1		U	0.1	446	R	20		U	0.1		U	0.1		U	0.1	0.11		0.1		U	0.1		U
Nitrate as N (reanalysis)	10	P	mg/L		NA			NA			NA			NA			NA			NA		0.11	H	0.1		NA			NA			NA			NA			NA			NA	
Sulfate	250	S	mg/L	66.5	D	6	13.6		0.6	17.7		0.6	16.4		0.6	5.51		0.6	20.5	F1	0.6	15		6	10.7		0.6	13.8		0.6	14.1		0.6	15		0.6		U	0.6		U
Total Dissolved Solids	500	S	mg/L	72		10	66		10	88		10	60		10	59		10	40		10	54		10	65		10	41		10	42		10	49		10		U	10		U

R: The original Nitrate data for MW-29 was rejected (R) by Advanced GeoServices. The laboratory confirmed after analysis and reporting that the sample bottle had a pH <2 resulting in a high Nitrate concentration. The sample was reanalyzed by the laboratory from a separate sample container.

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10B - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				520	EB-03-032620			EB-04-032720			Trip Blank		
Lab ID				4-08	460-205924-03			460-205973-04			460-206064-35		
				4-19	460-206064-22			460-206064-31					
Sample Date				0	3/26/2020			3/27/2020			3/23/2020		
Matrix				s	Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening		Blank	Equipment Blank			Equipment Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Volatiles													
1,1,1,2-Tetrachloroethane	NS		ug/L	1		U	1		U	1		U	1
1,1,1-Trichloroethane	200	P	ug/L	1		U	1		U	1		U	1
1,1,2,2-Tetrachloroethane	NS		ug/L	1		U	1		U	1		U	1
1,1,2-Trichloroethane	5	P	ug/L	1		U	1		U	1		U	1
1,1-Dichloroethane	NS		ug/L	1		U	1		U	1		U	1
1,1-Dichloroethene	7	P	ug/L	1		U	1		U	1		U	1
1,2,3-Trichloropropane	NS		ug/L	1		U	1		U	1		U	1
1,2-Dibromo-3-Chloropropan	0.2	P	ug/L	0.02		U	0.02		U	0.02		U	0.02
1,2-Dibromoethane	0.05	P	ug/L	0.02		U	0.02		U	0.02		U	0.02
1,2-Dichlorobenzene	600	P	ug/L	1		U	1		U	1		U	1
1,2-Dichloroethane	5	P	ug/L	1		U	1		U	1		U	1
1,2-Dichloropropane	5	P	ug/L	1		U	1		U	1		U	1
1,4-Dichlorobenzene	75	P	ug/L	1		U	1		U	1		U	1
2-Butanone (MEK)	NS		ug/L	5		U	5		U	5		U	5
2-Hexanone	NS		ug/L	5		U	5		U	5		U	5
4-Methyl-2-pentanone (MIBK	NS		ug/L	5		U	5		U	5		U	5
Acetone	NS		ug/L	5		U	5		U	5		U	5
Acrylonitrile	NS		ug/L	2		U	2		U	2		U	2
Benzene	5	P	ug/L	1		U	1		U	1		U	1
Bromochloromethane	NS		ug/L	1		U	1		U	1		U	1
Bromodichloromethane	80	TTHM	ug/L	1		U	1		U	1		U	1
Bromoform	80	TTHM	ug/L	1		U	1		U	1		U	1
Bromomethane	NS		ug/L	1		U	1		U	1		U	1
Carbon disulfide	NS		ug/L	1		U	1		U	1		U	1
Carbon tetrachloride	5	P	ug/L	1		U	1		U	1		U	1
Chlorobenzene	100	P	ug/L	1		U	1		U	1		U	1
Chloroethane	NS		ug/L	1		U	1		U	1		U	1
Chloroform	80	TTHM	ug/L	1		U	1		U	1		U	1
Chloromethane	NS		ug/L	1		U	1		U	1		U	1
cis-1,2-Dichloroethene	70	P	ug/L	1		U	1		U	1		U	1
cis-1,3-Dichloropropene	NS		ug/L	1		U	1		U	1		U	1
Dibromochloromethane	80	TTHM	ug/L	1		U	1		U	1		U	1
Dibromomethane	NS		ug/L	1		U	1		U	1		U	1
Ethylbenzene	700	P	ug/L	1		U	1		U	1		U	1
Iodomethane	NS		ug/L	1		U	1		U	1		U	1
Methyl tert-butyl ether	NS		ug/L	1		U	1		U	1		U	1
Methylene Chloride	5	P	ug/L	1		U	1		U	1		U	1
Styrene	100	P	ug/L	1		U	1		U	1		U	1
Tetrachloroethene	5	P	ug/L	1		U	1		U	1		U	1
Toluene	1000	P	ug/L	1		U	1		U	1		U	1
trans-1,2-Dichloroethene	100	P	ug/L	1		U	1		U	1		U	1
trans-1,3-Dichloropropene	NS		ug/L	1		U	1		U	1		U	1
trans-1,4-Dichloro-2-butene	NS		ug/L	1		U	1		U	1		U	1
Trichloroethene	5	P	ug/L	1		U	1		U	1		U	1
Trichlorofluoromethane	NS		ug/L	1		U	1		U	1		U	1
Vinyl acetate	NS		ug/L	2		U	2		U	2		U	2
Vinyl chloride	2	P	ug/L	1		U	1		U	1		U	1
Xylenes, Total	10000	P	ug/L	2		U	2		U	2		U	2
Total Metals													
Antimony	6	P	ug/L	2		U	2		U	2		NA	
Arsenic	10	P	ug/L	2		U	2		U	2		NA	
Barium	2000	P	ug/L	4		U	4		U	4		NA	
Beryllium	4	P	ug/L	0.8		U	0.8		U	0.8		NA	
Cadmium	5	P	ug/L	2		U	2		U	2		NA	
Calcium	NS		ug/L	200		U	200	106	J	200		NA	
Chromium	100	P	ug/L	4		U	4		U	4		NA	
Cobalt	NS		ug/L	4		U	4		U	4		NA	
Copper	1300	AL	ug/L	4		U	4		U	4		NA	
Iron	300	S	ug/L	120	81.9	J	120		U	120		NA	
Lead	15	AL	ug/L	1.2		U	1.2		U	1.2		NA	
Magnesium	NS		ug/L	200		U	200		U	200		NA	
Manganese	50	S	ug/L	8		U	8		U	8		NA	
Mercury	2	P	ug/L	0.2		U	0.2		U	0.2		NA	
Nickel	100	RE	ug/L	4		U	4		U	4		NA	
Potassium	NS		ug/L	200		U	200		U	200		NA	
Selenium	50	P	ug/L	10		U	10		U	10		NA	
Silver	100	S	ug/L	2		U	2		U	2		NA	
Sodium	NS		ug/L	200	424		200	386		200		NA	
Thallium	2	P	ug/L	0.8		U	0.8		U	0.8		NA	
Vanadium	NS		ug/L	4		U	4		U	4		NA	
Zinc	5000	S	ug/L	16		U	16		U	16		NA	

TABLE 10B - UNCONFINED WBZ
CHESAPEAKE TERRACE
ANALYTICAL TABLE
(March 2020 Sample Event)

Sample Location				520	EB-03-032620			EB-04-032720			Trip Blank		
Lab ID				4-08	460-205924-03			460-205973-04			460-206064-35		
				4-19	460-206064-22			460-206064-31					
Sample Date				0	3/26/2020			3/27/2020			3/23/2020		
Matrix				s	Aqueous			Aqueous			Aqueous		
Remarks	EPA MCL	Screening		Blank	Equipment Blank			Equipment Blank			Trip Blank		
Parameter	Criteria	Criteria	**Units**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**	**Result**	**Q**	**RL**
Dissolved Metals													
Antimony, Dissolved	6	P	ug/L			NA			NA			NA	
Arsenic, Dissolved	10	P	ug/L			NA			NA			NA	
Barium, Dissolved	2000	P	ug/L			NA			NA			NA	
Beryllium, Dissolved	4	P	ug/L			NA			NA			NA	
Cadmium, Dissolved	5	P	ug/L			NA			NA			NA	
Calcium, Dissolved	NS		ug/L			NA			NA			NA	
Chromium, Dissolved	100	P	ug/L			NA			NA			NA	
Cobalt, Dissolved	NS		ug/L			NA			NA			NA	
Copper, Dissolved	1300	AL	ug/L			NA			NA			NA	
Iron, Dissolved	300	S	ug/L			NA			NA			NA	
Lead, Dissolved	15	AL	ug/L			NA			NA			NA	
Magnesium, Dissolved	NS		ug/L			NA			NA			NA	
Manganese, Dissolved	50	S	ug/L			NA			NA			NA	
Mercury, Dissolved	2	P	ug/L			NA			NA			NA	
Nickel, Dissolved	100	RE	ug/L			NA			NA			NA	
Potassium, Dissolved	NS		ug/L			NA			NA			NA	
Selenium, Dissolved	50	P	ug/L			NA			NA			NA	
Silver, Dissolved	100	S	ug/L			NA			NA			NA	
Sodium, Dissolved	NS		ug/L			NA			NA			NA	
Thallium, Dissolved	2	P	ug/L			NA			NA			NA	
Vanadium, Dissolved	NS		ug/L			NA			NA			NA	
Zinc, Dissolved	5000	S	ug/L			NA			NA			NA	
Conventionals													
Alkalinity	NS		mg/L	5		U	5		U	5		NA	
Ammonia	NS		mg/L	0.1		U	0.1		U	0.1		NA	
Chemical Oxygen Demand	NS		mg/L	100		U	10		U	10		NA	
Chloride	250	S	mg/L	0.12		U	0.12		U	0.12		NA	
Hardness as calcium carbonat	NS		mg/L	10		U	5		U	5		NA	
Nitrate as N	10	P	mg/L	0.1		U	0.1		U	0.1		NA	
Nitrate as N (reanalysis)	10	P	mg/L			NA			NA			NA	
Sulfate	250	S	mg/L	0.6		U	0.6		U	0.6		NA	
Total Dissolved Solids	500	S	mg/L	10	28		10	24		10		NA	

Notes:
Shading exceeds EPA MCL screening criteria
P: EPA Primary MCL
S: EPA Secondary MCL
AL: EPA Action Level
RE: No MCL but recommended level by EPA
TTHM: Total Trihalomethanes includes the sum of
RL: Reporting Limit
Q: Qualifier
U: Compound not detected
J: The concentration is an estimated value.
B: Compound detected in sample and blank
ug/L: micrograms per liter
mg/L: milligram per liter
NS: No Standard
NA: Not analyzed
F1: MS and/or MSD exceeds control limits
*: LCS and/or LCSD outside of control limits
H: Sample analyzed beyond method holding time
MCL: Maximum Containment Level

TABLE 10C-1
CHESAPEAKE TERRACE
JANUARY 2020 GROUNDWATER FIELD PARAMETERS
Odenton, MD

Well ID	Hydrological Zone	Sample Method	Sample Date	Sample Time	DTW (1/28/20)	DTB (1/28/20)	pH	Temp (deg C)	SpC (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Final DTW	Equalized Flow Rate (ml/min)	Volume Removed (liters)	Dissolved metals collected?
MW-4	UC	Low Flow - Bladder	1/31/2020	10:49	30.06	46.50	4.82	10.40	0.063	3.60	295.4	7.08	30.05	100	7.57	No
MW-5	UC	Low Flow - Bladder	1/31/2020	10:01	32.18	53.50	3.38	11.34	0.049	9.51	417.0	6.8	32.30	200	7.57	No
MW-6	UC	Low Flow - Bladder	2/3/2020	12:35	27.55	44.53	4.92	13.94	0.045	6.82	329.0	0.0	27.70	160	5.68	No
MW-10	TZ	Low Flow - Peristaltic	2/4/2020	12:18	26.83	54.7	5.56	13.49	0.036	0.45	175.0	6.0	27.00	170	9.46	No
MW-14	TZ	Low Flow - Bladder	2/3/2020	15:26	41.75	80.2	5.81	13.40	0.113	0.41	-20.8	63.2	52.39	100	6.62	No
MW-15	UC	Low Flow - Bladder	1/30/2020	10:06	78.20	84.0	4.54	10.03	0.043	1.61	190.0	49.3	79.16	100	7.57	No
MW-16	UC	Low Flow - Bladder	1/30/2020	12:51	76.80	82.9	5.26	9.06	0.066	6.19	336.0	2.8	77.14	130	7.57	No
MW-17	UC	Low Flow - Bladder	1/29/2020	9:51	1.74	7.7	4.28	6.80	0.039	4.87	274.8	74.8	3.05	115	9.46	No
MW-18	UC	Low Flow - Bladder	1/29/2020	11:47	14.29	19.5	5.49	12.20	0.086	3.43	215.5	13.2	14.30	220	11.36	No
MW-19	UC	Low Flow - Bladder	1/29/2020	14:30	23.00	30.0	4.19	11.92	0.068	5.84	368.0	19.5	23.02	110	11.36	No
MW-20	UC	Low Flow - Bladder	1/29/2020	14:58	44.08	57.2	3.96	9.80	0.063	9.63	359.5	98.1	44.15	210	17.03	No
MW-21	UC	Low Flow - Bladder	1/30/2020	17:12	54.44	61.9	2.84	9.09	0.067	6.98	482.0	28.1	54.68	100	10.41	No
MW-22	UC	Low Flow - Bladder	2/3/2020	9:53	27.09	36.3	4.99	11.03	0.049	4.27	322.0	63.0	27.14	100	9.46	No
MW-24	UC	Low Flow - Bladder	1/30/2020	16:57	17.94	30.7	4.91	10.10	0.070	7.09	217.7	9.82	18.93	120	8.52	No
MW-25	UC	Low Flow - Bladder	1/31/2020	16:54	35.34	46.0	4.77	11.20	0.043	4.30	325.5	90.0	35.33	110	7.57	No
MW-27	UC	Low Flow - Bladder	2/4/2020	9:57	1.40	7.9	3.67	9.40	0.083	5.26	428.0	3.57	2.75	100	4.73	No
MW-28	TZ	Low Flow - Bladder	2/3/2020	17:42	42.88	69.8	5.98	12.30	0.104	0.22	-49.2	97.5	44.01	100	11.36	No
MW-29	UC	Low Flow - Bladder	2/3/2020	12:54	4.12	22.5	4.09	13.50	0.063	0.67	294.2	11.0	4.06	110	8.52	No
MW-30	UC	Low Flow - Bladder	1/31/2020	16:40	13.85	20.5	5.35	10.03	0.054	2.30	282.0	33.6	17.12	100	3.79	No
PMW-6	UC	Low Flow - Bladder	1/31/2020	14:12	14.50	30.6	4.95	11.30	0.054	5.23	293.4	8.13	14.48	160	4.73	No
PMW-11	Conf.	Low Flow - Bladder	1/29/2020	17:26	85.53	219.5	4.02	8.40	0.030	2.23	376.9	137	85.43	100	11.36	Yes
PMW-12	Conf.	Low Flow - Bladder	1/30/2020	12:54	115.85	239.2	5.30	9.60	0.064	0.61	110.6	167	115.70	100	12.30	Yes
PMW-13	Conf.	Low Flow - Bladder	1/30/2020	10:00	103.27	274.0	3.82	8.90	0.060	0.69	345.7	37.1	103.70	140	9.46	No
PMW-18	TZ	Low Flow - Bladder	2/3/2020	16:13	14.17	85.1	4.16	13.23	0.029	6.01	403.0	96.1	14.15	100	11.36	No
PMW-19	TZ	Low Flow - Bladder	2/4/2020	13:22	43.24	89.9	4.98	15.90	0.048	2.54	47.6	11.6	43.00	100	5.68	No
PMW-23	Conf.	Low Flow - Bladder	2/3/2020	9:43	108.20	228.0	3.40	11.80	0.029	5.12	328.5	263	107.90	110	8.52	Yes
PMW-28	UC	Low Flow - Bladder	1/31/2020	14:07	65.65	74.7	5.30	11.40	0.048	8.16	327.0	89.0	65.81	100	11.36	No

TABLE 10C-2
Chesapeake Terrace
MARCH 2020 GROUNDWATER FIELD PARAMETER
Odenton, MD

Well ID	Hydrological Zone	Sample Method	Sample Date	Sample Time	DTW (3/23/20)	DTB (3/23/20)	pH	Temp (deg C)	SpC (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Final DTW	Equalized Flow Rate (ml/min)	Volume Removed (liters)	Dissolved metals collected?
MW-4	UC	Low Flow - Bladder	3/24/20	1317	29.83	46.5	5.05	12.48	0.043	6.96	396	7.1	29.94	200	10.4	No
MW-5	UC	Low Flow - Bladder	3/24/20	1507	32.02	53.5	4.45	12.84	0.049	4.28	420.0	3.2	32.15	220	10.4	No
MW-6	UC	Low Flow - Bladder	3/24/20	1310	26.04	44.5	4.74	12.8	0.510	1.98	332.5	6.2	25.95	160	6.6	No
MW-10	TZ	Low Flow - Peristaltic	3/23/20	1800	26.32	54.7	5.66	11.81	0.025	0.19	213.0	11.8	26.53	240	11.4	No
MW-14	TZ	Low Flow - Bladder	3/24/20	1725	36.89	80.2	6.28	14.10	0.123	2.19	220.9	48.7	45.69	180	5.7	No
MW-15	UC	Low Flow - Bladder	3/25/20	1103	78.53	84.0	3.82	10.41	0.045	0.6	310.0	119	78.80	100	11.4	Yes
MW-16	UC	Low Flow - Bladder	3/25/20	1331	77.22	82.9	5.03	11.78	0.030	5.98	375.0	13.6	77.53	170	8.5	No
MW-17	UC	Low Flow - Bladder	3/25/20	1705	1.75	7.7	4.40	9.50	0.024	4.51	355	73.2	1.91	100	10.4	Yes
MW-18	UC	Low Flow - Bladder	3/25/20	1635	14.07	19.6	5.31	10.50	0.074	4.37	217.3	9.71	14.00	180	6.6	No
MW-19	UC	Low Flow - Bladder	3/26/20	1540	23.33	30.0	4.14	18.05	0.066	7.76	469.0	2.61	23.71	180	10.4	No
MW-20	UC	Low Flow - Bladder	3/26/20	1015	44.23	57.2	3.88	11.80	0.057	8.49	406.1	74.2	44.53	100	10.4	Yes
MW-21	UC	Low Flow - Bladder	3/26/20	1017	54.65	61.9	4.77	12.2	0.075	8.36	425.0	13.4	55.35	100	10.4	No
MW-22	UC	Low Flow - Bladder	3/26/20	1302	26.95	36.3	4.95	12.88	0.056	2.7	418.0	21.6	26.98	200	10.4	No
MW-24	UC	Low Flow - Bladder	3/27/20	1010	18.17	30.7	4.89	12.90	0.083	5.65	294.4	15.7	18.23	125	7.6	No
MW-25	UC	Low Flow - Bladder	3/27/20	1145	35.31	46.0	4.56	14.40	0.041	3.83	347.5	35.3	35.47	200	6.6	No
MW-27	UC	Low Flow - Bladder	3/26/20	1745	1.84	7.9	3.81	10.12	0.070	3.85	357.0	3.71	2.82	100	4.7	No
MW-28	TZ	Low Flow - Bladder	3/27/20	1542	42.32	69.8	6.64	17.50	0.108	2.28	-96	70.3	43.25	80	11.4	Yes
MW-29	UC	Low Flow - Bladder	3/24/20	1505	3.65	22.5	4.11	13.00	0.060	1.19	352.8	24.5	5.57	110	3.8	No
MW-30	UC	Low Flow - Bladder	3/27/20	1206	13.27	20.5	5.33	13.99	0.058	2.78	342.0	31.5	17.03	80	3.8	No
PMW-6	UC	Low Flow - Bladder	3/24/20	1005	14.13	30.6	4.45	10.90	0.050	3.94	314.9	2.83	14.30	180	7.6	No
PMW-11	Conf.	Low Flow - Bladder	3/26/20	1705	84.82	219.5	3.98	16.70	0.028	2.28	413.3	49.8	84.63	75	18.0	Yes
PMW-12	Conf.	Low Flow - Bladder	3/25/20	1415	115.03	239.2	5.53	11.00	0.066	0.37	97.1	279	115.73	110	11.4	Yes
PMW-13	Conf.	Low Flow - Bladder	3/24/20	1058	102.59	274.0	3.74	10.70	0.056	0.62	393.3	28.8	102.85	110	11.4	No
PMW-18	TZ	Low Flow - Bladder	3/24/20	1804	13.60	85.1	3.97	12.2	0.054	0.71	473.0	98.3	12.80	100	16.1	Yes
PMW-19	TZ	Low Flow - Bladder	3/27/20	1505	42.41	89.9	5.03	15.10	0.030	2.8	35.6	9.21	42.50	180	5.7	No
PMW-23	Conf.	Low Flow - Bladder	3/26/20	1335	107.45	228.0	4.15	16.50	0.027	4.01	394.3	126	107.51	100	10.4	Yes
PMW-28	UC	Low Flow - Bladder	3/24/20	1101	65.10	74.7	4.47	11.00	0.050	6.12	416.0	97.7	65.69	100	15.1	Yes
MW-1	UC	DTW Only	--	--	1.65	--	--	--	--	--	--	--	--		--	--
MW-26	Isolated/MCU	DTW Only	--	--	13.49	--	--	--	--	--	--	--	--		--	--
MW-31	Isolated/MCU	DTW Only	--	--	17.79	--	--	--	--	--	--	--	--		--	--

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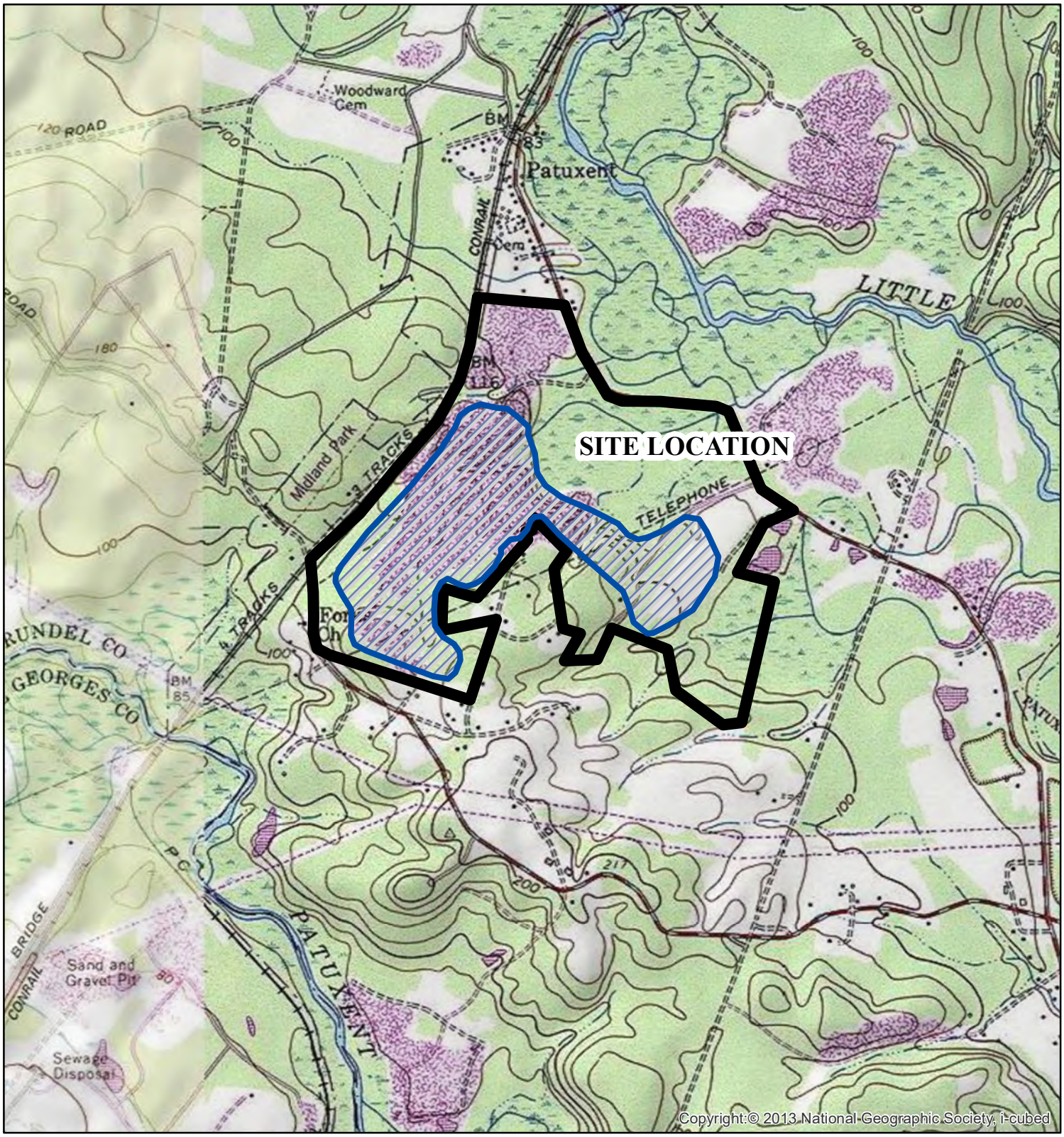
a Montrose Environmental Group company

PLATES



Legend

FILL BOUNDARY

PROPERTY BOUNDARY

Miles

0 0.1 0.2 0.4 0.6 0.8

REFERENCE

1. MAP FROM U.S.G.S. 7.5 MINUTE QUADRANGLES

CHESAPEAKE TERRACE RUBBLE LANDFILL
4TH ASSESSMENT DISTRICT
ANNE ARUNDEL COUNTY, MARYLAND

SITE LOCATION MAP

N W E S

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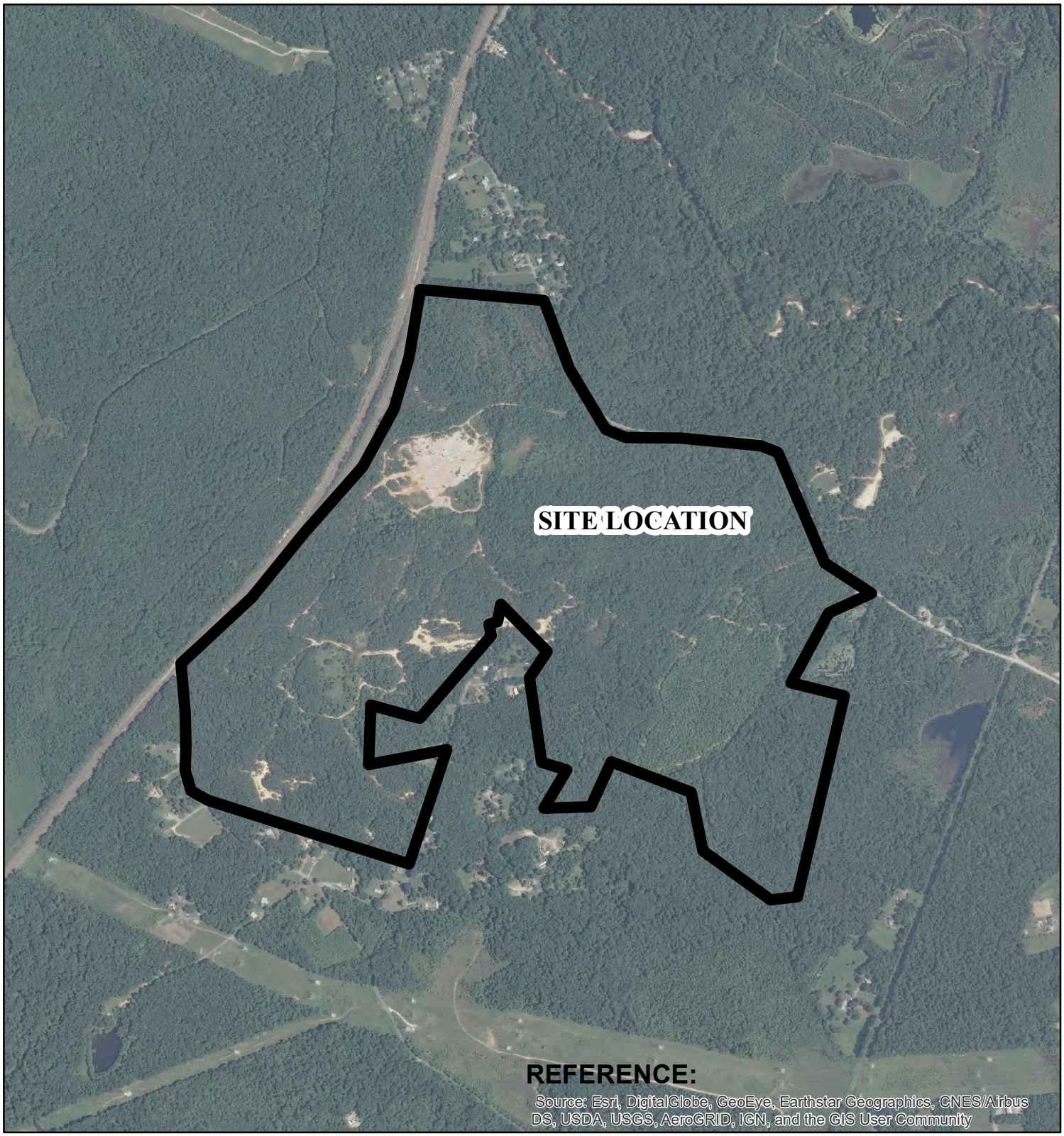
Scale:	
Drawn By:	GCR
Checked By:	VEF
Project Mgr.:	VEF
Originated By:	GCR
Project No.:	2018-3854
Drawing Date:	4/29/2019
Sheet No.:	1 of 2
Revision Number:	0

PLATE 1



Legend

Property Boundary

Miles

0 0.0750.15 0.3 0.45 0.6

CHESAPEAKE TERRACE RUBBLE LANDFILL
4TH ASSESSMENT DISTRICT
ANNE ARUNDEL COUNTY, MARYLAND

ORTHO LOCATION MAP

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Scale:	
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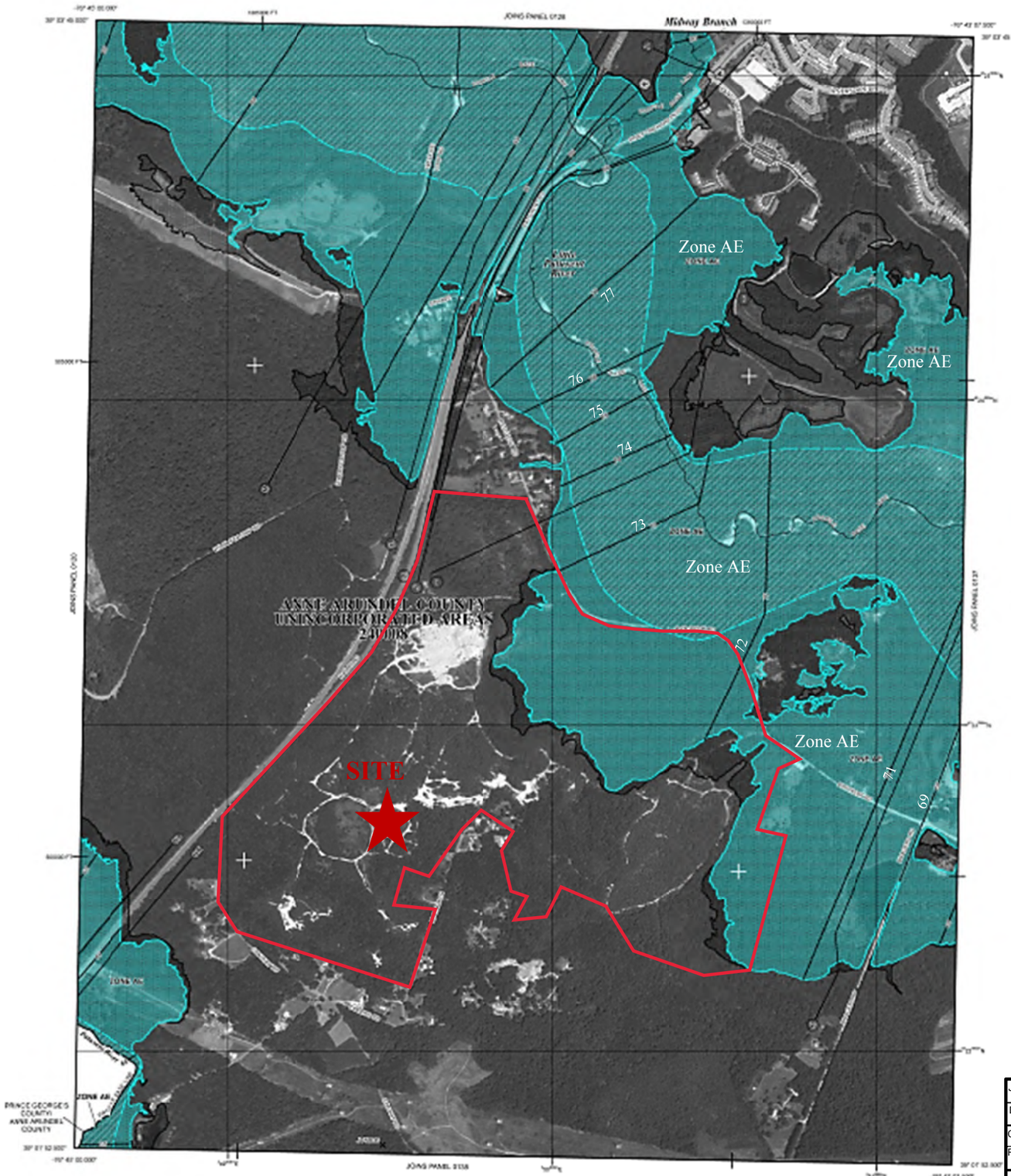
Project Mgr.:	VEF
Originated By:	GCR
Project No.:	2018-3854
Drawing Date:	4/29/2019
Sheet No.:	1 of 2
Revision Number:	0

Plate 2



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0136E

FIRM
FLOOD INSURANCE RATE MAP

ANNE ARUNDEL COUNTY, MARYLAND
AND INCORPORATED AREAS

PANEL 136 OF 395
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANNE ARUNDEL COUNTY	240008	0136	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
24003C0136E

EFFECTIVE DATE
OCTOBER 16, 2012

Federal Emergency Management Agency

JOB No.:	2018-3854	SCALE.:	Not to Scale
DRAWN BY.:	VEF	DATE.:	4/29/2019
CHECKED BY.:	VEF	FILE:	Plate 3
REVIEW BY.:	VEF		

Excerpts - 100-YEAR FLOODPLAIN (FEMA, 2012)

Advanced GeoServices

Chesapeake Terrace Rubble Landfill

Plate 3

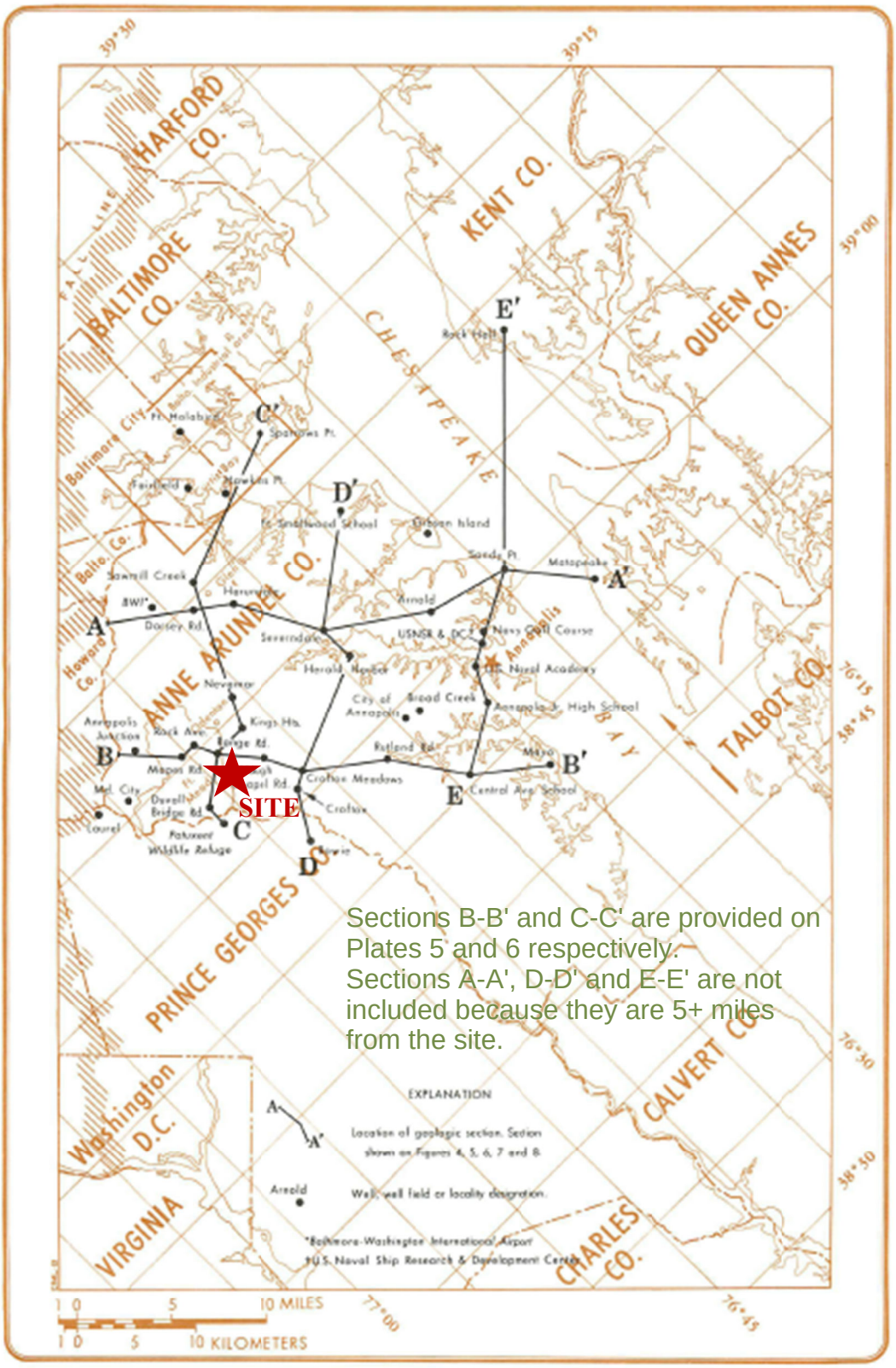


Figure 3. — Locations of geologic sections, key wells, test holes, and data-collection sites referred to in this report.

JOB No.:	2018-3854	SCALE:	Not to Scale	**Regional Geology Section Locations (Mack & Achmed, 1986)**
DR BY:	VEF	DATE:	4/29/2019	
CHK BY:	VEF	FILE No.:	Plate 4	
REV BY:		DIRECTORY:		

Advanced GeoServices | **Chesapeake Terrace Rubble Landfill** | **Plate 4**

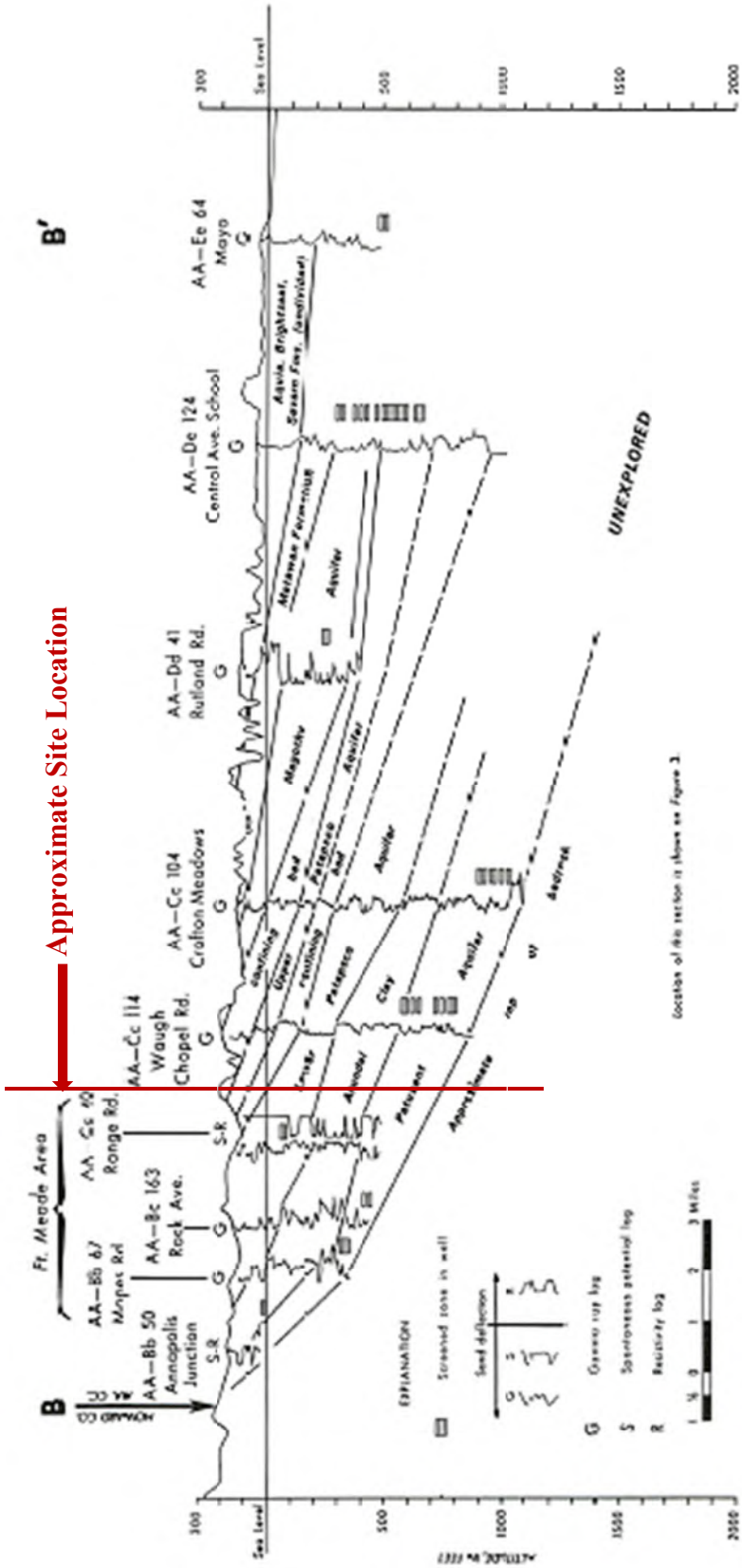


Figure 5. — Hydrogeologic section B-B', from north of Annapolis Junction to Mayo.

JOB No.: 2018-3854	SCALE: Not to Scale	**Regional Geology – Section B-B' (Mack & Achmed, 1986)**	
DR BY: VEF	DATE: 02/04/2019		
CHK BY: VEF	FILE No.: Plate 5		
REV BY: VEF	DIRECTORY:		
Advanced GeoServices		Chesapeake Terrace Rubble Landfill	Plate 5

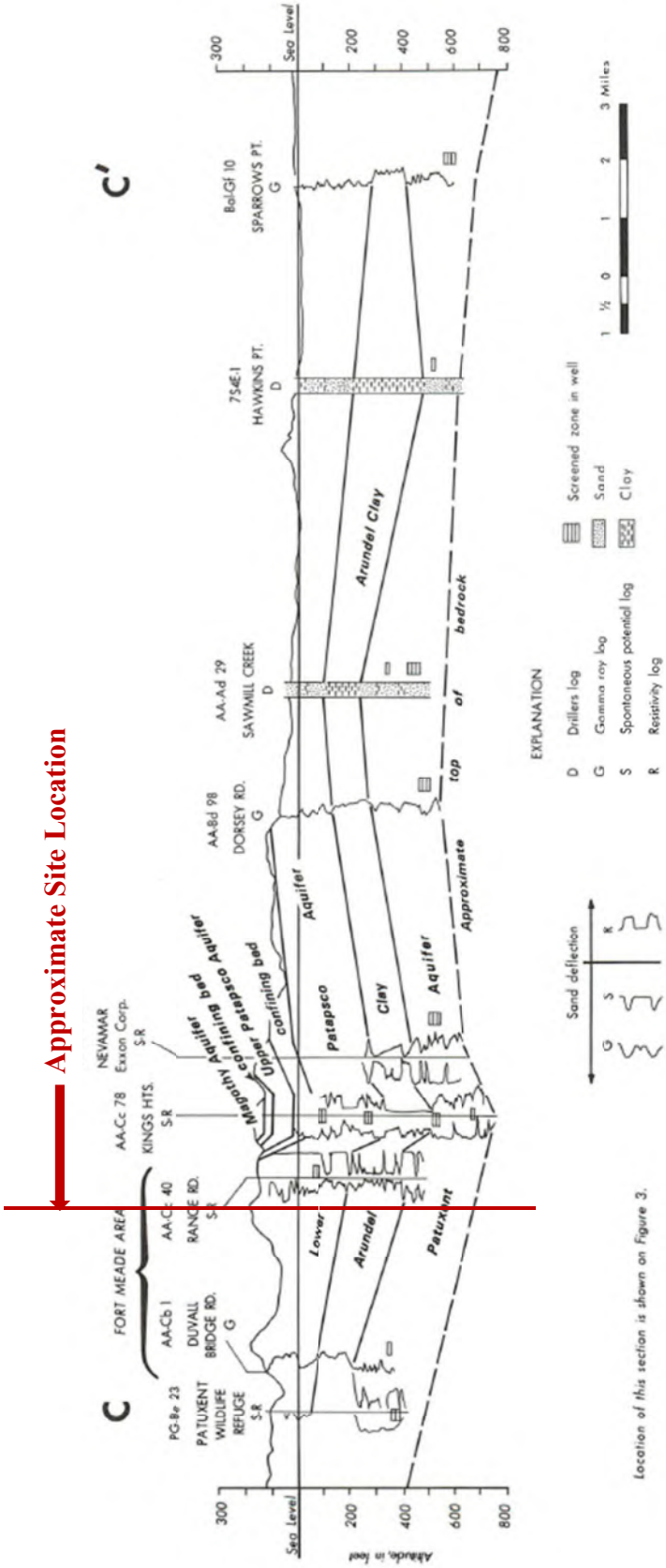
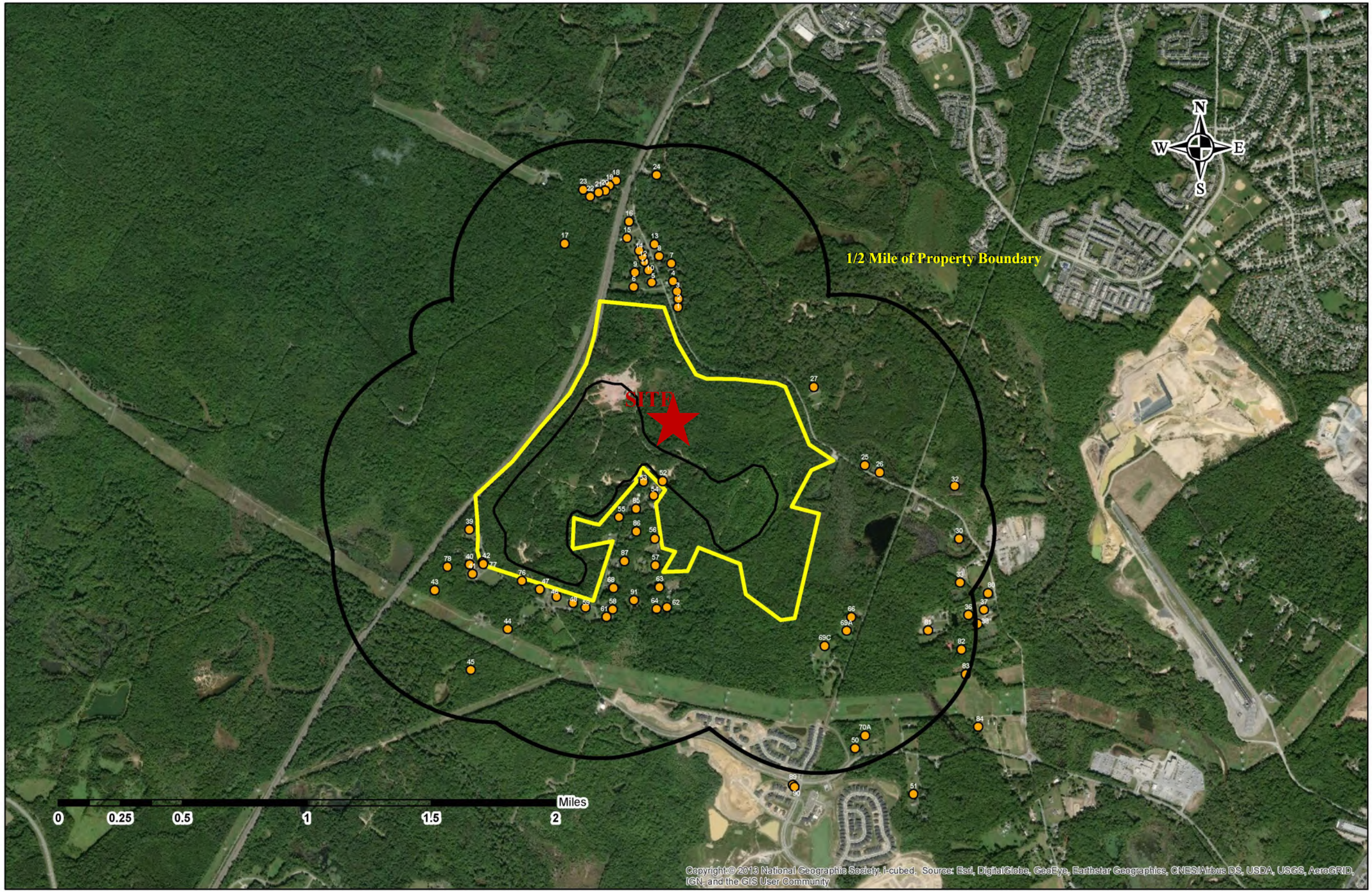


Figure 6. — Hydrogeologic section C-C', from the Patuxent Wildlife Refuge to Sparrows Point.

JOB No.:	2018-3854	SCALE:	Not to Scale
DR BY:	VEF	DATE:	02/04/2019
CHK BY:	VEF	FILE No.:	Plate 6
REV BY:	VEF	DIRECTORY:	

Regional Geology – Section C-C' (Mack & Achmed, 1986)

Advanced GeoServices | **Chesapeake Terrace Rubble Landfill** | **Plate 6**



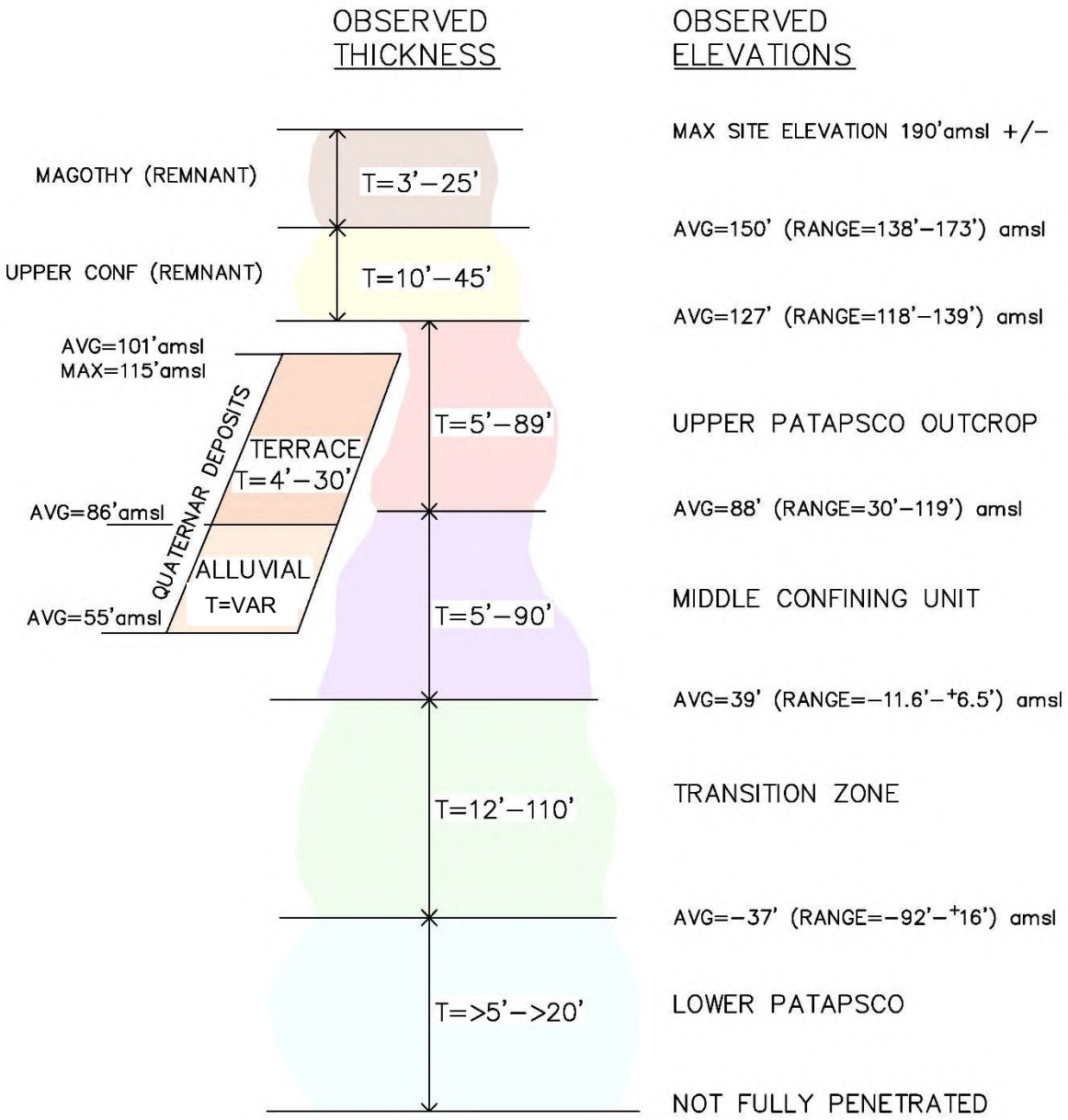
JOB No.:	2018-3854	SCALE.:	Not to Scale
DRAWN BY.:	VEF	DATE.:	4/29/2019
CHECKED BY.:	VEF	FILE:	PLATE 7
REVIEW BY.:	VEF		

Residential Wells within ½ Miles of the property

Advanced GeoServices

Chesapeake Terrace Rubble Fill

Plate 7

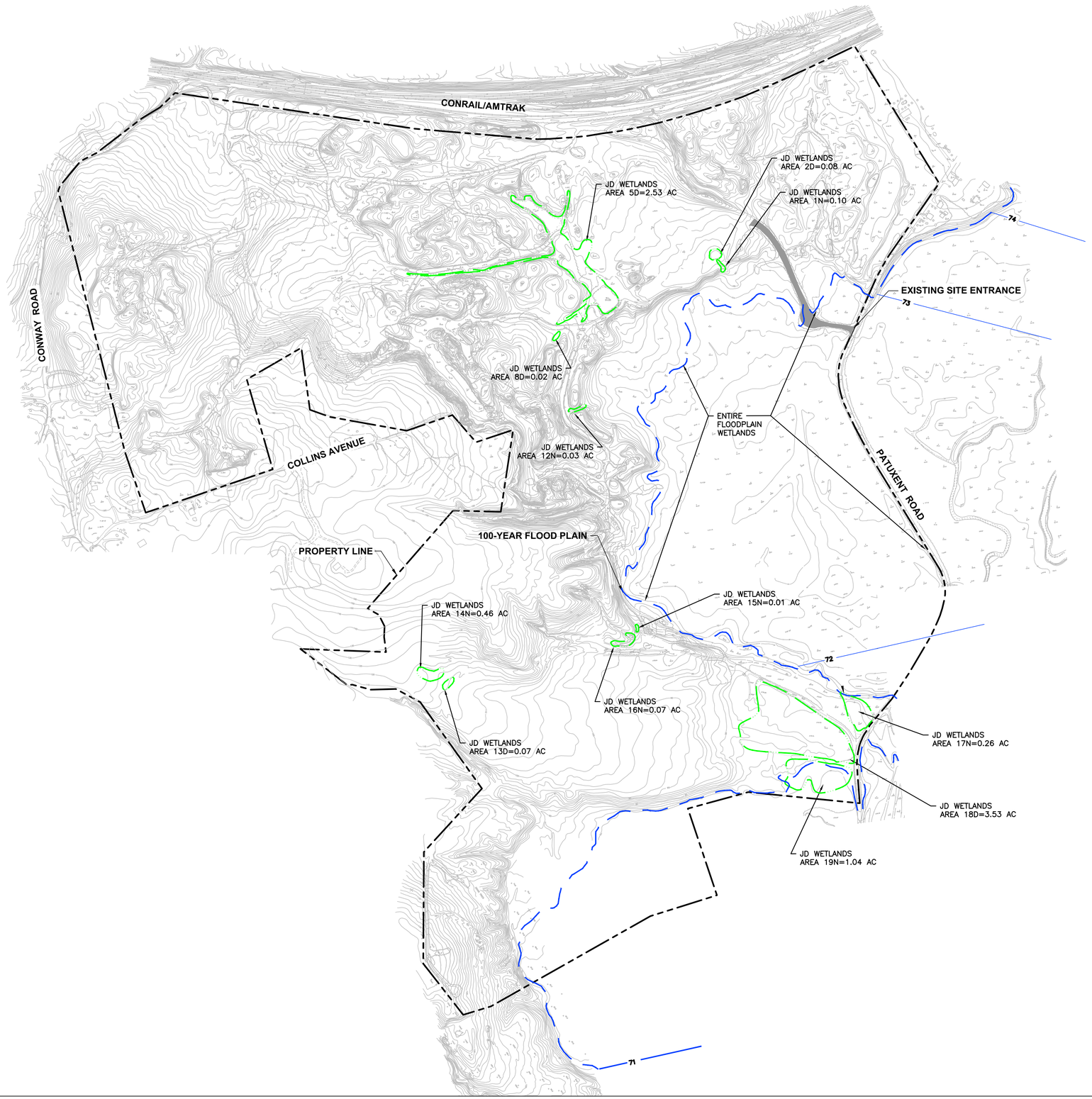


NOTE: BOTTOM ELEVATIONS BASED ONLY ON BORINGS FULLY PENETRATING THE UNIT

JOB No.:	2018-3854	SCALE:	Not to Scale	**SCHEMATIC SITE LITHOLOGY**
DR BY:	VEF	DATE:	02/21/2020	
CHK BY:	VEF	FILE No.:	Plate 8	
REV BY:	VEF	DIRECTORY:		

Advanced GeoServices | **Chesapeake Terrace Rubble Landfill** | **Plate 8**

FIGURES



LEGEND

- PROPERTY LINE
- SITE ENTRANCE
- JURISDICTIONAL DETERMINATION (JD) WETLANDS BOUNDARY (APPROX.) WITH IDENTIFICATION AND AREA (SEE NOTE 5)
- 100-YEAR FLOOD PLAIN (AFTER 2012) (SEE REFERENCE 2) (SEE NOTE 4)
- 73 — 100-YEAR FLOOD PLAIN SURFACE ELEVATION (AFTER 2012)

REFERENCES

1.) BASEMAP SHOWN, INCLUDING TOPOGRAPHICAL INFORMATION, IS FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) THE POST-2012 100-YEAR FLOOD PLAIN LIMITS SHOWN ARE BASED ON FEMA NATIONAL FLOOD INSURANCE PROGRAM MAP NUMBER 24003C0136E, DATED 10/16/2012, AND PROVIDED AS PLATE 3.

NOTES

1.) THE 100-YEAR FLOOD PLAIN LIMITS AND ASSOCIATED DEVELOPMENT PERMITTING HAS BEEN DEVELOPED BY OTHERS.

2.) THE CONRAIL TRACKS ARE ALSO SHARED WITH AMTRAK FOR HIGH-SPEED COMMUTER TRAINS BETWEEN BOSTON, MASSACHUSETTS AND WASHINGTON, D.C.

3.) THE PROPERTY WAS PREVIOUSLY USED FOR SAND AND GRAVEL MINING ACTIVITIES. PORTIONS OF THE SITE CURRENTLY HAVE NO VEGETATION AND ARE BARREN.

4.) THE PROPOSED LANDFILL PERIMETER ROAD BERM GRADES ARE PROPOSED A MINIMUM OF 5 FEET ABOVE THE FEMA BASE FLOOD ELEVATIONS.

5.) JURSIDICTIONAL WETLAND BOUNDARIES OBTAINED FROM FIGURES ATTACHED TO THE ARMY CORPS OF ENGINEERS PUBLIC NOTICE DATED NOVEMBER 22, 1991, AND AS SUBSEQUENTLY AMENDED IN WRITING BY MCCARTHY AND ASSOCIATES ON APRIL 2, 1997

NORTH

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch =300 ft.

VERONICA E. FOSTER
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DATE:	REVISION:
4/30/2020	REVISED TO ADDRESS MDE COMMENTS (PGS/VEF)
6/5/2020	REVISED JD WETLANDS AND DETAILED FLOODPLAIN

NATIONAL WASTE MANAGERS
PHASE II PERMIT APPLICATION
CHESAPEAKE TERRACE RUBBLE LANDFILL
PATUXENT ROAD, ODENTON
ANNE ARUNDEL COUNTY, MARYLAND

ADVANCED GeoServices
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SITE MAP

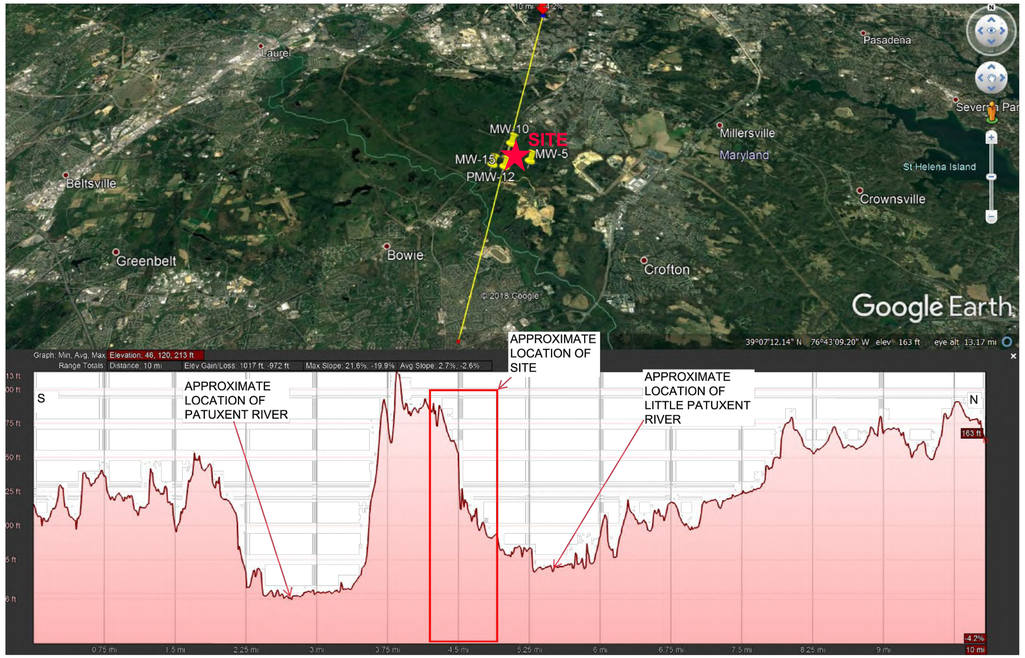
REPORT CODE: A	FILE NAME: 20183854A001
PROJECT MANAGER: VEF	SCALE: AS NOTED
CHECKED BY: VEF	PROJECT NUMBER: 2018-3854
DRAWN BY: EEE	DATE: 4/1/2019

FIGURE 1

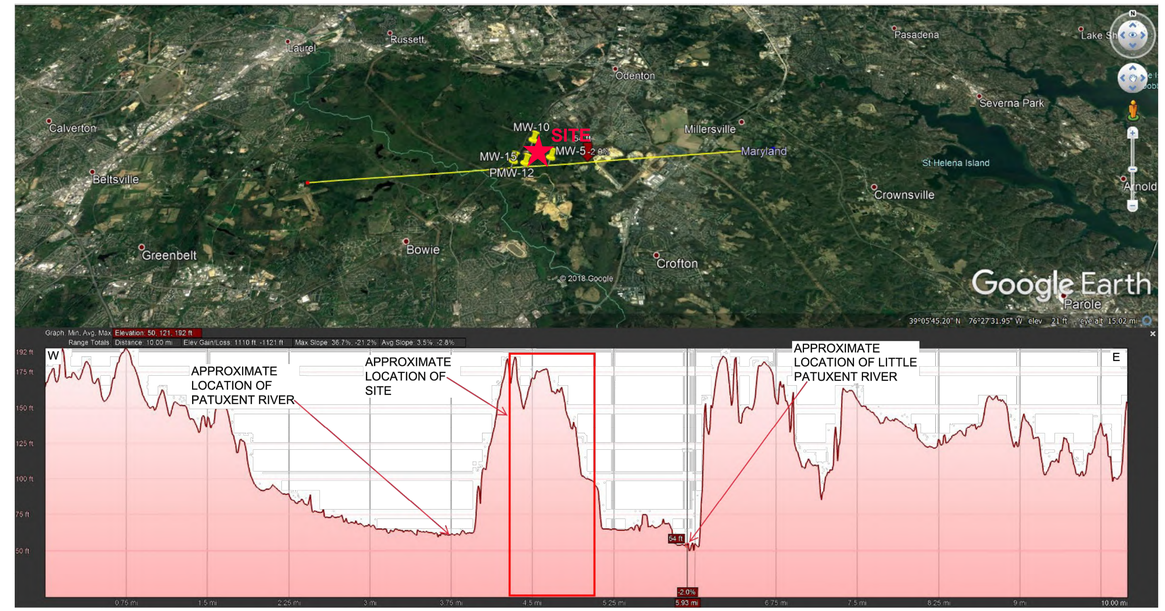
N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A001 - Site Map.dwg, 6/5/2020 3:50:28 PM

NOTES

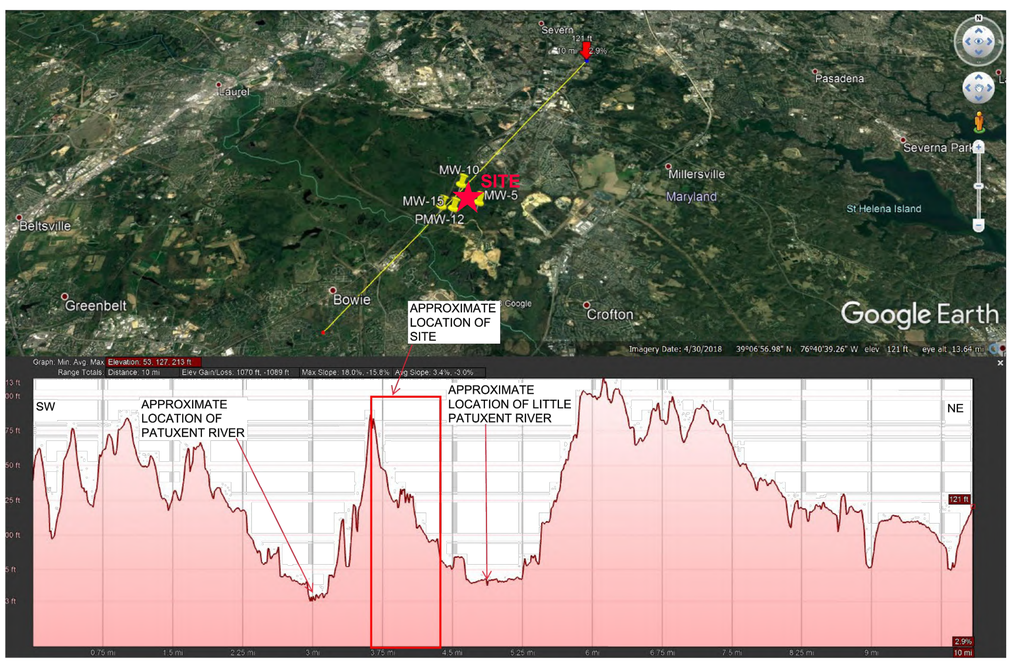
1. TOPOGRAPHIC AND MAP DATA SHOWN IS FROM GOOGLE EARTH UPDATED 4/30/2018.
2. THE PROFILES SHOWN REPRESENT THE GROUND SURFACE ELEVATIONS OF 10-MILE SECTIONS THAT ARE ROUGHLY CENTERED UPON THE PROPOSED LOCATION OF THE CHESAPEAKE TERRACE RUBBLE LANDFILL.
3. THE GROUND SURFACE ELEVATIONS SHOWN ARE NOT EXACT. ELEVATIONS SHOWN ARE INTENDED TO DEMONSTRATE THAT THE LOCATION OF THE PROPOSED CHESAPEAKE TERRACE RUBBLE LANDFILL IS ON A LOCALIZED HILL WHICH IS SEPARATED TOPOGRAPHICALLY FROM THE SURROUNDING AREAS BY THE PATUXENT AND LITTLE PATUXENT RIVERS.



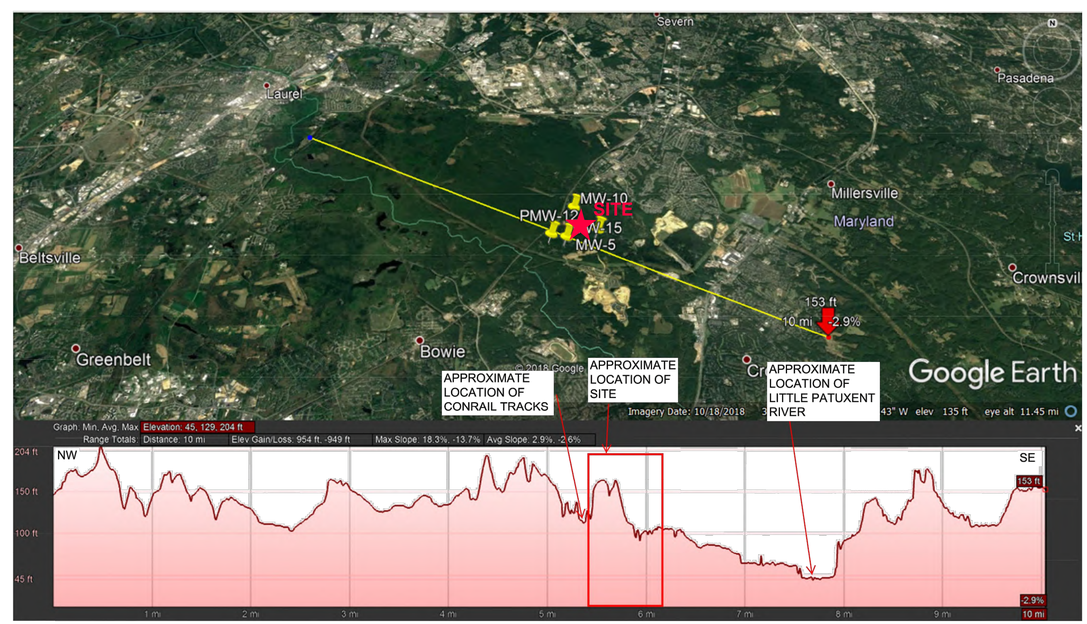
PROFILE A



PROFILE C



PROFILE B



PROFILE D

VERONICA M. FOSTER
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4/30/2020	REVISED TO ADDRESS MDE COMMENTS (PGS/VEF)

NATIONAL WASTE MANAGERS
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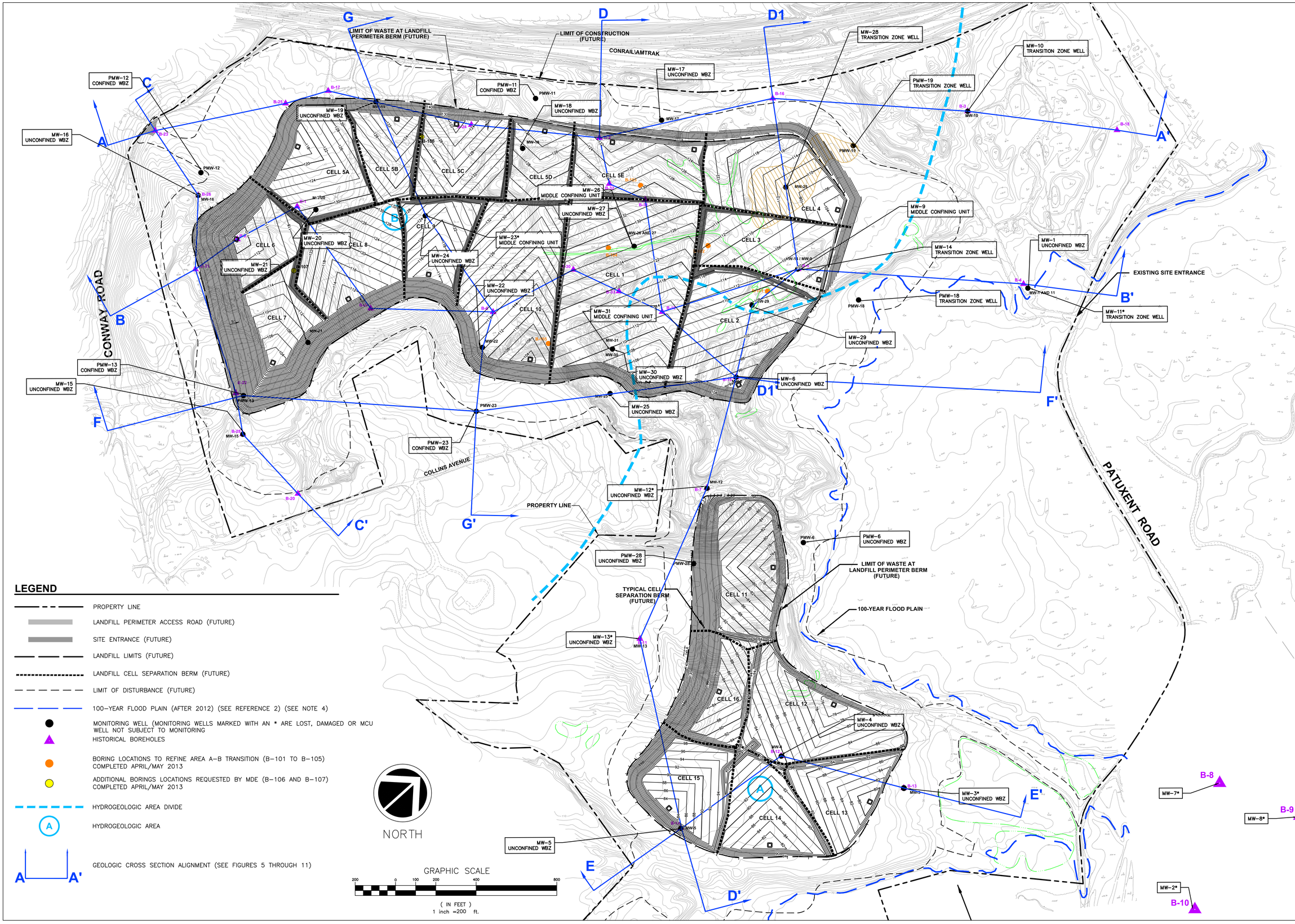
REGIONAL TOPOGRAPHIC PROFILES

REPORT CODE:	A	FILE NAME:	20183854A002
PROJECT MANAGER:	VEF	SCALE:	N.T.S.
CHECKED BY:	VEF	PROJECT NUMBER:	2018-3854
DRAWN BY:	EEE	DATE:	4/7/2019

FIGURE 2

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC_A_Phase II Application\20183854A002 - 4 On-site Boring and Well Locations.dwg, 6/5/2020 3:51:25 PM



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4/30/2020	REVISED TO ADDRESS MDE COMMENTS (PGS/VEF)
6/5/2020	EDITORIAL REVISIONS/NEW LANDFILL BOTTOM (PGS/VEF)

NATIONAL WASTE MANAGERS
PHASE II PERMIT APPLICATION
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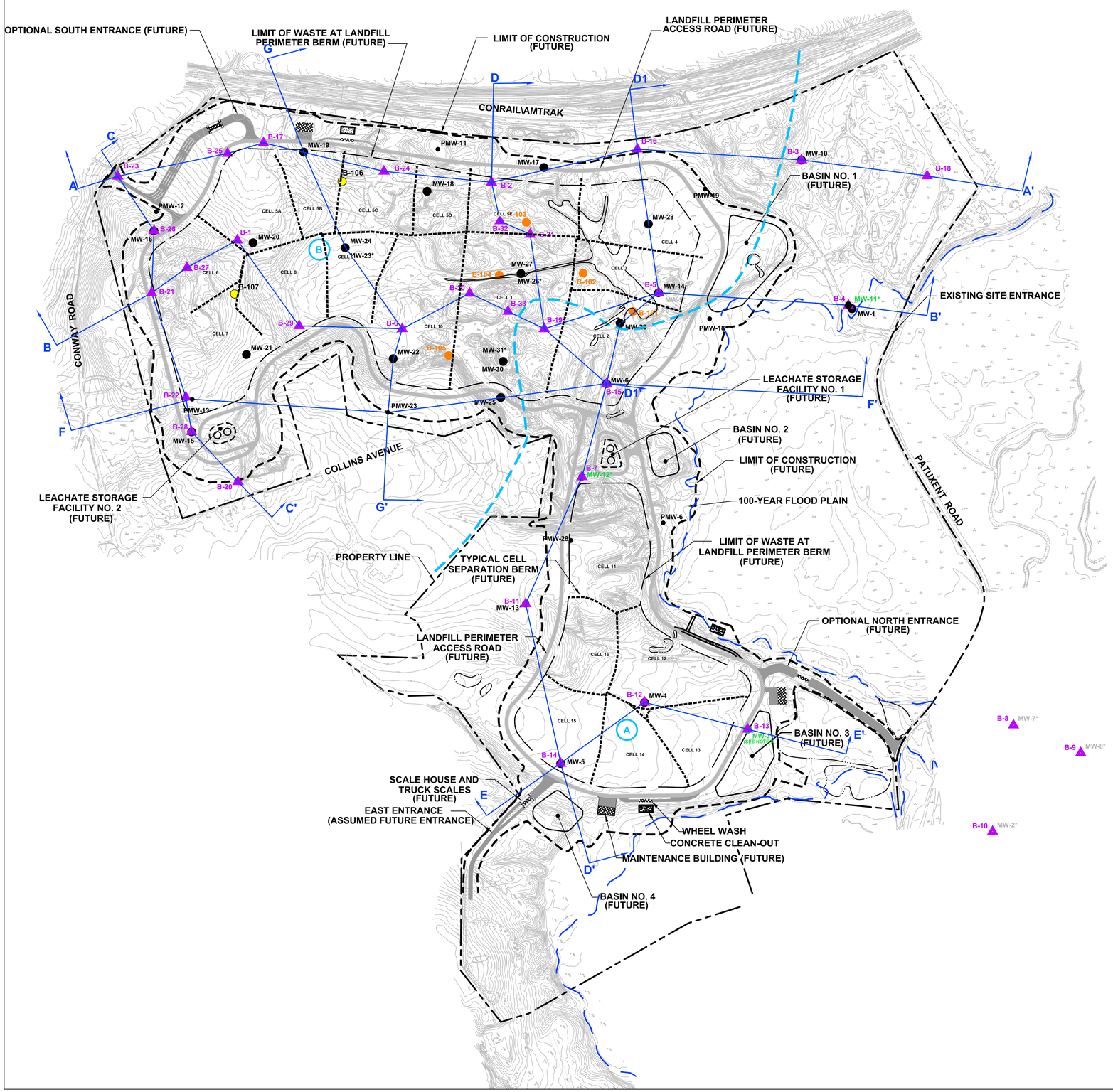
CONCEPTUAL LANDFILL BOTTOM ELEVATION CONTOUR MAP

REPORT CODE: A		FILE NAME: 20183854A003	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 3

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A003 PRP BOTTOM CELL GRADING.dwg, 6/5/2020 3:51:47 PM



LEGEND

- PROPERTY LINE
- LANDFILL PERIMETER ACCESS ROAD (FUTURE)
- SITE ENTRANCE (FUTURE)
- LANDFILL LIMITS (FUTURE)
- LANDFILL CELL SEPARATION BERM (FUTURE)
- LIMIT OF DISTURBANCE (FUTURE)
- 100-YEAR FLOOD PLAIN (AFTER 2012) (SEE REFERENCE 2) (SEE NOTE 4)
- JURISDICTIONAL DETERMINATION (JD) WETLANDS BOUNDARY (APPROX.) WITH IDENTIFICATION AND AREA (SEE NOTE 5)
- MONITORING WELL (MONITORING WELLS MARKED WITH AN * ARE LOST, DAMAGED OR MCU WELL NOT SUBJECT TO MONITORING
- HISTORICAL BOREHOLES (SEE REFERENCE 3)
- BORING LOCATIONS TO REFINE AREA A–B TRANSITION (B–101 TO B–105) COMPLETED APRIL/MAY 2013
- ADDITIONAL BORINGS LOCATIONS REQUESTED BY MDE (B–106 AND B–107) COMPLETED APRIL/MAY 2013
- HYDROGEOLOGIC AREA DIVIDE (SEE NOTE 3)
- (A) HYDROGEOLOGIC AREA (SEE NOTE 3)
- A — A' GEOLOGIC CROSS SECTION ALIGNMENT (SEE FIGURES 5 THROUGH 11)

REFERENCES

1.) BASEMAP SHOWN, INCLUDING TOPOGRAPHICAL INFORMATION, IS FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) MONITORING WELL LOCATIONS DIGITIZED FROM HARD COPY OF DRAWING ENTITLED "PERMANENT GROUNDWATER MONITORING WELL PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED MAY 2008.

3.) HISTORICAL BORING LOCATIONS FROM HARD COPY OF DRAWING ENTITLED "PLATE 2, CHESAPEAKE RUBBLE LANDFILL HYDROGEOLOGIC BASE MAP," DATED NOVEMBER 2003, CREATED BY MARK SCHULTZ ASSOCIATES, ANNAPOLIS, MARYLAND.

NOTES

1.) THE FUTURE RUBBLE LANDFILL DEVELOPMENT FEATURES ARE INCLUDED TO SHOW LOCATION OF THE BORINGS AND MONITORING WELLS RELATIVE TO THE PROPOSED DEVELOPMENT. THE ACTUAL LIMITS OF FUTURE DEVELOPMENT MAY BE ADJUSTED AS PART OF THE DETAILED ENGINEERING DESIGN TO BE INCLUDED IN THE PHASE III PERMIT APPLICATION, WHICH IS CURRENTLY UNDERGOING REVISION.

2.) GEOLOGIC CROSS SECTIONS ARE PRESENTED ON FIGURES 5 THROUGH 11.

3.) HYDROLOGIC AREAS AND THEIR MAPPING IS BASED ON FORMATIONS MAPPED IN FIELD BOREHOLES, SURFACE OBSERVATION, HISTORICAL AERIAL PHOTOGRAPHS, AND REGIONAL GEOLOGIC MAPS.

4.) THE 100–YEAR FLOODPLAIN LIMITS ARE BASED ON 2012 FEMA STUDY.

5.)THE CONRAIL TRACKS ARE ALSO SHARED WITH AMTRAK FOR HIGH–SPEED COMMUTER TRAINS BETWEEN BOSTON, MASSACHUSETTS, AND WASHINGTON, D.C.

6.) THE PROPERTY WAS PREVIOUSLY USED FOR SAND AND GRAVEL MINING ACTIVITIES. PORTIONS OF THE SITE CURRENTLY HAVE NO VEGETATION AND ARE BARREN.

7.) THE PROPOSED LANDFILL PERIMETER ROAD BERM GRADES ARE PROPOSED A MINIMUM OF 5 FEET ABOVE THE FEMA BASE FLOOD ELEVATIONS.

NORTH

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch =300 ft.

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DATE:	REVISION:
4/30/2020	REVISED TO ADDRESS MDE COMMENTS (PGS/VEF)
6/5/2020	EDITORIAL REVISIONS/NEW LANDFILL BOTTOM (PGS/VEF)

NATIONAL WASTE MANAGERS
PHASE II PERMIT APPLICATION
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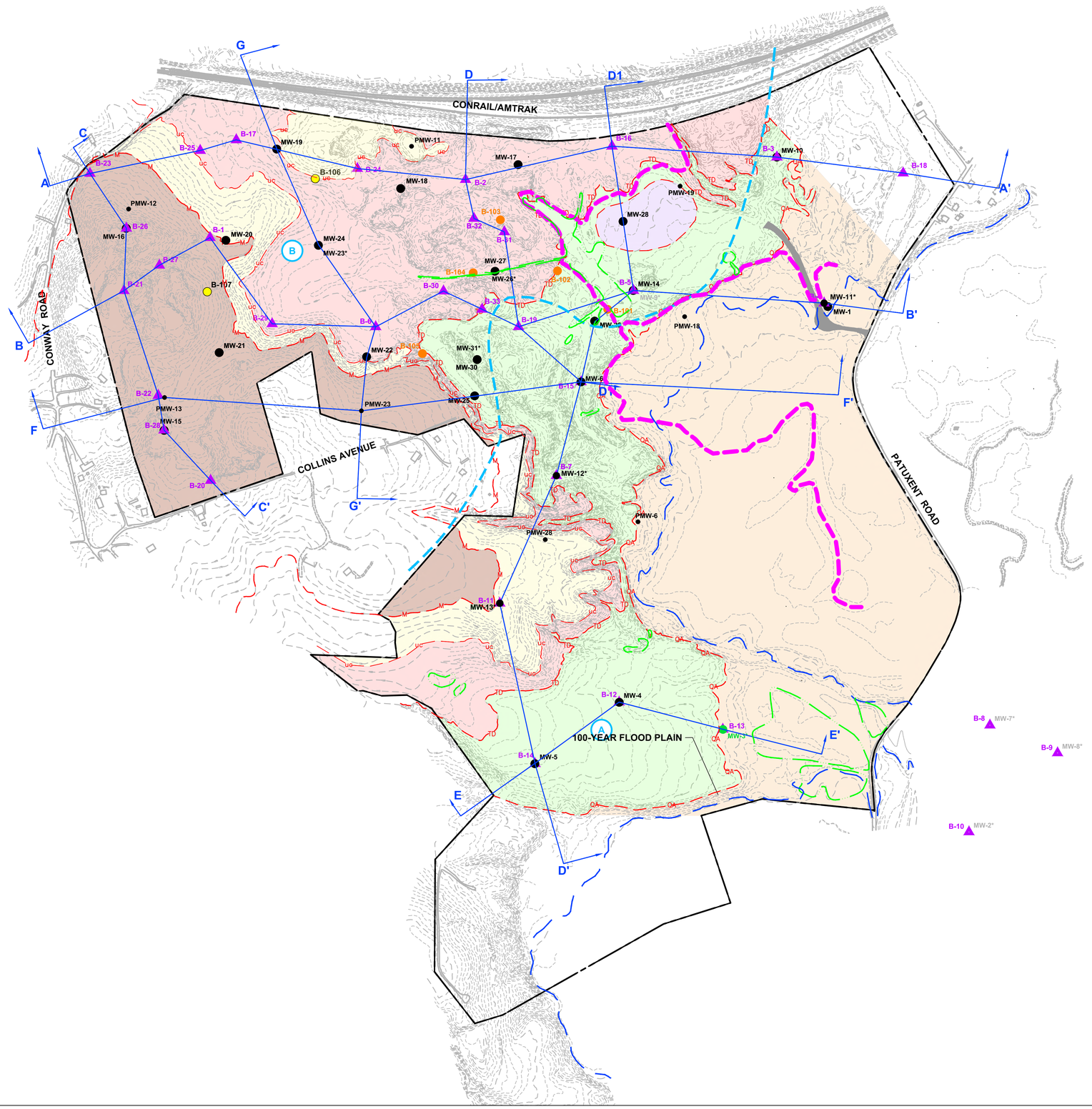
ON–SITE BORING AND WELL LOCATIONS MAP

REPORT CODE: A		FILE NAME: 20183854A004	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 4

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A Phase II Application\20183854A002 - 4 On-site Boring and Well Locations.dwg, 6/5/2020 3:52:45 PM



LEGEND

- PROPERTY LINE
- SITE ENTRANCE
- JURISDICTIONAL DETERMINATION (JD) WETLANDS BOUNDARY (APPROX.) WITH IDENTIFICATION AND AREA (SEE NOTE 5)
- 100–YEAR FLOOD PLAIN (AFTER 2012) (SEE REFERENCE 2) (SEE NOTE 4)
- BOUNDARY/OUTCROP OF MAGOTHY FORMATION AT SURFACE.
- AREA FIELD MAPPED WITH REMNANTS OF UPPER CONFINING LAYER AT SURFACE.
- M — APPROX. CONTACT BETWEEN BOTTOM OF MAGOTHY FORMATION AND TOP OF UPPER CONFINING LAYER.
- uc — APPROX. CONTACT BETWEEN BOTTOM OF UPPER CONFINING LAYER AND TOP OF UPPER PATAPSCO AQUIFER.
- AREA MAPPED WITH UPPER PATAPSCO SANDS AT SURFACE.
- TD — APPROX. LIMIT OF QUATENARY TERRACE DEPOSITS AND CRETACIOUS POTOMAC GROUP.
- AREA MAPPED WITH TERRACE DEPOSITS AT SURFACE.
- QA — APPROX. CONTACT BETWEEN BOTTOM OF QUATENARY TERRACE AND ALLUVIUM DEPOSITS.
- AREA MAPPED WITH ALLUVIAL DEPOSITS AT SURFACE.
- AREA WITH MIDDLE CONFINING LAYER EXPOSED AT GROUND SURFACE.
- MONITORING WELL (MONITORING WELLS MARKED WITH AN * ARE LOST, DAMAGED OR MCU WELL NOT SUBJECT TO MONITORING
- BORING LOCATIONS TO REFINE AREA A–B TRANSITION (B–101 TO B–105) COMPLETED APRIL/MAY 2013
- ADDITIONAL BORINGS LOCATIONS REQUESTED BY MDE (B–106 AND B–107) COMPLETED APRIL/MAY 2013
- HISTORICAL BOREHOLES (SEE REFERENCE 3)
- UNCONFINED WATER BEARING ZONE DISCHARGE TO GROUND SURFACE/SURFACE WATER

REFERENCES

1.) BASEMAP SHOWN, INCLUDING TOPOGRAPHICAL INFORMATION, IS FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) THE POST–2012 100–YEAR FLOOD PLAIN LIMITS SHOWN ARE BASED ON FEMA NATIONAL FLOOD INSURANCE PROGRAM MAP NUMBER 24003C0136E, DATED 10/16/2012, AND PROVIDED AS PLATE 3.

3.) ADDITIONAL HISTORICAL BORING LOCATIONS FROM HARD COPY OF DRAWING ENTITLED "PLATE 2, CHESAPEAKE RUBBLE LANDFILL HYDROGEOLOGIC BASE MAP," DATED NOVEMBER 2003, CREATED BY MARK SCHULTZ ASSOCIATES, ANNAPOLIS, MARYLAND.

NOTES

1.) THE 100–YEAR FLOOD PLAIN LIMITS ARE BASED ON 2012 FEMA STUDY.

2.) THE CONRAIL TRACKS ARE ALSO SHARED WITH AMTRAK FOR HIGH–SPEED COMMUTER TRAINS BETWEEN BOSTON, MASSACHUSETTS, AND WASHINGTON, D.C.

3.) THE PROPERTY WAS PREVIOUSLY USED FOR SAND AND GRAVEL MINING ACTIVITIES. PORTIONS OF THE SITE CURRENTLY HAVE NO VEGETATION AND ARE BARREN.

4.) THE PROPOSED LANDFILL PERIMETER ROAD BERM GRADES ARE PROPOSED A MINIMUM OF 5 FEET ABOVE THE FEMA BASE FLOOD ELEVATIONS.

NORTH

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch =300 ft.

VERONICA H. FOSTER
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DATE:	REVISION:
4/30/2020	REVISED TO ADDRESS MDE COMMENTS (PGS/VEF)

NATIONAL WASTE MANAGERS
PHASE II PERMIT APPLICATION
CHESAPEAKE TERRACE RUBBLE LANDFILL
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SITE SURFICIAL GEOLOGY MAP

REPORT CODE:	A	FILE NAME:	20183854A004A
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 4A

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RCA_Phase II Application\20183854A004A - Site Surficial Geology Map.dwg, 6/5/2020 3:53:43 PM

REFERENCES

1.) THE SURFACE GRADES SHOWN ARE FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) BORING LOGS ARE PROVIDED IN APPENDICES E AND F IN PHASE II APPLICATION HYDROGEOLOGIC REPORT, DATED JUNE 5, 2020, PREPARED BY ADVANCED GEOSERVICES CORP.

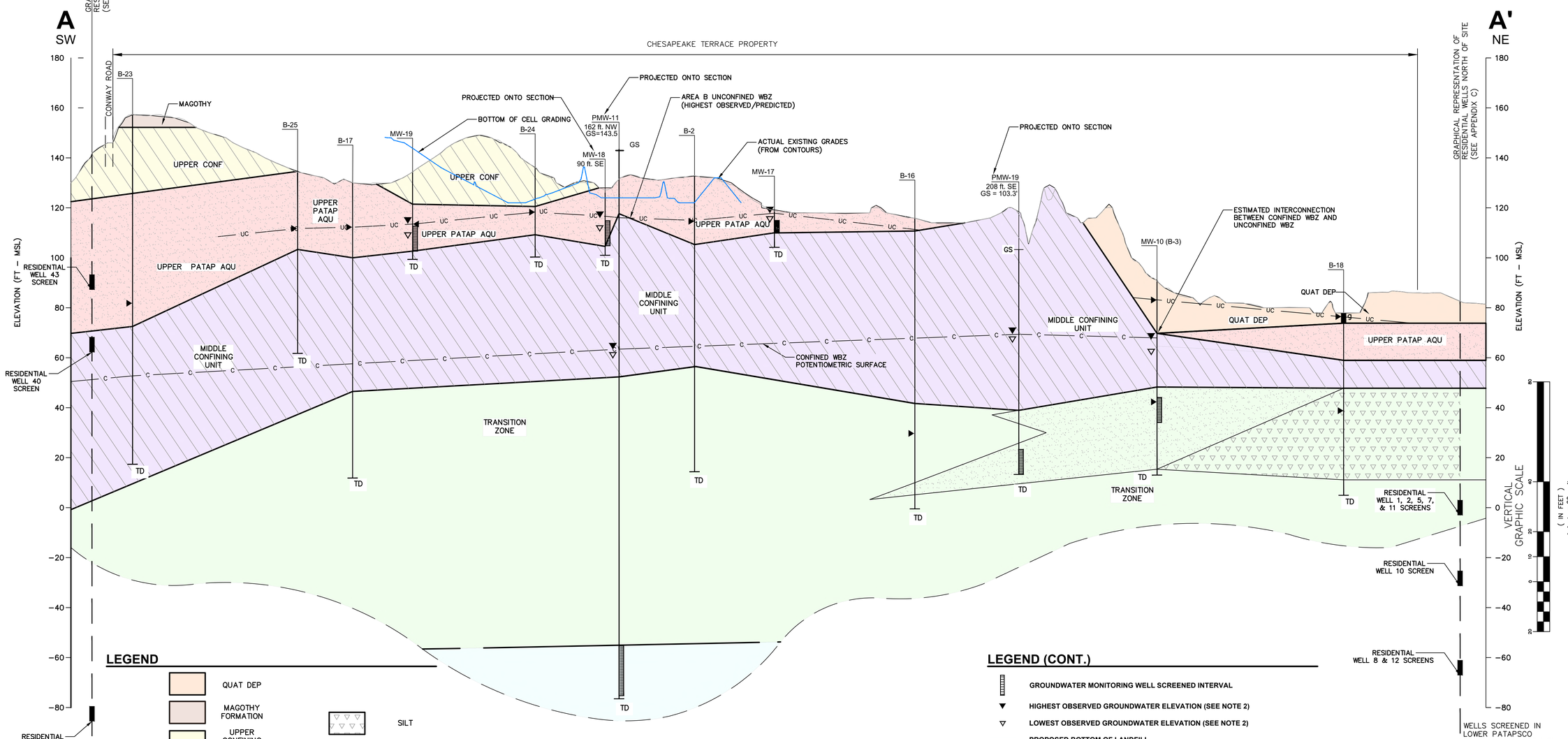
NOTES

1.) REFER TO FIGURE 4, ON-SITE BORING AND WELL LOCATIONS MAP, FOR THE GEOLOGIC CROSS SECTION LOCATIONS.

2.) REFER TO TABLE 4 FOR THE HIGHEST AND LOWEST OBSERVED GROUNDWATER ELEVATIONS. SURFACE SHOWN ON CROSS SECTION INTERPRETED FROM FIGURES 12 AND 15

3.) THE BOUNDARIES BETWEEN HYDROGEOLOGIC AREAS ARE BASED ON BORING DATA AND FIELD OBSERVATIONS. THE BOUNDARIES ARE NOT EVIDENCE OF THE END OF ONE FORMATION AND THE START OF ANOTHER, THE FORMATIONS TRANSITION ALONG THE BOUNDARIES.

4.) HYDROGEOLOGIC AREAS AND THEIR MAPPING IS BASED ON FORMATIONS MAPPED IN FIELD BOREHOLES, SURFACE OBSERVATION, HISTORICAL AERIAL PHOTOGRAPHS, AND REGIONAL GEOLOGIC MAPS.



LEGEND

- QUAT DEP
- MAGOTHY FORMATION
- UPPER CONFINING LAYER
- UPPER PATAPSCO AQUIFER
- MIDDLE CONFINING UNIT
- TRANSITION ZONE
- LOWER PATAPSCO AQUIFER
- SILT
- CLAY
- SAND
- GRAVEL

LEGEND (CONT.)

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- PROPOSED BOTTOM OF LANDFILL
- WET/SATURATED ZONE NOTED DURING DRILLING
- c — CLAY SEAM IDENTIFIED ON LOG
- g — LAYER OF PREDOMINANTLY GRAVEL IDENTIFIED ON LOG
- C — CONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- UC — UNCONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- TD — TERMINATION DEPTH

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DATE:	REVISION:
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6/5/2020	EDITORIAL REVISIONS/NEW LANDFILL BOTTOM (PGS/VEF)

NATIONAL WASTE MANAGERS
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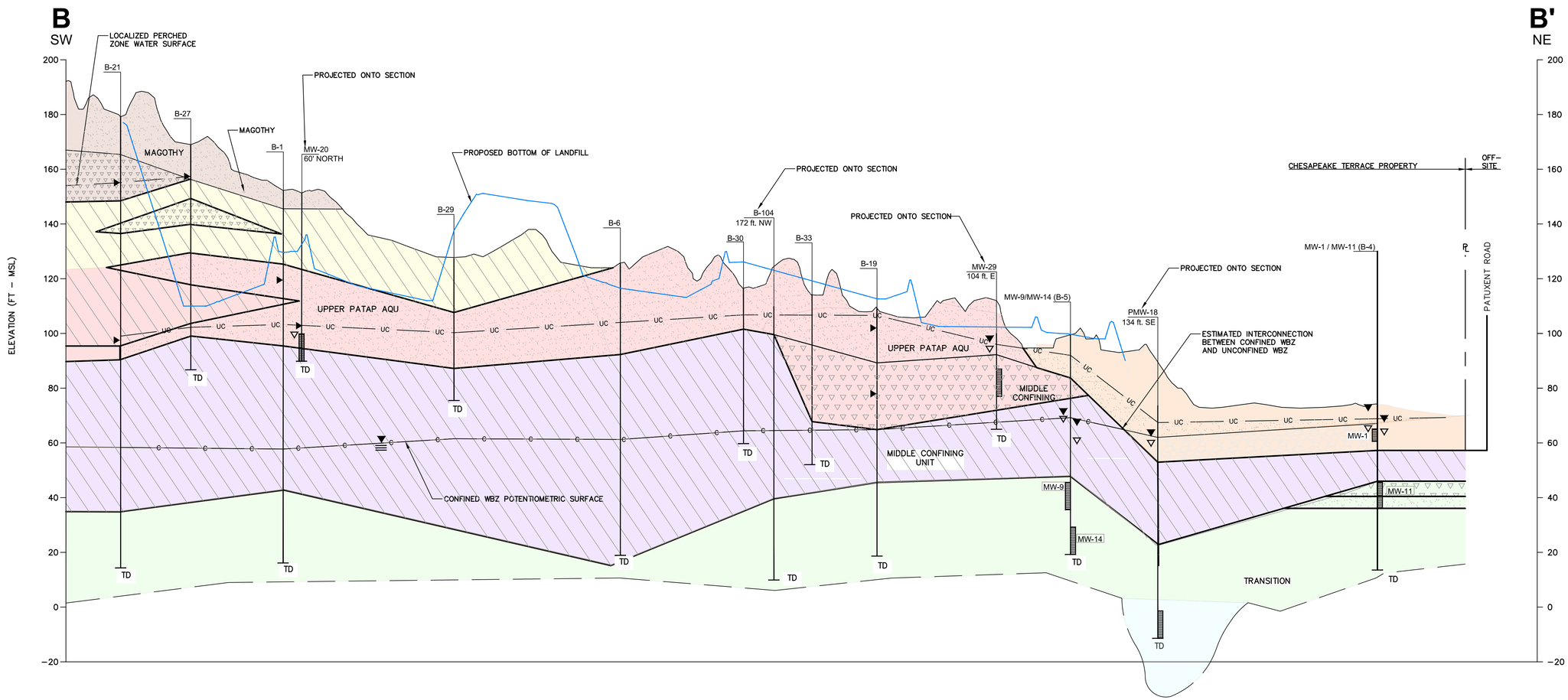
GEOLOGIC CROSS SECTION A–A'

REPORT CODE: A		FILE NAME: 20183854A005	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 5

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:15 PM



LEGEND

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- PROPOSED BOTTOM OF LANDFILL
- WET/SATURATED ZONE NOTED DURING DRILLING
- c — CLAY SEAM IDENTIFIED ON LOG
- g — LAYER OF PREDOMINANTLY GRAVEL IDENTIFIED ON LOG
- c — CONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- UC — UNCONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- TD — TERMINATION DEPTH

SILT
CLAY
SAND
GRAVEL

QUAT DEP
MAGOTHY FORMATION
UPPER CONFINING LAYER
UPPER PATAPSCO AQUIFER
MIDDLE CONFINING UNIT
TRANSITION ZONE
LOWER PATAPSCO AQUIFER

HORIZONTAL GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

REFERENCES

1.) THE SURFACE GRADES SHOWN ARE FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) BORING LOGS ARE PROVIDED IN APPENDICES E AND F IN PHASE II APPLICATION HYDROGEOLOGIC REPORT, DATED JUNE 5, 2020, PREPARED BY ADVANCED GEOSERVICES CORP.

NOTES

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2.) REFER TO TABLE 4 FOR THE HIGHEST AND LOWEST OBSERVED GROUNDWATER ELEVATIONS. SURFACE SHOWN ON CROSS SECTION INTERPRETED FROM FIGURES 12 AND 15

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4.) HYDROGEOLOGIC AREAS AND THEIR MAPPING IS BASED ON FORMATIONS MAPPED IN FIELD BOREHOLES, SURFACE OBSERVATION, HISTORICAL AERIAL PHOTOGRAPHS, AND REGIONAL GEOLOGIC MAPS.

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No. 35645

DATE:	REVISION:
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6/5/2020	EDITORIAL REVISIONS/NEW LANDFILL BOTTOM (PGS/VEF)

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PATUXENT ROAD, ODENTON
ANNE ARUNDEL COUNTY, MARYLAND

ADVANCED GeoServices
a Montrose Environmental Group company
1055 ADMIRAL BYRD, SUITE A, WEST CHESTER PA, 19380
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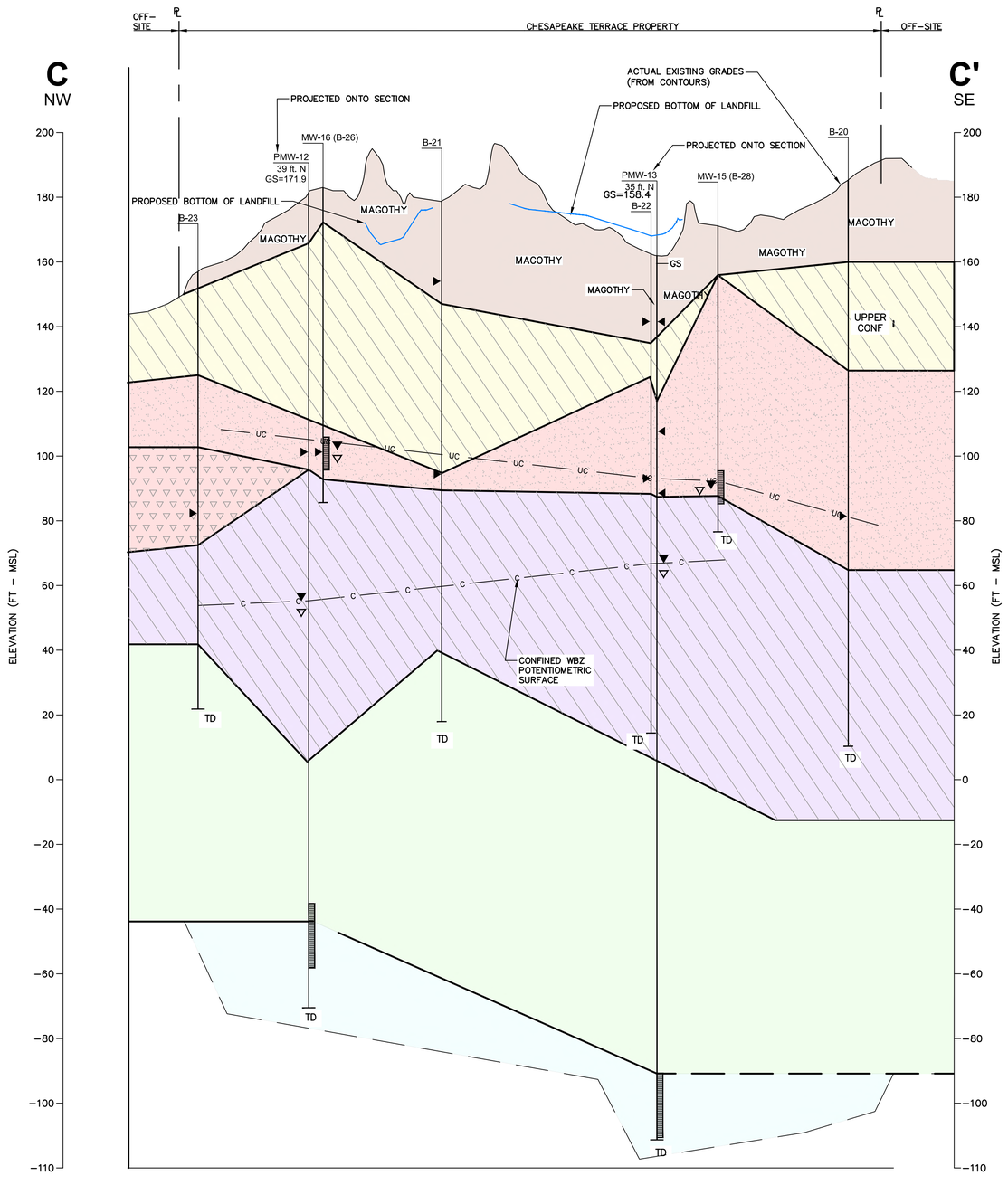
GEOLOGIC CROSS SECTION B–B'

REPORT CODE: A		FILE NAME: 20183854A006	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 6

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A, Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:19 PM



HORIZONTAL GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch =200 ft.

VERTICAL GRAPHIC SCALE

80 40 20 10 0 20

(IN FEET)
1 inch = 20 ft.

LEGEND

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
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- TD — TERMINATION DEPTH

SILT
CLAY
SAND
GRAVEL

QUAT DEP
MAGOTHY FORMATION
UPPER CONFINING LAYER
UPPER PATAPSCO AQUIFER
MIDDLE CONFINING UNIT
TRANSITION ZONE
LOWER PATAPSCO AQUIFER

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PROFESSIONAL ENGINEER

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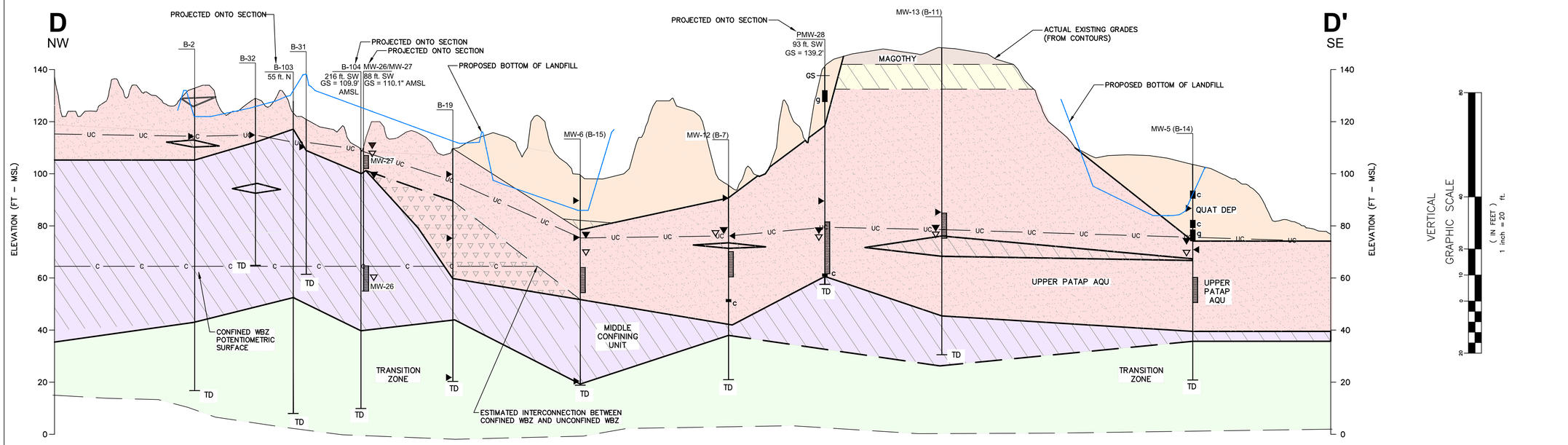
GEOLOGIC CROSS SECTION C–C'

REPORT CODE: A		FILE NAME: 20183854A007	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2019–3854
DRAWN BY:	EEE	DATE:	4/1/2019

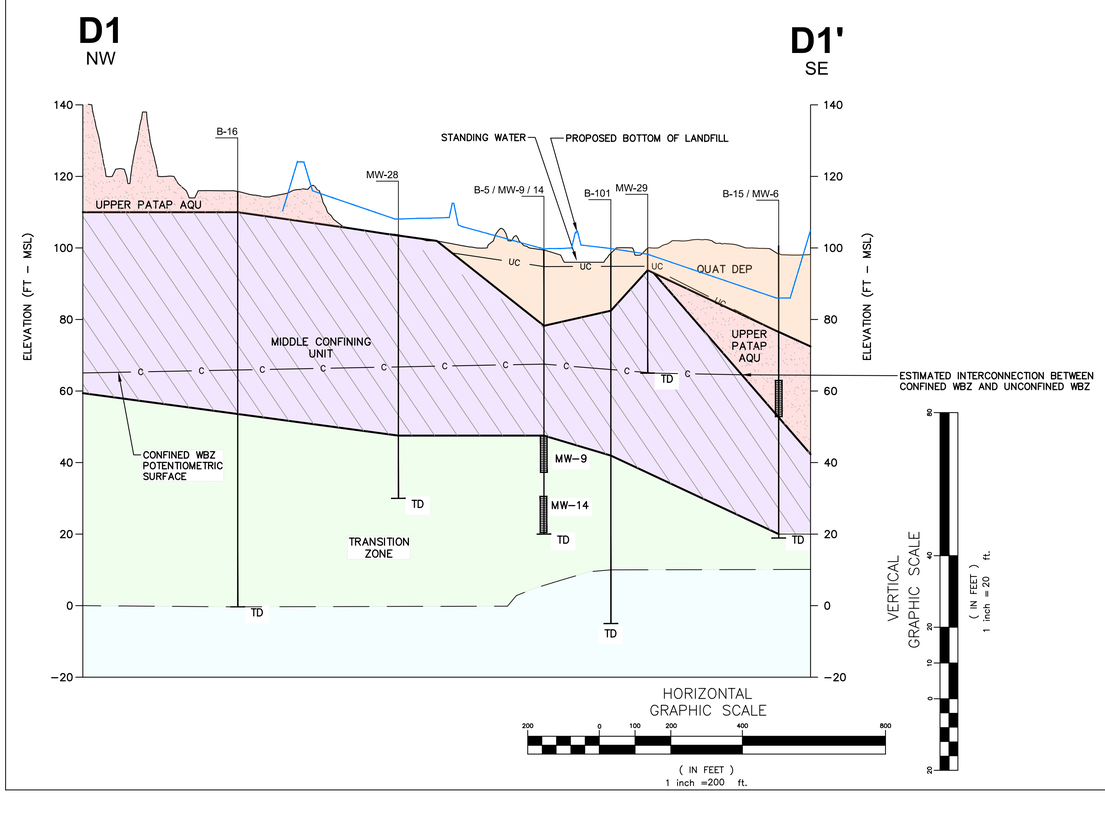
FIGURE 7

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RCA_Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:22 PM



HORIZONTAL GRAPHIC SCALE

(IN FEET)
1 inch =200 ft.



HORIZONTAL GRAPHIC SCALE

(IN FEET)
1 inch =200 ft.

LEGEND

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- PROPOSED BOTTOM OF LANDFILL
- WET/SATURATED ZONE NOTED DURING DRILLING
- c — CLAY SEAM IDENTIFIED ON LOG
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- C — CONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- UC — UNCONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- TD — TERMINATION DEPTH

SILT
CLAY
SAND
GRAVEL

QUAT DEP
MAGOTHY FORMATION
UPPER CONFINING LAYER
UPPER PATAPSCO AQUIFER
MIDDLE CONFINING UNIT
TRANSITION ZONE
LOWER PATAPSCO AQUIFER

REFERENCES

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PROFESSIONAL ENGINEER

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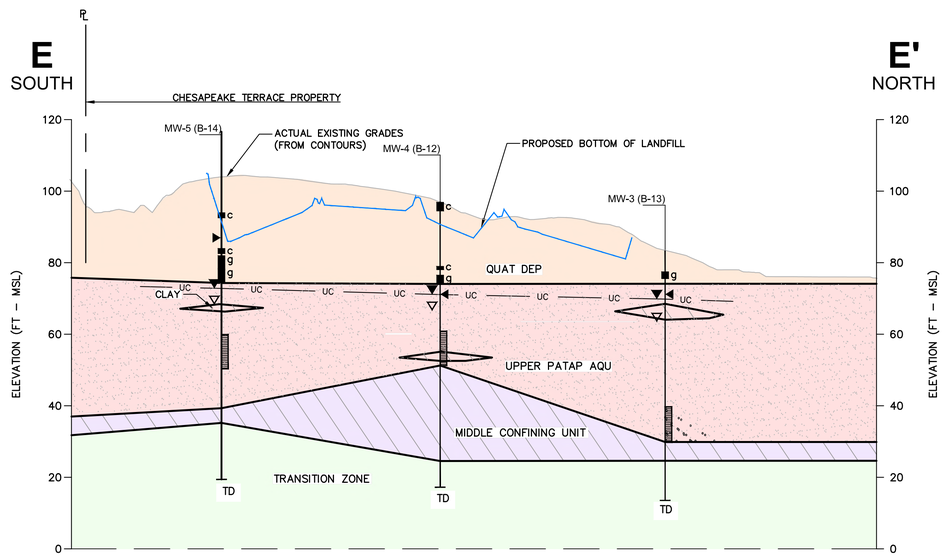
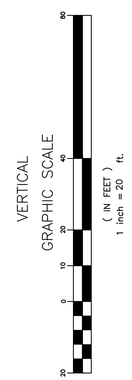
GEOLOGIC CROSS SECTIONS
D–D' AND D1–D1'

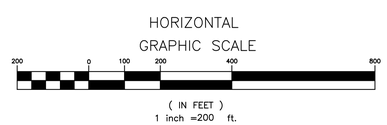
REPORT CODE: A		FILE NAME: 20183854A008	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018-3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 8

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RCA_Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:26 PM







LEGEND

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- PROPOSED BOTTOM OF LANDFILL
- WET/SATURATED ZONE NOTED DURING DRILLING
- c — CLAY SEAM IDENTIFIED ON LOG
- g — LAYER OF PREDOMINANTLY GRAVEL IDENTIFIED ON LOG
- c — CONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- UC — UNCONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- TD — TERMINATION DEPTH

SILT
CLAY
SAND
GRAVEL

QUAT DEP
MAGOTHY FORMATION
UPPER CONFINING LAYER
UPPER PATAPSCO AQUIFER
MIDDLE CONFINING UNIT
TRANSITION ZONE
LOWER PATAPSCO AQUIFER

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STATE OF MARYLAND
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NATIONAL WASTE MANAGERS
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GEOLOGIC CROSS SECTION E-E'

REPORT CODE: A		FILE NAME: 20183854A009	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018-3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 9

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RCA_Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:30 PM

REFERENCES

1.) THE SURFACE GRADES SHOWN ARE FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

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LEGEND

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
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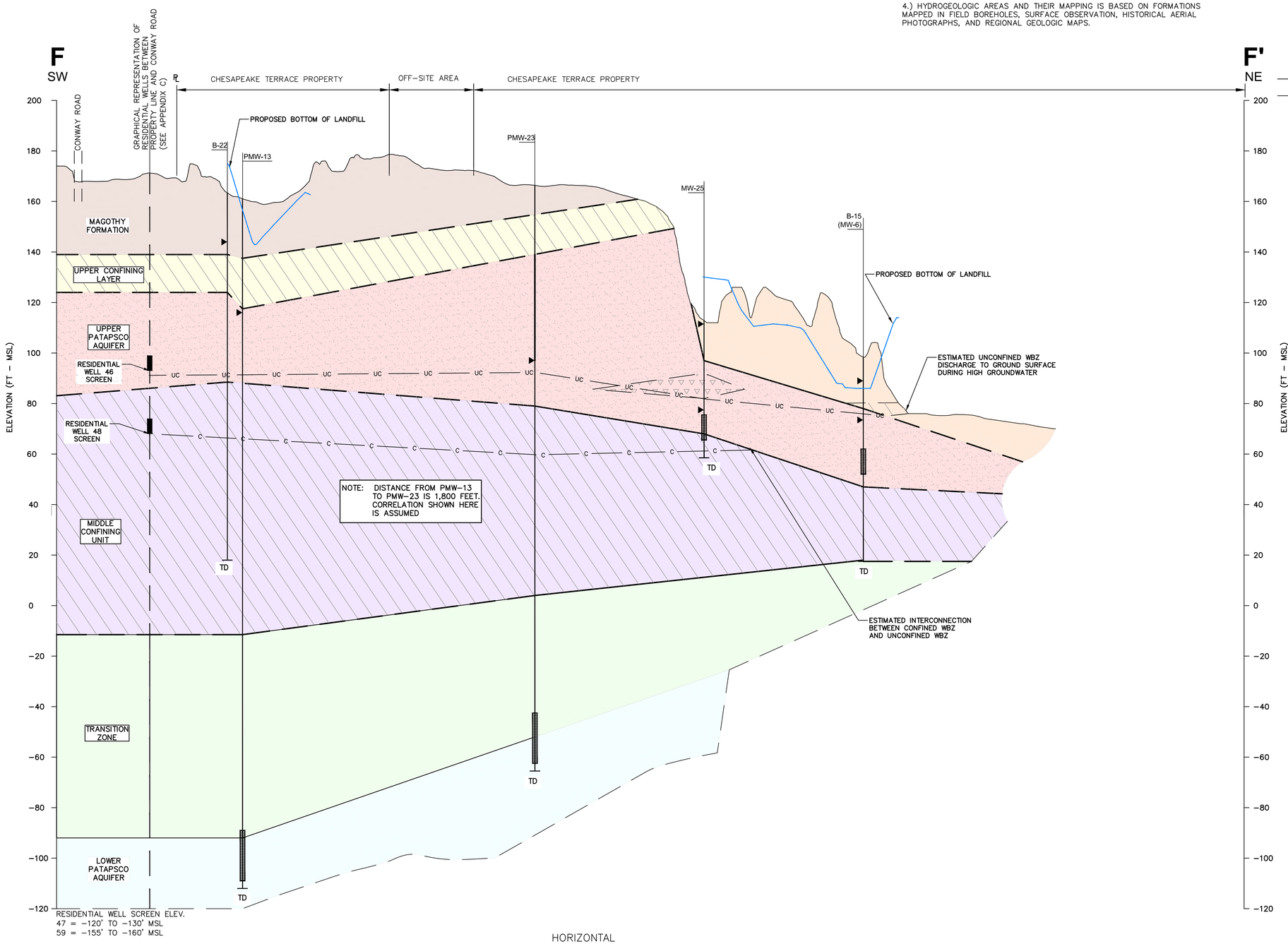
- TD — TERMINATION DEPTH

SILT, CLAY, SAND, GRAVEL

QUAT DEP, MAGOTHY FORMATION, UPPER CONFINING LAYER, UPPER PATAPSCO AQUIFER, MIDDLE CONFINING UNIT, TRANSITION ZONE, LOWER PATAPSCO AQUIFER



VERTICAL GRAPHIC SCALE

20 10 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

HORIZONTAL GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

VERON KOSTER
LICENSED PROFESSIONAL ENGINEER
No. 35645
PROFESSIONAL ENGINEER

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GEOLOGIC CROSS SECTION F-F'

REPORT CODE: A		FILE NAME: 20183854A010	
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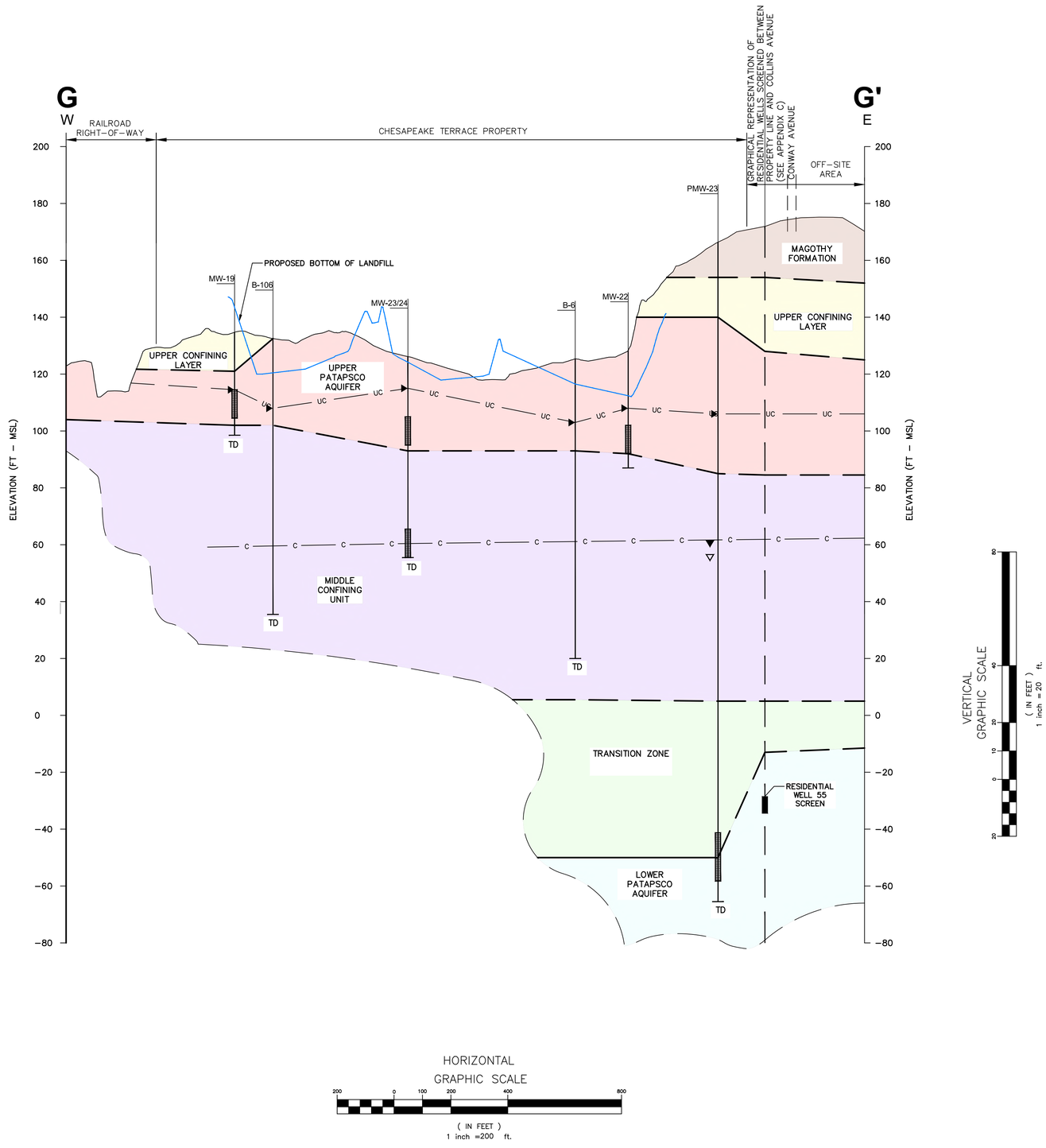
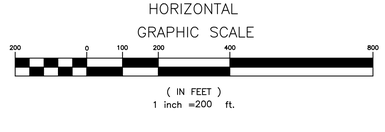
FIGURE 10

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:32 PM





LEGEND

- GROUNDWATER MONITORING WELL SCREENED INTERVAL
- HIGHEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
- LOWEST OBSERVED GROUNDWATER ELEVATION (SEE NOTE 2)
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- uc — UNCONFINED GROUNDWATER HIGHEST OBSERVED / PREDICTED
- TD — TERMINATION DEPTH

SILT
CLAY
SAND
GRAVEL

QUAT DEP
MAGOTHY FORMATION
UPPER CONFINING LAYER
UPPER PATAPSCO AQUIFER
MIDDLE CONFINING UNIT
TRANSITION ZONE
LOWER PATAPSCO AQUIFER

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PROFESSIONAL ENGINEER

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NATIONAL WASTE MANAGERS
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ANNE ARUNDEL COUNTY, MARYLAND

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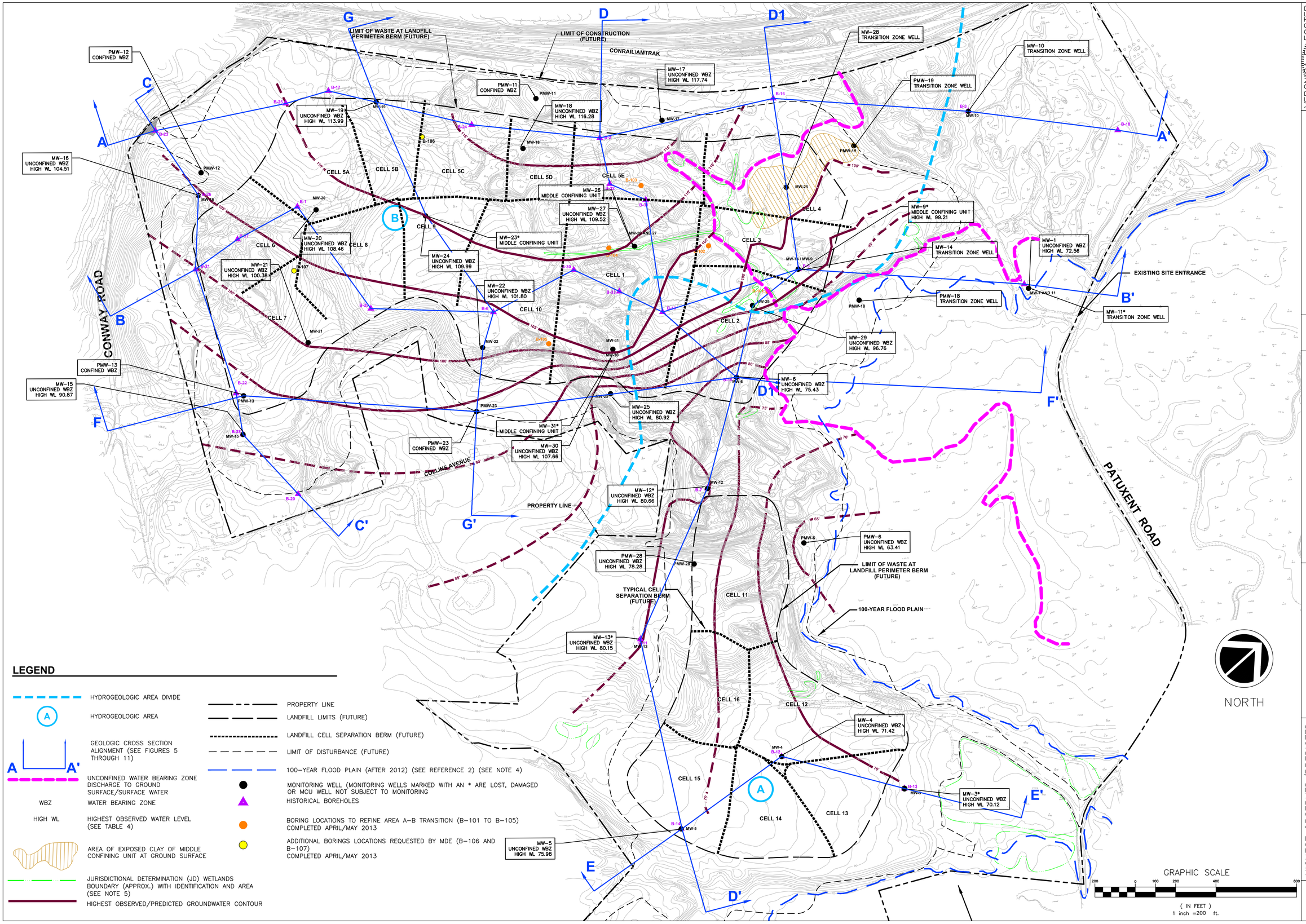
tel 610.840.9100 fax 610.840.9109 www.advancedgeoservices.com

GEOLOGIC CROSS SECTION G–G'

REPORT CODE: A		FILE NAME: 20183854A011	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	4/1/2019

FIGURE 11

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A, Phase II Application\20183854A005 - 11 - Cross Sections.dwg, 6/5/2020 3:54:36 PM



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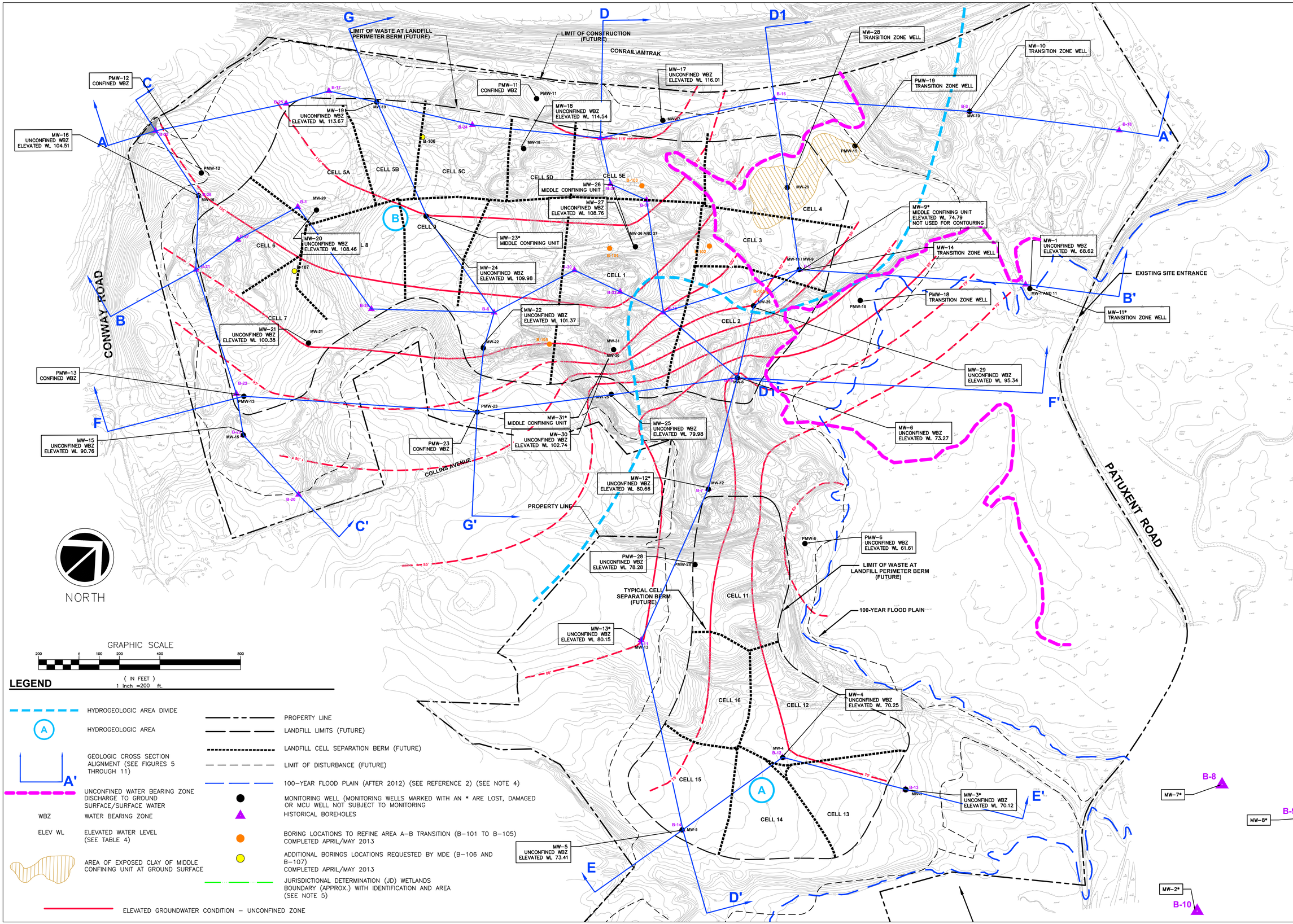
HIGHEST OBSERVED/PREDICTED GROUNDWATER CONDITION– UNCONFINED ZONE

REPORT CODE: A		FILE NAME: 20183854A012	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 12

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A Phase II Application\20183854A012 - Highest Unconfined.dwg, 6/5/2020 3:54:54 PM



VERONICA E. FOSTER
LICENSED PROFESSIONAL ENGINEER
STATE OF MARYLAND
No. 35645
PROFESSIONAL ENGINEER

DATE:	REVISION:
4/30/2020	REVISED TO ADDRESS MDE COMMENTS (PGS/VEF)
6/5/2020	EDITORIAL REVISIONS/NEW LANDFILL BOTTOM (PGS/VEF)

NATIONAL WASTE MANAGERS
PHASE II PERMIT APPLICATION
CHESAPEAKE TERRACE RUBBLE LANDFILL
PATUXENT ROAD, ODENTON
ANNE ARUNDEL COUNTY, MARYLAND

ADVANCED GeoServices
a Montrose Environmental Group company
1055 ANDREW DRIVE, SUITE A, WEST CHESTER PA, 19380
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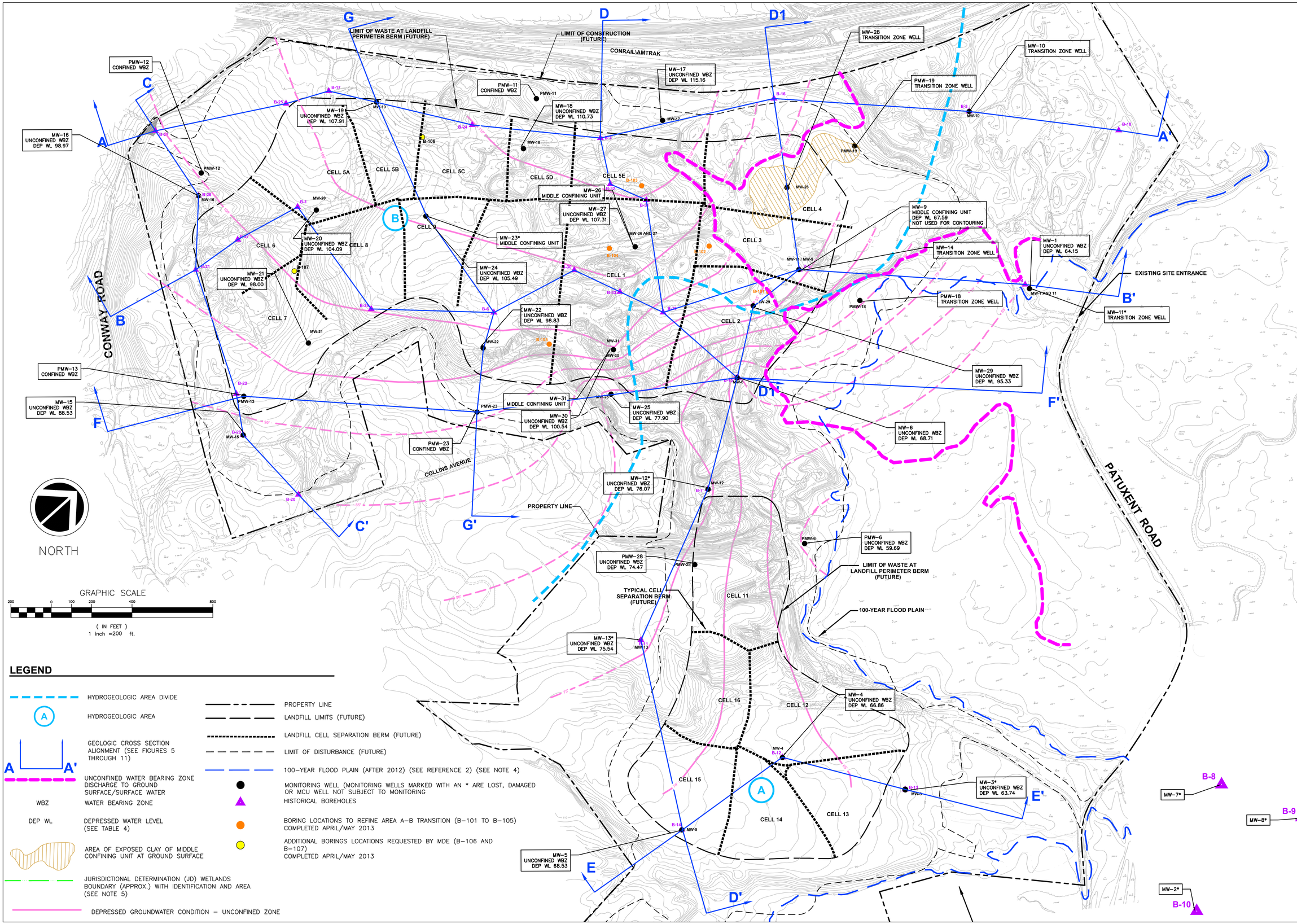
ELEVATED GROUNDWATER CONDITION– UNCONFINED ZONE

REPORT CODE: A		FILE NAME: 20183854A013	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 13

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A Phase II Application\20183854A013 - Elevated Unconfined.dwg, 6/5/2020 3:55:50 PM



VERONICA FOSTER
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ENGINEER
No. 35649
PROFESSIONAL ENGINEER

DATE:	REVISION:
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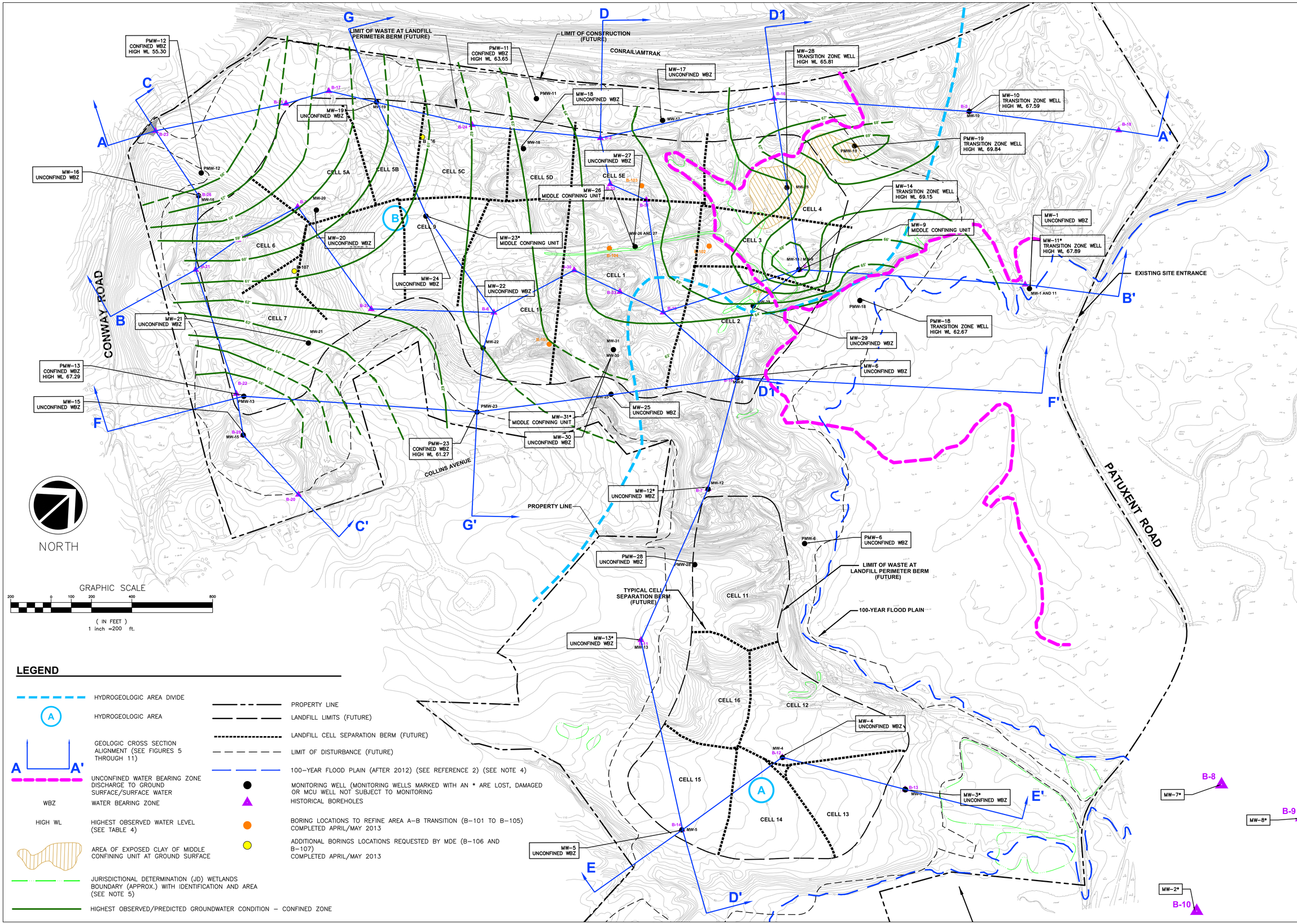
DEPRESSED GROUNDWATER CONDITION– UNCONFINED ZONE

REPORT CODE: A		FILE NAME: 20183854A014	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 14

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A Phase II Application\20183854A014 - Lowest Unconfined.dwg, 6/5/2020 3:56:42 PM



VERONICA E. FOSTER
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DATE:	REVISION:
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HIGHEST OBSERVED/PREDICTED GROUNDWATER CONDITION– CONFINED ZONE

REPORT CODE: A		FILE NAME: 20183854A015	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
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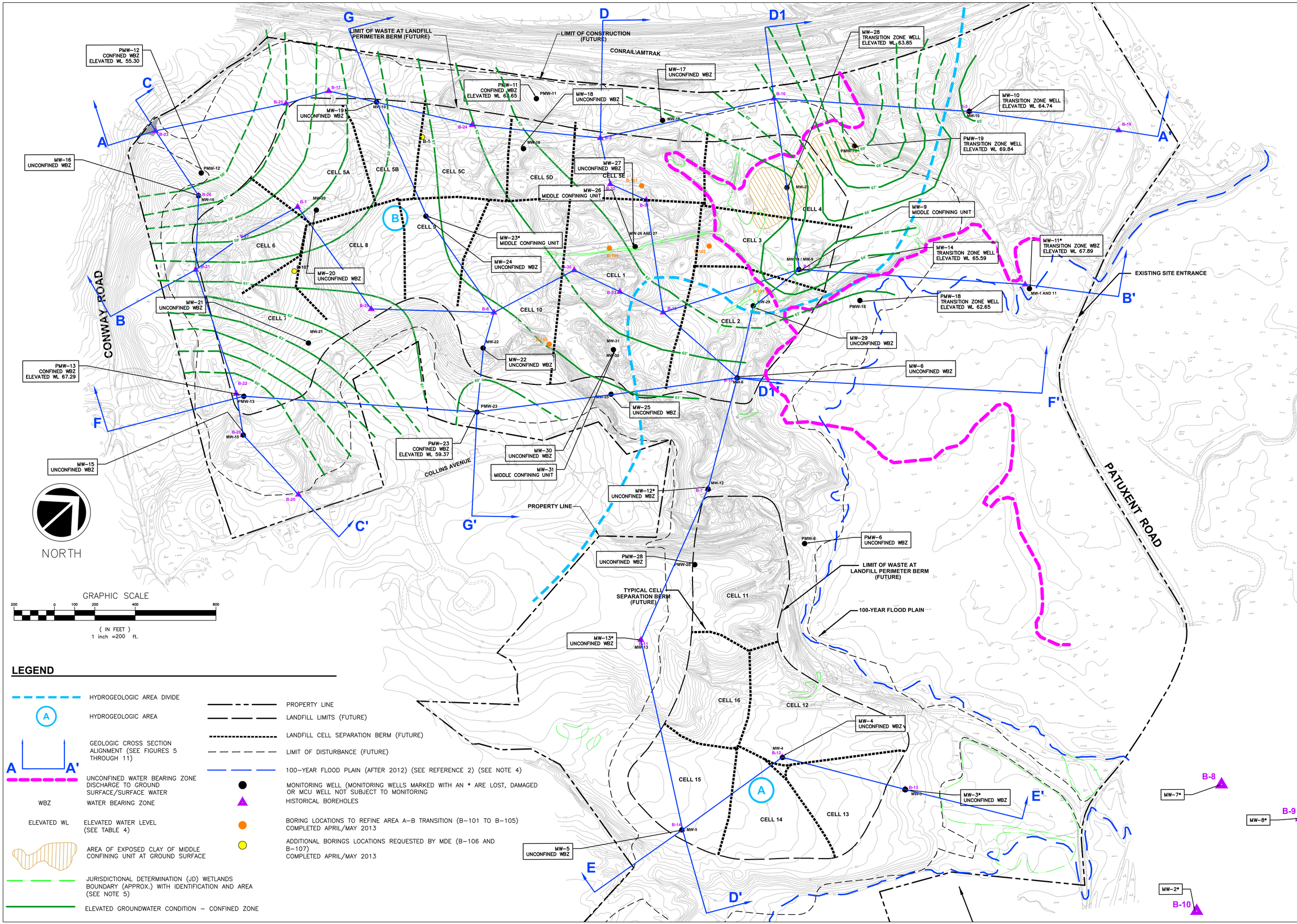
FIGURE 15

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A015 - Highest Confined.dwg, 6/5/2020 3:57:35 PM



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DATE:	REVISION:
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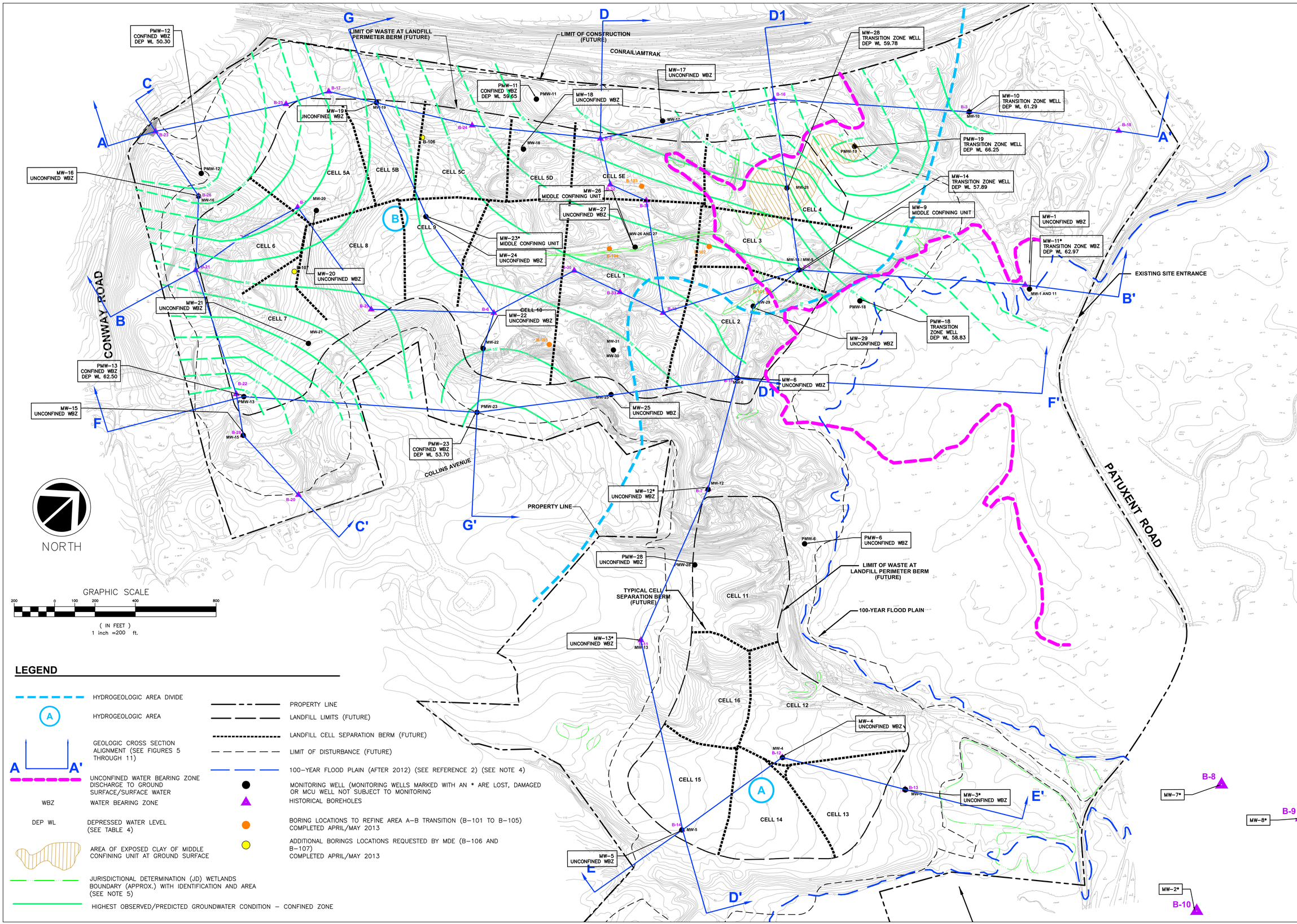
ELEVATED GROUNDWATER CONDITION– CONFINED ZONE

REPORT CODE: A		FILE NAME: 20183854A016	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
CHECKED BY:	VEF	PROJECT NUMBER:	2018–3854
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 16

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A016 - Elevated Confined.dwg, 6/5/2020 3:58:29 PM



LEGEND

- HYDROGEOLOGIC AREA DIVIDE
- A — HYDROGEOLOGIC AREA
- A — A' — GEOLOGIC CROSS SECTION ALIGNMENT (SEE FIGURES 5 THROUGH 11)
- UNCONFINED WATER BEARING ZONE DISCHARGE TO GROUND SURFACE/SURFACE WATER
- WBZ — WATER BEARING ZONE
- DEP WL — DEPRESSED WATER LEVEL (SEE TABLE 4)
- AREA OF EXPOSED CLAY OF MIDDLE CONFINING UNIT AT GROUND SURFACE
- JURISDICTIONAL DETERMINATION (JD) WETLANDS BOUNDARY (APPROX.) WITH IDENTIFICATION AND AREA (SEE NOTE 5)
- HIGHEST OBSERVED/PREDICTED GROUNDWATER CONDITION – CONFINED ZONE
- PROPERTY LINE
- LANDFILL LIMITS (FUTURE)
- LANDFILL CELL SEPARATION BERM (FUTURE)
- LIMIT OF DISTURBANCE (FUTURE)
- 100-YEAR FLOOD PLAIN (AFTER 2012) (SEE REFERENCE 2) (SEE NOTE 4)
- MONITORING WELL (MONITORING WELLS MARKED WITH AN * ARE LOST, DAMAGED OR MCU WELL NOT SUBJECT TO MONITORING
- HISTORICAL BOREHOLES
- BORING LOCATIONS TO REFINE AREA A–B TRANSITION (B–101 TO B–105) COMPLETED APRIL/MAY 2013
- ADDITIONAL BORINGS LOCATIONS REQUESTED BY MDE (B–106 AND B–107) COMPLETED APRIL/MAY 2013

VERONICA FOSTER
LICENSED FOR PROFESSIONAL ENGINEER
STATE OF MARYLAND
No. 36549
PROFESSIONAL ENGINEER

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NATIONAL WASTE MANAGERS
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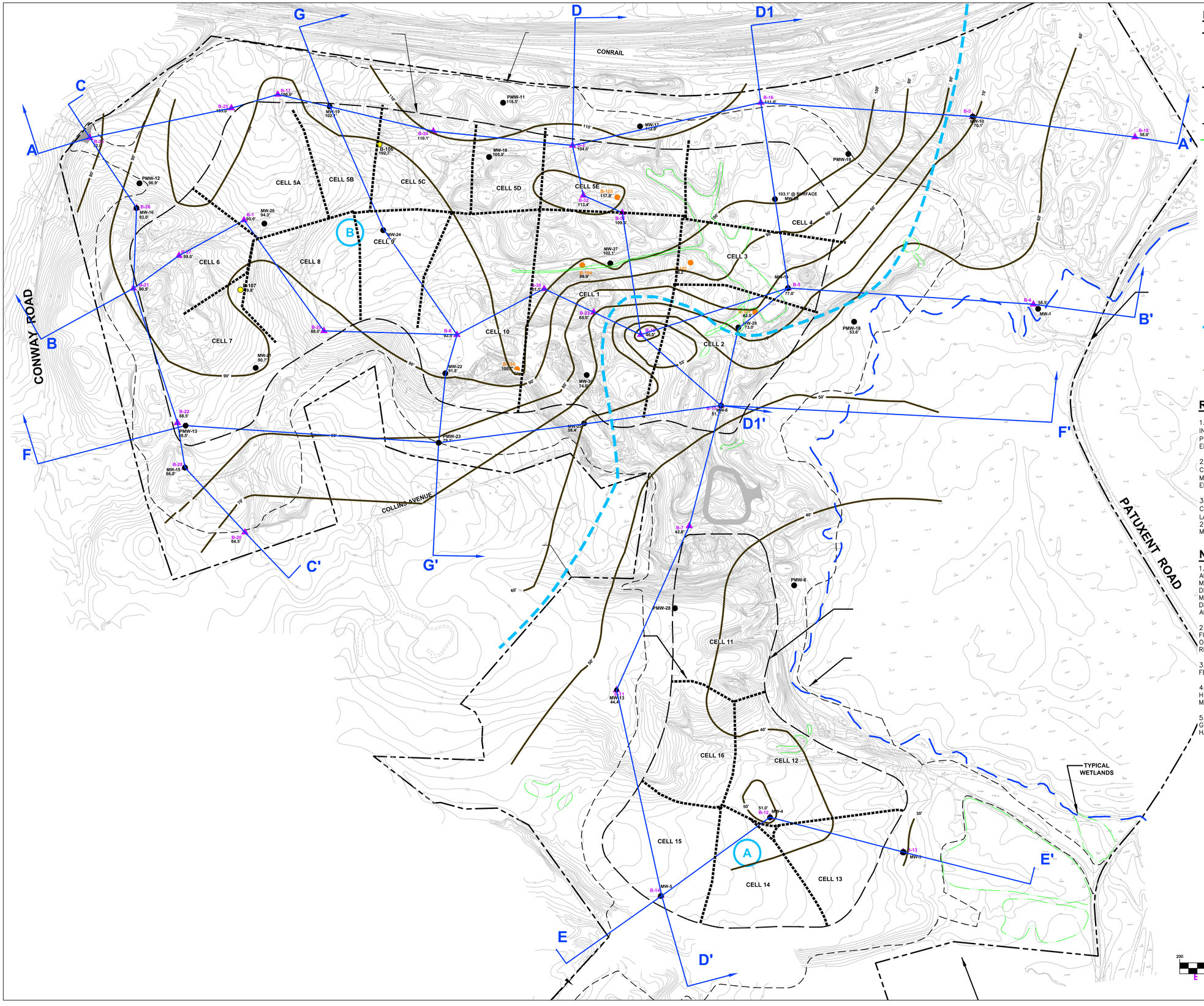
DEPRESSED GROUNDWATER CONDITION– CONFINED ZONE

REPORT CODE: A	FILE NAME: 20183854A017		
PROJECT MANAGER: VEF	SCALE: AS NOTED		
CHECKED BY: VEF	PROJECT NUMBER: 2018–3854		
DRAWN BY: EEE	DATE: 7/31/2019		

FIGURE 17

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A Phase II Application\20183854A017 - Lowest Confined.dwg, 6/5/2020 3:59:24 PM



LEGEND

- PROPERTY LINE
- LANDFILL PERIMETER ACCESS ROAD (FUTURE)
- SITE ENTRANCE (FUTURE)
- LANDFILL LIMITS (FUTURE)
- LANDFILL CELL SEPARATION BERM (FUTURE)
- LIMIT OF DISTURBANCE (FUTURE)
- JURISDICTIONAL DETERMINATION (JD) WETLANDS BOUNDARY (APPROX.) WITH IDENTIFICATION AND AREA (SEE NOTE 5)
- EXISTING GROUNDWATER MONITORING WELL (SEE REFERENCE 2)
- HISTORICAL BOREHOLES (SEE REFERENCE 3)
- BORING LOCATIONS TO DEFINE LIMIT OF MIDDLE CONFINING UNIT (B-101 TO B-105) COMPLETED APRIL/MAY 2013
- ADDITIONAL BORINGS LOCATIONS REQUESTED BY MDE (B-106 AND B-107) COMPLETED APRIL/MAY 2013
- ESTIMATED INTERCONNECTION BETWEEN CONFINED WBZ AND UNCONFINED WBZ
- (A) HYDROGEOLOGIC AREA
- 110' TOP OF CLAY ELEVATION CONTOUR LINE

REFERENCES

1.) BASEMAP SHOWN, INCLUDING TOPOGRAPHICAL INFORMATION, IS FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) MONITORING WELL LOCATIONS DIGITIZED FROM HARD COPY OF DRAWING ENTITLED "PERMANENT GROUNDWATER MONITORING WELL PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED MAY 2008.

3.) ADDITIONAL HISTORICAL BORING LOCATIONS FROM HARD COPY OF DRAWING ENTITLED "PLATE 2, CHESAPEAKE RUBBLE LANDFILL HYDROGEOLOGIC BASE MAP," DATED NOVEMBER 2003, CREATED BY MARK SCHULTZ ASSOCIATES, ANNAPOLIS, MARYLAND.

NOTES

1.) THE FUTURE RUBBLE LANDFILL DEVELOPMENT FEATURES ARE INCLUDED TO SHOW LOCATION OF THE BORINGS AND MONITORING WELLS RELATIVE TO THE PROPOSED DEVELOPMENT. THE ACTUAL LIMITS OF FUTURE DEVELOPMENT MAY BE ADJUSTED AS PART OF THE DETAILED ENGINEERING DESIGN TO BE INCLUDED IN THE PHASE III PERMIT APPLICATION; WHICH IS CURRENTLY UNDERGOING REVISION.

2.) HYDROLOGIC AREAS AND THEIR MAPPING IS BASED ON FORMATIONS MAPPED IN FIELD BOREHOLES, SURFACE OBSERVATION, HISTORICAL AERIAL PHOTOGRAPHS, AND REGIONAL GEOLOGIC MAPS.

3.) THE 100-YEAR FLOODPLAIN LIMITS ARE BASED ON 2012 FEMA STUDY.

4.)THE CONRAIL TRACKS ARE ALSO SHARED WITH AMTRAK FOR HIGH-SPEED COMMUTER TRAINS BETWEEN BOSTON, MASSACHUSETTS AND WASHINGTON, D.C.

5.) THE PROPERTY WAS PREVIOUSLY USED FOR SAND AND GRAVEL MINING ACTIVITIES. PORTIONS OF THE SITE CURRENTLY HAVE NO VEGETATION AND ARE BARREN.

VERONICA "VERI" FOSTER
LICENSED IN MARYLAND
SENIOR PROJECT ENGINEER
No. 39549
PROFESSIONAL ENGINEER

DATE:	REVISION:
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NATIONAL WASTE MANAGERS
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TOP OF MIDDLE CONFINING UNIT CONTOURS

REPORT CODE: A		FILE NAME: 20183854A018	
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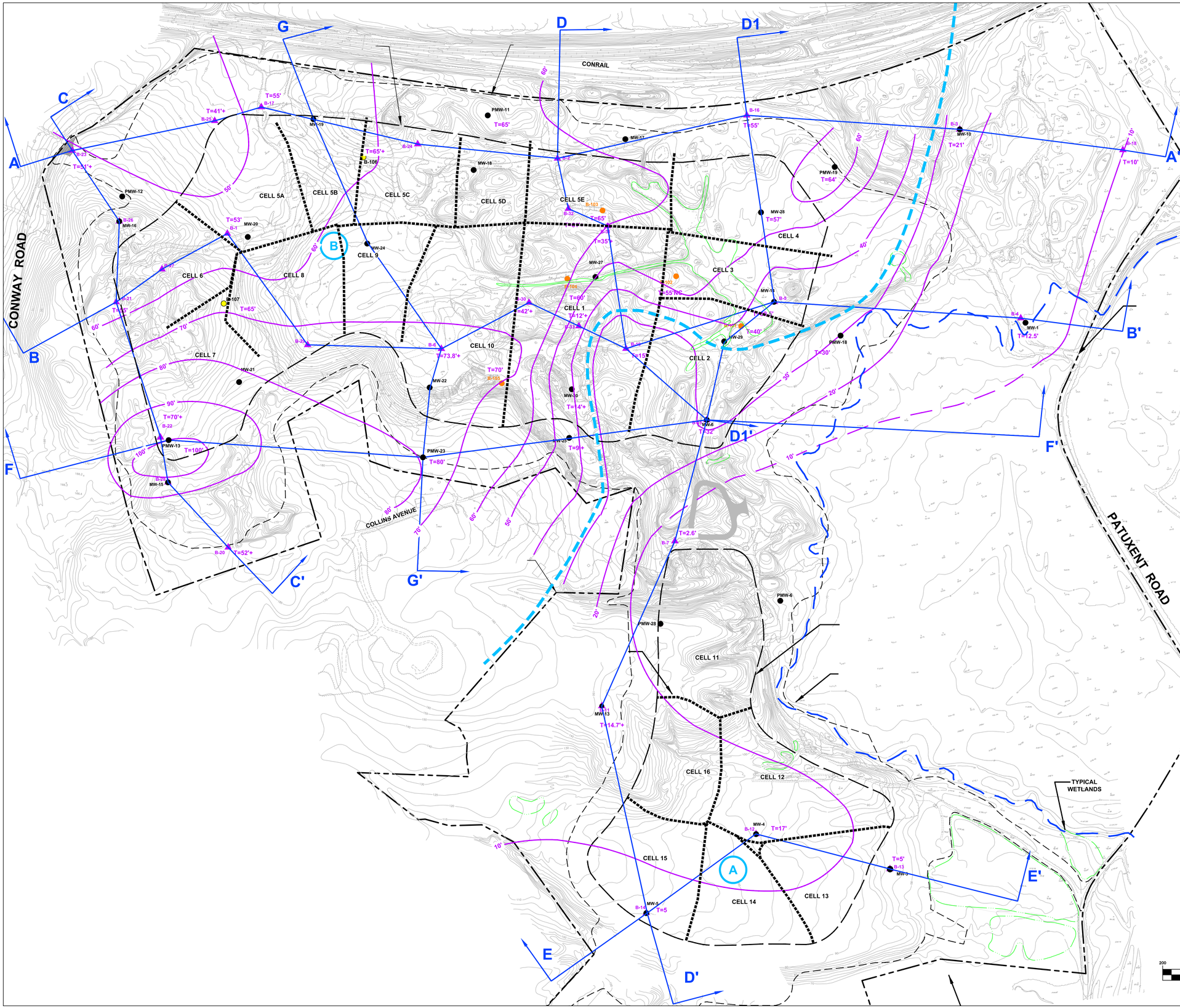
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 18

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A018 - Top of Clay.dwg, 6/5/2020 4:00:19 PM



LEGEND

- PROPERTY LINE
- LANDFILL PERIMETER ACCESS ROAD (FUTURE)
- SITE ENTRANCE (FUTURE)
- LANDFILL LIMITS (FUTURE)
- LANDFILL CELL SEPARATION BERM (FUTURE)
- LIMIT OF DISTURBANCE (FUTURE)
- EXISTING GROUNDWATER MONITORING WELL (SEE REFERENCE 2)
- HISTORICAL BOREHOLES (SEE REFERENCE 3)
- BORING LOCATIONS ALONG TA/B/TB TRANSITION (B–101 TO B–105) COMPLETED APRIL/MAY 2013
- ADDITIONAL BORINGS LOCATIONS REQUESTED BY MDE (B–106 AND B–107) COMPLETED APRIL/MAY 2013
- JURISDICTIONAL DETERMINATION (JD) WETLANDS BOUNDARY (APPROX.) WITH IDENTIFICATION AND AREA (SEE NOTE 5)
- HYDROGEOLOGIC AREA DIVIDE (SEE REFERENCE 2)
- (A) HYDROGEOLOGIC AREA (SEE REFERENCE 2)
- 110' MIDDLE CONFINING UNIT ISOPACH ELEVATION CONTOUR LINE

REFERENCES

1.) BASEMAP SHOWN, INCLUDING TOPOGRAPHICAL INFORMATION, IS FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

2.) MONITORING WELL LOCATIONS DIGITIZED FROM HARD COPY OF DRAWING ENTITLED "PERMANENT GROUNDWATER MONITORING WELL PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED MAY 2008.

3.) ADDITIONAL HISTORICAL BORING LOCATIONS FROM HARD COPY OF DRAWING ENTITLED "PLATE 2, CHESAPEAKE RUBBLE LANDFILL HYDROGEOLOGIC BASE MAP," DATED NOVEMBER 2003, CREATED BY MARK SCHULTZ ASSOCIATES, ANNAPOLIS, MARYLAND.

NOTES

1.) THE FUTURE RUBBLE LANDFILL DEVELOPMENT FEATURES ARE INCLUDED TO SHOW LOCATION OF THE BORINGS AND MONITORING WELLS RELATIVE TO THE PROPOSED DEVELOPMENT. THE ACTUAL LIMITS OF FUTURE DEVELOPMENT MAY BE ADJUSTED AS PART OF THE DETAILED ENGINEERING DESIGN TO BE INCLUDED IN THE PHASE III PERMIT APPLICATION; WHICH IS CURRENTLY UNDERGOING REVISION.

2.) HYDROLOGIC AREAS AND THEIR MAPPING IS BASED ON FORMATIONS MAPPED IN FIELD BOREHOLES, SURFACE OBSERVATION, HISTORICAL AERIAL PHOTOGRAPHS, AND REGIONAL GEOLOGIC MAPS.

3.) THE 100–YEAR FLOODPLAIN LIMITS ARE BASED ON 2012 FEMA STUDY

4.)THE CONRAIL TRACKS ARE ALSO SHARED WITH AMTRAK FOR HIGH–SPEED COMMUTER TRAINS BETWEEN BOSTON, MASSACHUSETTS AND WASHINGTON, D.C.

5.) THE PROPERTY WAS PREVIOUSLY USED FOR SAND AND GRAVEL MINING ACTIVITIES. PORTIONS OF THE SITE CURRENTLY HAVE NO VEGETATION AND ARE BARREN.

VERONICA E. FOSTER
LICENSED PROFESSIONAL ENGINEER
No. 35649
PROFESSIONAL ENGINEER

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NATIONAL WASTE MANAGERS
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MIDDLE CONFINING UNIT
ISOPACH MAP

REPORT CODE: A		FILE NAME: 20183854A019	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
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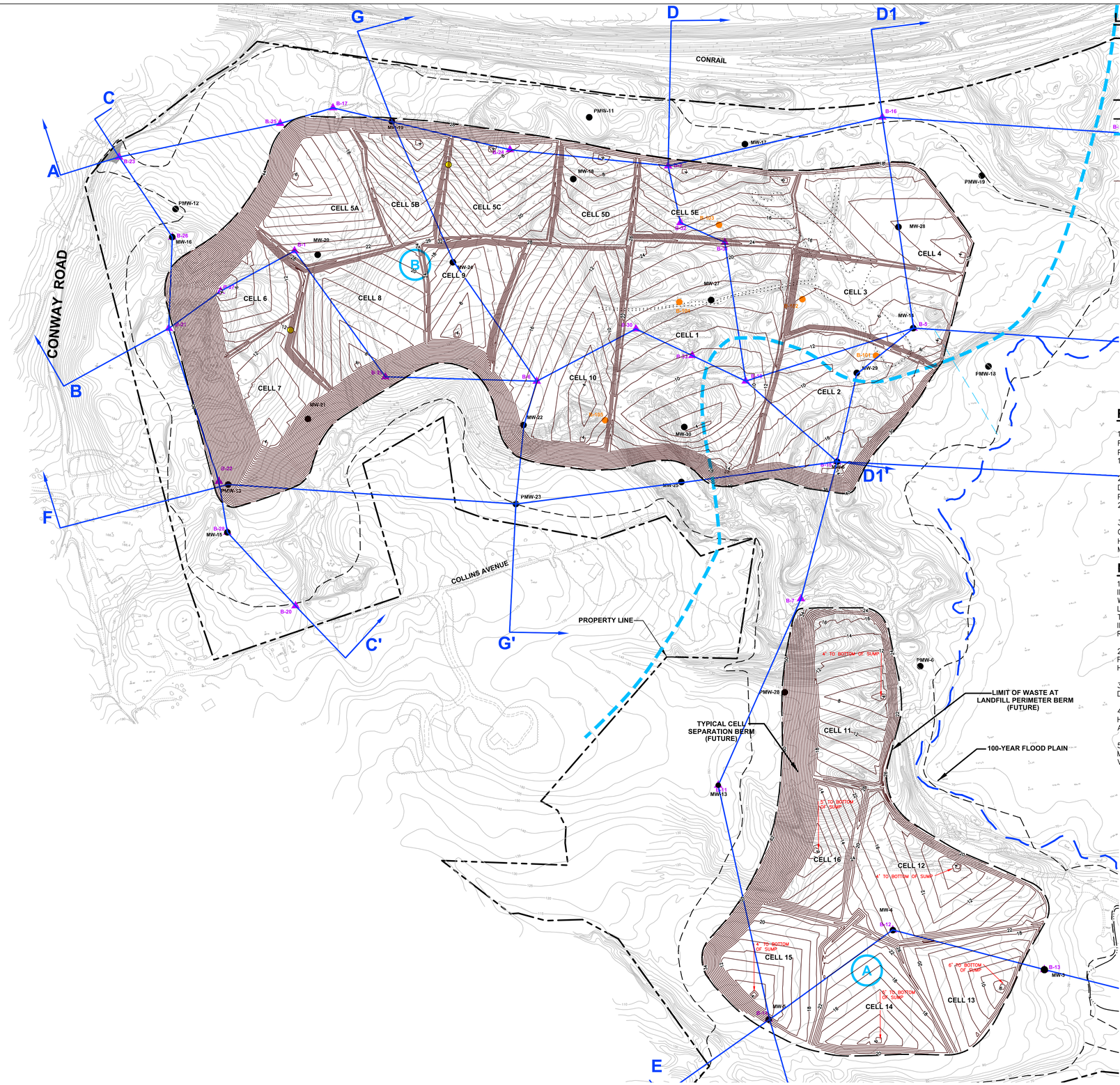
DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 19

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD\DWG\RC A_Phase II Application\20183854A019 - Isopach Map.dwg, 6/5/2020 4:02:04 PM



LEGEND

- PROPERTY LINE
- LANDFILL PERIMETER ACCESS ROAD (FUTURE)
- SITE ENTRANCE (FUTURE)
- LANDFILL LIMITS (FUTURE)
- LIMIT OF DISTURBANCE (FUTURE)
- HYDROGEOLOGIC AREA DIVIDE (SEE REFERENCE 2)
- (A) HYDROGEOLOGIC AREA (SEE REFERENCE 2)
- ISOPACH LINES

REFERENCES

1.) BASEMAP SHOWN, INCLUDING TOPOGRAPHICAL INFORMATION, IS FROM DIGITAL FILE (2 OF 68) SITE PLAN.DWG, ENTITLED "SITE PLAN," PREPARED BY CENTURY ENGINEERING, INC., DATED APRIL 12, 2010.

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3.) THE 100-YEAR FLOODPLAIN LIMITS AND ASSOCIATED DEVELOPMENT PERMITTING HAS BEEN DEVELOPED BY OTHERS.

4.)THE CONRAIL TRACKS ARE ALSO SHARED WITH AMTRAK FOR HIGH-SPEED COMMUTER TRAINS BETWEEN BOSTON, MASSACHUSETTS AND WASHINGTON, D.C.

5.) THE PROPERTY WAS PREVIOUSLY USED FOR SAND AND GRAVEL MINING ACTIVITIES. PORTIONS OF THE SITE CURRENTLY HAVE NO VEGETATION AND ARE BARREN.

NORTH

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch =200 ft.

UNCONFINED HIGHEST OBSERVED GROUNDWATER LEVELS COMPARED TO CELL BOTTOM GRADE

VERONICA E. FOSTER
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No. 25953
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DATE:	REVISION:
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ISOPACH MAP COMPARING LANDFILL BOTTOM GRADES WITH HIGHEST OBSERVED GROUNDWATER LEVELS

REPORT CODE: A		FILE NAME: 20183854A020	
PROJECT MANAGER:	VEF	SCALE:	AS NOTED
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DRAWN BY:	EEE	DATE:	7/31/2019

FIGURE 20

N:\Projects\2018\2018\3854 - Chesapeake Terrace LF\CAD\DWG\RCA_Phase II Application\20183854A020 - Bottom Cell vs HGW.dwg, 6/5/2020 4:03:02 PM

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APPENDIX A

Resumes of Geologist and Engineer

VERONICA E. FOSTER
Senior Project Consultant

Fields of Expertise
Soils and Groundwater Field Investigations; Surface Water Management Design and Permitting (including Best Management Practices); Soil Erosion and Sediment Control; NPDES Permitting, Sampling and Reporting; State Environmental Permitting; Brownfield and Landfill Remediation; Construction Documents Preparation; Construction Bid; Construction Certifying Engineer; Municipal Solid Waste (MSW), Construction Demolition & Debris, Coal Combustion Residuals, and Incinerator MSW Landfill Design, Permitting and Construction; Local Zoning and Site Development Permitting; Emergency Response Planning/Spill Prevention Containment and Countermeasures (SPCC) Plan/Stormwater Pollution Prevention Plan (SWPPP)/Preparedness Prevention Contingency (PPC) Plan/Integrated Contingency Plan (ICP)

Education
Bachelor of Science - Civil Engineering; Drexel University, 1990

Professional Registrations
Professional Engineer: DE, MD, NJ, PA

Present Duties & Responsibilities and Experience Summary
Ms. Foster has over 30 years of experience in managing and executing civil and environmental engineering projects. She has experience with solid waste management, environmental compliance, aggregate surface mining, oil & gas well pad development, environmental restoration, traditional civil engineering, and state and local permitting for those projects. Her engineering includes the planning, grading and phasing, stormwater management systems, environmental remediation systems, field investigations, and post-construction management and maintenance systems in MD, NJ, DE, PA, NY, MA, MI, GA, FL, and VA. She performs as Project Manager for numerous projects by coordinating staffing resources with budget restrictions, providing technical oversight to the design team as well as technical oversight for multi-disciplinary projects, and performing as the primary contact with clients. She also serves as Peer Reviewer for a range of environmental compliance and monitoring projects, as well as field investigation projects.

Project Experience – Coal Ash/Incinerated MSW Management

NRG Energy, Indian River Generating Station, Millsboro, Delaware: Peer reviewer for design of conceptual coal ash monofill landfill and vertical expansion, including grading and surface water design system. Design engineer for detailed engineering design of system. Engineer-of-Record for the preparation of Sediment and Stormwater Management Plans for the Phase I and Phase II Landfills. Preparation of construction documents for the construction of Cells 1 and 2 and capping of the old, unlined Phase I Landfill. Project Manager and Certifying Engineer for the construction quality assurance of Cell 1. The Cell 1 construction effort included placement of 180,000 cubic yards of subbase fill, geosynthetics installation (geosynthetic clay layer, geomembrane, and geocomposite drainage layer), 12-inches of sand for leachate collection layer, and 4-foot thick protective cover layer using flyash. Additionally, Cell 1 being the first cell constructed for the newly-permitted lined expansion, the infrastructure items that were constructed two 150,000 gallon leachate storage tanks with secondary containment, the leachate conveyance dual-contained forcemain, related cleanout and valve vaults, and stormwater controls. Provided construction documentation report to regulators for review and approval within two weeks of the Cell 1 construction achieving substantial completion. This project was awarded to 2010 Project Excellence Award by the State of Delaware Office of Management and Budget in conjunction with the Delaware Contractors Association.

Performed as the Lead Engineer and Engineer-of–Record for the design, permitting and construction of the 40-acre cap over the old, unlined landfill, in which filling began in 1979.

Further, performed as the Lead Engineer and Engineer-of –Record for landfill Permit Renewal Application in 2011.

Coming off the successful construction of Cell 1 and the Phase I Closure cap, Ms. Foster was retained as the Engineer-of-Record supporting the construction of Cell 2. Again, this effort included the preparation of bidding documents, leading the pre-bid meeting with contractors, issuance of addenda, evaluating contractor bids, and interviewing the prospective

contractors. While under construction, performed construction quality assurance official and Engineer-of-Record for the sole-sourced construction of Cell 2.

Hartford Landfill Phase I Landfill Construction in Hartford, CT. *Project Manager, Certifying Engineer of Record, and Engineer-of-Record.* Oversaw the design of an 18-acre geosynthetic double-lined area to receive incinerator ash. The layout of the area was restricted to the west and north by delineated wetlands, to the east by an USACOE dike, and to the south by the existing landfill. In order to maximize available airspace, reviewed historical groundwater levels and prepared five conceptual landfill designs from which the client selected their preferred choice, including minimizing the distance between the liner system and high groundwater levels while still complying with regulatory requirements, maximizing slope inclination of the perimeter berms, and minimizing backfill volumes. Additionally, a portion of the Phase I Area overlapped the existing unlined facility and the USACOE dike. This overlapping required extensive slope stability analyses to demonstrate no adverse impacts upon the existing landfill and the USACOE dike from the Phase I activities. Also performed additional analyses in support of removing, or lifting, fill placement restrictions previously imposed for activities near the USACOE dike. These analyses were submitted with a detailed explanatory narrative to the USACOE and was approved within 30 days of submission. In addition to the landfill layout and grading, designed leachate collection and conveyance systems; leachate storage systems; leachate pre-treatment systems; stormwater collection, conveyance and management; permanent erosion control measures; wheel wash building and system; leachate secondary containment systems; permanent and temporary access roads; and electrical and controls connections and tie-ins. Compiled construction-level design drawings and technical specification for the Phase I Landfill, as well as operations and maintenance drawings and specifications. Project Manager and Engineer-of-Record for on-site, full-time construction quality assurance services as well as ongoing design support (including review of contractor submittals) during the construction of the Phase I Landfill from May to December of 1997. The liner system certification report for submittal to the CTDEP was provided to the client on November 17, 1997. Upon completion of the placement of the leachate collection layer and other appurtenances (drainage ditches, seeding, sedimentation basin, etc.), a certification letter for these items was provided. The liner certification report was required by the client to allow CTDEP time to review/approve the report such that filling of the Phase 1 Landfill could begin in January 1998. Served as the Certifying Engineer of Record for the design and CQA efforts.

Shelton Landfill Horizontal Expansion in Shelton, CT. *Project Manager and Engineer-of-Record.* Supervised the design of a 3-acre geosynthetic double-lined horizontal expansion to receive incinerator ash. The layout of this expansion included a portion piggy-backing over the existing unlined facility. This overlapping presented unique stability and settlement concerns which were addressed by the installation of reinforcing geogrid along the interface between the top of the existing refuse and the liner system for the expansion. Other aspects of the design included stormwater management, erosion and sediment control structures and ponds, and a leachate collection and conveyance system. As part of this effort, technical specifications and bidding documents corresponding to the design were developed. Compiled operations and maintenance drawings and technical specifications to assist the Operations contractor with the closure of the expansion. Provided review of Contractor submittals for geosynthetics, soils, leachate collection pipe, stormwater structures, and erosion control measures. Project Manager for the design engineer and quality assurance services provided during construction of the expansion. Upon completion of the construction, a report certifying the liner system was installed as designed was prepared for submission to the CTDEP. Due to available airspace limitations, during the construction of the Northeast Ash Area Expansion liner system, evaluated whether the final cover slope inclination could be increased from 3 horizontal to 1 vertical (3H:1V) to 2H:1V for the Northeast Ash Area Expansion and the Southeast Ash Area Expansion (designed by others and under operations). In order to determine this possibility, performed extensive slope stability (static and psuedo-static) and liquefaction analyses. The slope stability analyses indicated that benches, or terraces, were required to maintain the stability of the cover system. After determining that the inclination increase would remain stable under static and psuedo-static loading conditions, revised grading plans, fill sequence drawings, sections, and details were prepared. The stormwater and leachate management systems were reevaluated for the changed inclination. All supporting drawings and calculations were provided to the client, who added his financial data related to this change, and submitted the package to the CTDEP for a major permit modification. In June 1998, the CTDEP approved this modification. Served as Project Manager, overseeing field personnel, and Engineer of Record for the closure of the Northeast and Southeast Ash Area Expansions from April 1999 to May 2000. Provided engineering to field construction quality assurance personnel to adjust the original design due to field conditions encountered by the contractor. Due to the Contractor's scheduling and supply problems, the construction was not complete within the contracted time, and fines were imposed by the CTDEP. By contract, these fines were passed on to the contractor. Provided project history summaries from daily reports, meeting minutes and other information in project files, which contradict contractor claims.

Shelton Landfill MSW Closure in Shelton, CT. *Certifying Engineer of Record.* The old municipal solid waste landfill (which was used as an interim ash disposal area until the construction of the Southeast and Northeast Expansions) had been partially closed upon the construction of the Expansions. Performed a field investigation comprised of test pits and geotechnical soils testing to verify the presence of final cover soils, their depth, and their aerial extent. Upon completion of the field investigation, prepared a Closure Plan, using GIS to identify areas with adequate soil and vegetative cover, as well as outlining proposed remedies for areas requiring construction activity. This Closure Plan was approved without comment by the CTDEP within two weeks of submission. Upon completion of construction of the proposed remedies, provided a Certification Report indicating all activities had been completed as designed. Performed as Certifying Engineer of Record for Design and CQA efforts.

Brandywine Coal Ash Landfill, MD. *Remedial Design Engineer.* Project Manager and Lead Engineer for developing a closure cap for an inactive coal ash disposal area located within the power utility transmission right-of-way with 230keV overhead transmission lines and towers. Since the facility was inactive (i.e., no longer receiving coal ash) as of October 2015, the facility was exempt from the USEPA Coal Combustion Residuals regulations finalized in April 2015. As such, the Maryland residual waste landfill closure regulations were the governing regulations for the closure cap design. The challenge for this project was the sort-term challenges of constructing a closure cap beneath the high-voltage overhead wires, while the long-term performance of the cap had to assure the finished product maintained the 25-foot separation between the sag in the overhead wires and the finished grade of the cap, to avoid “fouling” the right-of-way. There was significant investment in providing the client with an understanding of the range of capping options which complied with Maryland regulations and the costs associated with each, as well as addressing concerns regarding maintenance and protection of the overhead wires in conjunction with construction worker safety. The client opted for a state-of-the-art closure cap with the engineered geosynthetic barrier materials overlain by natural soils for their protection and establishing a natural vegetative surface. Developed an engineering design package for submission to Maryland Department of the Environment (MDE), including design narrative, design drawings and details, technical specifications which could be used during construction, and stormwater management calculations and design.

Flue Gas Desulfurization Conversion for Coal Fire Power Plants Aquasco and Newberg, Maryland. *Site Design and Erosion Control Engineer-of-Record.* White a Design/Build company had been contracted for the design and permitting of the FGD system and stacks installation and the railroad reconfiguration, the permitting and construction of other on-site, support systems was contracted separately. These items included synthetic gypsum dewatering systems, limestone storage dome, gypsum storage dome, and associated access roads and stormwater management features. Our team worked with the owner and the officials at Prince Georges and Charles Counties to obtain the local site development and erosion control permits for the proposed additional site improvements. A condition of the erosion control permit with regular inspection and review by the permit application engineer to confirm compliance with the schedule and proposed erosion control measures included in the permit application. Ms. Foster served as Engineer-of Record for these applications and ongoing inspections.

CCR Rule Compliance for Location Restrictions in PA. *Lead Engineer and Reports Author*. The new CCR Rule requires that existing, active CCR surface impoundment demonstrate compliance with locations restrictions within 36 months of the effective date of the CCR Rule (i.e., October 17, 2018). These locations restrictions are identified as groundwater, wetlands, fault damage areas, seismic impact zones, and unstable areas. Worked with the client to review published and historical site-specific data to demonstrate compliance with these restrictions. Reports were prepared and reviewed by the client well in advance of the required date of publication to the site’s operating record and the publicly available website.

CCR Compliance for Groundwater Monitoring Program in PA. *Lead Engineer and Report Author*. Part of the NEW CCR Rule was that active CCR units were required to establish a groundwater monitoring network for sampling and testing to determine whether groundwater was being impacted. The Rule has specific requirements for the amount of sampling and the constituents required to be tested. Comparison of the test data was prescribed using statistical methods to discern whether there were Statistically Significant Increase (SSI) in the measured constituents above background levels had occurred. For both CCR Units at this site, SSIs were identified. One of the units was a state-of-the-art lined landfill constructed atop an old, unlined storage impoundment (or basin). The Rule allowed the review of whether an SSI could be caused by an Alternate Source and remain in ongoing detection monitoring. For this CCR Unit, this Alternate Source Demonstration was successful; thus, allowing the groundwater monitoring program to remain the detection monitoring

mode. For the other CCR Unit on-site – a surface impoundment, an alternate source was not identified, so the next step was upgraded groundwater monitoring – an assessment monitoring program (AMP), required collecting and testing samples for additional constituents to then identify if these are detected as Statistically Significant Levels (SSLs) above Groundwater Protection Standards (GWPS). For this second CCR Unit, SSLs were detected so that the AMP will continue while Corrective Measures Assessment (CMA) is performed. This CMA is ongoing.

Project Experience – Remediation – Federal and State Programs

CERCLA Remediation, Industri-Plex Site Remediation, Woburn, Massachusetts. *Lead Stormwater Deisgn Engineer*, The Industri-Plex Site in Woburn, Massachusetts was ranked 5th on the National Priority List. The 244-acre site has been the location of numerous industrial activities since the mid-1800's and contains soils and sediments contaminated with arsenic, lead, chromium and hide residue. Task Leader for the evaluation of potential flow rates for the 25, 50 and 100 year storm events of two rivers traveling through the Site. These rivers service a 5 square mile watershed which impacted the selection of the computer model to be used. HEC-1 was selected because of its ability to evaluate confluence, bifurcation and multiple storm events. The entire task was conducted to evaluate the potential flow rates and verify that the proposed remedy would not be adversely affected by these flows.

Supervised the functional assessment of existing wetlands being impacted by the remedy. This assessment identified the properties, which required replacement as a result of the remedy. Based upon this identification, mitigation (creation and enhancement) wetlands were designed, as well as revitalization of existing wetlands. Incorporated the design of mitigation wetlands into the hydrologic analysis to evaluate their hydrologic effectiveness.

Provided field engineer services during fall of 1993 for construction of the remedy in developed areas of the site. Provided technical support for modifications to soil, streams and wetlands remedies due to field conditions during construction.

Cap Evaluation and Remedial Cap Design & Permitting, Berks Landfill Superfund Site, Sinking Spring, Pennsylvania. *Lead Engineer.* Lead engineer for ancillary repairs and maintenance during the O&M (post-2000 remedy construction) period. Lead engineer in 1998 for the field investigation of existing stormwater management features in and around the Eastern Landfill during the Pre-Design Investigation (PDI). As part of this PDI effort, identified information requirements from surveyors so that the capacity and performance of these features could be verified during the remedial design. Prepared narrative and existing conditions drawings detailing these features for inclusion in the PDI report. Prepared narrative and supporting calculations for the proposed conceptual improvements/restoration of surface water management features. Lead Engineer for the remedial design (1999) stormwater management improvement/restoration features. Commended by EPA Project Manager for quality of design and report. Performed as the lead engineer (2000) for the construction quality oversight personnel for field adjustments to design based upon field conditions encountered by the contractor. Performed final review of constructed features for Completion Acceptance.

Lead Engineer in 1997 for the preparation of the Feasibility Study demonstrating the existing site conditions were protective of human health and the environment. Provided these demonstrations though a series of engineering analyses of infiltration through the existing cap using the EPA developed method defined as HELP, stormwater run-off calculations using TR-55 (SCS developed methods), and soil loss potential of the existing cover using the Universal Soil Loss Equation. Prepared construction and operations and maintenance costs estimates.

Prepared design and provided resident engineer services in 1996 for a channel washout repair consisting of gabion lining overlaying a geotextile to protect the native soils from further erosion. Provided field engineer services in 1991 during construction of two acres of new landfill cap over areas of existing cap which had undergone significant deterioration.

Landfill Remedial Components, Elizabethtown Landfill Superfund Site, Elizabethtown, Pennsylvania. *Project Manager, Lead and Certifying Engineer.* Lead designer for the proposed cover and stormwater management system upgrades. The property owner, as well as the local community, preferred a cover system that allowed beneficial reuse of the property. Therefore, an asphalt cover system was proposed for the former site operations management area, nearest the public roadway. This cover choice resulted in an increase in stormwater runoff from this cover, and the stormwater

management system was upgraded to accommodate this increase. The stormwater management system upgrades, include the design of stormwater culverts, cable-concrete lined channels, asphalt lined channels, and an enlarged stormwater detention basin. The proposed materials were selected based upon minimizing excavation into the existing downgradient clay cover in order to build the remedy, combined with minimizing the potential erosion of the existing clay cover. Lead designer and Engineer of Record for the Soil Erosion and Sediment Control Permit Equivalency from the Lancaster County Conservation District. Task leader for the preparation of bidding documents and technical specifications for the construction of the Landfill Remedial Components (LRC). Served as Engineer of Record and Remedial Designer during the construction of the LRC and performed as project manager for the Construction Quality Assurance personnel stationed at site full-time during the construction. This effort included review all contractor submittals; responding to contractor's requests for clarification/information; performing as a liaison between the contractor and the Owner/Construction Manager; served as a liaison between the contractor and the Agency oversight personnel; reviewed all daily reports of CQA personnel; lead weekly progress meetings with Contractor, Owner, and Agencies; and provided review of contractor's applications for payments and claims. Due to the large number of team members for the project, created and administered a project specific web-page to which field daily reports, contractor submittals, Remedial Designer review of submittals, progress meeting minutes, site photos, and Remedial Designer responses to contractor's requests for clarification were posted to allow all teams members instantaneous access to project documents. Served as Engineer of Record for the preparation of a Construction Documentation Report documenting the construction effort and any field adjustments to the Agency-approved design based upon encountered field conditions. This Construction Documentation Report will be submitted to the Agencies for review and approval.

Landfill Closure Investigation and Capping, Keystone Landfill Superfund Site, Littlestown, Pennsylvania. *Lead Engineer for Capping and Stormwater Management.* Lead Engineer for the pre-design investigation (PDI) field activities, including test pits to better define limits of waste, geoprobes to define locations with reduced existing cover thickness, and site inspection for erosion or stability concerns. Prepared the report and supporting documentation (i.e. graphics, logs, charts, photos) summarizing the PDI activities. Also, prepared the Preliminary and Final Design Reports summarizing the proposed remedies for the locations, requiring repair or upgrade, which were identified in the PDI. The remedies included minor adjustments in the ROD-negotiated remedy, based upon review of newly located historical evidence regarding the site. These adjustments reduced the PRP group's capital construction costs as much as sixty percent. Also prepared Permit Equivalencies for Soil Erosion and Sediment Control from the Adams County Conservation District and a Road Opening Permit from the local Township. Aided the PRP group in re-negotiation of one aspect of the Agency-approved design to address Township concerns, ultimately reducing PRP group's capital costs and improving the often adversarial relationship between the PRP group and the Township. Task leader for the preparation of bidding documents and technical specifications for the construction of the cover and stormwater management system upgrades.

Residual Waste Disposal Area Closure, Lukens Steel (formerly Bethlehem Steel), Coatesville, Pennsylvania. *Lead and Certifying Engineer.* Performed as lead designer and Engineer of Record for the design of a cover over an existing dust monofill, containing material resulting from the steel manufacturing process over the previous 40+ years. The dust was undergoing wind and water erosion. A soil cover was design to encapsulate the pile in order to protect it from these elements. A critical aspect of the design included flattening the existing side slopes of the pile to 2 horizontal to 1 vertical (2H:1V) or flatter, compared to the existing 1H:1V slope. Based upon slope stability calculations, a soil cover system required this inclination to be stable, with 5 foot wide benches every 25 vertical feet. In order to provide a constructable design, a cover system configuration was designed to provide 10 foot wide benches (to provide adequate width for an excavator or long-reach hoe) to function as a working platform for heavy earthmoving equipment during construction, with 20 feet vertical feet between benches, such that the length measured along the slope between benches was reachable using standard construction equipment. The benches served multiple purposes after construction including providing access for inspection of the cover, performing as drainage ditched to provide positive drainage off the cover system to reduce infiltration into the dust, and to provide adequate stability of the slopes. This voluntary effort was being performed under the supervision of the Pennsylvania Department of Environmental Protection (PaDEP).

Landfill Closure Design & Permitting, Bell Landfill Superfund Site, Towanda, Pennsylvania. *Lead Grading and Stormwater Designer.* Lead engineer for the design of layout, grading, and stormwater management system during the Remedial Design for the lined and unlined fills at Bell Landfill located in a rural community. Prepared construction level drawings detailing these designs. Provided engineering support services during construction. Also developed revegetation/visual screen recommendations to provide a natural visual barrier between the roadway and the Site.

Source Control Design and Permitting, Former Gas Works Site, Bordentown, New Jersey. *Lead and Certifying Engineer.* Lead design engineer for the design and construction specification for the regrading and capping of the existing tainted soils. Special considerations included the majority of the property was within the 100 year floodplain along a creek discharging into the Delaware River. Also, the municipal storm sewer discharged within the cap limits, requiring the design of significant erosion protection measures.

Landfill Closure, Sharkey Landfill Superfund Site, Parsippany, New Jersey. *Lead Cap Grading and Stormwater Designer*. As part of the preparation of the 95% Remedial Design Report, performed as lead engineer for the layout and grading plans for cap subgrade and top of cap proposed conditions for the South, Northwest-North, Northwest-South, and Southwest Fills. Designed layout and grading plans directly in AutoCad Release 14. Performed as task leader (supervising designers), and provided technical oversight/review of the design of stormwater management channels, benches, and basins, and temporary and permanent sediment control measures (such as hay bales, silt fences, seeding type and application rates, sediment basins, and slope armoring). Prepared design narrative describing measures and method of design. Developed details outlining the design and coordinated drafting efforts. Supervised drafting/designers utilizing SoftDesk's Civil Soft computer program to perform volume calculations for cut and fill quantities corresponding to the grading plans for the Fills.

Landfill Closure Design and Permitting, KL Landfill Superfund Site, Kalamazoo, Michigan. *Lead Designer*. Lead designer and task manager for the development of a Preliminary (30%) Design Report for the site remedial design to be developed in accordance with the Record of Decision (ROD) for the site. Lead designer and task manager for the preparation of the Pre-Final (95%) Design Report (PFDR) for the ROD remedy. The ROD remedy entailed the construction of an engineered, geosynthetics cap over the 60-acre landfill area. As with the design of any cap, analyses developed in support of the design included evaluation of the geosynthetics proposed for transmissivity, impermeability, veneer stability, local subsidence, differential settlement, stormwater management, and landfill gas management. As part of the PFDR, a borrow area investigation was performed for a vacant parcel near the landfill, as a source for grading fill and cover soil materials during the construction.

Industrial Waste Consolidation and Capping, Lemon Lane Landfill, Bloomington, Indiana. *Lead Site Design and Stormwater Egnineer***.** Lead engineer for the design of stormwater management features related to the waste regrading and final cap design also developed by Golder. The site was the location of past disposal of pesticide and PCB wastes. The PCB materials were excavated and disposed off site at an approved facility. The remaining waste on site was consolidated to reduce the surface area, capped with an impermeable geosynthetic barrier overlain by 2-feet of soil cover to provide positive drainage from the cap surface and sustain vegetation. Developed minimum temporary erosion and sediment control criteria for the contractor to satisfy during construction. Provided construction support to the contractor to adjust the design to account for field conditions encountered by the contractor during construction.

Project Experience – Oil & Gas – Shale Plays

Fracking Water Impoundments, International Oil & Gas Company (Confidential), multiple locations, Western Pennsylvania. *Certifying Engineer.* Oversaw the design and construction of geosynthetic-lined, fracking water impoundments on natural gas well pads in support of Shale Gas extraction. Recommended a liner exceeded the regulatory requirements and was more protective of the environment, helping the client manage risk, with nominal increase in cost. Oversaw the installation of nearly 5MM s.f. of barrier geosynthetics at over 60 well pads in 16 months. While some states are moving away from this option, this technology is applicable to reservoirs and landfill leachate evaporation options.

Emergency Response Planning, Shale Gas Pads, Regional Gas Development Company, Western Pennsylvania and Eastern Ohio. *Project Manager & Certifying Engineer.* Developed site management plans, including Prevention Preparedness & Contingency Plans and Emergency Response Plans, for more than forty-five shale gas pads.

Closed Vent Storage Vessel Release Control Reporting, Shale Gas Pads, Regional Gas Development Company, Western Pennsylvania and Eastern Ohio. *Project Manager & Certifying Engineer.* Developed Single Line-Diagram drawings, itemizing equipment installed at shale gas pads to prevent the release of gases into the environment. Visited

each site and developed site-specific maps detailing the on-site gas processing equipment. Confirmed the operating pressures at the site, and the emergency release pressure, vs, combustion of off-gas. Provide one drawing for each site meeting the requirements of 40 CFR 60, Subpart OOOOa.

Project Experience – Drinking Water Treatment

Water Treatment System, Stockton University, Galloway, New Jersey. *Project Manager & Certifying Engineer*. Certifying Engineer for the construction fa new water supply well (Well No. 3) at the New Jersey State Stockton University. This well was installed to serve as redundancy for the two existing wells installed in the 1970s.

Supervise Licensed Operator services also being provided per NJDEP requirements, Coordinate NJDEP-required water quality testing with outside laboratory. Provide ongoing environmental compliance planning and reporting for Lead and Copper Sampling Plan, Water Quality Parameter Sampling Plan, Revised Coliform sampling Plan for Stockton University and their on-site daycare facility, Free-to-Be Daycare.

Team leader for the development of an Asset Management Plan to document the current asset conditions and estimate replacement value of existing water system assets. Assets include water treatment plant, water supply wells, storage tank, fire hydrants, water values, and water mains.

Water Treatment System, Resorts Casino & Hotel, Atlantic City, New Jersey. *Project Manager.* Supervise Licensed Operator services providing semi-monthly water quality field testing, monitoring and reporting to NJDEP. Coordinate NJDEP-required water quality testing with outside laboratory.

Water Treatment Design & Permitting, Multiple Mobile Home Parks, New Jersey. *Lead Designer and Certifying Engineer.* Evaluate the regional hydrogeology and nearby public community well water quality to evaluate value and benefits to clients installing new wells vs. adding treatment for the increasingly impacted water quality in their existing wells. Water treatment design included adding treatment to address radium and gross alpha, water hardness, acidic water, and metals removal.

Water Treatment Engineer, City of Vineland, New Jersey. *Project Manager and Certifying Engineer.* Provide ongoing environmental compliance planning and reporting for Lead and Copper Sampling Plan, Water Quality Parameter Sampling Plan, Revised Coliform Sampling Plan, Annual Master Permit Renewal, Annual Water Audit required by the Delaware River Basin Commission, and Biennial Water Conservation Plan. Engineer-of-Record for the design of a water main replacement along Route 56 (Landis Avenue) prior to NJDOT repaving of the street.

Water Treatment Engineer, City of Bridgeton, New Jersey. *Project Manager and Certifying Engineer.* Provide ongoing environmental compliance planning and reporting for Lead and Copper Sampling Plan, Water Quality Parameter Sampling Plan, Revised Coliform Sampling Plan, annual Master Permit Renewal, and Biennial Water Conservation Plan. Team leader for the development of an Asset Management Plan to document and estimate replacement value of existing water system assets, including water treatment plants, water supply wells, storage tanks, fire hydrants, water values, and water mains. Team leader for the design and permitting for a radium removal water treatment plant for Wells 14 & 15, taken off-line between 1970s and 2000s due to elevated radiologicals. Supporting the City with obtaining NJDEP-loans for the construction.

Water Treatment Engineer, City of Wildwood, New Jersey. Project Manager and Certifying Engineer. Provide environmental compliance planning and reporting for Lead and Copper Sampling Plan, Water Quality Parameter Sampling Plan, Revised Coliform Sampling Plan.

Water Treatment Engineer, City of Millville, New Jersey. Project Manager and Certifying Engineer. Provide ongoing environmental compliance planning and reporting for Lead and Copper Sampling Plan, Water Quality Parameter Sampling Plan, Revised Coliform Sampling Plan. Support ongoing reporting and prepare Request to Reduce Sampling frequency to NJDEP in light of laboratory testing showing compliance with NJDEP standards.

Certifying Engineer for Water Main replacement along Route 49 prior to NJDOT repaving of the street. Provided training to new department heads on public bidding of the project and lead mandatory pre-bid meeting with prospective contractors. Lead the effort to issue Addenda during the bidding process.

Water Treatment Design & Permitting, Waterford Elementary, Waterford, NJ. *Project Manager & Certifying Engineer*. As a result of rising radiologicals one order of magnitude above the NJDEP maximum contaminant level (MCL), and poor water quality in the existing Well No. 1, Waterford Board of Education opted to install a new well into a deeper formation, consistent with the well at another school in the district where the water quality required no treatment before use. Well No. 2 was installed and provided water that met NJDEP Primary and Secondary Drinking Water Standards, but did not produce the desired pumping rate. New water storage tanks were added to the system to provide storage during peak demand periods. During the construction, the conveyance line between the well and the water storage in the water treatment room was discovered to have holes. The following summer, the conveyance line was replaced.

Project Experience – Other Services

Site Management Plans. *Project Manager & Certifying Engineer.* Developed site management plans in support of industrial and oil & gas clients, such as PPC Plans; SPCC Plans; SWPPP; and Erosion and Sediment Control Plans. Certifying Engineer for annual compliance monitoring and reporting.

Shoreline Improvements. *Project Director and Engineer-of-Record.* Managed field investigations and conceptual design for shoreline improvements along the Delaware River at a power plant.

Permitting. *Lead and Certifying Engineer.* Oversaw the preparation of permit applications for erosion and sediment control, discharges of surface water from construction activities, permanent discharges from commercial and industrial activities, landfill disruption, stream encroachment, and water diversion permitting.

Geotechnical Field Investigations. *Project Manager and Engineer-of-Record.* Directed geotechnical field investigations at multiple sites, including greenfield and brownfield sites. Obtained site information to develop site conceptual model relative to subsurface soils and bedrock conditions, in addition to groundwater flow information.

Remedial Designs and Construction Oversight. *Lead Design Engineer.* Designed closure cap, stormwater management systems, and post-construction management and maintenance systems for remedial actions in MD, NJ, PA, NY, MA, MI, and VA. Project materials involved earthworks, aggregate, beneficial reuse of byproduct materials (crushed concrete, coal ash, stabilized impacted soils), in-situ treatment to immobilize contaminants of concern, and/or geosynthetics and asphalt closure caps.

Landfill Expansions. *Lead Design Engineer.* Designed landfill expansions (horizontal and vertical) for municipal waste, residual waste, construction debris, and incinerator ash, focusing on layout, grading, surface water management, leachate management and sequencing, at sites in MD, GA, FL, OH, VA, DE, NJ, PA, CT, NY, MA, NH, ME, Puerto Rico, and the Bahamas. Developed construction specifications, operations plans, and groundwater monitoring programs.

Publications/Presentations

- Presentation: “Unconventional Soil Disposal Options,” USWAG, CCR Committee Meeting, May 2019.
- Presentation: “An Historical Perspective of State Adoption of CCR Rules,” USWAG Event, Coal Combustion Residuals Workshop, March 2019.
- Article: “Don’t Let Leachate Derail your CCR Landfill Plans.” Power Magazine, July 2015.
- Primary Speaker: “Summary of Final CCR Rule.” Webinar by Golder Associates, March 25, 2015.
- Article: “Summary of Final CCR Rules Affecting Power Companies.” Chronicle Magazine published by Southern New Jersey Development Council, February 2015.

- Article: "Technical Considerations for Beneficial Use of Coal Ash in Civil Engineering Applications." Ash At Work Magazine published by the American Coal Ash Association, 2014.
- Presentation: "How to Optimally Locate and Design Frac Pits." 5th Annual Shale Play Water Management, Dallas, November 2014.
- Presentation: "CCR Landfill Beneficial End Uses." Midwest Energy Association, Energy Learnings Summit, Chicago, September 2014.
- Presentation: "CCR Landfill End Uses." USWAG, Washington, DC, December 5, 2013.
- Presentation: "Liner Considerations at Unconventional Shale Gas Drilling Site Improvements." WEFTEC Event, New Orleans, October 2012.
- Presentation: "Best Management Practices for Marcellus Shale Drill Pit/Water Improvement Lining Systems." Winter PIOGA Event, Seven Springs, February 2012.
- Presentation: "Dry Ash Monofills: Permitting, Design, Construction & Operations." Ash 101 Workshop, Atlanta, April 2011.
- Numerous private presentations to Power and Oil & Gas clients covering a range of topics

Continuing Education

- First Aid, AED and CPR Certified
- MSHA Part 48 Surface Miner Certification (for above-ground mines)
- NIMS/ICS 100, 200, 400
- OSHA 40-hour HAZWOPER with annual refresher training

Professional Affiliations

- Society of Women Environmental Professionals, Member
- Edison Electric Institute, Utilities Solid Waste Activities Group (USWAG), Member
- South Jersey Water Professionals, Member

PAUL G. STRATMAN
Consultant

Fields of Expertise
Environmental Engineering, Geotechnical Engineering, and Civil Engineering.

Education
Graduate Studies – Environmental Engineering: Drexel University; 1991
Bachelor of Science - Civil Engineering; Drexel University, 1990
Bachelor of Science - Geology; Bloomsburg University; 1984

Professional Registrations
Professional Engineer: AL, AZ, CA, DE, FL, GA, IA, IN, KS, LA, MD, MI, MO, MT, NC, NJ, OH, PA, TN, UT, VT & WV
Professional Geologist: DE, FL, IN, KS, MO, NC and PA
Registered Site Manager for NC

Present Duties & Responsibilities and Experience Summary
Mr. Stratman is Vice President of Environmental Operation for Advanced GeoServices and a Senior Project Consultant. As Vice President of Operations he is responsible for quality assurance, contracting, professional development, and risk management for six project managers engaged in Environmental Engineering, Geology, Wastewater Treatment and Ecological Services. As Consultant, Mr. Stratman is the Advanced GeoServices Client Relationship Manager/Project Manager to a wide range of large and small clients responsible for client interaction, task assignments, quality control, budgets, scheduling, subcontracting, invoicing and report writing. Mr. Stratman has been involved in the environmental consulting industry since 1984 and has extensive experience in Environmental, Geotechnical and Civil Engineering. Mr. Stratman's experience in the environmental field includes the siting, design, construction and closure of municipal, residual and hazardous waste landfills and surface impoundments; permitting and design of hazardous waste facilities; preparing and implementing environmental and geotechnical investigations; design and implementation of plans for stabilizing and remediating contaminated sites; facility closure and decommissioning; and installation and testing of geosynthetic materials. In addition to his technical experience, Mr. Stratman has also served as chairman for a community advisory panel, testified at public hearings, negotiated with regulators and consulted to Financial Advisors and Institutions.

Landfill and Surface Impoundment Project Experience

Waste Disposal Facilities. *Project Engineer and Project Manager.* Managed all activities pertaining to Municipal Residential and Industrial Waste Disposal Facilities in Pennsylvania, New Jersey, Delaware, Michigan, and Mexico.

Closure of Hazardous Waste Surface Impoundments. *Project Engineer.* Prepared design drawings and specifications for the stabilization and closure of two 5-million gallon hazardous waste surface impoundments. Designs required a composite geomembrane and soil cap system. Also performed QA/QC services required during construction for geosynthetics and plate load testing.

Waste Disposal Impoundments. *Project Engineer and Project Manager.* Designed and permitted two waste disposal impoundments in accordance with RCRA design standards for a dye stuffs manufacturer in central Pennsylvania. The impoundments covered 3.5 and 6.0 acres and were double lined with leachate detection and alarm systems. Construction specifications and quality assurance plans were also prepared as part of the projects. Provided technical QA support during construction.

Waste Landfill Design. *Staff Engineer.* Prepared design drawings, construction specifications, quality assurance plans and sequential development plans for a 130-acre construction waste landfill incorporating a clay liner, leachate collection system, and geosynthetic cap.

Hazardous Waste Landfill in Mexico. *Lead Designer.* Assisted with the siting and design efforts for a privately funded double lined hazardous waste landfill in Mexico that required the preparation of construction drawings and operation plans in Spanish and English.

Closure and Remediation of Surface Impoundments. *Staff Engineer.* Prepared construction drawings, specifications and CQA documents required for remediation and on-site closure of four surface impoundments containing 600,000 cubic yards of electroplating sludges (F006). The project included designing a leachate collection system to be constructed within the in-place sludges, wave protection along tidal areas of Lake Erie, slurry walls and a geocomposite cover system.

Design of Solar Panel Support System on Landfill Cover. *Senior Project Consultant.* Prepared design for 500 Kw solar panel center on a landfill cap at a Superfund Site in USEPA Region 3. Design included Engineering Design Drawings, Specification and Erosion and Sediment Control Plan for integrating panel foundations with landfill cover system. Design was reviewed and approved by the USEPA and Pennsylvania Department of Environmental Protection.

Remedial Design/Remedial Action Project Experience

Former Refinery Cleanup/Closure, Southcentral New York. *Project Manager.* Prepare the remedial design documents for a Superfund Site in Wellsville, New York. The project is a former oil refinery site situated along the Genesee River. The design included sediment excavation in the Genesee River, over a half a mile of funnel and gate treatment wall (soil bentonite/slurry and sheet pile walls), groundwater recovery system and Treatment Wetland System. Major project components include surface water diversion around areas of river excavation/dredging, surface water quality and turbidity management, excavation de-watering and restoration of wetland and riparian habitat.

RCRA Corrective Measures, Tampa, Florida. *Senior Project Consultant.* Retained during the remedial design process to review the preliminary design at a former Interim Status RCRA facility. Advanced GeoServices identified changes that were estimated to reduce implementation costs by $10 million based on contractor estimates. AGC assumed the remedial design role and revised/completed the design of the consolidation of approximately 250,000 cy of material, construction of a 3,000 foot slurry wall and in-situ groundwater treatment section for inorganics, and a RCRA cap system. A significant portion of the site consists of wetland areas that include high quality, tidally influenced salt marsh and mangrove areas. An estimated 15,000 cy of sediments will be excavated/dredged from the wetland areas.

Industrial Superfund Facility in Nesquehoning, Pennsylvania. *Assistant Project Manager and Lead Design Engineer.* Mr. Stratman was responsible for preparing and implementing a supplemental design investigation and remedial design to remediate areas within and surrounding a former secondary lead smelter. Critical design components included decontamination and demolition of the facility, consolidation and capping of a non-site landfill and remediation of soil and sediment. prepared design documents for a passive groundwater in-situ treatment wall for inorganics.

Stream Capping and Reconstruction Removal Action. *Senior Project Consultant.* Responsible for the design and construction quality assurance required for a stream liner system (geosynthetics, geomembranes and structural elements) at a former solvent recycling facility in northern Maryland. The project involved interaction and negotiation with United States Environmental Protection Agency, Department of Interior, Watershed Trusties, State and Local Agencies. The project required evaluation and interpretation of significant amounts of structural and hydrogeologic information in conjunction with hydrologic and hydraulic conditions which

resulted in a unique "one of a kind" design. The design utilized regulatory and technical guidance developed for a wide range of applications (such as dam safety, hydraulic modeling, sedimentology and contaminant fate and transport) to substantiate the unique application and gain regulatory and public acceptance. The $6 million design was built in 1998 and 1999 and has been successfully operated ever since. The success of the project is also a testimony to the importance of cooperation and communication between private, public and regulatory interests.

RFI Work Plan Preparation and Investigation. *Project Manager.* Prepared and implemented a RCRA facility investigation work plans for hazardous waste facilities in Pennsylvania, California, Indiana, Tennessee, Louisiana, Michigan, and Florida. Investigation activities included file reviews, soil sampling, sediment sampling, dust sampling, soil vapor sampling, soil gas sampling, monitoring well installation, groundwater sampling and data interpretation.

Stormwater Management System Design. *Project Manager.* Designed stormwater management system at a large chemical manufacturing plant in southeastern Pennsylvania capable of collecting and holding first flush stormwater runoff and allowing subsequent runoff to discharge through NPDES outfall. Design incorporated conventional hydraulic and hydrologic design procedures with an automated pumping system.

Remediation of PCB-Contaminated Soil. *Project Manager.* Developed design drawings and specifications for the remediation of over 10,000 tons of PCB-contaminated soil at an active chemical manufacturing facility in New Jersey. Project also included the design and construction of several above ground tank containment structures, a 5,000 square foot press pad and an extensive FRP piping system for product and wastewater. Provided full-time construction management services over three primary contractors and coordinated work to minimize disruption to plant activities.

Smelter Site Remedial Action. *Project Manager.* Provided resident engineering and construction quality assurance services for the demolition and remediation of a secondary lead smelter site in Alabama. Project included the excavation and stabilization of over 200,000 tons of lead contaminated soil, slag and battery casings; remediation of a residential property; and the decontamination and demolition of former smelter buildings.

Geophysical Investigations. Mr. Stratman utilized refraction and reflection seismic techniques to map subsurface conditions in karst topography in southeastern Pennsylvania as part of geotechnical investigations. Results of the survey were utilized to establish soil rock interface, identify solution cavities and supplement other subsurface investigation techniques. He was the primary field investigator during the mapping of a buried valley in Luzerne County Pennsylvania. The buried valley, observed in the present day Wapwallopen Creek valley represents a pre-glacial feature that was filled with Woodfordian Age Olean Drift of the late Wisconsian glacial period. Mr. Stratman has also utilized electromagnetic, resistivity and downhole video logging information to evaluate subsurface geologic conditions.

Rail Yard Superfund Site - *Project Manager.* For a $15 million PCB contaminated soil Remedial Design and Remedial Action Project at a former rail yard in Southeastern Pennsylvania. During the initial design efforts, Advanced GeoServices functioned as a subconsultant to larger consulting firm. Eventually, the PRPs (which included SEPTA and Amtrak) retained Advanced GeoServices directly to complete the design, interface with federal and state agencies, and manage several million dollars of specialty contractors and services. Mr. Stratman was remained the Project Manager throughout the Remedial Action and remains in charge of the long term operation and maintenance of the site.

Publications

"Cooperation Breeds Innovation," by W.K. Richardson and P.G. Stratman. Presented at the 16th Annual International Conference on Contaminated Soils, Sediments and Water Conference. Amherst, MA. September 2000.

"Development of a CERCLA Multimedia Containment Remedy Within an Active Stream Channel," by P.G. Stratman and W.K. Richardson. Presented at the 16th Annual International Conference on Contaminated Soils, Sediments and Water Conference. Amherst, MA. September 2000.

Continuing Education

- 8-Hour OSHA Refresher, 2018
- National Safety Council Emergency Care Adult CPR Course, 2011
- Ecological Risk Assessment: Practice and Protocols Seminar through Rutgers University, 2008
- Current Issues in Stormwater and Wetlands Regulations in Pennsylvania, 2006
- Developing and Implementing an ISO 14001 EMS, Philadelphia, PA 1996
- Risk Communication Workshop, Chemical Manufacturers Association, Atlanta, GA 1995
- Geotextile Design Seminar, Philadelphia, PA 1995
- Health Risk Assessment Workshop, Boston, MA, 1995
- GRI Seminar, Geosynthetics in Filtration, Drainage, and Erosion Control, Drexel University, 1991
- Landfill Design Seminar, University of Wisconsin, 1990
- GRI Seminar, Landfill Closure, Drexel University, 1990
- Hazardous Waste Site Manager/Supervisor, 1989
- 40-Hour OSHA Health & Safety Training, October 1987
- Nuclear Density Gauge Training, February 1985
- Computational Methods in Stormwater Management, Pennsylvania State University

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX B

J.A. Chisholm Floodplain Study

J.A. CHISHOLM, P.E. LLC

Land Development Consultant
Engineering Planning Surveying

2661 Riva Road, Suite 320
Annapolis, Md. 21401

October 14, 2003

National Waste Managers
2900 Linden Lane Suite 300
Silver Spring, Md.

Attn.: Mr. Steve Fleischman, V.P.

Gentlemen:

As requested please find our response to the following MDE comment:

"Floodplain Analysis- The 100-year floodplain was delineated in March 1990 for the Phase II Report as required under the Code of Maryland (COMAR) 26.04.07.07C (1) (b). However, since that time the area upstream of the Site has undergone substantial development, which can change the hydraulic response of the receiving stream. Therefor, you are required to reevaluate the 100-year floodplain for the Patuxent River on the site."

First we should note that the site is not adjacent to the Patuxent River but rather the Little Patuxent River approximately 30,000 feet upstream from the confluence with the Patuxent River.

The 100 year flood plain limits shown upon the exhibits submitted to MDE with the March 1990 Phase II report was derived from the FEMA (Federal Emergency Management Agency) Anne Arundel County FIRM Panels 24 and 25 dated May 2, 1983. These panels showed the Little Patuxent River adjacent to the Chesapeake Terrace site. One Hundred-year water surface elevations ranging from elevation 67 to elevation 71 shown upon Panel 24 and 25 were transferred to the aerial topography of the landfill site. The proposed landfill is located above the influence of the 100-year floodplain. The footprint of the landfill is located above elevation 75.

The July 18, 1985 FEMA Flood Insurance Study for Anne Arundel County, Maryland provided additional insight as to the methodology utilized for determination of water surface for the 100-year flood level. Specifically "*For the Little Patuxent River, flood-flow frequency data were based on a statistical analysis of stage-discharge records covering 31 and 45 year periods at gage stations operated by the USGS (reference 7)*". The closest upstream gage station is located at Savage, Md.(USGS 01594000). Also included in the Flood Insurance Study were various floodway data tables. Table 4 of the Little Patuxent River provided cross-section and velocity data for two points adjacent to the Chesapeake Terrace site. Specifically cross-section H and cross-section I (exhibit D).

Telephone 410-224-3990 Fax 410-224-4203
Email: newshuz@hotmail.com

This data was used as the basis for interpolation of increased flow impacts to Chesapeake Terrace site from the Little Patuxent River.

Typically proposed land use (Zoning) would be utilized in a determination of 100-year flood plain impacts. It is this writers opinion that since the original 1983 study was prepared that zoning within the watershed has not significantly changed. Significant construction and development has admittedly occurred within the watershed, however the original study parameters would likely have utilized zoning and not the then current land use in developing the 100-year flood elevations.

We also sourced stream flow statistics (Exhibit B and C) for the Little Patuxent River at Savage, Md. (USGS 01594000). While not immediately adjacent to the Chesapeake Terrace site the data should be indicative of what is happening within the entire watershed. For instance if the flows at Savage increased by x % then it should be reasonable to assume the downstream response would be similar. We reviewed the annual mean stream flow (exhibit B) in cfs from 1976 to 1990 versus the time period from 1991-2001 and determined that an increase of approximately 7% was indicated by the data.

As a conservative approach we suggested a 50% increase in the potential 100 year storm event flows due to development within the last twenty years.

From cross section H and I we determined (utilizing the continuity equation: Q=AV) that a 100 year storm event resulted in a flow of approximately 22,000 – 23,000cfs. We also determined the flow through cross section H and I by increasing the water surface elevation in 1-foot increments. We found that an increase of two feet to the water surface current 100 year water surface elevation would provide an increase of approximately 50% of the base 100- year flow (see Exhibit A). A three-foot increase in elevation effectively doubles the capacity of the floodplain.

In conclusion we submit that the proposed Chesapeake Terrace landfill operations as proposed are at an elevation that would be located above the influence of any 100-year FEMA floodplain limits within the adjacent Little Patuxent River.

Should you have any questions or require additional information please contact me.

Very truly yours

J.A. Chisholm, P.E.

100-year fp

Telephone 410-224-3990 Fax 410-224-4203
Email: newshuz@hotmail.com

CHESAPEAKE TERRACE: FLOODPLAIN STUDY OF THE LITTLE PATUXENT RIVER

FP Elev.	Section Length	Velocity	Elevation Increased by 1 foot Increments							
			+ 0 ft		+ 1 ft		+ 2 ft		+ 3 ft	
			Q	Area	Q	Area	Q	Area	Q	Area
71	1,200 ft	6.4 fps	22,500 cfs	3,516 sf	30,180 cfs	4,716 sf	37,860 cfs	5,916 sf	45,540 cfs	7,116 sf
70	3,500 ft	1.7 fps	22,600 cfs	13,294 sf	28,550 cfs	16,794 sf	34,500 cfs	20,294 sf	40,450 cfs	23,794 sf

EXHIBIT A

EXHIBIT B

Water Resources

Data Category: Surface Water | Geographic Area: Maryland | GO

Calendar Year Streamflow Statistics for Maryland

USGS 01594000 LITTLE PATUXENT RIVER AT SAVAGE, MD

Available data for this site: Surface-water: Annual streamflow statistics | GO

Howard County, Maryland
Hydrologic Unit Code 02060006
Latitude 39°08'03.9", Longitude 76°48'58.2" NAD83
Drainage area 98.4 square miles
Gage datum 140 feet above sea level NGVD29

Output formats

- HTML table of all data
- Tab-separated data
- Reselect output format

Year	Annual mean streamflow, in ft^3/s	Year	Annual mean streamflow, in ft^3/s	Year	Annual mean streamflow, in ft^3/s	Year	Annual mean streamflow, in ft^3/s
1940	93.4	1950	108	1978	135	1993	143
1941	62.4	1951	121	1979	230	1994	128
1942	81.2	1952	174	1986	65.7	1995	85.9
1943	89.2	1953	147	1987	89.5	1996	213
1944	75.3	1954	55.9	1988	85.1	1997	108
1945	129	1955	89.6	1989	150	1998	126
1946	87.8	1956	82.3	1990	115	1999	92.6
1947	72.0	1957	84.4	1991	81.6	2000	109
1948	119	1976	122	1992	94.0	2001	87.8
1949	113	1977	92.3				

Questions about data gs-w-md_NWISWeb_Data_Inquiries@usgs.gov Top
Feedback on this websitegs-w-md_NWISWeb_Maintainer@usgs.gov Explanation of terms
Surface Water data for Maryland: Calendar Year Streamflow Statistics
http://waterdata.usgs.gov/md/nwis/annual/calendar_year?

Retrieved on 2003-10-14 10:36:32 EDT
Department of the Interior, U.S. Geological Survey
USGS Water Resources of Maryland
Privacy Statement || Disclaimer || Accessibility
0.7 0.64.nadww01

1976-1990/1991-200 = 1.07±
7%± Increase Avg.

1976-2001 Avg. = 117.7
1976-1990 Avg = 107.8
1991-2001 Avg = 115.4

EXHIBIT C

USGS

USGS 01594000 LITTLE PATUXENT RIVER AT SAVAGE, MD

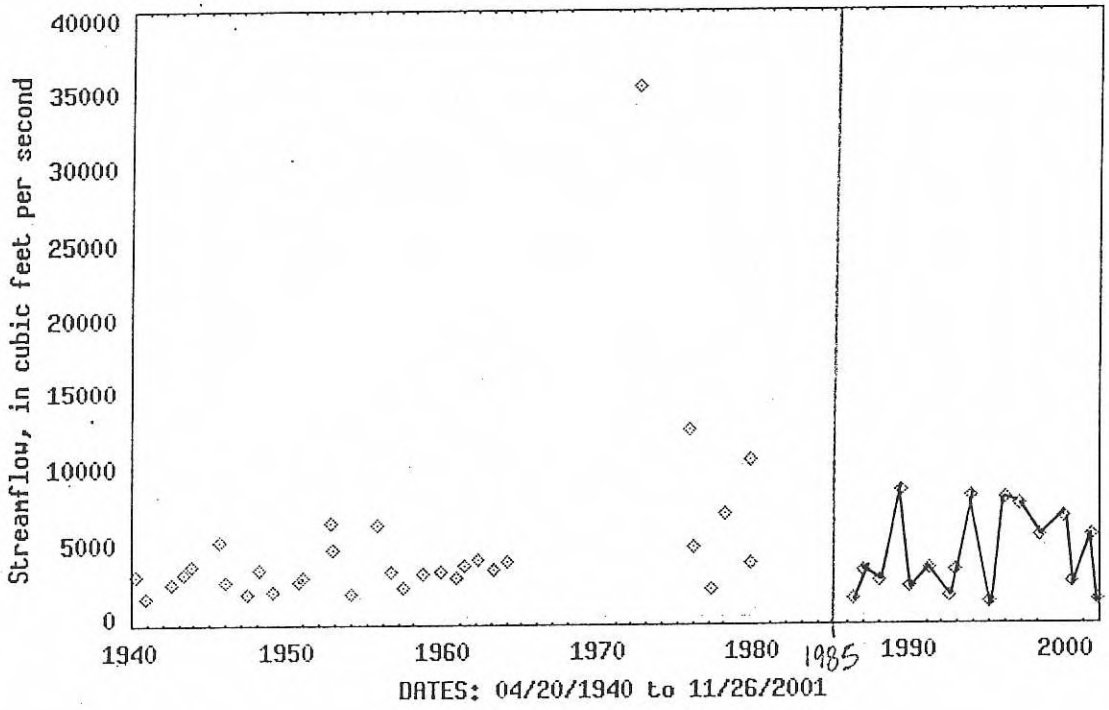


EXHIBIT D

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION				
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE	(Q=AV) Q_{100}
					(FEET NGVD)				
Little Patuxent River (continued)									
D	15,820	1,712	11,885	2.0	53.6	53.6	54.1	0.5	
E	15,956	1,706	14,731	1.6	55.1	55.1	55.9	0.8	
F	16,606	1,585	12,612	1.8	55.2	55.2	56.0	0.8	
G	23,866	329	2,293	9.9	58.1	58.1	58.4	0.3	
H	28,846	1,613	13,544	1.7	66.4	66.4	67.2	0.8	23,000 cfs
I	33,206	648	3,526	6.4	70.8	70.8	70.8	0.0	22,600 cfs
J	37,306	1,911	12,946	1.7	76.7	76.7	77.3	0.6	
K	37,546	590	2,998	7.5	76.8	76.8	77.3	0.5	
L	38,056	1,244	10,448	2.0	81.8	81.8	81.8	0.0	
M	39,456	1,583	9,741	2.2	82.0	82.0	82.1	0.1	
N	53,056	1,394	5,323	3.9	94.4	94.4	95.2	0.8	
O	54,656	600	4,105	5.1	99.1	99.1	99.1	0.0	
P	54,976	537	4,811	4.3	101.5	101.5	101.7	0.2	
Q	58,276	1,285	9,241	2.3	104.6	104.6	105.1	0.5	
R	59,876	210	2,315	9.0	105.0	105.0	105.4	0.4	
S	60,876	1,684	7,109	2.9	107.6	107.6	108.3	0.7	
T	62,083	720	4,407	4.7	108.6	108.6	109.2	0.6	

[1]Feet above confluence with Patuxent River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

ANNE ARUNDEL COUNTY, MD
(UNINCORPORATED AREAS)

FLOODWAY DATA

LITTLE PATUXENT RIVER

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX C

Residential Well Records

107-25

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
STATE OFFICE BUILDING
ANNAPOLIS, MARYLAND 21401

PERMIT TO DRILL WELL

ISSUE DATE- 08/07/72
MO DA YR

****
* PERMIT NUMBER- AA-73-0145 *
****

ISSUED TO DRILLER-
GREER, H J DRLG CO
P O DRAWER A
GAMBRILLS MD 21054

DRILLER
ID. NUMBER- 136

THE ABOVE NAMED DRILLER IS HEREBY AUTHORIZED TO DRILL A WELL TO BE OWNED BY-
WIST, JAMES
BX 376A PATUXENT RD
ODENTON MD 21113

THIS WELL IS TO BE LOCATED IN ANNE ARUNDEL COUNTY, NEAR THE TOWN OF ODENTON

THE WATER IS TO BE USED FOR A DOMESTIC SUPPLY.

THIS WELL WILL REPLACE A WELL WHICH WILL BE ABANDONED & SEALED.

****SPECIAL CONDITIONS****

THIS PERMIT IS SUBJECT TO THE FOLLOWING SPECIAL CONDITIONS-

NONE.

THIS PERMIT IS VALID UNTIL 02/07/73. A WELL COMPLETION REPORT MUST BE SUBMITTED TO THE DEPARTMENT WITHIN 30 DAYS AFTER COMPLETION OF THE WELL

PAUL W. MCKEE
DIRECTOR, MARYLAND
DEPARTMENT OF WATER
RESOURCES

DWR COPY

WR-WT 3/71

EMERGENCY NO. (If any) - AA73-R -

B 1 05021 (SEQUENCE NO. (DWR USE ONLY)) 1 2 3 (SEQ. NO.) 5 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-5 ON ALL CARDS)

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
APPLICATION FOR PERMIT TO DRILL WELL

DWR PERMIT NUMBER: AA-73-0145
FILL IN THIS FORM COMPLETELY

DATE RECEIVED (DWR USE ONLY): 08 07 72

OWNER: WIST, JAMES (COL 15 LAST NAME; FIRST NAME COL. 34)
STREET OR RFD: BOX 376A PATUXENT RD. (COL 36; COL. 55)
POST OFFICE: ODENTON, MARYLAND 21113 (COL 57; COL. 76)

B 1 CONTINUED (1 2 3 (SEQ. NO.) 5)

DRILLER INFORMATION
DATE: 8-4-72 LICENSE NUMBER: 136 (77 80)
H. J. GREER DRILLING CO. INC. (FIRST NAME; DRILLER; LAST NAME)
SIGNATURE: Harold J. Greer

B 2 (1 2 3 (SEQ. NO.) 5)

WELL INFORMATION
MAXIMUM PUMPING RATE (GALLONS PER MINUTE): 10 (8 12)
AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY): 500 (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- (D) DOMESTIC, HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- (F) FARMING, AGRICULTURE, IRRIGATION
- (I) INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT.
- (M) MUNICIPAL WATER SUPPLY
- (P) PRIVATE WATER COMPANY
- (T) TEST

} MUST HAVE STATE HEALTH DEPT. APPROVAL

APPROXIMATE DEPTH OF WELL: 100 FEET (24 28)
APPROXIMATE DIAMETER OF WELL: 4 (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)
BORED (OR AUGERED) JETTED DRIVEN
AIR-ROTARY AIR-PERCUSSION ROTARY (HYDRAULIC ROTARY)
CABLE REVERSE-ROTARY DRIVE-POINT
OTHER (DESCRIBE)

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)
- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- (Y) THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- (S) THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- (D) THIS WELL WILL DEEPEN AN EXISTING WELL
  PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) (41 52)

B 3 (1 2 3 (SEQ. NO.) 5)

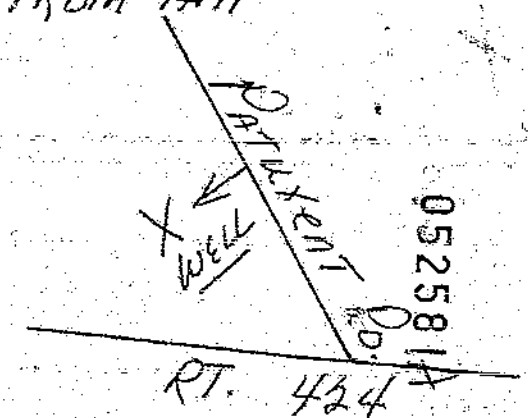
LOCATION OF WELL
COUNTY: ANNE ARUNDEL (DO NOT ABBREVIATE COUNTY NAME) (6 21)
SUBDIVISION: (23 42)
SECTION: (44 46; 48 50)
NEAREST TOWN: ODENTON (52 71)
MILES FROM TOWN (ENTER 0 IF IN TOWN): 6 (72 76) (M I)

B 4 (1 2 3 (SEQ. NO.) 5)

DIRECTION FROM TOWN (CIRCLE APPROPRIATE BOX)
(N) NORTH (E) EAST (NE) NORTHEAST (SE) SOUTHEAST
(S) SOUTH (W) WEST (NW) NORTHWEST (SW) SOUTHWEST
NEAR WHAT ROAD: PATUXENT RD. (11 30)
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH (N) (32) SOUTH (S) (32) EAST (E) (32) WEST (W) (32)
DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX): 40 (34 37) (F T) (M I) (38 39)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS, ROADS AND STREAMS. WITH NORTH IN THE DIRECTION OF THE ARROW, AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION OR STREAM CROSSING SHOWN ON THE SKETCH. ALSO SHOW, BY MEANS OF AN "X", THE WELL LOCATION IN THE BOX BELOW, AND THE BOX NUMBER FROM THE WELL LOCATION MAP.

N ↑ 75' from any Septic System.



NOT TO BE FILLED IN BY DRILLER (DWR USE ONLY)
APPROPRIATION PERMIT NUMBER: (G A P) (54 63)
ENGINEER REVIEW DISTRICT NO. (65)
FORCE: WRITE INITIALS IN BOX (67 68)
CONDITIONS: A E N S G W Q C L U (70 71 72 73 74 75 76 77 78 79)

BOX NUMBER: E 880 N 430
NORTH COORDINATE: 4350000 (50 51 52 53 54 55)
EAST COORDINATE: 0800000 (57 58 59 60 61 62 63)
ELEVATION AT WELL HEAD (FEET): (65 66 67 68)

B 4 CONTINUED (1 2 3 (SEQ. NO.) 5)

HEALTH DEPARTMENT APPROVAL
STATE HEALTH (CIRCLE BOX): (S) (41)
COUNTY NAME: AA COUNTY NO.: 02
DATE: MO. 08 DAY 04 YR. 75 (43 46)
APPROVED BY: JC

B 5 (1 2 3 (SEQ. NO.) 5)
SPECIAL CONDITIONS B-63 (DWR USE ONLY)

ORIGINAL

107-25

WR - W-4 9/71

C 1 C0304 (SEQUENCE NO. OWN USE ONLY) (SEQ. NO.) 6
(THIS NUMBER IS TO BE PUNCHED IN COLS. 1-6 ON ALL CARDS)

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (OWN USE ONLY) 8-13-72

DATE WELL COMPLETED 8-9-72

DEPTH OF WELL 193 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" PA-75-0145

DRILLING CONTINUATION NO. 130

OWNER Wist, James (LAST NAME) (FIRST NAME)

STREET OR RFD Box 316 Patuxent Rd. POST OFFICE Crofton, Md.

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Top Soil	0	1	
Gravel	1	30	
White Clay	30	80	
Fine Sand	80	92	
Red Clay	92	160	
White Clay	160	178	
Medium Fine Sand	178	193	

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX) YES [Y] NO [N]

TYPE OF GROUTING MATERIAL (CIRCLE BOX) CEMENT [C M] BENTONITE CLAY [B C]

NO. OF BAGS _____ NO. OF POUNDS _____

GALLONS OF WATER _____

DEPTH OF GROUT SEAL (TO NEAREST FOOT)

FROM _____ FT. TO _____ FT.
(ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): [S T] STEEL, [C O] CONCRETE, [P L] PLASTIC, [O T] OTHER

MAIN CASING TYPE	NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
S T	4	188

OTHER CASING (IF USED)

EACH CASING

DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): [S T] STEEL, [B R] BRASS OR BRONZE, [H O] OPEN HOLE, [P L] PLASTIC, [O T] OTHER

C 2 (SEQ. NO.)

DEPTH (NEAREST WHOLE FOOT)

EACH SCREEN

		FROM	TO
1	S L	188	193
2			
3			

SLOT SIZE 1. 0.30 2. _____ 3. _____

DIAMETER OF SCREEN 4 1/4 (NEAREST INCH)

GRAVEL PACK FROM _____ TO _____

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX [F]

OWN USE ONLY (NOT TO BE FILLED IN BY DRILLER) (E.R.O.S.)
[T] TELESCOPE CASING, [ ] LOG INDICATOR, [W Q] OTHER DATA AVAILABLE

C 3 (SEQ. NO.)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR) 1

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON) 50

METHOD USED TO MEASURE PUMPING RATE Air Comp.

WATER LEVEL: (DISTANCE FROM LAND SURFACE)
BEFORE PUMPING 3 (NEAREST FOOT)
WHEN PUMPING 12 (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST)
[A] AIR, [P] PISTON, [T] TURBINE, [C] CENTRIFUGAL, [R] ROTARY, [O] OTHER (DESCRIBE BELOW), [J] JET, [S] SUBMERSIBLE

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: A, C, J, P, R, S, T, O)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES [Y] NO [N]

CAPACITY:
GALLONS PER MINUTE (TO NEAREST GALLON) Owners

PUMP HORSE POWER

PUMP COLUMN LENGTH (NEAREST FOOT)

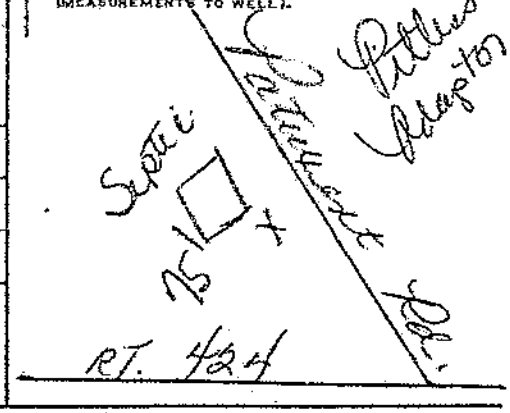
CASING HEIGHT

(CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)
[A] ABOVE, [B] BELOW LAND SURFACE 1 (NEAREST FOOT)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

N



CIRCLE APPROPRIATE BOXES

[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
[E] ELECTRIC LOG OBTAINED
[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME N. J. Green Drilling
(PLEASE PRINT) Elmer E. Green
SIGNATURE Harold J. Green

ORIGINAL

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

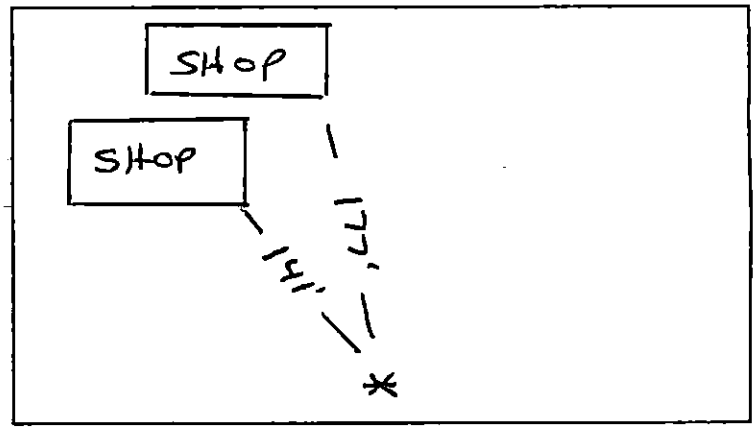
rec'd 4-22-14
4816-9023-8255
~~Tax#00578502~~

DATE WELL ABANDONED: 4/10/14 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any): AA — 74 — 2104
* PERMIT NUMBER OF REPLACEMENT WELL: NONE — —
* PERSON ABANDONING WELL: Randall Melson
* WELL DRILLERS LICENSE NUMBER: JWD 385
CIRCLE: ~~MWD/MSD/MGD~~
* OWNER'S NAME: Two Rivers LLC
* WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Crofton
TAX MAP 36 ~~BLOCK~~ 20 PARCEL ~~110~~ 0105
SUBDIVISION: grid
SECTION: _____ LOT: _____
NEAREST ROAD: 2801 Conway Rd.

GPS 02080
Lat 39.~~118100°~~
Long 76.~~439540°~~ 73237

SITE LOCATION MAP



* TYPE OF WELL BEING ABANDONED:

x DRILLED ____ JETTED
____ BORED/AUGERED ____ HAND DUG
____ OTHER (specify) _____

* USE CODE:

x DOMESTIC ____ MUNICIPAL/PUBLIC
____ IRRIGATION ____ INDUSTRIAL
____ TEST/OBSERVATION ____ GEOTHERMAL

* TYPE OF CASING:

____ STEEL x PLASTIC
____ CONCRETE ____ OTHER (specify)

* SIZE OF CASING: 4 INCHES IN DIAMETER
* DEPTH OF WELL: 120 FEET DEEP
* WAS ANY CASING REMOVED? x YES ____ NO
if yes, length removed, in feet: 120
* WAS CASING RIPPED OR PERFORATED? ____ YES x NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Bentonite	120'	0

VOLUME OF MATERIAL USED

500 lbs. Bentonite
250 gal H20

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN | LICENSE # 517 | MWD/MSD/MGD CIRCLE ONE | DATE 4/11/14

DENV 828 JULY 1997 1) MDE

EMERGENCY/TEMP. NO. IF ANY

B 1 6255 SEQUENCE NO. (OEP USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS) SEP 7 1982

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please print or type

OEP PERMIT NUMBER AA - 81 - 0820
fill in this form completely

Date Received 10 03 0 82 (OEP Use Only)

OWNER INFORMATION

WASHINGTON DEMETRIUS
Last Name 15 Owner 36 Name

12614 VIRGINIA LN
Street or RFD

WILSONTOWN MD
Town 57 State 76 Zip

B 1 Continued **DRILLER INFORMATION**

DENTON J. WOLFORD 2 8 8
Driller's Name 77 License No. 80

WOLFORD'S WELL AND PUMP SERVICE INC.
Firm Name

685 DUVALL HIGHWAY, PASADENA, MARYLAND 21122
Address

Denton J. Wolford 8-24-82
Signature Date

B 2 **WELL INFORMATION**

APPROX. PUMPING RATE (GAL. PER MIN.) 8

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 300

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- [F] ~~FARMING~~ (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- 22 [I] INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)
- [P] ~~PUBLIC OR PRIVATE WATER COMPANY~~ (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)
- [T] TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

APPROXIMATE DEPTH OF WELL 150 FEET

APPROXIMATE DIAMETER OF WELL 4" NEAREST INCH

METHOD OF DRILLING (circle one)

~~BORED (OR AUGERED)~~ JETTED JETTED & DRIVEN

30 AIR ROTARY AIR PERCUSSION (ROTARY (HYDRAULIC ROTARY))

37 CABLE REVERSE ROTARY DRIVE POINT

other ROTARY

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) 41 52

Not to be filled in by driller (OEP USE ONLY)

APPROP. PERMIT NUMBER 54 G A P 58

FORCE [A] [T] WRITE INITIALS IN BOX 64 65

PERMIT No. AA-81-0820 70 71 72 73 74 75 76 77 78 79

B 3 **LOCATION OF WELL**

COUNTY ANNE ARUNDEL 21

SUBDIVISION WILSONTOWN 42

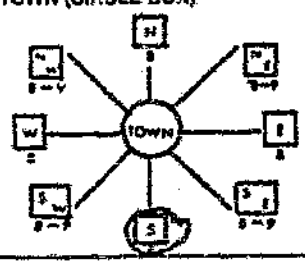
SECTION 44 45 LOT 49 50

NEAREST TOWN ODENTON 52

MILES FROM TOWN (enter 0 if in town) 3.7 73 76 77 78 (M) (I)

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)

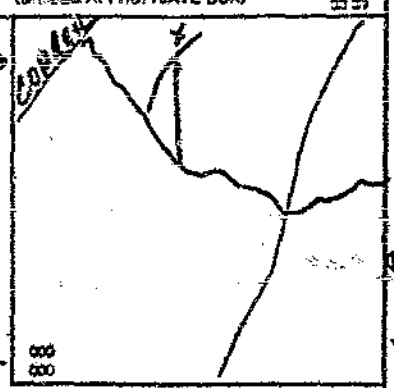


COLLINS RD
11 NEAR WHAT ROAD 30

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) NORTH (N) (W) WEST (E) EAST (S) SOUTH

15+
34 DISTANCE FROM ROAD 37 (CIRCLE APPROPRIATE BOX) (M) (I)

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

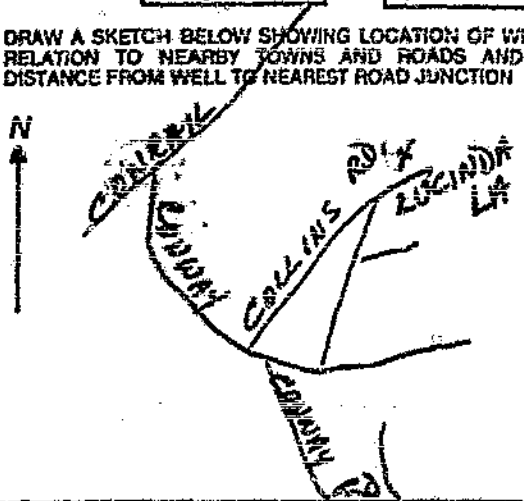


SOURCES OF DRILLING WATER
1. AA-74-3901
2. COUNTY WATER
3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 870
N 430

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



B 4 NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel 02
COUNTY NAME COUNTY NO.

OEP SIGNATURE STATE HEALTH CIRCLE BOX (S) 41

DATE ISSUED 10 03 82 CO SIGNATURE E Tofts

NORTH GRID 430 EAST GRID 0874 EXPIRES

B 5 SPECIAL CONDITIONS 9-63

1 2 3 9

4 8 0 3 1 2 3 7

C 1 3147 — SEQUENCE NO. (DEP USE ONLY)

THIS NUMBER IS TO BE PUNCHED IN COLS. 1-6 ON ALL CARDS

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED

COUNTY NUMBER 03

Date Rec'd (DEP use only) MAY 4 1983

DATE WELL COMPLETED 03 17 83

Depth of Well 235 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-81-0830

OWNER Cher Chris Construction Co. (last name first name)

STREET OR RFD 10519 York Rd. TOWN Cockeysville, Md. 21030

SUBDIVISION Wilson Town SECTION 1264 Lucinda Lane LOT 2

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown clay	0	6	
White clay	6	25	
Gravel	25	40	
Red, white clay	40	75	
White sand	75	100	
Red clay	100	170	
Gray clay	170	225	
White sand	225	238	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) YES [Y] NO [N]

TYPE OF GROUTING MATERIAL

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS 1 NO. OF POUNDS 100

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot) from 3 ft. to 36 ft. (TOP / BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types — insert appropriate code below: [ST] STEEL, [CO] CONCRETE, [PL] PLASTIC, [OT] OTHER

MAIN CASING TYPE	Nominal diameter top/main casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	231

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or openhole — insert appropriate code below: [ST] STEEL, [BR] BRASS, BRONZE, [HO] OPEN HOLE, [PL] PLASTIC, [OT] OTHER

C 2 (seq no.)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	231	238
2			
3			

SLOT SIZE 050

DIAMETER OF SCREEN 2" (NEAREST INCH)

GRAVEL PACK from 226 to 238

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX [F]

C 3 (seq no.)

PUMPING TEST
HOURS PUMPED (nearest hour) 2½

PUMPING RATE (gal. per min. to nearest gal.) 30

METHOD USED TO MEASURE PUMPING RATE AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING 105

WHEN PUMPING 130'

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES [Y] NO [N]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE): (A, C, J, P, R, S, T, O) [S]

CAPACITY:

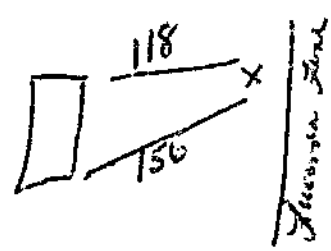
GALLONS PER MINUTE (to nearest gallon) 7

PUMP HORSE POWER 3

PUMP COLUMN LENGTH (nearest ft.) 140

CASING HEIGHT (circle appropriate box and enter casing height) [+] above [−] below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE BOX
[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

[E] ELECTRIC LOG OBTAINED

[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE

DRILLERS IDENT NO 288

DRILLERS SIGNATURE Denton J. Wolford

(MUST MATCH SIGNATURE ON APPLICATION)

Denton J. Wolford

SITE SUPERVISOR sign of driller or journeyman responsible for sitework if different from permittee

DEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T — TELESCOPE CASING

(E.R.O.S.) — LOG INDICATOR

W O — OTHER DATA

ORIGINAL

EMERGENCY/TEMP NO. IF ANY

B 1 3268 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA-94-3297

fill in this form completely

Date Received (APA): 10-28-98 DOK

OWNER INFORMATION

Lanham, Alice (Owner)

1250 Patuxent Road

Odenton, MD 21113

DRILLER INFORMATION

John Greer — License No. MSD 086

H.J. Greer Drilling Co, Inc.

P.O. Drawer A Gambrills, MD 21054

Signature — Date 10-28-98

B 3 LOCATION OF WELL

County: Anne Arundel

Subdivision: Woodwardville

Section: Lot:

Nearest Town: Odenton

Miles from Town (enter 0 if in town): 4 MI

B 4

Direction of well from town (circle box): NW, N, NE, W, TOWN, E, SW, S, SE

Near what road: 1250 Patuxent Road

On which side of road (circle appropriate box): NORTH, WEST, EAST, SOUTH

Distance from road: 401 FT

TAX MAP: 36 BLK: 15 PARCEL: 0033

B 2 WELL INFORMATION

Approx. pumping rate (gal. per min.): 10

Average daily quantity needed (gal. per day): 500

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

County name: Anne Arundel — County no.: 02

State signature: — Insert S →

Date issued: 10 28 98 — CO signature: Barry D. Adams — Exp. date: 10 28 99

North grid: 436 000 — East grid: 0881 000

Approximate depth of well: 100 feet

Approximate diameter of well: 4 nearest inch

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN

AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)

CABLE — REVerse-ROTary — DRive-POINT

other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- [N] THIS WELL WILL NOT REPLACE AN EXISTING WELL
- (Y) THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) — —

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X →

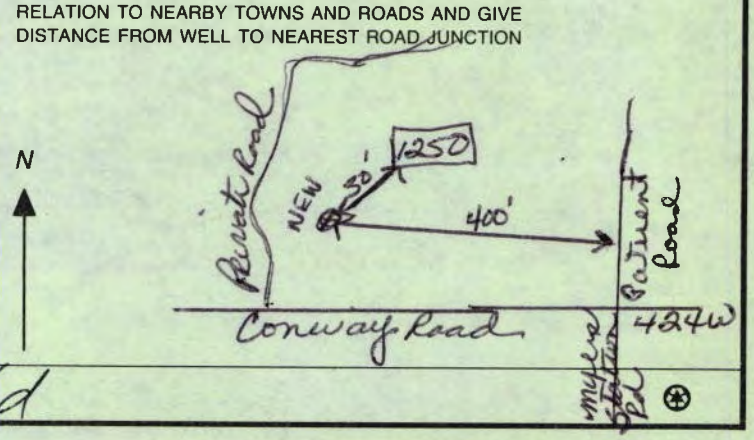
SOURCES OF DRILLING WATER
1. Well Drillers
2. TAX 145 225
3. 4000-0103-3000

WRITE THE BOX NUMBER FROM THE MAP HERE

E 880 000

N 430 000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER

PERMIT No. AA-94-3297

SPECIAL CONDITIONS: Radium Sampling Rqd

NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

DENV-Permit 97

① ORIGINAL

C 1 — 5550 (1 2 3 6)

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY — DATE Received: NOV 9 1998 (MM DD YY; 8 13)

DATE WELL COMPLETED: MM 11 DD 4 YY 98 (15 20)

Depth of Well: 37 (TO NEAREST FOOT) (22 26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-94-3297 (28 29 30 31 32 33 34 35 36 37)

OWNER: Lanham v Alice (last name, first name)

STREET OR RFD: 1250 Patuxent Road TOWN: Odenton

SUBDIVISION: Woodward Vill SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown Clay	0	10	
Sand + Gravel	10	24	
White Clay	24	31	
Med Brown Sand	31	37	

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- (A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 0 8 6

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one): CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS (45 46): 3 NO. OF POUNDS (45 46): 150

GALLONS OF WATER: 75

DEPTH OF GROUT SEAL (to nearest foot): from 4 ft. (48 TOP 52) to 30 ft. (54 BOTTOM 58) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	32 (66 70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [PL] PLASTIC [HO] OPEN HOLE [OT] OTHER

C 2 (1 2)

DEPTH (nearest ft.) — EACH SCREEN

1	PL (8 9)	32 (11 15)	37 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 020 2 ___ 3 ___

DIAMETER OF SCREEN: 2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 27 to 37 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

70 TELESCOPE CASING ___ 72 LOG INDICATOR ___ 74 75 76 OTHER DATA A

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour): 2 (8 9)

PUMPING RATE (gal. per min.): 15 (11 15)

METHOD USED TO MEASURE PUMPING RATE: Barrel

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 15' ft. (17 20)

WHEN PUMPING: 20' ft. (22 25)

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): (YES) NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon): 15 (31 35)

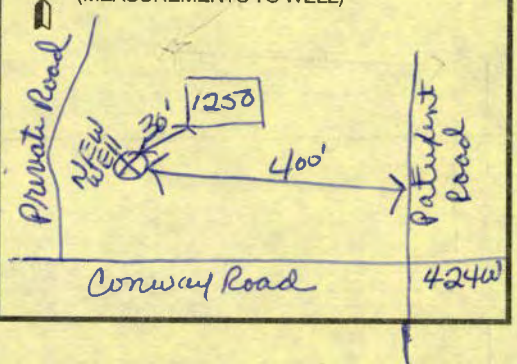
PUMP HORSE POWER: .50 (37 41)

PUMP COLUMN LENGTH (nearest ft.): 30' (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)
- [+] above (49)
- [–] below (49)

LAND SURFACE — 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR97 ① ORIGINAL

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:

- ★ COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
- ★ WELL OWNER
- ★ MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 11/4/98 (month/day/year)

★ PERMIT NUMBER OF ABANDONED WELL (if any) — —

★ PERMIT NUMBER OF REPLACEMENT WELL AA - 94 - 3297

★ PERSON ABANDONING WELL: John Grew

WELL DRILLERS LICENSE NUMBER: 086

CIRCLE: MWD/(MSD)/MGD

★ OWNER'S NAME: Alice V Lanham

★ WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Odenton
TAX MAP 36 BLOCK 15 PARCEL 0033
SUBDIVISION: Wood Wardville
SECTION: _____ LOT: _____
NEAREST ROAD: 1250 Patuxent Road

MARYLAND GRID COORDINATES
BOX NUMBER E 880 N 430 <

X	
0 0 0 0 0 0	

SHOW WELL LOCATION BY X WITHIN BOX

★ TYPE OF WELL BEING ABANDONED:

X DRILLED ____ JETTED
____ BORED/AUGUERED ____ HAND DUG
____ OTHER (specify) _____

★ USE CODE:

X DOMESTIC ____ MUNICIPAL/PUBLIC
____ IRRIGATION ____ INDUSTRIAL
____ TEST/OBSERVATION

★ TYPE OF CASING:

____ STEEL X PLASTIC
____ CONCRETE ____ OTHER (specify) _____

★ SIZE OF CASING: 4 INCHES IN DIAMETER

★ DEPTH OF WELL: 37 FEET DEEP

★ WAS ANY CASING REMOVED? ____ YES X NO
if yes, length removed, in feet: _____

★ WAS CASING RIPPED OR PERFORATED? ____ YES X NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Bentonite CLAY	37	—

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN | LICENSE # 086 | MWD/(MSD)/MGD CIRCLE ONE | DATE 11-5-98

DENV 828 JULY 1993

1) MDE

EMERGENCY/TEMP NO. IF ANY

B 1 06805 (1 2 3 6) — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA-94-5923 (70–79)

fill in this form completely

Date Received (APA): 10/31/00 (8 MM DD YY 13)

OWNER INFORMATION

Campbell Sand & Gravel Ltd. Partnership (15 Last Name Owner First Name 34)

2126 Espey Court Suite F (36 Street or RFD 55)

Crofton (57 Town) Md (70 State) 21114-2425 (72 Zip 76)

DRILLER INFORMATION

Larry Wooster (Driller's Name) M S D 062 (76 License No. 81)

Wooster Drilling Co (Firm Name)

10930 Bridle Path Cr. Waldorf, Md 20601 (Address)

Larry Wooster (Signature) Oct 29, 2000 (Date)

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): 50 (8 12)

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 6800 (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- D DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- 22 (I) INDUSTRIAL, COMMERICIAL, DEWATERING
- P PUBLIC WATER SUPPLY WELL
- T TEST, OBSERVATION, MONITORING
- G GEO-THERMAL

APPROXIMATE DEPTH OF WELL: 330 (24 28) FEET

APPROXIMATE DIAMETER OF WELL: 4½ NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN

30 AIR-ROTary — AIR-PERcussion — (ROTARY (Hydraulic Rotary))

37 CABLE — REVerse-ROTary — DRive-POINT

other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX) Back-up Well

- XXX THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) 41 — — - — — - — — — — 52

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER: AA98 G A P013 (01) (54 63)

PERMIT No. AA-94-5923 (70 71 72 73 74 75 76 77 78 79)

B 3 LOCATION OF WELL

Anne Arundel (8 COUNTY 21)

(23 SUBDIVISION 42)

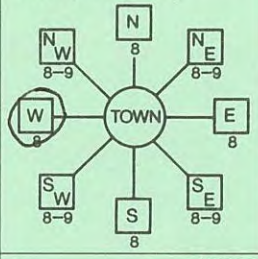
SECTION (44 46) LOT (48 50)

Conway (52 NEAREST TOWN 71)

MILES FROM TOWN (enter 0 if in town): 2.4 (73 76 77 78) M I

B 4

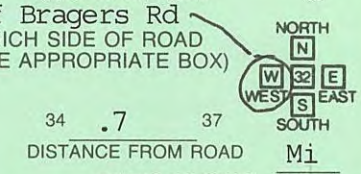
DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



2801 Conway Road (11 NEAR WHAT ROAD 30)

Off Bragers Rd

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)



34 .7 37 DISTANCE FROM ROAD Mi

ENTER FT OR MI 38 39

TAX MAP: 36 BLK: 20 PARCEL 110

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel (COUNTY NAME) 02 (COUNTY NO.)

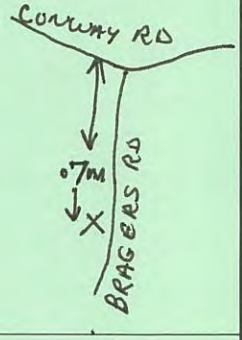
STATE SIGNATURE _____ INSERT S → (41)

DATE ISSUED 10/31/00 (43 MM DD YY 48) CO SIGNATURE _____ EXP. DATE

NORTH GRID 433 000 (50 55) EAST GRID 0876 000 (57 63)

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X →

ADC-17
GRID D-2



SOURCES OF DRILLING WATER

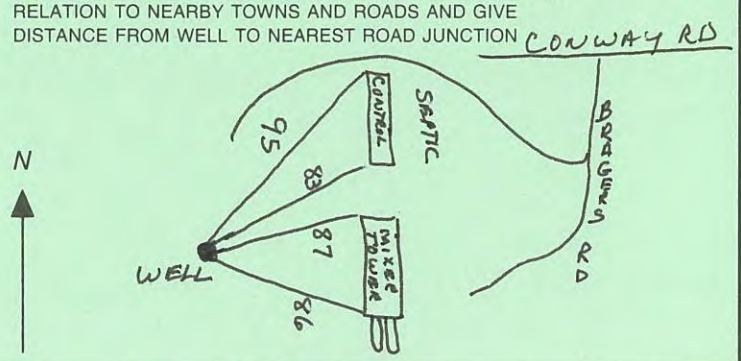
1. Drilled Well
2.
3. 3314-595

WRITE THE BOX NUMBER FROM THE MAP HERE

E 876

N 433

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



SPECIAL CONDITIONS
NOTE – APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED –

Radium Sampling Req.

DENV-Permit 97

① ORIGINAL

C 1 | 09097 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

ST/CO USE ONLY
DATE Received JAN 24 2001 (MM DD YY 8 13)

DATE WELL COMPLETED: MM 12 DD 18 YY 00 (15 20)

Depth of Well: 22 396 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 94 - 5923 (28 29 30 31 32 33 34 35 36 37)

OWNER: Campbell Sand & Gravel Ltd. Partnership (last name first name)

STREET OR RFD: 2801 Conway Road TOWN: Conway

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown Clay	0	5	
White + Tan Sandy Clay	5	59	
Iron Rock	59	60	
Red Clay	60	91	
Gummy Clay	91	121	
White Sand + Clay	121	147	
Red Clay	147	164	
Sandy Red Clay	164	183	
Gummy Clay	183	189	
Brown + White Sand	189	210	
White Sandy Clay	210	225	
Red Clay	225	316	
White Sand	316	319	
Gummy Clay	319	331	
Fine White Sand	331	348	
Gummy Clay	348	351	
White Sand	351	395	✓
Red Clay	395	396	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED: yes [Y] no (N)

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 0 6 2 1

Larry Koster
DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: M S D 0 6 1 1

Frederick S. Schutt
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one): CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 10 NO. OF POUNDS 500

GALLONS OF WATER 250

DEPTH OF GROUT SEAL (to nearest foot): from 4 (48 TOP 52) ft. to 120 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	4½ (63 64)	311 (66 70)

OTHER CASING (if used) — EACH CASING

	diameter inch	depth (feet) from	to
ST	2	306	366

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

DEPTH (nearest ft.) — EACH SCREEN

1	ST (8 9)	366 (11 15)	386 (17 21)
2	ST (23 24)	386 (26 30)	396 (32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 10 2 15 3

DIAMETER OF SCREEN 3 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 — from to (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

70 T — TELESCOPE CASING

72 — LOG INDICATOR

74 75 76 — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour): 4 (8 9)

PUMPING RATE (gal. per min.): 300 (11 15)

METHOD USED TO MEASURE PUMPING RATE: Bucket

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 105 (17 20) ft.

WHEN PUMPING: 118 @ 85 GPM (22 25) ft.

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S (29)

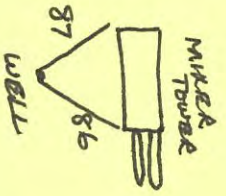
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 85 (31 35)

PUMP HORSE POWER: 5.0 (37 41)

PUMP COLUMN LENGTH (nearest ft.): 275 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)
[+] above (49) / [–] below (49) LAND SURFACE: 2 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



ORIGINAL - STATE

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM rec'd 4-22-14

****

SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

New Tax # 4816-9023-8255
~~4800-~~
Tax# 00578502

DATE WELL ABANDONED: 4/10/14 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) AA — 94 — 5923

* PERMIT NUMBER OF REPLACEMENT WELL NONE — —

* PERSON ABANDONING WELL: Randall Melson

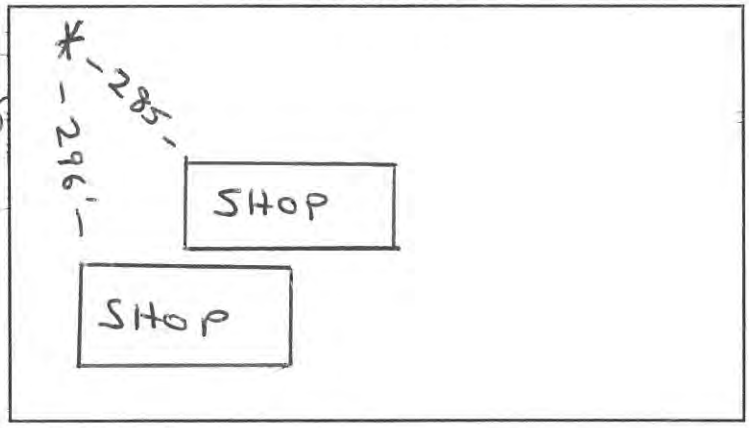
WELL DRILLERS LICENSE NUMBER: ~~JWD~~ 385
CIRCLE: MWD/MSD/MGD

* OWNER'S NAME: ~~Two Rivers LLC~~

* WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Crofton
TAX MAP 36 ~~BLOCK~~ xxxxx 20 PARCEL ~~110~~ 0105
SUBDIVISION: Grid
SECTION: _____ LOT: _____
NEAREST ROAD: 2801 Conway Rd.

GPS - Lat 39.~~018768°~~ 02117°
Long 76.~~732283°~~ 73219

SITE LOCATION MAP



* TYPE OF WELL BEING ABANDONED:

x DRILLED ____ JETTED
____ BORED/AUGERED ____ HAND DUG
____ OTHER (specify) _____

* USE CODE:

x DOMESTIC ____ MUNICIPAL/PUBLIC
____ IRRIGATION ____ INDUSTRIAL
____ TEST/OBSERVATION ____ GEOTHERMAL

* TYPE OF CASING:

____ STEEL x PLASTIC
____ CONCRETE ____ OTHER (specify)

* SIZE OF CASING: 4 ½ INCHES IN DIAMETER

* DEPTH OF WELL: 390 FEET DEEP

* WAS ANY CASING REMOVED? ____ YES x NO
if yes, length removed, in feet: 2'

* WAS CASING RIPPED OR PERFORATED? x YES ____ NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Bentonite	390	0

VOLUME OF MATERIAL USED
900 lbs. Bentonite
450 gal H20

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN | 517 LICENSE # | MWD/MSD/MGD CIRCLE ONE | 4/11/14 DATE

DENV 828 JULY 1997

1) MDE

EMERGENCY/TEMP NO. IF ANY

B 1 06805 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL

please type

STATE PERMIT NUMBER: AA-94-5923

fill in this form completely

Date Received (APA): 10/31/00

OWNER INFORMATION

Campbell Sand & Gravel Ltd. Partnership — Last Name / Owner / First Name

2126 Espey Court Suite F — Street or RFD

Crofton — Town; Md — State; 21114-2425 — Zip

DRILLER INFORMATION

Larry Wooster — Driller's Name; M S D 062 — License No.

Wooster Drilling Co — Firm Name

10930 Bridle Path Cr. Waldorf, Md 20601 — Address

Larry Wooster — Signature; Oct 29, 2000 — Date

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): 50

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 6800

B 3 LOCATION OF WELL

Anne Arundel — COUNTY

SUBDIVISION

SECTION ____ LOT ____

Conway — NEAREST TOWN

MILES FROM TOWN (enter 0 if in town): 2.4 MI

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX): N, NW, NE, W, E, SW, SE, S

2801 Conway Road — NEAR WHAT ROAD

Off Bragers Rd — ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH, WEST, EAST, SOUTH

.7 — DISTANCE FROM ROAD; Mi — ENTER FT OR MI

TAX MAP: 36 BLK: 20 PARCEL 110

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- D DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- 22 I INDUSTRIAL, COMMERICIAL, DEWATERING
- P PUBLIC WATER SUPPLY WELL
- T TEST, OBSERVATION, MONITORING
- G GEO-THERMAL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel — COUNTY NAME; 02 — COUNTY NO.

STATE SIGNATURE _____ INSERT S → 41

DATE ISSUED: 10/31/00 — CO SIGNATURE — EXP. DATE

NORTH GRID: 433 000 — EAST GRID: 0876 000

APPROXIMATE DEPTH OF WELL: 330 FEET

APPROXIMATE DIAMETER OF WELL: 4½ NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN

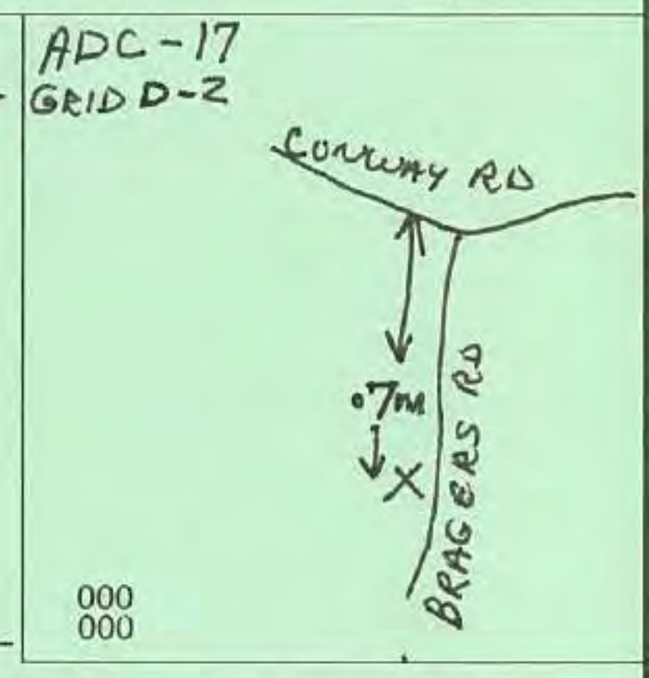
30 AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)

37 CABLE — REVerse-ROTary — DRive-POINT

other _____

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X →

ADC-17 GRID D-2



SOURCES OF DRILLING WATER

1. Drilled Well
2.
3. 3314-595

WRITE THE BOX NUMBER FROM THE MAP HERE

E 876

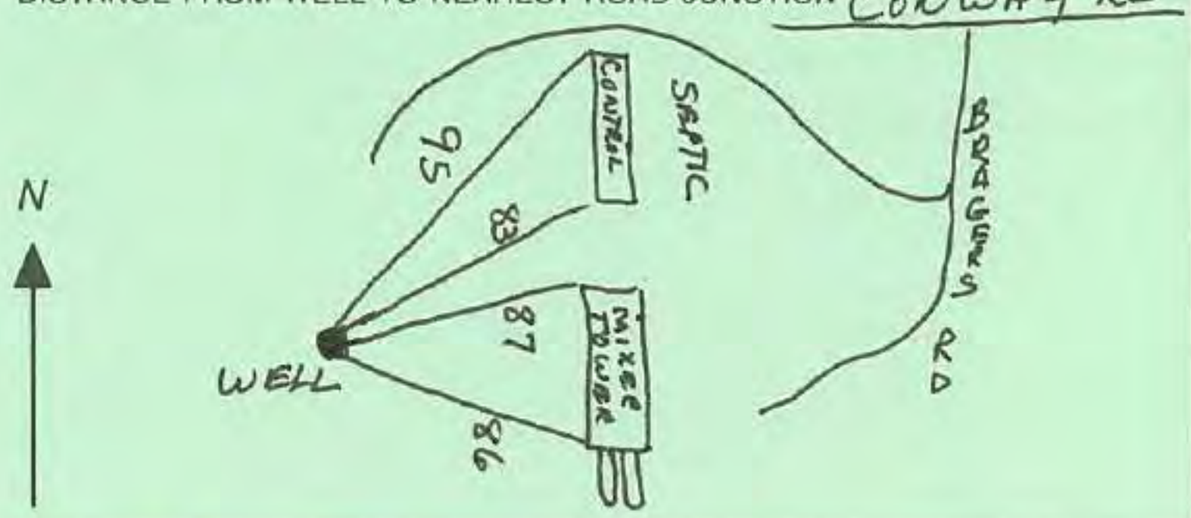
N 433

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX) Back-up Well

- XXX THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) 41 __ __ - __ __ - __ __ __ __ 52

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION CONWAY RD



Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER: AA98 G A P013 (01)

PERMIT No. AA-94-5923

SPECIAL CONDITIONS
NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED -

Radium Sampling Req.

DENV-Permit 97

① ORIGINAL

C 1 09097

SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

ST/CO USE ONLY
DATE Received MM DD YY JAN 24 2001 8 33

DATE WELL COMPLETED MM 12 DD 18 YY 00 (15 20)

Depth of Well 22 396 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA - 94 - 5923 (28 29 30 31 32 33 34 35 36 37)

OWNER Campbell Sand & Gravel Ltd. Partnership (last name)

STREET OR RFD 2801 Conway Road (first name) TOWN Conway

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown Clay	0	5	
White + Tan Sandy Clay	5	59	
Iron Rock	59	60	
Red Clay	60	91	
Gummy Clay	91	121	
White Sand + Clay	121	147	
Red Clay	147	164	
Sandy Red Clay	164	183	
Gummy Clay	183	189	
Brown + White Sand	189	210	
White Sandy Clay	210	225	
Red Clay	225	316	
White Sand	316	319	
Gummy Clay	319	331	
Fine White Sand	331	348	
Gummy Clay	348	351	
White Sand	351	395	✓
Red Clay	395	396	

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes [Y] no (N)

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 0 6 2

Larry Waters
DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: M S D 0 6 1

Frederick S. Schutt
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] 44 no [N] 44

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [C M] 45 46 BENTONITE CLAY [B C] 45 46

NO. OF BAGS 10 NO. OF POUNDS 500

GALLONS OF WATER 250

DEPTH OF GROUT SEAL (to nearest foot)
from 4 ft. (48 TOP 52) to 120 ft. (54 BOTTOM 58)
(enter 0 if from surface)

CASING RECORD

casing types insert appropriate code below

[S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	4½ (63 64)	311 (66 70)

OTHER CASING (if used) — EACH CASING

	diameter inch	depth (feet) from	to
ST	2	306	366

SCREEN RECORD

screen type or open hole insert appropriate code below

[S T] STEEL [B R] BRASS BRONZE [H O] OPEN HOLE [P L] PLASTIC [O T] OTHER

C 2 (1 2)

DEPTH (nearest ft.) — EACH SCREEN

1	ST (8 9)	366 (11 15)	386 (17 21)
2	ST (23 24)	386 (26 30)	396 (32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 10 2 15 3 _____

DIAMETER OF SCREEN 3 (56 60) (NEAREST INCH)

	from	to
GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68		

68

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T	(E.R.O.S.)	W Q
70 T	72	74 75 76
TELESCOPE CASING	LOG INDICATOR	OTHER DATA

C 3 (1 2)

PUMPING TEST

HOURS PUMPED (nearest hour) 4 (8 9)

PUMPING RATE (gal. per min.) 300 (11 15)

METHOD USED TO MEASURE PUMPING RATE Bucket

WATER LEVEL (distance from land surface)

BEFORE PUMPING 105 ft. (17 20)

WHEN PUMPING 118 @ 85 GPM ft. (22 25)

TYPE OF PUMP USED (for test)

[A] air 27 [P] piston 27 [T] turbine 27
[C] centrifugal 27 [R] rotary 27 [O] other (describe below) 27
[J] jet 27 [S] submersible 27

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) (YES) NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 85 (31 35)

PUMP HORSE POWER 5.0 (37 41)

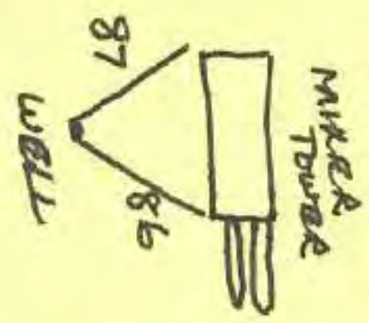
PUMP COLUMN LENGTH (nearest ft.) 275 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)
[+] above (49) / [–] below (49) LAND SURFACE 2 (50 51) (nearest foot)

LOCATION OF WELL ON LOT

N

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



ORIGINAL - STATE

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
1800 Washington Blvd., Baltimore, Maryland 21230 (410) 537-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM rec'd 4-22-14

****

SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

New Tax # 4816-9023-8255 ~~4800~~ -

DATE WELL ABANDONED: 4/10/14 (month/day/year)

Tax# 00578502

* PERMIT NUMBER OF ABANDONED WELL (if any) AA — 94 — 5923

* PERMIT NUMBER OF REPLACEMENT WELL NONE — —

* PERSON ABANDONING WELL: Randall Melson

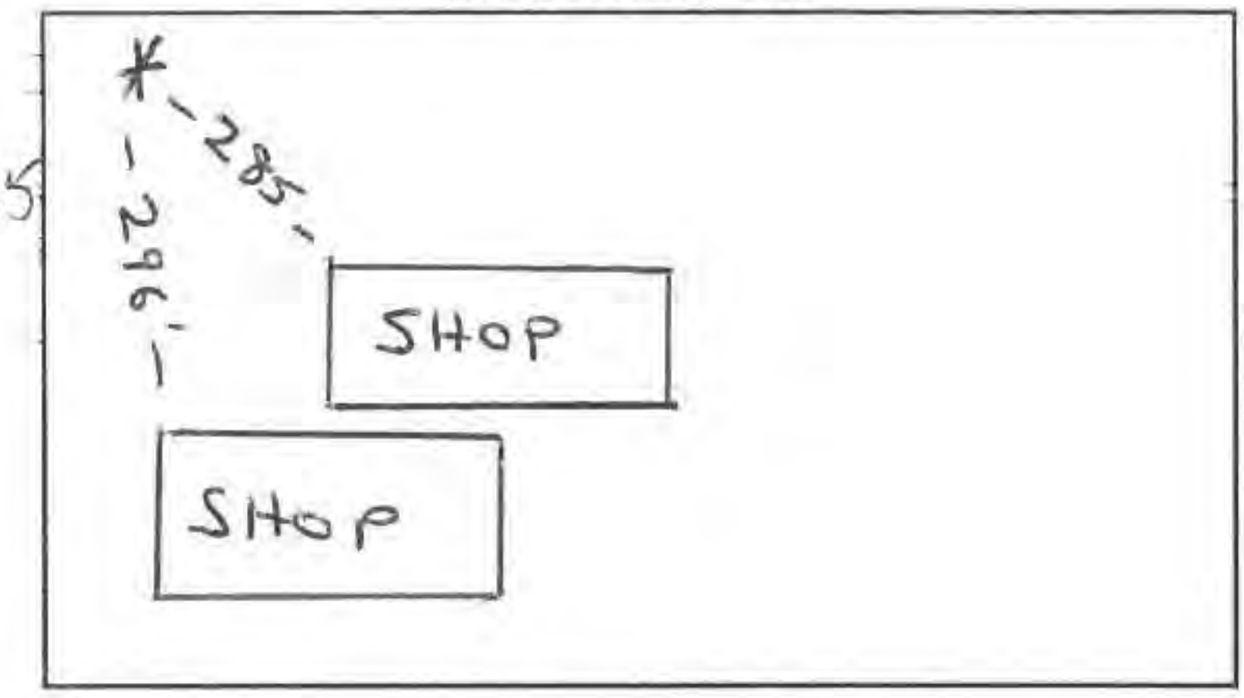
WELL DRILLERS LICENSE NUMBER: ~~JWD~~ 385
CIRCLE: MWD/MSD/MGD

* OWNER'S NAME: ~~Two Rivers LLC~~

* WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Crofton
TAX MAP 36 ~~BLOCK~~ xxxxx 20 PARCEL ~~110~~ 0105
SUBDIVISION: Grid
SECTION: _____ LOT: _____
NEAREST ROAD: 2801 Conway Rd.

GPS - Lat 39.~~018768°~~ 02117°
Long 76.~~732283°~~ 73219

SITE LOCATION MAP



* TYPE OF WELL BEING ABANDONED:

x DRILLED ____ JETTED
____ BORED/AUGERED ____ HAND DUG
____ OTHER (specify) _____

* USE CODE:

x DOMESTIC ____ MUNICIPAL/PUBLIC
____ IRRIGATION ____ INDUSTRIAL
____ TEST/OBSERVATION ____ GEOTHERMAL

* TYPE OF CASING:

____ STEEL x PLASTIC
____ CONCRETE ____ OTHER (specify)

* SIZE OF CASING: 4 ½ INCHES IN DIAMETER

* DEPTH OF WELL: 390 FEET DEEP

* WAS ANY CASING REMOVED? ___ YES x NO
if yes, length removed, in feet: 2'

* WAS CASING RIPPED OR PERFORATED? x YES ___ NO

LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO
Bentonite	390	0

VOLUME OF MATERIAL USED
900 lbs. Bentonite 450 gal H20

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN — LICENSE # 517 — MWD/MSD/MGD CIRCLE ONE — DATE 4/11/14

DENV 828 JULY 1997

© MDE

EMERGENCY/TEMP NO. IF ANY

B 1 7983 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA-95-3469

fill in this form completely

Date Received (APA): 11-26-07 sak

OWNER INFORMATION

Burchell, Candace L (Last Name, First Name)

1194 Patuxent Rd. (Street or RFD)

Odenton, MD 21113 (Town, State, Zip)

DRILLER INFORMATION

Robert P Copsey M SD 161 (Driller's Name, License No.)

Wolford's Well + Pump Svc. (Firm Name)

4429 Mountain Rd - 21122 (Address)

Robert P. Copsey 11/19/07 (Signature, Date)

LOCATION OF WELL

Anne Arundel (County)

Mary A. Warnick Prop. (Subdivision)

SECTION ____ LOT 2

Odenton (Nearest Town)

MILES FROM TOWN (enter 0 if in town): 3 M I

DIRECTION OF WELL FROM TOWN (CIRCLE BOX): N 8; NW 8–9; NE 8–9; W 8; TOWN; E 8; SW 8–9; S 8; SE 8–9

1194 Patuxent Rd. (NEAR WHAT ROAD)

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH N; WEST W 32 E EAST; SOUTH S

DISTANCE FROM ROAD: 15 Ft (ENTER FT OR MI)

18322 7 566

TAX MAP: 36 BLK: 15 PARCEL: 0318

WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): 8

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 300

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- 22 [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

COUNTY NAME: AA — COUNTY NO.: 02

STATE SIGNATURE: ____ INSERT S →

DATE ISSUED: 11/28/07 — CO SIGNATURE: Juliarna Scott — EXP. DATE: 11/28/08

NORTH GRID: 439000 — EAST GRID: 0881000

APPROXIMATE DEPTH OF WELL: 250 FEET

APPROXIMATE DIAMETER OF WELL: 4 NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered)	JETTED	Jetted & DRIVEN
30 AIR-ROTary	AIR-PERcussion	(ROTARY (Hydraulic Rotary))
37 CABLE	REVerse-ROTary	DRive-POINT

other ____

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) 41 __ __ - __ __ - __ __ __ __ 52

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X →

SOURCES OF DRILLING WATER
1. AA-81-0990
2. AA-81-9800
3.

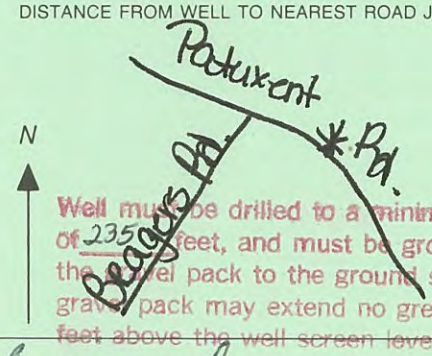
TO20 348 96 06 C

WRITE THE BOX NUMBER FROM THE MAP HERE

E 880 000

N 430 000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



Well must be drilled to a minimum depth of 235 feet, and must be grouted from the gravel pack to the ground surface. The gravel pack may extend no greater than 10 feet above the well screen level.

12 F12

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER ____ G ____

PERMIT No. AA-95-3469

SPECIAL CONDITIONS
NOTE – APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

Radium Testing Required

4000-9006-9850

DENV-Permit 97

① ORIGINAL

C 1 | 3485 — SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY — DATE Received: MAR 04 2008

DATE WELL COMPLETED: MM 01 DD 23 YY 08

Depth of Well: 275 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-95-3469

OWNER: Burchell (last name) Candace L. (first name)

STREET OR RFD: 1194 Patuxent Road — TOWN: Odenton, MD 21113

SUBDIVISION: Mary A Warnick Prop. — SECTION: — LOT: 2

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown White Sand & Gravel	0	15	
White Clay	15	20	
Black White Sand	20	38	
Red White Clay	38	60	
Red Gray Clay	60	90	
Red Clay	90	110	
White Clay	110	122	
Red Gray Clay	122	140	
Red Clay	140	160	
Brown White Sand	160	190	
Red White Clay	190	215	
Brown White Sand	215	240	
White Clay	240	248	
Brown White Sand	248	275	****

NUMBER OF UNSUCCESSFUL WELLS: ____

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M 3D 1161 — Robert D. Cosey
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: JS D028 — Michael Sinevan
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N]

TYPE OF GROUTING MATERIAL (Circle one): CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS: 14 — NO. OF POUNDS: 700

GALLONS OF WATER: 350

DEPTH OF GROUT SEAL (to nearest foot): from 0 ft. (TOP) to 260 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below: [ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	225

OTHER CASING (if used) — EACH CASING

	diameter inch	depth (feet) from	to
PL	2	225	265

SCREEN RECORD
screen type or open hole — insert appropriate code below: [ST] STEEL [BR] BRASS BRONZE [PL] PLASTIC [HO] OPEN HOLE [OT] OTHER

C 2

EACH SCREEN	TYPE	DEPTH (nearest ft.) from	to
1	PL	265	275
2			
3			

SLOT SIZE 1: .010 2: ____ 3: ____

DIAMETER OF SCREEN: 2 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 260 to 275

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
TELESCOPE CASING: T — LOG INDICATOR: ____ — OTHER DATA: ____

C 3

PUMPING TEST
HOURS PUMPED (nearest hour): 2

PUMPING RATE (gal. per min.): 60

METHOD USED TO MEASURE PUMPING RATE: AIR

WATER LEVEL (distance from land surface)
BEFORE PUMPING: 45 ft.
WHEN PUMPING: 63 ft.

TYPE OF PUMP USED (for test): [A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10

PUMP HORSE POWER: .75

PUMP COLUMN LENGTH (nearest ft.): 100

CASING HEIGHT (circle appropriate box and enter casing height): [+] above / [–] below LAND SURFACE: 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES* (MEASUREMENTS TO WELL)

ROAD, N-Ra 235

DENV-CR00

ORIGINAL

EMERGENCY/TEMP NO. IF ANY

B 1 **24223** SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA - 14 - 0211

fill in this form completely

Date Received (APA): 06/11/15

OWNER INFORMATION

Cozzone Sr James M.
Last Name Owner First Name

1200 Patuxent Rd.
Street or RFD

Owenton MD 21113
Town State Zip

LOCATION OF WELL

Anne Arundel Co.
COUNTY

Brogers Station
SUBDIVISION

SECTION ____ LOT ____

Owenton
NEAREST TOWN

DRILLER INFORMATION

John Greer MD5 Dolce
Driller's Name License No.

H.J. Greer & Sons Drilling Co. Inc.
Firm Name

P.O. Box 1415 Glen Burnie, MD 21061
Address

Signature Date 6-1-15

B 4 SOURCES OF DRILLING WATER: Well Driller TA04000-90045651

1200 Patuxent Rd
STREET ADDRESS

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH N, W WEST, E EAST, S SOUTH

DISTANCE FROM ROAD: 1000 FT.

TAX MAP 0036 BLK 005 PARCEL 019

B 2 **WELL INFORMATION**

APPROX. PUMPING RATE (GAL. PER MIN.): 10

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 500

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- D DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)
- I INDUSTRIAL, COMMERCIAL, DEWATERING
- P PUBLIC WATER SUPPLY WELL
- T TEST, OBSERVATION, MONITORING
- O OPEN LOOP GEOTHERMAL
- C CLOSED LOOP GEOTHERMAL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

COUNTY NAME: Anne Arundel COUNTY NO.: 02

STATE SIGNATURE: INSERT S

DATE ISSUED: 06/11/15 CO SIGNATURE: EXP. DATE: 6/11/16

APPROXIMATE DEPTH OF WELL: 150 FEET

APPROXIMATE DIAMETER OF WELL: 4 NEAREST INCH

METHOD OF DRILLING (circle one)

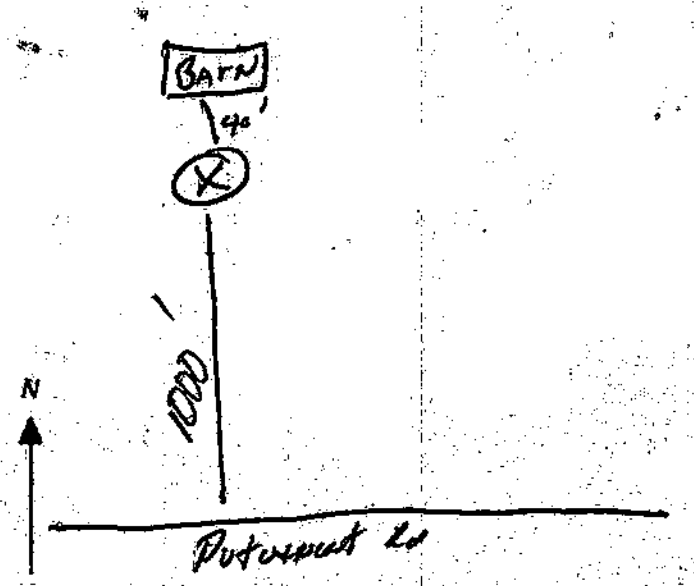
BORED (or Augered) JETTED Jetted & DRIVEN
AIR-ROTary AIR-PERcussion ROTARY (Hydraulic Rotary)
CABLE REVerse-ROTary DRive-POINT
other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- N THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

PROPOSED LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES SUCH AS BUILDINGS, SEPTIC SYSTEM, ROADS AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCE MEASUREMENTS TO WELL



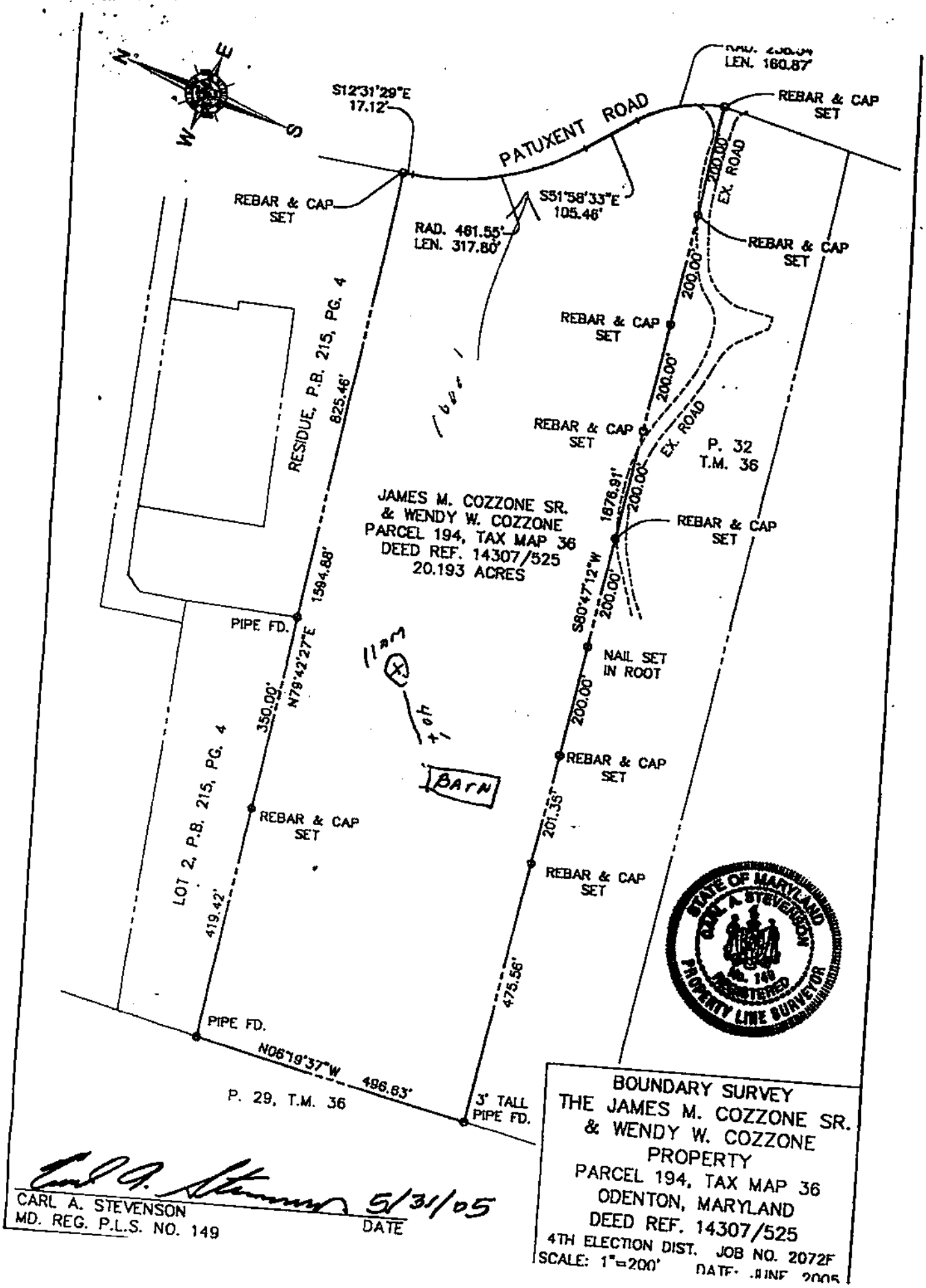
Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER _ _ _ _ _ _ G _ _ _

PERMIT No. AA - 14 - 0211

SPECIAL CONDITIONS: Non Potable Use Only

NOTE: APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED



CARL A. STEVENSON
MD. REG. P.L.S. NO. 149

5/31/05
DATE

BOUNDARY SURVEY
THE JAMES M. COZZONE SR.
& WENDY W. COZZONE
PROPERTY
PARCEL 194, TAX MAP 36
ODENTON, MARYLAND
DEED REF. 14307/525
4TH ELECTION DIST. JOB NO. 2072F
SCALE: 1"=200' DATE: JUNE 2005

C 1 32963
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received 08/11/15

DATE WELL COMPLETED 07/01/15

Depth of Well 134 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-14-0211

OWNER Cozzone Sr. James M.
WELL SITE ADDRESS 210 Patuxent Rd. TOWN Oldenton
SUBDIVISION Bragers Station SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
		22	
White Clay	22	41	
Brown Sand	41	65	
Red Clay	65	110	
White Clay	110	121	
Med. Brown sand	121	134	

Cont #00101

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED yes Y no N

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: MD086

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y 44 no N 44

TYPE OF GROUTING MATERIAL (Circle one)
CEMENT CM 45 46 BENTONITE CLAY BC 47 48

NO. OF BAGS 7 NO. OF POUNDS 350
GALLONS OF WATER 175
DEPTH OF GROUT SEAL (to nearest foot)
from 4 ft. (48 TOP 52) to 70 ft. (54 BOTTOM 58)
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	129 (66 70)

OTHER CASING (if used) — EACH CASING
diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below
ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2 (1 2)
DEPTH (nearest ft.) — EACH SCREEN
1: 31 (8 9) 129 (11 15) 134 (17 21)
2: (23 24) (26 30) (32 36)
3: (38 39) (41 45) (47 51)

SLOT SIZE 1 0 2 20 3 0

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 — from 124 to 134 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING
(E.R.O.S.) (72) LOG INDICATOR
W Q (74 75 76) OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 2 (8 9)
PUMPING RATE (gal. per min.) 20 (11 15)
METHOD USED TO MEASURE PUMPING RATE Bucket
WATER LEVEL (distance from land surface)
BEFORE PUMPING 35 (17 20) ft.
WHEN PUMPING 45 (22 25) ft.

TYPE OF PUMP USED (for test)
A air (27) P piston (27) T turbine (27)
C centrifugal (27) R rotary (27) O other (describe below) (27)
J jet (27) S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10 (31 35)
PUMP HORSE POWER (37 41)
PUMP COLUMN LENGTH (nearest ft.) 90' (43 47)
CASING HEIGHT (circle appropriate box and enter casing height) + above (49) − below (49) LAND SURFACE (50 51) (nearest foot)

LATITUDE 39.033365
LONGITUDE 76.217515
(DEFAULT COORD. WGS 84)
NOTES: Hot Barn
(X) New well
100'
Patuxent Rd
Farmwell - Non Potable Use

MDE/WMA/PER.071

COUNTY

C 1 5550 (1 2 3 6)

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM 11 DD 5 YY 98 (8 13)

DATE WELL COMPLETED MM 11 DD 4 YY 98 (15 20)

Depth of Well 22 37 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-94-3297 (28 29 30 31 32 33 34 35 36 37)

OWNER Lanham v Alice (last name first name)
STREET OR RFD 1250 Patuxent Road TOWN Odenton
SUBDIVISION Woodward Villa SECTION ____ LOT ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown Clay	0	10	
Sand & Gravel	10	24	
White Clay	24	31	
Med Brown Sand	31	37	

NUMBER OF UNSUCCESSFUL WELLS: ____

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
(A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M S D 0 8 6

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)
CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 3 NO. OF POUNDS 250
GALLONS OF WATER 75
DEPTH OF GROUT SEAL (to nearest foot)
from 4 (48 TOP 52) ft. to 30 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[ST] STEEL [CO] CONCRETE [PK] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	32 (66 70)

EACH CASING — OTHER CASING (if used)

	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below
[ST] STEEL [BR] BRASS BRONZE [PK] PLASTIC [HO] OPEN HOLE [OT] OTHER

C 2 (1 2)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL (8 9)	32 (11 15)	37 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 020 2 ____ 3 ____

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 — from 27 to 37 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
70 TELESCOPE CASING; 72 LOG INDICATOR; 74 75 76 OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 2 (8 9)

PUMPING RATE (gal. per min.) 15 (11 15)

METHOD USED TO MEASURE PUMPING RATE Bassil

WATER LEVEL (distance from land surface)
BEFORE PUMPING 15' (17 20) ft.
WHEN PUMPING 20' (22 25) ft.

TYPE OF PUMP USED (for test)
[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) (YES) NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)

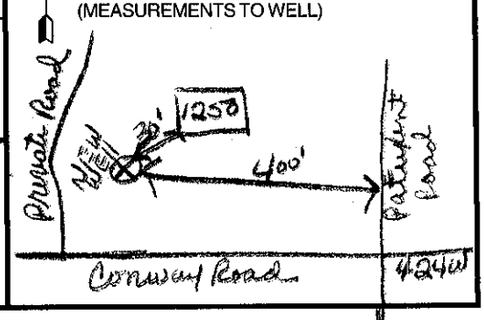
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 15 (31 35)

PUMP HORSE POWER .50 (37 41)

PUMP COLUMN LENGTH (nearest ft.) 30' (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)
[+] above (49) / [−] below (49) LAND SURFACE 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR97 ② COUNTY R; (−)

EMERGENCY/TEMP NO. IF ANY

B 1 | 3268 (1 2 3 6) SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA-94-3297 (70–79)

fill in this form completely

Date Received (ARA): 10-28-98 (8 MM DD YY 13)

OWNER INFORMATION

Lanham V Alice (15 Last Name, Owner, First Name 34)

1250 Patuxent Road (36 Street or RFD 55)

Odenton MD 21113 (57 Town, 70 State, 72 Zip 76)

DRILLER INFORMATION

John Greer — MSD 086 (Driller's Name 76, License No. 81)

H.G. Greer Drilling Co., Inc. (Firm Name)

P.O. Drawer A Gambrills, MD 21054 (Address)

(Signature) — 10-28-98 (Date)

B 3 LOCATION OF WELL

Anne Arundel (8 COUNTY 21)

Woodwardville (23 SUBDIVISION 42)

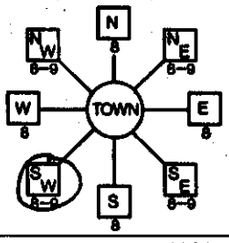
SECTION (44 46) LOT (48 50)

Odenton (52 NEAREST TOWN 71)

MILES FROM TOWN (enter 0 if in town): 4 M (73 76 77 78)

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



1250 Patuxent Road (11 NEAR WHAT ROAD 30)

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH N, WEST W, 32, E EAST, S SOUTH

34 401 37 DISTANCE FROM ROAD — FT (ENTER FT OR MI 38 39)

TAX MAP: 36 BLK: 15 PARCEL 0023

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): 10 (8 12)

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 500 (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- 22 [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel — 02 (COUNTY NAME, COUNTY NO.)

STATE SIGNATURE _____ INSERT S → (41)

DATE ISSUED: 102898 (43 MM DD YY 48) — Barry D. Adams (CO SIGNATURE) — 102899 (EXP. DATE)

NORTH GRID: 436 000 (50 55) EAST GRID: 0881 000 (57 63)

APPROXIMATE DEPTH OF WELL: 100 FEET (24 28)

APPROXIMATE DIAMETER OF WELL: 4 NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN

30 AIR-ROTary — AIR-PERcussion — (ROTARY (Hydraulic Rotary))

37 CABLE — REVerse-ROTary — DRive-POINT

other _____

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X →

SOURCES OF DRILLING WATER
1. Well Drillers
2. TAX # 145 225
3. 4000-0108-3600

WRITE THE BOX NUMBER FROM THE MAP HERE

E 880 (~~870~~)

N 430

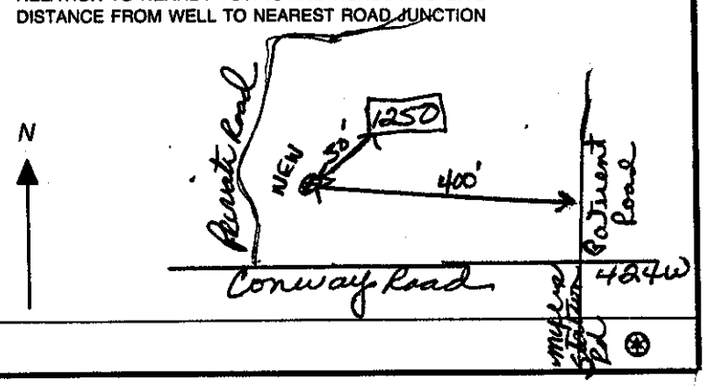
000 000

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- [N] THIS WELL WILL NOT REPLACE AN EXISTING WELL
- (Y) THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) 41 — — — — — — — — 52

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER: GAP 94 (54 63)

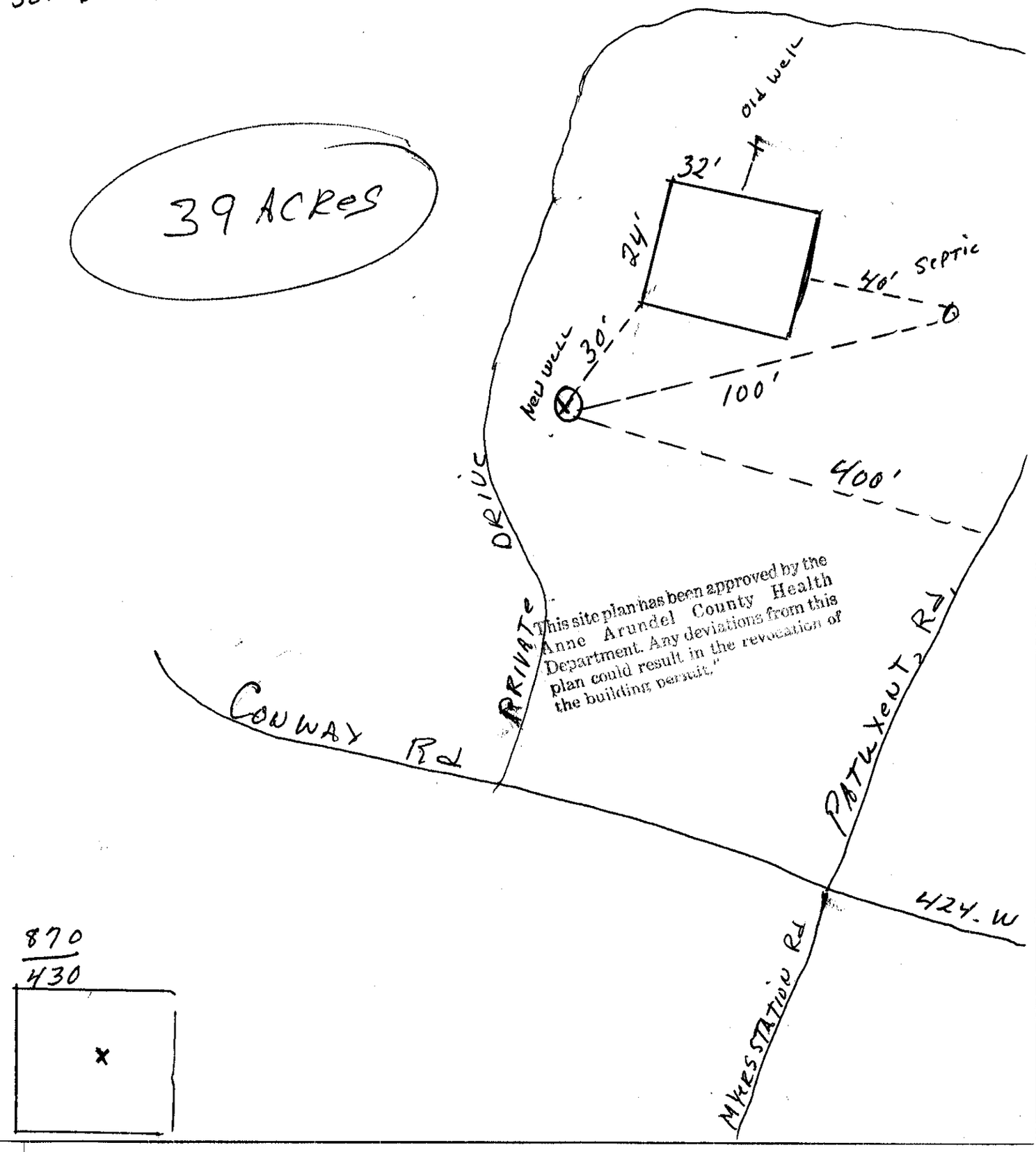
PERMIT No. AA-~~52~~-3297 (70 71 72 ~~73~~ 74 75 76 77 78 79)

SPECIAL CONDITIONS
NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED -

Lakeham
ALICE V. CHOWANETZ

1250 PATUXENT RD
ODENTON, Md.
301-621-7743

TAX Acc # 145225



870
430

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

11/5/98

WATER WELL ABANDONMENT-SEALING REPORT FORM

SUBMIT COPIES OF COMPLETED FORM TO:
- ★ COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
- ★ WELL OWNER
- ★ MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 11/4/98 (month/day/year)

★ PERMIT NUMBER OF ABANDONED WELL (if any) — —

★ PERMIT NUMBER OF REPLACEMENT WELL AA - 94 - 3297

★ PERSON ABANDONING WELL: John Greer

WELL DRILLERS LICENSE NUMBER: 086
CIRCLE: MWD/MSD/MGD

★ OWNER'S NAME: Alice V Lanham

★ WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Odenton
TAX MAP 36 BLOCK 15 PARCEL 0033
SUBDIVISION: Wood Wardsville
SECTION: _____ LOT: _____
NEAREST ROAD: 1250 Patuxent Road

MARYLAND GRID COORDINATES
BOX NUMBER E 880 N 430 <

X	
000 000	

SHOW WELL LOCATION BY X WITHIN BOX

★ TYPE OF WELL BEING ABANDONED:

X DRILLED ____ JETTED
____ BORED/AUGUERED ____ HAND DUG
____ OTHER (specify) _____

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Bentonite CLAY	37	—

★ USE CODE:

X DOMESTIC ____ MUNICIPAL/PUBLIC
____ IRRIGATION ____ INDUSTRIAL
____ TEST/OBSERVATION

★ TYPE OF CASING:

____ STEEL X PLASTIC
____ CONCRETE ____ OTHER (specify)

★ SIZE OF CASING: 4 INCHES IN DIAMETER

★ DEPTH OF WELL: 37 FEET DEEP

★ WAS ANY CASING REMOVED? ____ YES X NO
if yes, length removed, in feet: _____

★ WAS CASING RIPPED OR PERFORATED? ____ YES X NO

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN | LICENSE # 086 | MWD/MSD/MGD CIRCLE ONE | DATE 11-5-98

DENV 828 JULY 1993 2) COUNTY ENVIRONMENTAL AGENCY

ANNE ARUNDEL COUNTY
MARYLAND

DEPARTMENT OF HEALTH
J. HOWARD BEARD HEALTH SERVICES BUILDING
3 HARRY S. TRUMAN PARKWAY
ANNAPOLIS, MARYLAND 21401
410-222-7274
FAX 410-222-7294
TDD FOR THE HEARING IMPAIRED 410-222-7153
www.health.co.anne-arundel.md.us/

FRANCES B. PHILLIPS, R.N., M.H.A.
Health Officer

July 12, 1999

CHOWANETZ, ALICE
1250 PATUXENT RD
ODENTON, MD 21113

CERTIFICATE OF POTABILITY

This letter certifies that the requirements of COMAR 26.04.04 "WELL CONSTRUCTION REGULATIONS" have been met for the water supply system installed under permit number AA-94-3297 at the above referenced location.

The Anne Arundel County Department of Health has conducted an evaluation of this system and has tested the water produced by the well to determine if it met the standards set for the following parameters: coliform bacteria, nitrates, turbidity, sand, and radionuclides. The analyses indicate that the water does meet the applicable standards set for these parameters and has satisfied the review requirements of this department.

The well driller's signature on the completion report is his certification that well construction as performed under his supervision conforms to State of Maryland requirements.

Sincerely,

Kerry Topovski
Sanitary Engineering
Division of Community & Environmental Health

EMERGENCY/TEMP NO. IF ANY

B 1 7983 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA-95-3469

fill in this form completely

Date Received (APA): 11-26-07 SAK

OWNER INFORMATION

Burchell, Candace L (Last Name, Owner, First Name)

1194 Patuxent Rd. (Street or RFD)

Odenton, MD 21113 (Town, State, Zip)

DRILLER INFORMATION

Robert P Copsey M SD161 (Driller's Name, License No.)

Wolford's well + Pump Svc. (Firm Name)

4429 Mountain Rd - 21122 (Address)

Robert P. Copsey 11/19/07 (Signature, Date)

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): 8

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 300

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL

APPROXIMATE DEPTH OF WELL: 250 FEET

APPROXIMATE DIAMETER OF WELL: 4 NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN

AIR-ROTary — AIR-PERcussion — (ROTARY (Hydraulic Rotary))

CABLE — REVerse-ROTary — DRive-POINT

other

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER - - - - - - G - - -

PERMIT No. AA-95-3469

B 3 LOCATION OF WELL

Anne Arundel (COUNTY)

Mary A. Warnick Prop. (SUBDIVISION)

SECTION: ____ LOT: 2

Odenton (NEAREST TOWN)

MILES FROM TOWN (enter 0 if in town): 3

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX): (NW) (N) (NE) (W) TOWN (E) (SW) (S) (SE)

1194 Patuxent Rd. (NEAR WHAT ROAD)

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH (N) WEST (W) (S) EAST (E) SOUTH

DISTANCE FROM ROAD: 15 ENTER FT OR MI: FT

TAX MAP: 36 BLK: 15 PARCEL: 0318

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

COUNTY NAME: AA COUNTY NO.: 02

STATE SIGNATURE: INSERT S

DATE ISSUED: 11/28/07 CO SIGNATURE: Julianna Smith EXP. DATE: 11/28/08

NORTH GRID: 439000 EAST GRID: 0881000

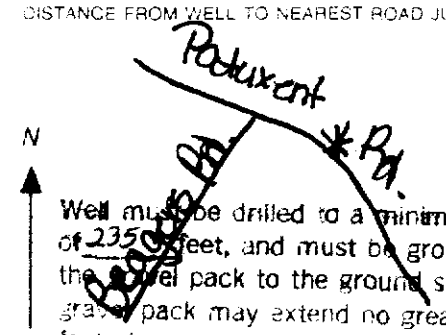
SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X: X

SOURCES OF DRILLING WATER
1. AA-81-0490
2. AA-81-9800
3. TD20 34896

WRITE THE BOX NUMBER FROM THE MAP HERE: 06 C

E 880 000
N 430 000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



Well must be drilled to a minimum depth of 235 feet, and must be grouted from the gravel pack to the ground surface. The gravel pack may extend no greater than 10 feet above the well screen level.

12 F 12

SPECIAL CONDITIONS: Radium Testing Required

DENV-Permit 97 — ORIGINAL

ANNE ARUNDEL COUNTY
MARYLAND
County Executive John R. Leopold

Department of Health
Division of Environmental Health
3 Harry S. Truman Parkway
Annapolis, MD 21401
Phone 410-222-7024 www.aahealth.org
Fax 410-222-7678

Frances B. Phillips, R.N., M.H.A.
Health Officer

April 11, 2008

CANDACE BURCHELL
1194 PATUXENT RD.
ODENTON, MD 21113

Re: BURCHELL, CANDACE
1194 PATUXENT RD
ODENTON, MD 21113

CERTIFICATE OF POTABILITY

This letter certifies that the requirements of COMAR 26.04.04 "WELL CONSTRUCTION REGULATIONS" have been met for the water supply system installed under permit number AA-95-3469 at the above referenced location.

The Anne Arundel County Department of Health has conducted an evaluation of this system and has tested the water produced by the well to determine if it met the standards set for the following parameters: coliform bacteria, nitrates, turbidity, sand, and radionuclides. The analyses indicate that the water does meet the applicable standards set for these parameters and has satisfied the review requirements of this department.

The well driller's signature on the completion report is his certification that well construction as performed under his supervision conforms to State of Maryland requirements.

Sincerely,

Brian Chew

Brian Chew, Program Supervisor
Sanitary Engineering Program
Division of Environmental Health

C 1 | 3485 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY — DATE Received MM DD YY: MAR 0 5 2008 (13)

DATE WELL COMPLETED: MM 01 DD 23 YY 08 (15–20)

Depth of Well: 22 275 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-95-3469 (28–37)

OWNER: Burchell, Candace L. (last name, first name)

STREET OR RFD: 1194 Patuxent Road TOWN: Odenton, MD 21113

SUBDIVISION: Mary A Warnick Prop. SECTION: LOT: 2

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown White Sand & Gravel	0	15	
White Clay	15	20	
Black White Sand	20	38	
Red White Clay	38	60	
Red Gray Clay	60	90	
Red Clay	90	110	
White Clay	110	122	
Red Gray Clay	122	140	
Red Clay	140	160	
Brown White Sand	160	190	
Red White Clay	190	215	
Brown White Sand	215	240	
White Clay	240	248	
Brown White Sand	248	275	****

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED: yes Y / no N

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M 3D 161

Robert D. Copsey
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: JS 028

Michael Sinevon
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y 44 / no N 44

TYPE OF GROUTING MATERIAL (Circle one): CEMENT CM 45 46 / BENTONITE CLAY BC

NO. OF BAGS 14 NO. OF POUNDS 700

GALLONS OF WATER 360

DEPTH OF GROUT SEAL (to nearest foot): from 0 ft. (48 TOP 52) to 260 ft. (54 BOTTOM 58) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below: ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER

MAIN CASING TYPE: PL (60 61) — Nominal diameter top (main) casing (nearest inch): 4 (63 64) — Total depth of main casing (nearest foot): 225 (66 70)

EACH CASING — OTHER CASING (if used): PL, diameter 2 inch, depth (feet) from 225 to 265

SCREEN RECORD
screen type or open hole insert appropriate code below: ST STEEL, BR BRASS BRONZE, HO OPEN HOLE, PL PLASTIC, OT OTHER

EACH SCREEN — DEPTH (nearest ft.)
1: PL 265 275 (8 9 / 11 15 / 17 21)
2: (23 24 / 26 30 / 32 36)
3: (38 39 / 41 45 / 47 51)

SLOT SIZE 1: .010 2: 3:

DIAMETER OF SCREEN: 2 (NEAREST INCH) (56 60)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 260 to 275 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
70 TELESCOPE CASING; 72 LOG INDICATOR; 74 75 76 OTHER DATA

PUMPING TEST
HOURS PUMPED (nearest hour): 2 (8 9)

PUMPING RATE (gal. per min.): 60 (11 15)

METHOD USED TO MEASURE PUMPING RATE: AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 45 ft. (17 20)

WHEN PUMPING: 63 ft. (22 25)

TYPE OF PUMP USED (for test): A air, P piston, T turbine, C centrifugal, R rotary, O other (describe below), J jet, S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S (29)

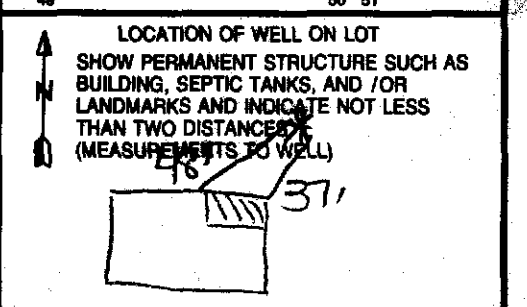
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10 (31 35)

PUMP HORSE POWER: .75 (37 41)

PUMP COLUMN LENGTH (nearest ft.): 100 (43 47)

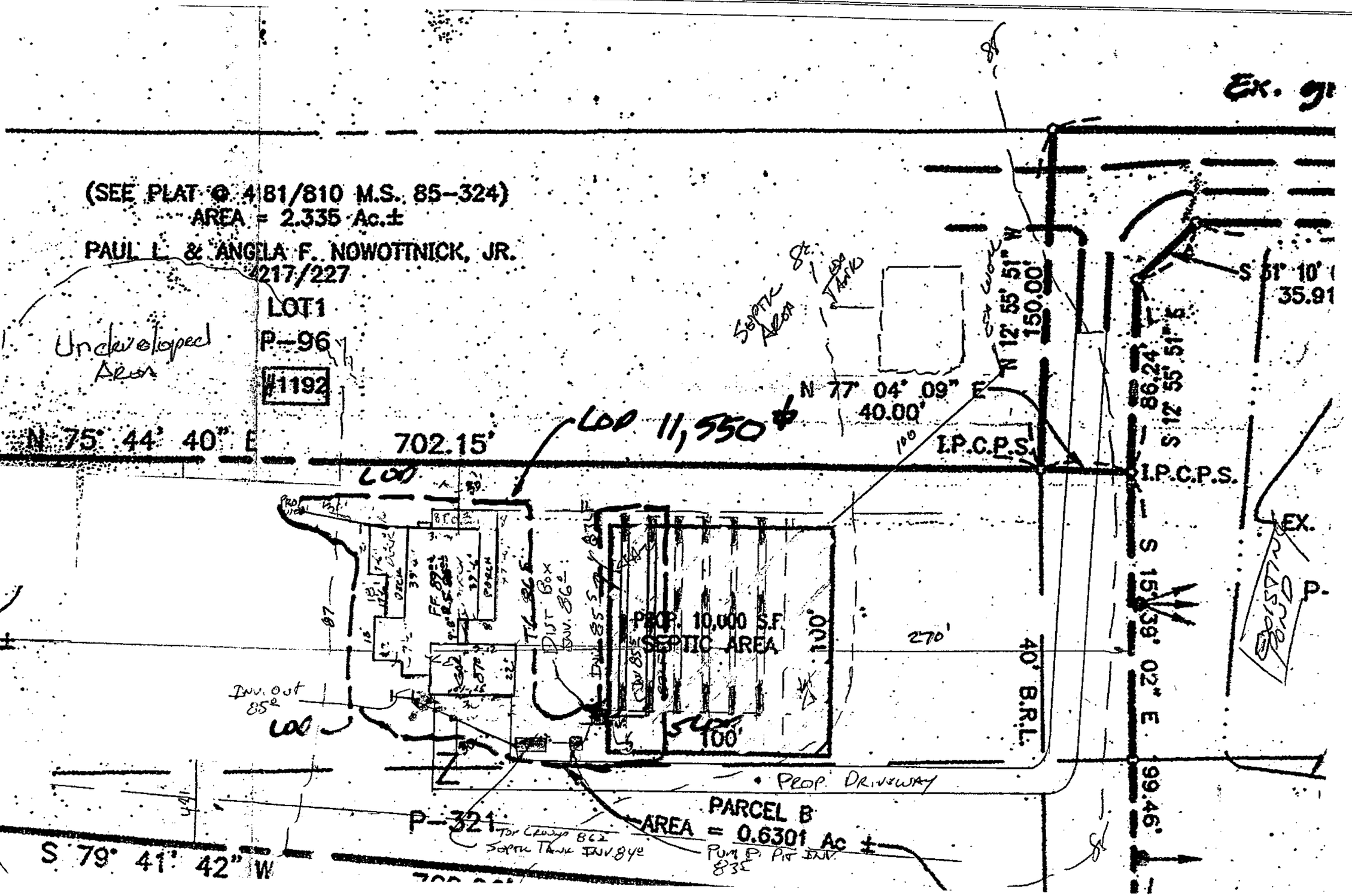
CASING HEIGHT (circle appropriate box and enter casing height): + above, − below (49) — LAND SURFACE (nearest) foot (50 51)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



DENV-CR00

COUNTY


Ex. 91
(SEE PLAT @ 481/810 M.S. 85-324)
AREA = 2.335 Ac.±
PAUL L. & ANGELA F. NOWOTTNICK, JR.
217/227
LOT 1
P-96
#1192
Undeveloped Area
N 75° 44' 40" E
702.15'
LOD 11,550 ±
N 77° 04' 09" E
40.00'
I.P.C.P.S.
N 12° 55' 51" W
150.00'
S 51° 10'
35.91
S 12° 55' 51" E
86.24'
I.P.C.P.S.
EX.
P-
S 15° 39' 02" E
99.46'
PROP. 10,000 S.F. SEPTIC AREA
100'
270'
40' B.R.L.
PROP. DRIVEWAY
PARCEL B
AREA = 0.6301 Ac ±
P-321
S 79° 41' 42" W
Septic Area
Dist Box
Inv. out 85
LOD
Top Group 86
Septic Tank Inv. 84
Pump Pit Inv. 83

(35)

C 1 00304 — SEQUENCE NO. (DWR USE ONLY)

(SEQ. NO.) (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401

WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (DWR USE ONLY): 13072

DATE WELL COMPLETED: 8-9-72 (08 09 72)

DEPTH OF WELL: 193 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-DG-0143

DRILLERS IDENTIFICATION NO.: 135

OWNER: WIST JAMES (LAST NAME)

STREET OR RFD: Box 376 Patuxent Rd. POST OFFICE: Odenton, Md.

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Top Soil	0	1	
Gravel	1	30	
White Clay	30	80	
Fine Sand	80	92	
Red Clay	92	160	
White Clay	160	178	
Medium Sand			
Sand	178	193	

WELL DESCRIPTION

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES [V] NO [N]

TYPE OF GROUTING MATERIAL (CIRCLE BOX): CEMENT [C M]; BENTONITE CLAY [B C]

NO. OF BAGS _____ NO. OF POUNDS _____

GALLONS OF WATER _____

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM _____ FT. TO _____ FT. (MUST BE 10 FT. FROM SURFACE)

CASING RECORD

TYPE (INSERT APPROPRIATE CODE BELOW): STEEL [S T]; CONCRETE [C O]; PLASTIC [P L]; OTHER [O T]

MAIN CASING TYPE: ST; NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH): 4; TOTAL DEPTH OF MAIN CASING (NEAREST FOOT): 188

OTHER CASING (IF USED)

DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): STEEL [S T]; BRASS OR BRONZE [B R]; OPEN HOLE [H O]; PLASTIC [P L]; OTHER [O T]

C 2 (SEQ. NO.)

DEPTH (NEAREST WHOLE FOOT): PL 188 193

SLOT SIZE: 0.30

DIAMETER OF SCREEN: 4 (NEAREST INCH)

GRAVEL PACK: FROM _____ TO _____

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: P

DWR USE ONLY (NOT TO BE FILLED IN BY DRILLER): TELESCOPE CASING; LOG INDICATOR; OTHER DATA AVAILABLE

C 3 (SEQ. NO.)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 1

PUMPING RATE GALLONS PER MINUTE TO NEAREST GALLON: 50

METHOD USED TO MEASURE PUMPING RATE: Air Comp

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 3 (NEAREST FOOT)

AFTER PUMPING: 12 (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST): AIR [A]; PISTON [P]; TURBINE [T]; CENTRIFUGAL [C]; ROTARY [R]; OTHER (SEE BELOW) [O]; JET [J]; SUBMERSIBLE [S]

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX → SEE ABOVE: A, C, J, P, R, S, T, O)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES [V] NO [N]

CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON): Owners

PUMP HORSE POWER

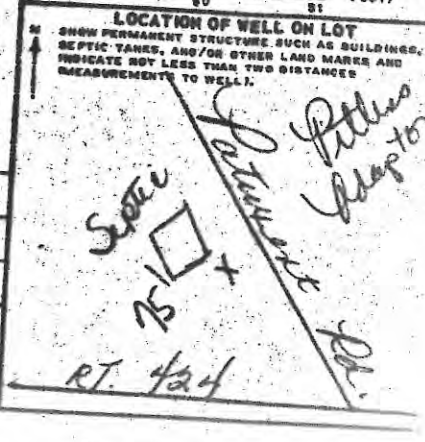
PUMP COLUMN LENGTH (NEAREST FOOT)

CASING HEIGHT

(CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT): ABOVE [+]; BELOW [−] LAND SURFACE: 1 (NEAREST FOOT)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES MEASUREMENTS TO WELL).



CIRCLE APPROPRIATE BOXES

[A] A WELL WAS DRILLED AND CASED WHEN THIS WELL WAS COMPLETED

[E] ELECTRIC LOG OBTAINED

[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH THE CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME: F. J. Green Drilling

DRILLER: Emerie E. Green

SIGNATURE: Harold J. Green

ORIGINAL

(31)

C L 9784 (SEQ. NO.) (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

DATE RECEIVED (OFFICE USE ONLY): 2 1 9 3

DATE WELL COMPLETED: 8-25-73 (082573)

DEPTH OF WELL: 72 ft. (TO NEAREST FOOT)

COUNTY NUMBER

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-73-1966

OWNER: Jackson (LAST NAME) Dorothy (FIRST NAME)

STREET OR RFD: Rt 1, Box 520

POST OFFICE: Odenton, Md.

DRILLERS IDENTIFICATION NO.: 136

WELL LOG — STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Top soil	0	2	
Sandstone	2	15	
White clay	15	45	
Coarse brown sand	45	72	

WELL DESCRIPTION

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES Y (44) NO N (44)

TYPE OF GROUTING MATERIAL (CIRCLE ONE): CEMENT C M (45,46) BENTONITE CLAY B C (45,46)

NO. OF BAGS ____ NO. OF POUNDS ____

GALLONS OF WATER ____

DEPTH RECORD IS FROM ____ FT. TO ____ FT. (TO NEAREST FOOT) (ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES — INSERT APPROPRIATE CODE BELOW: S T STEEL; C O CONCRETE; P L PLASTIC; O T OTHER

MAIN CASING TYPE: P L (60, 61) NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH): 4 (63, 64) TOTAL DEPTH OF MAIN CASING (NEAREST FOOT): 67 (66, 70)

OTHER CASING (IF USED) — EACH CASING: DIAMETER (INCH) DEPTH (FEET) FROM TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE — INSERT APPROPRIATE CODE BELOW: S T STEEL; B R BRASS OR BRONZE; H O OPEN HOLE; P L PLASTIC; O T OTHER

C 2 (SEQ. NO.)

EACH SCREEN: P L DEPTH (NEAREST WHOLE FOOT) FROM 67 (11, 15) TO 72 (17, 21)

SLOT SIZE 1. 0.30 (46, 47) 2. ____ (49, 51) 3. ____

DIAMETER OF SCREEN 2 (56, 60) (NEAREST INCH)

GRAVEL PACK FROM ____ TO ____

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: 68 F

DNR USE ONLY (NOT TO BE FILLED IN BY DRILLER) (E.G.S.)

TELESCOPE CASING T (70) — LOG INDICATOR (72) — OTHER DATA AVAILABLE (74, 75, 76)

C 3 (SEQ. NO.)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 1 (8, 9)

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON): 10 (11, 15)

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 40 (17, 20) (NEAREST FOOT)

WHEN PUMPING: 48 (22, 26) (NEAREST FOOT)

TYPE OF PUMPED USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST): A (27) AIR; P (27) PISTON; T (27) TURBINE; C (27) CENTRIFUGAL; R (27) ROTARY; O (27) OTHER (DESCRIBE BELOW); J (27) JET; S (27) SUBMERSIBLE

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX — SEE ABOVE: A, C, J, P, R, S, T, O): S (29)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES Y NO N

CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON): 8 (31, 35)

PUMP HORSE POWER: 1/2 (37, 41)

PUMP COLUMN LENGTH (NEAREST FOOT): 60 (43, 47)

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT): + ABOVE; − BELOW (49) LAND SURFACE: 1 (50, 51) (NEAREST FOOT)

CIRCLE APPROPRIATE BOXES

A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME: H. J. Greer Drilling Co

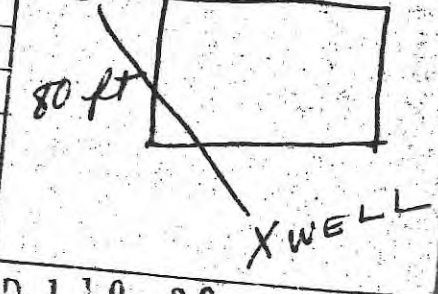
(PLEASE PRINT): Elmer E. Greer

SIGNATURE: Harold J. Greer

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

Pitless Adaptor



ORIGINAL

ENTERED 1 10 29

ENTERED 1 10

EMERGENCY NO. (If any)

B 1 3678 (SEQUENCE NO. DWR USE ONLY)
1 2 3 (SEQ. NO.) 6
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
STATE OFFICE BLDG., ANNAPOLIS, MARYLAND 21401
APPLICATION FOR PERMIT TO DRILL WELL

AA 73-2071

DATE RECEIVED (DWR USE ONLY) 09 26 73

OWNER CARTER, (COL 15 LAST NAME)
STREET OR RFD RT 1, BOX 365 (COL 36)
POST OFFICE ODENTON, MD. 21113 (COL 57)

B 1 CONTINUED (SEQ. NO.)

DRILLER INFORMATION

DATE 9/25/73 LICENSE NUMBER 55 (77–80)
H. H. BUNKER & SONS INC (FIRST NAME / DRILLER / LAST NAME)
SIGNATURE Donald R. Bunker

B 2 (SEQ. NO.)

WELL INFORMATION

MAXIMUM PUMPING RATE (GALLONS PER MINUTE) 10 (8–12)
AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY) 300 (14–21)

USE FOR WATER (CIRCLE APPROPRIATE BOX)
- (D) DOMESTIC, HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- [F] FARMING, AGRICULTURE, IRRIGATION
- [I] INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT.
- [M] MUNICIPAL WATER SUPPLY
- [P] PRIVATE WATER COMPANY
- [T] TEST

} MUST HAVE STATE HEALTH DEPT. APPROVAL

APPROXIMATE DEPTH OF WELL 80 (24–26) FEET

APPROXIMATE DIAMETER OF WELL 4 (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)
BORED (OR AUGERED) JETTED DRIVEN
30-37 AIR-ROTARY AIR-PERCUSSION (ROTARY) (HYDRAULIC ROTARY)
CABLE REVERSE-ROTARY DRIVE-POINT
OTHER (DESCRIBE)

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)
- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL
PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) (41–52)

NOT TO BE FILLED IN BY DRILLER (DWR USE ONLY)
APPROPRIATION PERMIT NUMBER (54–63) ENGINEER REVIEW DISTRICT NO. (65)
FORCE (67–68) WRITE INITIALS IN BOX
CONDITIONS A E N S G W Q C L U (70–79)

B 4 CONTINUED (SEQ. NO.)

HEALTH DEPARTMENT APPROVAL

41 [S] STATE HEALTH (CIRCLE BOX) COUNTY NAME AA COUNTY NO. 02
DATE MO. 09 DAY 26 YR. 73 (43–48)
APPROVED BY

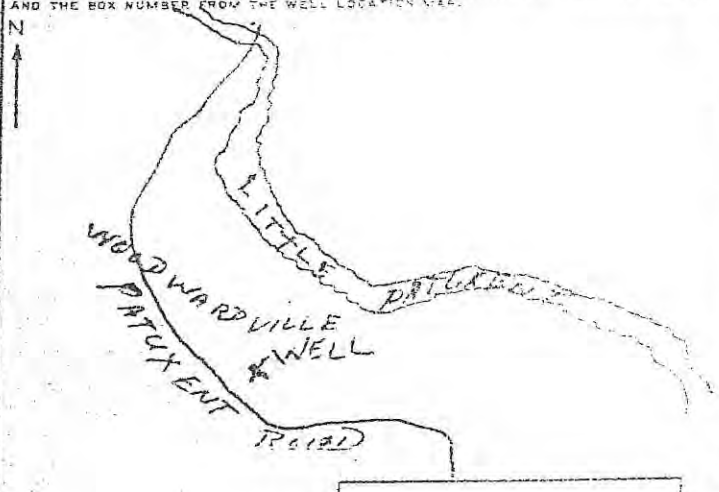
B 3 (SEQ. NO.)

LOCATION OF WELL
COUNTY ANNE ARUNDEL (8)
SUBDIVISION (22)
SECTION (44–46)
NEAREST TOWN WOODWARDVILLE (52)
MILES FROM TOWN (ENTER DIST. IN MILES)

B 4 (SEQ. NO.)

DIRECTION FROM TOWN
(N) NORTH (E) EAST (NE) NORTHEAST (SE)
(S) SOUTH (W) WEST (NW) NORTHWEST (SW)
NEAR WHAT ROAD PATUXENT ROAD (11)
ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) (N) (S) (E) (32)
DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX) 40 (34)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO ROADS AND STREAMS WITH NORTH IN THE DIRECTION OF THE TOP OF THE SKETCH. ALSO SHOW, BY MEANS OF AN "X", THE WELL LOCATION BELOW AND THE BOX NUMBER FROM THE WELL LOCATION MAP.



BOX NUMBER E 870 N 440

NORTH COORDINATE 44000 (50–55)
EAST COORDINATE 08750 (57–63)
ELEVATION AT WELL HEAD (FEET) (65–68)

B 5 (SEQ. NO.) SPECIAL CONDITIONS 8-63 (DWR USE ONLY)

ORIGINAL

ENTERED 1 09 69

WR-WL-8/71

C 1 4509 (SEQ. NO.) — SEQUENCE NO. (OWR USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401

WELL COMPLETION REPORT

DATE RECEIVED (OWR USE ONLY): 102373

DATE WELL COMPLETED: 10/9/73 (10 09 73)

DEPTH OF WELL: 70 (TO NEAREST FOOT)

AA 73 2071

OWNER: CARTER (LAST NAME) — ERNEST

STREET OR RFD: Rt. 1, Box 365 — POST OFFICE: Charlton, Md.

WELL DESCRIPTION

WELL LOG — STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Sand & gravel	0	12	
Layers of red clay & sand	12	30	
Red & blue clay	30	52	
Rock & white clay	52	62	
Medium tan sand	62	70	

GROUTING RECORD — WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): Y

TYPE OF GROUTING MATERIAL (CIRCLE ALL): CEMENT (C M) — BENTONITE CLAY (B C)

NO. OF BAGS: 10 — NO. OF POUNDS: 940

GALLONS OF WATER: 60

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 0 FT. TO 20 FT. (ENTER 0 IF FROM SURFACE)

CASING RECORD — CASING TYPES (INSERT APPROPRIATE CODE BELOW): STEEL (S T), CONCRETE (C O), PLASTIC (P L), OTHER (O T)

MAIN CASING TYPE	NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
P L	4	65

OTHER CASING (IF USED)

EACH CASING	DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD — SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): STEEL (S T), BRASS OR BRONZE (B R), OPEN HOLE (H O), PLASTIC (P L), OTHER (O T)

C 2 (SEQ. NO.)

EACH SCREEN		DEPTH (NEAREST WHOLE FOOT) FROM	TO
1	P L	65	70
2			
3			

SLOT SIZE 1. .030 2. 3.

DIAMETER OF SCREEN: 2 (NEAREST INCH)

GRAVEL PACK: FROM 63 TO 70

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: F

WATER LEVEL: BEFORE PUMPING: 15 — WHEN PUMPING: 28

1 hR

20gpm

TYPE OF PUMPED USED (FOR PUMPING TEST): A AIR, L PISTON, C CENTRIFUGAL, P ROTARY, J JET, S SUBMERSIBLE

METHOD OF MEASURING: Bucket

PUMP INSTALLED — TYPE OF PUMP (WRITE APPROPRIATE BOX OR FILE ABOVE): J

DRILLER WILL INSTALL THIS PUMP (CIRCLE APPROPRIATE BOX): Y

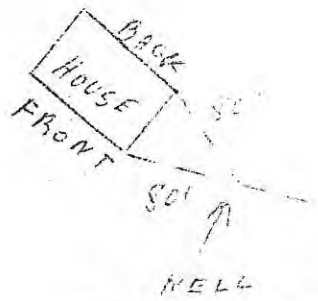
CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON): 8

PUMP HORSE POWER: 1/2

PUMP COLUMN LENGTH (NEAREST FOOT): 30

CASING HEIGHT (CIRCLE APPROPRIATE BOX): + ABOVE, − BELOW — LAND SURFACE: 7

LOCATION OF WELL ON LOT — N — SHOW PERMANENT STRUCTURE SUCH AS HOUSE, SEPTIC TANKS, AND DRIVEWAY (IF POSSIBLE) INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



CIRCLE APPROPRIATE BOXES

- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME: H. H. BUNKER & SONS, INC.

(PLEASE PRINT) Harold H. Bunker, Jr.

SIGNATURE: Harold H. Bunker, Jr.

OWR USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T	(E.R.O.S.)	W Q
70	72	74 75 76
TELESCOPE CASING	LOG INDICATOR	OTHER DATA AVAILABLE

ORIGINAL

DNR-131

EMERGENCY NO. (If any) - AA 73 2509

B 1 5895 SEQUENCE NO. (DWR USE ONLY)

1 2 3 (SEQ. NO.) 6
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
DEPARTMENT OF WATER RESOURCES
STATE OFFICE BLDG., ANNAPOLIS, MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL

AA 73 2509

DATE RECEIVED (DWR USE ONLY) 8 12 73

OWNER (COL 15 LAST NAME) McHenry William

STREET OR RFD (COL 37) Rt 1 - Box 47

POST OFFICE (COL 57) ~~Odenton~~ Severna Park

5-13

B 1 CONTINUED (SEQ. NO.) 6

DRILLER INFORMATION

DATE 11-28-73 LICENSE NUMBER 239 ~~230~~

John Bruce Houston
FIRST NAME DRILLER LAST NAME

SIGNATURE JB Houston

B 2 (SEQ. NO.) 6

WELL INFORMATION

MAXIMUM PUMPING RATE (GALLONS PER MINUTE) 8

AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY) 300

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) DOMESTIC, HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F FARMING, AGRICULTURE, IRRIGATION
- I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT
- M MUNICIPAL WATER SUPPLY } MUST HAVE STATE HEALTH DEPT. APPROVAL
- P PRIVATE WATER COMPANY
- T TEST

APPROXIMATE DEPTH OF WELL 70 FEET

APPROXIMATE DIAMETER OF WELL 4 (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)

BORED (OR AUGERED) JETTED DRIVEN
AIR-ROTARY AIR-PERCUSSION (ROTARY) (HYDRAULIC ROTARY)
CABLE REVERSE-ROTARY DRIVE-POINT

OTHER (DESCRIBE)

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

- N THIS WELL WILL NOT REPLACE AN EXISTING WELL
- (X) THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D THIS WELL WILL DEEPEN AN EXISTING WELL
  PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

NOT TO BE FILLED IN BY DRILLER (DWR USE ONLY)

APPROPRIATION PERMIT NUMBER G A P

ENGINEER REVIEW DISTRICT NO.

FORCE (WRITE INITIALS IN BOX)

CONDITIONS A E N S G W Q C L U

B 4 CONTINUED (SEQ. NO.) 6

HEALTH DEPARTMENT APPROVAL

STATE HEALTH (CIRCLE BOX) S

COUNTY NAME COUNTY NO. 02

DATE MO. DAY YR. 1 1 2 8 7 3

APPROVED BY

B 3 (SEQ. NO.) 6

COUNTY Anne Arundel

SUBDIVISION Woodwardville

SECTION

NEAREST TOWN Woodwardville

MILES FROM TOWN

B 4 (SEQ. NO.) 6

DIRECTION FROM TOWN

- N NORTH
- S SOUTH
- E EAST
- W WEST

NEAR WHAT ROAD Private

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)

DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX) 46

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO ROADS AND STREAMS WITH NORTH ARROW. ENTER DISTANCE FROM WELL TO NEAREST ROAD. ALSO SHOW BY MEANS OF AN "X" THE WELL SITE ON THE SKETCH. ALSO SHOW BY MEANS OF AN "X" THE WELL SITE ON THE SKETCH AND THE BOX NUMBER FROM THE WELL LOCATION MAP.

N

Private Rd

• well

Patuxent Rd

BOX NUMBER E 370 N 240

NORTH COORDINATE 445000

EAST COORDINATE 0815000

ELEVATION AT WELL HEAD (FEET)

B 5 (SEQ. NO.) 6

SPECIAL CONDITIONS 8-63 (DWR USE ONLY)

WR-W-4 9/71

C 1 9727 (SEQ. NO.) — SEQUENCE NO. (DWR USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-5 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

AA 73 2509

DATE RECEIVED — (DWR USE ONLY): 031974

DATE WELL COMPLETED: 2-8-74 (020874)

DEPTH OF WELL (TO NEAREST FOOT): 140'

OWNER: McHenry, William (LAST NAME)

STREET OR RFD: RT #1 BX 47

POST OFFICE: SEVERN, Md.

WELL DESCRIPTION

WELL LOG — STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
sand	0	8	
white clay	8	23	
sand	23	25	
red clay	25	80	
sand	80	84	
red clay	84	125	
water bearing sand	125	140	✓

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): Y / N

TYPE OF GROUTING MATERIAL USED: CEMENT (C M) — BENTONITE CLAY (B C)

NO. OF BAGS: 1 — NO. OF GALLONS: 100 #

GALLONS OF WATER: 70 gal

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 3 FT. TO 25' FT.

(ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): STEEL (S T) — CONCRETE (C O) — PLASTIC (P L) — OTHER (O T)

MAIN CASING TYPE: P L — NOMINAL DIAMETER FOR MAIN CASING (NEAREST INCH): 4" — TOTAL DEPTH OF MAIN CASING (NEAREST FOOT): 133'

OTHER CASING (IF USED) — EACH CASING: DIAMETER (INCH) — DEPTH (FEET) FROM — TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): STEEL (S T) — BRASS OR BRONZE (B R) — OPEN HOLE (H O) — PLASTIC (P L) — OTHER (O T)

C 2 (SEQ. NO.)

EACH SCREEN — DEPTH (NEAREST WHOLE FOOT): FROM / TO

1: P L — 130' / 140'

2:

3:

SLOT SIZE: 1 .025 2 3

DIAMETER OF SCREEN: 3 (NEAREST INCH)

GRAVEL PACK: FROM 128 TO 140

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: F

DWR USE ONLY (NOT TO BE FILLED IN BY DRILLER): T — (S.R.O.S.) — W Q — TELESCOPE CASING — LOG INDICATOR — OTHER DATA AVAILABLE

PUMPING TEST

HOURS PUMPED: 1 ½

PUMPING RATE (GALLONS PER MINUTE): 15

METHOD MEASURING PUMPING RATE: Bucket & watch

WATER LEVEL: BEFORE PUMPING: 73

WHEN PUMPING: ?

TYPE OF PUMPED USED (FOR PUMPING TEST): A — C — D

PUMP INSTALLED

TYPE OF PUMP INSTALLED (CIRCLE APPROPRIATE BOX — SEE ABOVE): A C D

DRILLER WILL INSTALL PUMP (CIRCLE FOR DWR USE): Y / N

CAPACITY: GALLONS PER MIN. (TO NEAREST 10 GPM)

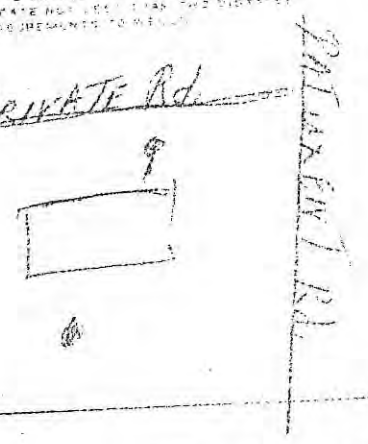
PUMP HORSE POWER

PUMP TO BE SET LENGTH (NEAREST FOOT)

CASING HEIGHT (CIRCLE APPROPRIATE BOX): + ABOVE / − BELOW — LAND SURFACE: 1'

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURES, SUCH AS HOUSE, SEPTIC TANK, AND ROADS ON LOT AND INDICATE NORTH. INDICATE DISTANCES IN MEASUREMENTS TO WELL.



CIRCLE APPROPRIATE BOXES

- (A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- (E) ELECTRIC LOG OBTAINED
- (P) TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT): VERGIL S. ERNSBERGER

SIGNATURE: Vergil S. Ernsberger

ORIGINAL

TAWES STATE OFFICE BLDG. ANNAPOLIS, MARYLAND 21401

APPLICATION FOR PERMIT TO DRILL WELL

Ht 73 3273

(NUMBER IS TO BE PUNCHED IN 2-6 ON ALL CARDS)

(WRA USE ONLY) 07167

OWNER: Thomas, Leon H., Jr. (LAST NAME) (FIRST NAME)

STREET OR RFD: Rt. 1, Box 394 X

POST OFFICE: Odenton

B 1 — DRILLER INFORMATION

CONTINUED (SEQ. NO.)

DATE: 7/11/74 LICENSE NUMBER: 80

John E. Brenham (FIRST NAME) DRILLER (LAST NAME)

SIGNATURE: John E. Brenham

B 2 — WELL INFORMATION

MAXIMUM PUMPING RATE (GALLONS PER MINUTE): 10

AVERAGE DAILY QUANTITY NEEDED (GALLONS PER DAY): 600

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- D — HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)
- F — FARMING, AGRICULTURE, IRRIGATION
- I — INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOVERNMENT
- M — MUNICIPAL WATER SUPPLY
- P — PRIVATE WATER COMPANY
- T — TEST

(M, P: MUST HAVE STATE HEALTH DEPT. APPROVAL)

APPROXIMATE DEPTH OF WELL: 110 FEET

APPROXIMATE DIAMETER OF WELL: 4 (NEAREST INCH)

METHOD OF DRILLING USED (CIRCLE APPROPRIATE METHOD)

BORED (OR AUGERED) JETTED DRIVEN

AIR-ROTARY AIR-PERCUSSION ROTARY (HYDRAULIC ROTARY)

CABLE REVERSE-ROTARY DRIVE-POINT

OTHER (DESCRIBE):

REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

- N — THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y — THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- S — THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY
- D — THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

NOT TO BE FILLED IN BY DRILLER (WRA USE ONLY)

APPROPRIATION PERMIT NUMBER (A P) — ENGINEER REVIEW DISTRICT NO.

FORCE — WRITE INITIALS IN BOX

CONDITIONS: A E N S G W Q C L U

B 4 — HEALTH DEPARTMENT APPROVAL

CONTINUED (SEQ. NO.)

STATE HEALTH (CIRCLE BOX) — COUNTY NAME — COUNTY NO.

DATE (MO. DAY YR.): 07 12 74

APPROVED BY

B 3 — LOCATION OF WELL

COUNTY: Anne Arundel (DO NOT ABBREVIATE COUNTY NAME)

SUBDIVISION

SECTION — LOT

NEAREST TOWN: Conway

MILES FROM TOWN (ENTER 0 IF IN TOWN): 5 (M, T)

B 4 — DIRECTION FROM TOWN

(CIRCLE APPROPRIATE BOX)

N NORTH — E EAST — NE NORTHEAST — SE SOUTHEAST

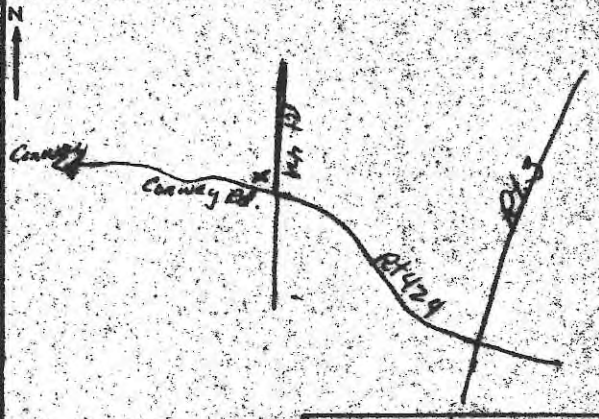
S SOUTH — W WEST — NW NORTHWEST — SW SOUTHWEST

NEAR WHAT ROAD: Conway Rd.

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH N — SOUTH S — EAST E — WEST W

DISTANCE FROM ROAD (ENTER DISTANCE AND CIRCLE APPROPRIATE BOX): 45 (F, T) (M, L)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS, ROADS AND STREAMS WITH NORTH IN THE DIRECTION OF THE ARROW, AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION OR STREAM CROSSING SHOWN ON THE SKETCH. ALSO SHOW, BY MEANS OF AN "X", THE WELL LOCATION IN THE BOX BELOW AND THE BOX NUMBER FROM THE WELL LOCATION MAP.

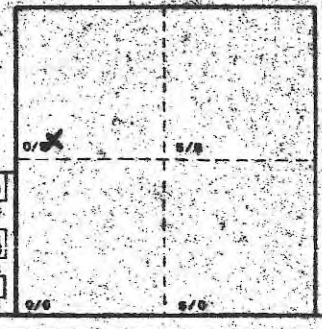


BOX NUMBER: E 880 N 430

NORTH COORDINATE: 439000

EAST COORDINATE: 0880000

ELEVATION AT WELL HEAD (FEET)



B — SPECIAL CONDITIONS (WRA USE ONLY)

ORIGINAL

ENTERED 111 53 !

(48)

120777

AA 73 8073

OWNER: Fincock (LAST NAME) — Raymond (FIRST NAME)

STREET OR RFD: Collins & Conway Rds — POST OFFICE: Clarksburg, MD 20871

WELL DESCRIPTION

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING.

DESCRIPTION (USE ADDITIONAL SHEETS, IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Brown clay	0	4	
Brown sand	4	18	
Red &blue clay	18	67	
Medium brown sand	67	69	X

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): Y N

TYPE OF GROUTING MATERIAL (CIRCLE): CEMENT (C M) 45 46 — BENTONITE CLAY (B C)

NO. OF BAGS 2 — NO. OF POUNDS

DEPTH OF GROUTING: 0 FT. TO 20 FT.

DEPTH OF CASING (NEAREST FOOT): FROM 3 FT. TO 20 FT. (48 52 54 58)

(ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPE (INSERT APPROPRIATE CODE BELOW): (S T) STEEL — (C O) CONCRETE — (P L) PLASTIC — (O T) OTHER

MAIN CASING TYPE: (F L) 60 61 — NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH): 4" 63 64 — TOTAL DEPTH OF MAIN CASING (NEAREST FOOT): 64 68 70

OTHER CASING (IF USED) — DIAMETER (INCH) — DEPTH (FEET) FROM

EACH CASING

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): (S T) STEEL — (B R) BRASS OR BRONZE — (H O) OPEN HOLE — (P L) PLASTIC — (O T) OTHER

C 2 (SEC. NO.)

DEPTH (NEAREST WHOLE FOOT) FROM 64 TO 69

EACH SCREEN

SLOT SIZE 1. 0.30 2. 3.

DIAMETER OF SCREEN 2 (NEAREST INCH) 58 60

GRAVEL PACK FROM TO

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: F

WELL USE ONLY (NOT TO BE FILLED IN BY DRILLER): 71 TELESCOPE CASING — 72 LOW INTERVAL — 74 75 76 OTHER (SPECIFY)

CIRCLE APPROPRIATE BOXES

A — WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLER'S NAME (PLEASE PRINT): J T Greer Drilling Co.

SIGNATURE: [signature]

C 3 — PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 2

PUMPING RATE GALLONS PER MINUTE TO NEAREST GALLON: 10

METHOD USED TO MEASURE PUMPING RATE: air

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 75 — DATE

AFTER PUMPING: 80 — DATE

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX): (A) AIR — (P) PISTON — (T) TURBINE — (C) CENTRIFUGAL — (R) ROTARY — (O) OTHER (SPECIFY) — (J) JET — (S) SUBMERSIBLE

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE TYPE OR BOX - S.C ABOVE): A, C, J, P, R, S

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): Y N

CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON): 7

PUMP HORSE POWER: 1/3

PUMP COLUMN LENGTH (NEAREST FOOT): 65

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT): + ABOVE — − BELOW — LAND SURFACE: 1 (NEAREST FOOT)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

N

Pitless Adaptor

Collins Rd

75 ft. x well house septic

(41)

C 1 3037 (SEQ. NO.)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

RESOURCE NO. (WRA USE ONLY)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401

WELL COMPLETION REPORT

THIS REPORT MUST BE COMPLETED IN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY): DEC 05 1978

DATE WELL COMPLETED: 10-26-78

DEPTH OF WELL: 248 ft (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-73-9729

1102678

OWNER: Queen (LAST NAME) Harry C. (FIRST NAME)

DRILLERS IDENTIFICATION NO. 136

STREET OR RFD: 396 Conaway Rd.

POST OFFICE: Odenton, MD 21113

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
rown clay	0	6	
Brown sand	6	[illegible]	
ite clay	35	68	
ed & white	68	225	
lay			
dium brown	225	248	x
d			

WELL DESCRIPTION

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

TYPE OF GROUTING MATERIAL (CIRCLE BOX): CEMENT (C M) BENTONITE CLAY (B C)

NO. OF BAGS: 300

GALLONS OF WATER: 250

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 3 FT. TO 35 FT. (ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): STEEL (S T), CONCRETE (C O), PLASTIC (P L), OTHER (O T)

MAIN CASING TYPE	NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
P L	4"	243

OTHER CASING (IF USED)

EACH CASING	DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): STEEL (S T), BRASS OR BRONZE (B R), OPEN HOLE (H O), PLASTIC (P L), OTHER (O T)

C 2 (SEQ. NO.)

EACH SCREEN	DEPTH (NEAREST WHOLE FOOT) FROM	TO
1	3	248
2		
3		

SLOT SIZE 1. 0.30 2. 3.

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK FROM TO

IF WELL DRILLED WAS A FLOWING ... CIRCLE BOX: (F)

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER) (C.R.O.S.)

TELESCOPE CASING: TC

LOG INDICATOR: L

OTHER DATA AVAILABLE: W Q

C 3 (SEQ. NO.)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 1

PUMPING RATE GALLONS PER MINUTE TO NEAREST GALLON: 15 ~~12~~

METHOD USED TO MEASURE PUMPING RATE: air

WATER LEVEL (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 55 (NEAREST FOOT)

WHEN PUMPING: 60 (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST): AIR (A), PISTON (P), TURBINE (T), CENTRIFUGAL (C), ROTARY (R), OTHER (DESCRIBE BELOW) (O), JET (J), SUBMERSIBLE (S)

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX — SEE ABOVE: A, C, J, P, R, S, T, O): S

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON): 12

PUMP HORSE POWER: 1/3

PUMP COLUMN LENGTH (NEAREST FOOT): 100

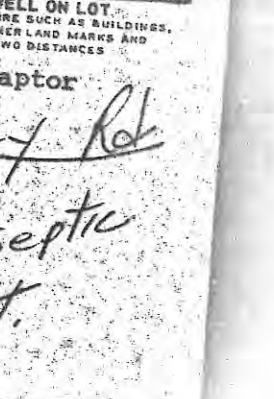
CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)

ABOVE (+) / BELOW (−) LAND SURFACE: 1 (NEAREST FOOT)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

Pitless Adaptor



CIRCLE APPROPRIATE BOXES

WELL WAS ABANDONED AND SEALED WHEN THIS WAS COMPLETED

GEOLOGIC LOG OBTAINED

WELL CONVERTED TO PRODUCTION WELL

I CERTIFY THAT I HAVE COMPLIED WITH ALL STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL", AND THAT INFORMATION CONTAINED ... IS TRUE, ACCURATE, AND COMPLETE ... BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

Green Drilling Co.

H H Green

DNR-214 (7-77)

C 1 1038 (SEQ. NO.) — SEQUENCE NO. (WRA USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-8 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY): NOV 07 1979

DATE WELL COMPLETED: 10-30-79 (10 30 79)

DEPTH OF WELL: 127 ft. (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-124-1350

DRILLERS IDENTIFICATION NO.: 136

OWNER: Snyder (LAST NAME) Lawrence (FIRST NAME)

STREET OR RFD: 2751 Conway Rd.

POST OFFICE: Odenton, MD 21113

WELL DESCRIPTION

WELL LOG — STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Brown sand & gravel	0	30	
White clay	30	41	
Red clay	41	124	
Medium brown sand	120	127	x

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

TYPE OF GROUTING MATERIAL (CIRCLE APPROPRIATE BOX): CEMENT (CM) BENTONITE CLAY (BC)

NO. OF BAGS: 3 NO. OF POUNDS: 300

GALLONS OF WATER: 200

FROM: 3 TO: 30 FT. (ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): STEEL (ST), CONCRETE (CO), PLASTIC (PL), OTHER (OT)

MAIN CASING TYPE: P L

NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH): 4"

TOTAL DEPTH OF MAIN CASING (NEAREST FOOT): 122

OTHER CASING (IF USED) — EACH CASING: DIAMETER (INCH), DEPTH (FEET) FROM, TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): STEEL (ST), BRASS OR BRONZE (BR), OPEN HOLE (HO), PLASTIC (PL), OTHER (OT)

C 2 (SEQ. NO.)

EACH SCREEN — DEPTH (NEAREST WHOLE FOOT) FROM: 122 TO: 127

SLOT SIZE: 1. 0.30 2. 3.

DIAMETER OF SCREEN: 2 (NEAREST INCH)

GRAVEL PACK: FROM TO

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX: F

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER): TELESCOPE CASING, LOG INDICATOR (E.R.O.S.), OTHER DATA AVAILABLE

C 3 (SEQ. NO.)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 1

PUMPING RATE GALLONS PER MINUTE TO NEAREST GALLON: 15

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 40 (NEAREST FOOT)

WHEN PUMPING: 50 (NEAREST FOOT)

TYPE OF PUMPER USED (FOR PUMPING TEST) (CIRCLE APPROPRIATE BOX): AIR (A), PISTON (P), TURBINE (T), CENTRIFUGAL (C), ROTARY (R), OTHER (DESCRIBE BELOW), JET (J), SUBMERSIBLE (S)

PUMP INSTALLER

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: A, C, J, P, R, S, T, O): S

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

CAPACITY: GALLONS PER MINUTE (TO NEAREST GALLON): 10

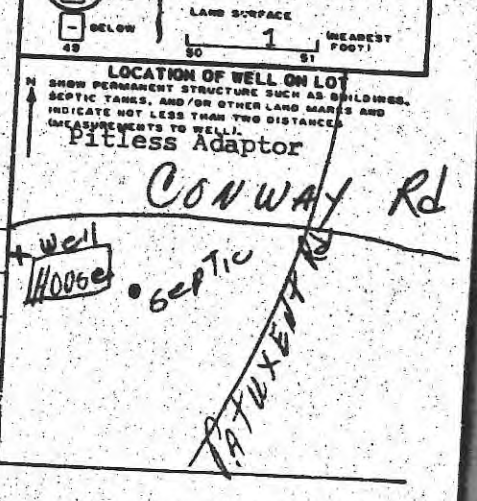
PUMP HORSE POWER: 1/3

PUMP COLUMN LENGTH (NEAREST FOOT): 70

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT): (+) ABOVE, (-) BELOW LAND SURFACE: 1 (NEAREST FOOT)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).



CIRCLE APPROPRIATE BOXES

A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT): HJ Greer Drilling Co.

SIGNATURE: H J Greer

ORIGINAL

8372 — SEQUENCE NO. (WRA USE ONLY)

1 2 3 (SEQ. NO.) 6 (THIS NUMBER IS TO BE PUNCHED COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY) 8-13

DATE WELL COMPLETED: 12-4-80 (15–20)

DEPTH OF WELL: 149 ft (22 (TO NEAREST FOOT) 26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-74-2508 (28 29 30 31 32 33 34 35 36 37)

DRILLERS IDENTIFICATION NO. 135

OWNER: Neal (LAST NAME) John C. & Mary (FIRST NAME)

STREET OR RFD: 960 Patuxent Rd. POST OFFICE: Odenton, MD 21113

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Brown sand & gravel	0	12	
Blue clay	12	128	
White clay	128	137	
Medium brown sand	137	149	x

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES [Y] (44) NO [N] (44)

TYPE OF GROUTING MATERIAL (CIRCLE BOX): CEMENT [C M] (45 46) BENTONITE CLAY [B C] (45 46)

NO. OF BAGS 2 NO. OF POUNDS 200

GALLONS OF WATER 100

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 3 FT. (48 52) TO 20 FT. (54 58) (ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES — INSERT APPROPRIATE CODE BELOW: [S T] STEEL, [C O] CONCRETE, [P L] PLASTIC, [O T] OTHER

MAIN CASING TYPE	NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
P L (60 61)	4" (63 64)	144 (66 70)

OTHER CASING (IF USED)

EACH CASING

DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE — INSERT APPROPRIATE CODE BELOW: [S T] STEEL, [B R] BRASS OR BRONZE, [H O] OPEN HOLE, [P L] PLASTIC, [O T] OTHER

C 2 (1 2 3 (SEQ. NO.) 6)

DEPTH (NEAREST WHOLE FOOT)

EACH SCREEN

		FROM	TO
1	P L (8 9)	144 (11 15)	149 (17 21)
	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1. 0.30 3.

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK FROM TO

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX 68 [F]

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER): [T] (70) TELESCOPE CASING; (E.R.O.S.) [ ] (72) LOG INDICATOR; [W Q] (74 75 76) OTHER DATA AVAILABLE

C 3 (1 2 3 (SEQ. NO.) 6)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR): 1 (8 9)

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON): 30 (11 15)

METHOD USED TO MEASURE PUMPING RATE: air

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING: 8 (17 20) (NEAREST FOOT)

WHEN PUMPING: 25 (22 25) (NEAREST FOOT)

TYPE OF PUMPED USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST)

[A] AIR (27) [P] PISTON (27) [T] TURBINE (27)
[C] CENTRIFUGAL (27) [R] ROTARY (27) [O] OTHER (DESCRIBE BELOW) (27)
[J] JET (27) [S] SUBMERSIBLE (27)

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX — SEE ABOVE: A, C, J, P, R, S, T, O): S (29)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES [Y] NO [N]

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON): 15 (31 35)

PUMP HORSE POWER: 1/3 (37 41)

PUMP COLUMN LENGTH (NEAREST FOOT): 25 (43 47)

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)

[+] ABOVE / [−] BELOW (49) — LAND SURFACE 1 (50 51) (NEAREST FOOT)

LOCATION OF WELL ON LOT

N ↑ SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

Pitless Adaptor.

Well

Patuxent Rd.

CIRCLE APPROPRIATE BOXES

[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

ELECTRIC LOG OBTAINED

[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL THE ACTIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT): HJ Greer Drilling Co.

SIGNATURE: [signature]

HEALTH

MDE.WSP: INTAKES - [INTAKES]

Action Edit Query Block Record Field Window Help

EDIT/DATA ENTRY Call: APPLICATION COMPLETION PWS INFO

	Seq	Date	
C1		11061980	AA-74-2530

WELL COMPLETION REPORT

COMPLETION

Completion Date	11061980
Depth of Well	130
Number Unsuccessful	
Hydrofractured?	

CASING

Casing Type	PL
Casing Diameter	4
Casing Depth	125
Casing Height	+01

PUMPING TEST

Hours Pumped	1
Pumping Rate	30
Water Level Before	8
Water Level During	20
Type Pump Used	S

GROUTING

Grouted?	Y
Grout Type	BC
Grout From	3
Grout To	20

SCREENS

	Type	Top	Bottom
1	PL	125	130
2			
3			

Screen Diameter 2

PUMP INSTALLED

Pump Installed?	
Type of Pump Installed	S
Capacity	10
Pump Horsepower	.25
Pump Column Length	35

Flowing ☐ Telescoping ☐ Log Indicator ☐ Closed ☐ Abandoned ☐

Abandon Date

ecord: 1/1

8392 (SEQ. NO.) — 1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

SEQUENCE NO. (WRA USE ONLY)

STATE OF MARYLAND
WATER RESOURCES ADMINISTRATION
TAWES STATE OFFICE BLDG., ANNAPOLIS, MD. 21401
WELL COMPLETION REPORT

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL COMPLETION

FILL IN THIS FORM COMPLETELY

COUNTY NUMBER

DATE RECEIVED (WRA USE ONLY) 8-13

DATE WELL COMPLETED: 11-24-80 (18–20)

DEPTH OF WELL: 262 ft. (22 (TO NEAREST FOOT) 26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-74-2573 (28 29 30 31 32 33 34 35 36 37)

DRILLERS IDENTIFICATION NO. 135

OWNER: Truesdale (LAST NAME) Philip & Bonita (FIRST NAME)

STREET OR RFD: 1221 Collins Rd. POST OFFICE: Odenton, MD 21113

WELL DESCRIPTION

WELL LOG

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (USE ADDITIONAL SHEETS IF NECESSARY)	FEET FROM	FEET TO	CHECK IF WATER BEARING
Top soil	0	2	
RED soil	2	80	
Medium brown sand	80	98	
Blue & red clay	98	178	
Fine brown sand	178	237	
White clay	237	251	
Medium brown sand	251	262	x

GROUTING RECORD

WELL HAS BEEN GROUTED (CIRCLE APPROPRIATE BOX): YES [Y] (44) NO [N] (44)

TYPE OF GROUTING MATERIAL (CIRCLE BOX): CEMENT [C M] (45 46) BENTONITE CLAY [B C] (45 46)

NO. OF BAGS 2 NO. OF POUNDS 200

GALLONS OF WATER 100

DEPTH OF GROUT SEAL (TO NEAREST FOOT): FROM 3 FT. (48 52) TO 20 FT. (54 58) (ENTER 0 IF FROM SURFACE)

CASING RECORD

CASING TYPES (INSERT APPROPRIATE CODE BELOW): [S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE	NOMINAL DIAMETER TOP (MAIN) CASING (NEAREST INCH)	TOTAL DEPTH OF MAIN CASING (NEAREST FOOT)
P L (60 61)	4" (63 64)	257 (66 70)

OTHER CASING (IF USED)

EACH CASING

	DIAMETER (INCH)	DEPTH (FEET) FROM	TO

SCREEN RECORD

SCREEN TYPE OR OPEN HOLE (INSERT APPROPRIATE CODE BELOW): [S T] STEEL [B R] BRASS OR BRONZE [H O] OPEN HOLE [P L] PLASTIC [O T] OTHER

C 2 (1 2 3 (SEQ. NO.) 6)

DEPTH (NEAREST WHOLE FOOT)

EACH SCREEN

		FROM	TO
1	P L (8 9)	257 (11 15)	262 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1. 0.30 2. 3.

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK FROM TO

IF WELL DRILLED WAS A FLOWING WELL CIRCLE BOX 68 [F]

C 3 (1 2 3 (SEQ. NO.) 6)

PUMPING TEST

HOURS PUMPED (TO NEAREST HOUR) 1 (8 9)

PUMPING RATE (GALLONS PER MINUTE TO NEAREST GALLON) 15 (11 15)

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL: (DISTANCE FROM LAND SURFACE)

BEFORE PUMPING 110 (17 20) (NEAREST FOOT)

WHEN PUMPING 120 (22 25) (NEAREST FOOT)

TYPE OF PUMP USED (CIRCLE APPROPRIATE BOX) (FOR PUMPING TEST)

[A] AIR (27) [P] PISTON (27) [T] TURBINE (27)
[C] CENTRIFUGAL (27) [R] ROTARY (27) [O] OTHER (DESCRIBE BELOW) (27)
[J] JET (27) [S] SUBMERSIBLE (27)

PUMP INSTALLED

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX – SEE ABOVE: A, C, J, P, R, S, T, O) S (29)

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES [Y] NO [N]

CAPACITY:

GALLONS PER MINUTE (TO NEAREST GALLON) 10 (31 35)

PUMP HORSE POWER 1/2 (37 41)

PUMP COLUMN LENGTH (NEAREST FOOT) 140 (43 47)

CASING HEIGHT (CIRCLE APPROPRIATE BOX AND ENTER CASING HEIGHT)

[+] ABOVE / [–] BELOW LAND SURFACE 1 (49 50 51) (NEAREST FOOT)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDINGS, SEPTIC TANKS, AND/OR OTHER LAND MARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL).

N

Pitless Adaptor.

Collins Rd

x well

40 ft.

CIRCLE APPROPRIATE BOXES

[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

[E] ELECTRIC LOG OBTAINED

[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS NAME (PLEASE PRINT) HJ Greer Drilling Co.

SIGNATURE Edward Greer

WRA USE ONLY. (NOT TO BE FILLED IN BY DRILLER)

[T] (70) TELESCOPE CASING (E.R.O.S.) [ ] (72) LOG INDICATOR W Q (74 75 76) OTHER DATA AVAILABLE

HEALTH

C 1 7166 SEQUENCE NO. (WRA USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 30 DAYS AFTER WELL IS COMPLETED

COUNTY NUMBER

Date Received (WRA use only)

DATE WELL COMPLETED: 3-9-81

Depth of Well: 207 ft. (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-74-284

OWNER: Durham (last name) George B. & Ellen K. (first name)

STREET OR RFD: 977 Patuxent Road TOWN: Odenton, MD 21113

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Sand & gravel	0	10	
Red clay	10	152	
Fine brown sand with thin layers of white clay.	152	187	
Blue clay	187	198	
Medium brown sand	198	207	x

CIRCLE APPROPRIATE BOX

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT I HAVE COMPLIED WITH ALL CONDITIONS STATED ON THE ABOVE-CAPTIONED "PERMIT TO DRILL WELL", AND THAT INFORMATION CONTAINED IN THIS REPORT IS TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

DRILLERS IDENT. NO. 135

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION): James H. Greer

HJ Greer Drilling

SITE SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y no N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 2 NO. OF POUNDS 200 100

GALLONS OF WATER

DEPTH OF GROUT SEAL (to nearest foot) from 3 ft. (TOP) to 20 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top(main)casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4"	202 205

OTHER CASING (if used) EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL BR BRASS, BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2 (seq. no.)

EACH SCREEN		DEPTH (nearest ft.) from	to
1	PL	202	207
2			
3			

SLOT SIZE 0.30

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from to

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX F

WRA USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

TELESCOPE CASING LOG INDICATOR OTHER D

C 3 (seq no)

PUMPING TEST
HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 25

METHOD USED TO MEASURE PUMPING RATE air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 8

WHEN PUMPING 15

TYPE OF PUMP USED (for test)

A air P piston T turbine

C centrifugal R rotary O other (describe below)

J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES Y NO N

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE) (A, C, J, P, R, S, T, O): S

CAPACITY:

GALLONS PER MINUTE (to nearest gallon) 15

PUMP HORSE POWER 1/3

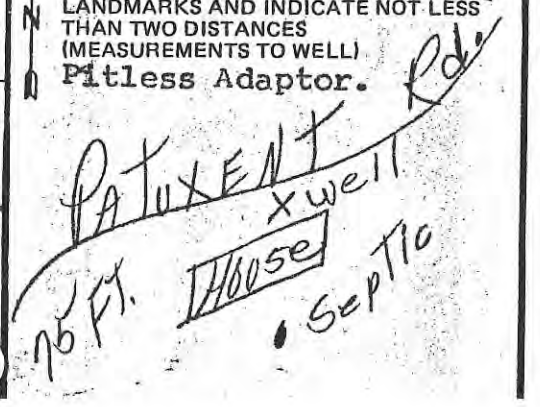
PUMP COLUMN LENGTH (nearest ft) 40

CASING HEIGHT (circle appropriate box and enter casing height)

+ above / − below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

Pitless Adaptor.



09 SEQUENCE NO. (OEP USE ONLY)

NUMBER IS TO BE PUNCHED COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

Date Received (OEP use only)

DATE WELL COMPLETED 1 20 82

Depth of Well 81 ft. (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-81-0049

OWNER Zuknick (last name) Ernest (first name)

STREET OR RFD 1122 Bragers Rd. TOWN Odenton, MD 21113

SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sand	0	16	
White clay	16	25	
Red clay	25	48	
Blue clay	48	60	
tan sand	60	81	x

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 2 NO. OF POUNDS 100

GALLONS OF WATER 30

DEPTH OF GROUT SEAL (to nearest foot) from 5 ft. (TOP) to 20 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4"	76

OTHER CASING (if used) EACH CASING

	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL BR BRASS, BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2 (seq. no.)

EACH SCREEN

		DEPTH (nearest ft.)	
1	PL	76	81
2			
3			

SLOT SIZE 0.30

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from to

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX F

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.)

TELESCOPE CASING LOG INDICATOR OTHER DATA WQ

C 3 (seq. no.)

PUMPING TEST
HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 12

METHOD USED TO MEASURE PUMPING RATE air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 40

WHEN PUMPING 50

TYPE OF PUMP USED (for test)

A air P piston T turbine

C centrifugal R rotary O other (describe below)

J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES Y NO N

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: (A, C, J, P, R, S, T, O) S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER 1/3

PUMP COLUMN LENGTH (nearest ft.) 60

CASING HEIGHT (circle appropriate box and enter casing height) + above − below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

Well

CIRCLE APPROPRIATE BOX

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 136

DRILLERS SIGNATURE Harold H. Greer

(MUST MATCH SIGNATURE ON APPLICATION

HJ Greer Drilling Co.

SITE SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

HEALTH

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

Date Received (OEP use only)

WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

45 DAYS AFTER WELL IS COMPLETED

COUNTY NUMBER: 00

DATE WELL COMPLETED: 3-17-83

Depth of Well: 238 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-81-0870

OWNER: Cher Chris Construction Co. (last name)

STREET OR RFD: 10519 York Rd. (first name)

TOWN: Cockeysville, MD. 21030

SUBDIVISION: Wilson Town

SECTION: 1264 Lucinda Lane

LOT: 2

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown clay	0	6	
White clay	6	25	
Gravel	25	40	
Red, white clay	40	75	
White sand	75	100	
Red clay	100	170	
Gray clay	170	225	
White sand	225	238	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): YES (Y) NO (N)

TYPE OF GROUTING MATERIAL

CEMENT (CM) BENTONITE CLAY (BC)

NO. OF BAGS 1 NO. OF POUNDS 100

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot)

from 3 ft. (TOP) to 30 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types: insert appropriate code below

(ST) STEEL (CO) CONCRETE (PL) PLASTIC (OT) OTHER

MAIN CASING TYPE	Nominal diameter top(main)casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	231

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or openhole: insert appropriate code below

(ST) STEEL (BR) BRASS, BRONZE (HO) OPEN HOLE (PL) PLASTIC (OT) OTHER

C 2 (seq. no.)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	231	238
2			
3			

SLOT SIZE 030

DIAMETER OF SCREEN 2" (NEAREST INCH)

GRAVEL PACK from 226 to 238

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX (F)

C 3 (seq. no.)

PUMPING TEST
HOURS PUMPED (nearest hour) 2½

PUMPING RATE (gal. per min. to nearest gal.) 30

METHOD USED TO MEASURE PUMPING RATE: AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING 108

WHEN PUMPING 130'

TYPE OF PUMP USED (for test)

(A) air (P) piston (T) turbine (C) centrifugal (R) rotary (O) other (describe below) (J) jet (S) submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES (Y) NO (N)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: (A, C, J, P, R, S, T, O) S

CAPACITY:

GALLONS PER MINUTE (to nearest gallon) 7

PUMP HORSE POWER 1/3

PUMP COLUMN LENGTH (nearest ft.) 140

CASING HEIGHT (circle appropriate box and enter casing height)

(+) above (−) below LAND SURFACE 1 (nearest foot)

CIRCLE APPROPRIATE BOX

(A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

(E) ELECTRIC LOG OBTAINED

(P) TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 288

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION) Denton J. Wolford

Denton J. Wolford

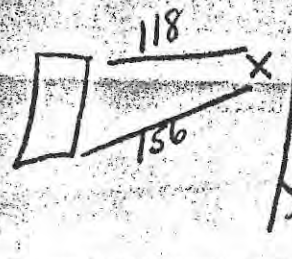
SITE SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.)

TELESCOPE CASING LOG INDICATOR OTHER DATA

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



HEALTH

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

DATE WELL COMPLETED: 12/16/82

Depth of Well: 300 ft. (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-81-1176

OWNER: Contee (last name) Lucinda (first name)

STREET OR RFD: 1255 Collins Ave. TOWN: Odenton, MD 21113

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sand	0	6	
Brown clay	6	10	
Brown sand	10	21	
White clay	21	45	
Brown sand	45	75	
Red clay	75	122	
White clay	122	180	
Red clay	180	227	
White clay	227	250	
Fine brown sand	250	277	
Coarse brown sand	277	300	x

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): YES [Y] NO [N]

TYPE OF GROUTING MATERIAL: CEMENT [CM] BENTONITE CLA [BC]

NO. OF BAGS 2 NO. OF POUNDS 100

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot) from 3 ft. to 25 ft. (enter 0 if from surface)

CASING RECORD
casing types — insert appropriate code below: [ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top(main)casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4"	295

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below: [ST] STEEL [BR] BRASS, BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (seq. no.)

EACH SCREEN — DEPTH (nearest ft.)

PL	295	300

SLOT SIZE 0.30

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from to

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX [F]

C 3 (seq. no.)

PUMPING TEST
HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 25

METHOD USED TO MEASURE PUMPING RATE air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 125

WHEN PUMPING 140

TYPE OF PUMP USED (for test): [A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES [Y] NO [N]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE) (A, C, J, P, R, S, T, O): S

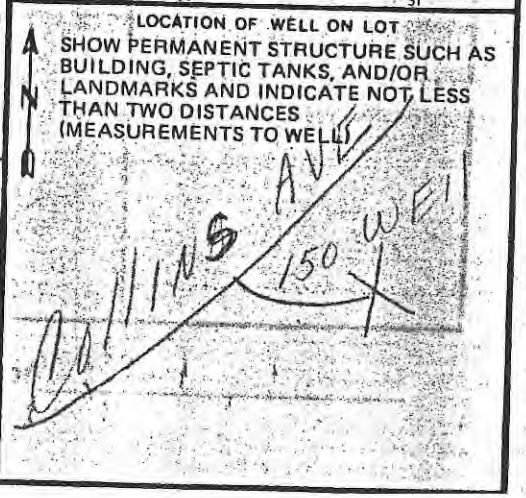
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 15

PUMP HORSE POWER 1/2

PUMP COLUMN LENGTH (nearest ft.) 200'

CASING HEIGHT (circle appropriate box and enter casing height): [+] above [−] below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE BOX
[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
[E] ELECTRIC LOG OBTAINED
[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 33

John C. Greer

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

HJ Greer Drilling Co.

SITE SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

TELESCOPE CASING | LOG INDICATOR | OTHER DATA

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS) 5221

WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

COUNTY NUMBER

Date Received (DEP use only): MAY 31 1983

DATE WELL COMPLETED: 12/31/82

Depth of Well: 205 (TO NEAREST FOOT)

PERMIT NO. FROM PERMIT TO DRILL: AA-81-1194

OWNER: Chidley (last name) Marvin (first name)

STREET OR RFD: 1284 Collins Rd. TOWN: Marcellus

SUBDIVISION: SECTION: LOT:

WELL LOG (not required for driven wells)

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown clay	0	11	
Brown sand	11	23	
Red clay	23	50	
Brown sand	50	90	
White clay	90	125	
Red clay	125	177	
White clay	177	190	
Medium brown sand	190	205	x

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) YES (Y) NO (N)

TYPE OF GROUTING MATERIAL

CEMENT [C M] BENTONITE CLAY [B C]

NO. OF BAGS ____ NO. OF POUNDS ____

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot) from 3 ft (top) to 25 ft. (bottom) (enter 0 if from surface)

CASING RECORD

casing types (insert appropriate code below): [S T] STEEL, [C O] CONCRETE, [P L] PLASTIC, [O T] OTHER

MAIN CASING TYPE: [P L] Nominal diameter (of main casing) (nearest inch): 4" Total depth of main casing (nearest foot): 200

OTHER CASING (if used) — EACH CASING: diameter (inch), depth (feet) from, to

SCREEN RECORD

screen type or open hole (insert appropriate code below): [S T] STEEL, [B R] BRASS, BRONZE, [H O] OPEN HOLE, [P L] PLASTIC, [O T] OTHER

[C 2] seq. no.

EACH SCREEN — DEPTH (nearest ft.)

[P L]	200	205

SLOT SIZE 0.30

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from ____ to ____

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX [F]

PUMPING TEST [C 3] seq. no.

HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 20

METHOD USED TO MEASURE PUMPING RATE

WATER LEVEL (distance from land surface)

BEFORE PUMPING 110

WHEN PUMPING 120

TYPE OF PUMP USED (for test): [A] air, [P] piston, [T] turbine, [C] centrifugal, [R] rotary, [O] other (describe below), [J] jet, [S] submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX) YES (Y) NO (N)

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE) (A, C, J, P, R, S, T, O) [S]

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER

PUMP COLUMN LENGTH (nearest ft.) 160

CASING HEIGHT (circle appropriate box and enter casing height) [+] above / [−] below LAND SURFACE (nearest foot)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

X WELL

Drillers hole

CIRCLE APPROPRIATE BOX

[A] A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

[E] ELECTRIC LOG OBTAINED

[P] TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337

John C. Greer

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

HJ Greer Drilling Co.

SITE SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W

TELESCOPE CASING ____ LOG INDICATOR ____ OTHER DATA ____

ORIGINAL

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

WELL COMPLETED: 04 15 83

Depth of Well: 72' (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-81-1580

last name: ROLLING, George

first name:

STREET OR RFD: 2987 Conway Rd.

TOWN: Odenton

SUBDIVISION:

SECTION:

LOT:

C 3 (seq no)

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Top Soil	0	2	
Red Sand, Gravel	2	12	
White Clay	12	18	
Red Clay	18	34	
Tan Sand Fine	34	60	
Coarse Tan Sand	60	72	

CIRCLE APPROPRIATE BOX
WELL WAS ABANDONED AND SEALED
WHEN THIS WELL WAS COMPLETED
ELECTRIC LOG OBTAINED
TEST WELL CONVERTED TO PRODUCTION WELL

I CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 134

DRILLERS SIGNATURE
MATCH SIGNATURE ON APPLICATION

SUPERVISOR (sign of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): YES [Y] NO [N]

TYPE OF GROUTING MATERIAL

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS 3 NO. OF POUNDS 150

GALLONS OF WATER 175

DEPTH OF GROUT SEAL (to nearest foot) from 3 ft. (TOP) to 30 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types — insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top(main)casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4"	67

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

[ST] STEEL [BR] BRASS, BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (seq no)

EACH SCREEN

		DEPTH (nearest ft.)	
1	PL	60	72
2			
3			

SLOT SIZE .030

DIAMETER OF SCREEN 4" (NEAREST INCH)

GRAVEL PACK from 58 to 72

IF WELL DRILLED WAS FLOWING WELL CIRCLE BOX [F]

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.)

TELESCOPE CASING — LOG INDICATOR — W Q — OTHER DATA

PUMPING TEST
HOURS PUMPED (nearest hour) 3

PUMPING RATE (gal. per min. to nearest gal.) 18

METHOD USED TO MEASURE PUMPING RATE Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 40

WHEN PUMPING 51

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE APPROPRIATE BOX): YES [Y] NO [N]

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP (WRITE APPROPRIATE LETTER IN BOX - SEE ABOVE: (A, C, J, P, R, S, T, O) [6]

CAPACITY:

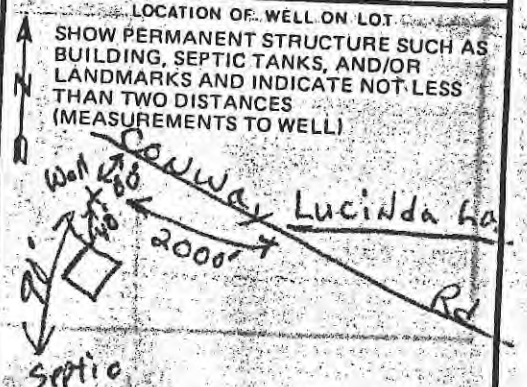
GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER .5

PUMP COLUMN LENGTH (nearest ft.) 72

CASING HEIGHT (circle appropriate box and enter casing height) [+] above / [−] below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



HEALTH

C1 4195 SEQUENCE NO (OEP USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

COUNTY NUMBER 08

PERMIT NO. FROM REPM TO DATE 74-81-2032

DATE Received SEP 8 1983

DATE WELL COMPLETED 8 6 5 8 3

Depth of Well 94 ft (TO NEAREST FOOT)

OWNER Blackman (last name) Earl (first name)

STREET OR RFD Rt.1 Box 363 TOWN Odenton, MD 21113

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sand and gravel	0	23	
Red clay	23	40	
White clay	40	55	
Gray clay	55	85	
Coarse brown sand	85	94	x

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) Y N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 2 NO. OF POUNDS 100

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot)

from 3 ft. (TOP) to 24 ft. (BOTTOM)

(enter 0 if from surface)

CASING RECORD

casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE: PL

Nominal diameter top (main) casing (nearest inch): 4

Total depth of main casing (nearest foot): 89

OTHER CASING (if used) EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD

screen type or open hole insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	89	94
2			
3			

SLOT SIZE 0.30

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from _____ to _____

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

C3

PUMPING TEST

HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min to nearest gal.) 25

METHOD USED TO MEASURE PUMPING RATE

WATER LEVEL (distance from land surface)

BEFORE PUMPING 20

WHEN PUMPING 30

TYPE OF PUMP USED (for test)

A air P piston T turbine C centrifugal R rotary O other (describe below) J jet S submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER 3/4

PUMP COLUMN LENGTH (nearest ft.) 50

CASING HEIGHT (circle appropriate box and enter casing height) + above − below LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

CIRCLE APPROPRIATE LETTER

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN COMPLIANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREWITH IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLER'S IDENT. NO.

DRILLER'S SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SJ Greer Drilling Co.

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

TELESCOPE CASING LOG INDICATOR OTHER DATA

1 7305 SEQUENCE NO. (OEP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

DATE Received

DATE WELL COMPLETED 10 27 83

Depth of Well 245 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-81-2350

OWNER mack (last name) John (first name)

STREET OR RFD Conway Road TOWN Crofton

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
brown clay	0	6	
brown sand	6	25	
red clay	25	68	
white clay	68	88	
red clay	88	110	
rock	110	111	
red clay	111	190	
white clay	190	237	
med brown sand	237	245	x

140

CIRCLE APPROPRIATE LETTER
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

F ELECTRIC LOG OBTAINED

TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337

John E Green
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

[illegible]
SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 2 NO. OF POUNDS 200

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot)

from 4 ft. to 27 ft.
(enter 0 if from surface)

CASING RECORD
casing types Insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
P1	4	225

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole Insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C2

EACH SCREEN		DEPTH (nearest ft.)	
1	P1	225	245
2			
3			

SLOT SIZE 1 .020 2 _____ 3 _____

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 225 to 245

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

OEP USE ONLY
(NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) WQ

TELESCOPE CASING LOG INDICATOR OTHER DATA

C3

PUMPING TEST
HOURS PUMPED (nearest hour) 8

PUMPING RATE (gal. per min. to nearest gal.) 15

METHOD USED TO MEASURE PUMPING RATE AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING 140

WHEN PUMPING 150

TYPE OF PUMP USED (for test)

A air P piston T turbine C centrifugal R rotary O other (describe below) J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 45

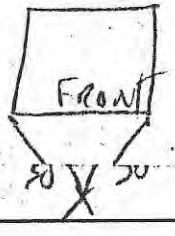
PUMP HORSE POWER .50

PUMP COLUMN LENGTH (nearest ft.) 180

CASING HEIGHT (circle appropriate box and enter casing height)
+ above
− below
LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N



AA-81 2492

B 1 3147 SEQUENCE NO (O&P USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 1-5 ON ALL CARDS)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL A WELL

(PRINT OR TYPE)

Date Received 11/8/83

OWNER INFORMATION

COLE CARL & ADA TRACT (Last Name, Owner, First Name)

126 5/19 ROAD (Number & Street)

GLEN ARM MD 21057 (Town, State, Zip)

B 3

ANNE ARUNDEL (County)

GLEN ARM (Nearest Town)

SECTION ___ LOT ___

OLD MOUNTAIN ROAD (Nearest Road)

MILES FROM TOWN (nearest town) ___

DRILLER INFORMATION

Denton J. Wolford (Driller's Name) 2 8 (Driller's License No.)

Wolford's Well & Pump Service, Inc. (Firm Name)

4429 Mountain Rd., Pasadena, MD. 21122 (Address)

(Signature) 10-26-83 (Date)

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)

N, NW, NE, W, TOWN, E, SW, S, SE

OR WHEN SIDE OF ROAD (CIRCLE APPROPRIATE BOX)

NW NORTH SOUTH SE

DISTANCE FROM TOWN ___

B 2

WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.) 0

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 300

USE FOR WATER (CIRCLE APPROPRIATE BOX)

D HOME (SINGLE OR DOUBLE HOUSEHOLD UNIT ONLY)

F FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION)

I INDUSTRIAL, COMMERCIAL, STATE AND FEDERAL GOV. OTHER (REQUIRES APPROPRIATION PERMIT)

P PUBLIC OR PRIVATE WATER COMPANY (REQUIRES APPROPRIATION PERMIT AND STATE HEALTH DEPARTMENT APPROVAL)

T TEST, OBSERVATION, MONITORING (MAY REQUIRE APPROPRIATION PERMIT)

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel

COUNTY NAME

OZP SIGNATURE

DATE ISSUED 11/8/83

NORTH GRID 42 090 0 0 (100 SECTIONS) EAST GRID 6 7 0 0 0

APPROXIMATE DEPTH OF WELL 250 feet

APPROXIMATE DIAMETER OF WELL 6 inches

METHOD OF DRILLING (CIRCLE ONE)

BORED (or Augered) JETTED Jetted & DRIVEN

AIR ROTary AIR PERCussion ROTARY (Hydraulic Rotary)

CABLE REVerse ROTary DRIVE POINT

OTHER ___

SHOW MAJOR FEATURES ON BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER

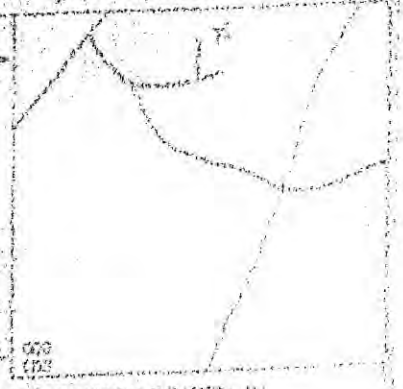
1. A.A.-81-0360
2. County Water
3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 870

N 430

GRID (100)



REPLACEMENT OR DEEPENED WELLS (CIRCLE APPROPRIATE BOX)

N THIS WELL WILL NOT REPLACE AN EXISTING WELL

Y THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED

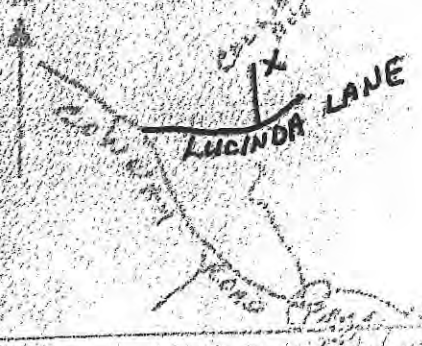
S THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY

D THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE)

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD INTERSECTION

N



(NOT TO BE READ IN BY DRILLERS (USE ONLY)

APPROP. PERMIT NUMBER ___

FORCE ___ WRITE PERMIT NO. A.A.-81-0360

SPECIAL CONDITIONS

C1 6330 SEQUENCE NO. (DEP USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS NUMBER IS TO BE PUTTED ON 15 DAYS AFTER DRILLING

COUNTY NUMBER C2

FROM PERMIT NO. AA 81 2492

DATE Received MAY 14 1984

DATE WELL COMPLETED 5 3 2 2 84

Depth of Well 2 7 8 (TO NEAREST FOOT)

OWNER Cher Chris Construction (last name) (first name)

STREET OR RFD 10519 York Rd. TOWN Cockeysville, MD

SUBDIVISION Odenton SECTION LOT 38

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown clay	0	4	
Brown sand	4	10	
White clay	10	23	
Red & white clay mixed	23	30	
Brown sand	30	41	
Red, white & gray clay mixed	41	60	
Red clay	60	94	
White, brown sand	94	110	
White clay	110	121	
Red, white, gray clay mixed	121	265	
Brown & white sand mixed	265	278	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) Y N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 1 NO OF POUNDS 180

GALLONS OF WATER 50

DEPTH OF GROUT SEAL (to nearest foot)

from 3 ft. to 36 ft. (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	271

OTHER CASING (if used) EACH CASING — diameter inch, depth (feet) from to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C2

DEPTH (nearest ft.)

EACH SCREEN		
PL	271	278

SLOT SIZE .032

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 266 to 278

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

C3

PUMPING TEST

HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 50

METHOD USED TO MEASURE PUMPING RATE pail

WATER LEVEL (distance from top of casing)

BEFORE PUMPING 110

WHEN PUMPING 136

TYPE OF PUMP USED (for test)

A air P piston T turbine

C centrifugal R rotary O other (specify below)

J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER .50

PUMP COLUMN LENGTH (nearest ft.) 190

CASING HEIGHT (circle appropriate box and enter casing height) + above − below LAND SURFACE 1 (nearest foot)

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

THEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH GOOD WATER WELL CONSTRUCTION AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE SANITARY PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLER'S LICENSE NO. 250

DRILLER'S SIGNATURE

(MUST MATCH SIGNATURE ON APPLICATION)

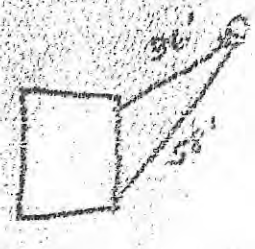
SITE SUPERVISOR (agent of driller or homeowner responsible for sanitary if different from permittee)

DEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) WO

TELESCOPE CASING LOG INDICATOR OTHER DATA

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



ORIGINAL

3 (6) — SEQUENCE NO. (OEP USE ONLY)

EN IS TO BE PUNCHED 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

DATE Received (8–13):

DATE WELL COMPLETED (15–20): 09/28/89

Depth of Well (22–26): 182 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" (28–37): AA-81-3754

OWNER: Queen, C. Andrew.
STREET OR RFD: P.O. Box 351 (last name, first name)
TOWN: Gambrills, MD 210
SUBDIVISION: ____ SECTION: ____ LOT: ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown Clay	0	7	
Red Clay	7	14	
Brown Sand	14	26	
Red Clay	26	60	
Brown Sand	60	100	
Red Clay	100	150	
White Clay	150	162	
Medium Brown Sand	162	182	X

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO.: 337

John E. Green

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): (Y) yes (44) · N no (44)

TYPE OF GROUTING MATERIAL: CEMENT (CM) (45–46) BENTONITE CLAY (BC) (45–46)

NO. OF BAGS: 6 NO. OF POUNDS: 300

GALLONS OF WATER: 150

DEPTH OF GROUT SEAL (to nearest foot): from 3 (48) TOP (52) ft. to 27 (54) BOTTOM (58) ft. (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL · CO CONCRETE · PL PLASTIC · OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60–61)	4 (63–64)	177 (66–70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL · BR BRASS BRONZE · HO OPEN HOLE · PL PLASTIC · OT OTHER

C 2 (1–2)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL (8–9)	177 (11–15)	182 (17–21)
2	(23–24)	(26–30)	(32–36)
3	(38–39)	(41–45)	(47–51)

SLOT SIZE 1 ____ 2 ____ 3 ____ .020

DIAMETER OF SCREEN: 2 (56–60) (NEAREST INCH)

GRAVEL PACK: from ____ to ____

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) TELESCOPE CASING · (E.R.O.S.) (72) LOG INDICATOR · WQ (74–76) OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour): 2 (8–9)

PUMPING RATE (gal. per min. to nearest gal.): 7 (11–15)

METHOD USED TO MEASURE PUMPING RATE: AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 95 (17–20)

WHEN PUMPING: 105 (22–25)

TYPE OF PUMP USED (for test) (27)
- A air · P piston · T turbine
- C centrifugal · R rotary · O other (describe below)
- J jet · S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX-SEE ABOVE: J (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon): 7 (31–35)

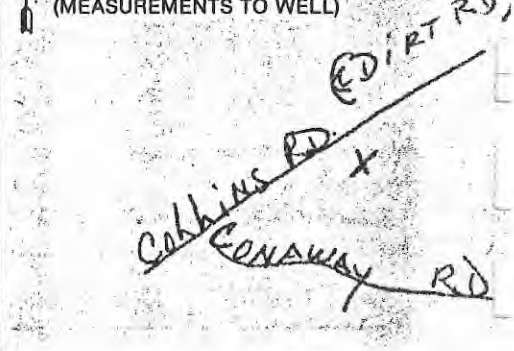
PUMP HORSE POWER: 1/3 (37–41)

PUMP COLUMN LENGTH (nearest ft.): 130 (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)
- (+) above (49)
- (−) below (49)

LAND SURFACE: 1 (50–51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



C 1 06582 — SEQUENCE NO. (OEP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

DATE Received: 8 13

DATE WELL COMPLETED: 09 25 85 (15–20)

Depth of Well: 55 (22–26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-811-1535 (28–37)

OWNER: BOTTS (last name) PEARL (first name)

STREET OR RFD: 2825 5th Avenue TOWN: Odenton

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Sand & Gravel	0	8	
Brown Sand	8	23	
Red Clay	23	45	
Medium Brown Sand	45	55	X

CIRCLE APPROPRIATE LETTER
A — WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E — ELECTRIC LOG OBTAINED
P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337

X [signature]
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y (44) no N (44)

TYPE OF GROUTING MATERIAL
CEMENT CM (45–46) BENTONITE CLAY BC (45–46)

NO. OF BAGS 4 NO. OF POUNDS 250

GALLONS OF WATER 100

DEPTH OF GROUT SEAL (to nearest foot)
from 3 (48) ft. TOP (52) to 25 (54) ft. BOTTOM (58)
(enter 0 if from surface)

CASING RECORD
casing types — insert appropriate code below
ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER

MAIN CASING TYPE: PL (60–61)
Nominal diameter top (main) casing (nearest inch): 4 (63–64)
Total depth of main casing (nearest foot): 50 (66–70)

OTHER CASING (if used) — EACH CASING
diameter inch / depth (feet) from / to

SCREEN RECORD
screen type or open hole — insert appropriate code below
ST STEEL, BR BRASS BRONZE, HO OPEN HOLE, PL PLASTIC, OT OTHER

C 2 (1–2)

DEPTH (nearest ft.) — EACH SCREEN
1: PL (8–9) 50 (11–15) 55 (17–21)
2: (23–24) (26–30) (32–36)
3: (38–39) (41–45) (47–51)

SLOT SIZE 1 0 2 20 3

DIAMETER OF SCREEN 2 (56–60) (NEAREST INCH)

GRAVEL PACK from 45 to 55

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING; (E.R.O.S.) (72) LOG INDICATOR; WQ (74–76) OTHER DATA

C 3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour): 1 (8–9)

PUMPING RATE (gal. per min. to nearest gal.): 10 (11–15)

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL (distance from land surface)
BEFORE PUMPING: 13 (17–20)
WHEN PUMPING: 20 (22–25)

TYPE OF PUMP USED (for test)
A air (27), P piston (27), T turbine (27), C centrifugal (27), R rotary (27), O other (describe below) (27), J jet (27), S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)

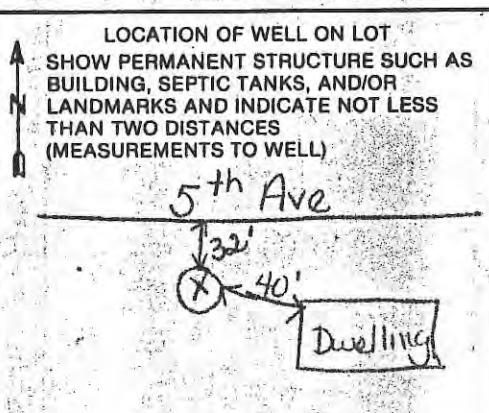
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10 (31–35)

PUMP HORSE POWER: 3.50 (37–41)

PUMP COLUMN LENGTH (nearest ft.): 40 (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)
+ above (49) / − below (49) — LAND SURFACE: 1 (50–51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



...ORT
...M COMPLETELY
...LEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

...MPLETED 0 4 0 7 8 6 (13–20)

Depth of Well 2 0 5 (22–26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" A A – 8 1 – 6 0 5 1 (26–37)

OWNER REVIES (last name) SALLY (first name)

STREET OR RFD 1201 Collins Road TOWN Odenton

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
rown Clay	0	7	
and	7	24	
ed Clay	24	60	
rown Sand	60	82	
hite Clay	82	100	
ed Clay	100	152	
ray Clay	152	180	
edium Brown Sand	180	205	X

CIRCLE APPROPRIATE LETTER
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
ELECTRIC LOG OBTAINED
TEST WELL CONVERTED TO PRODUCTION WELL

BY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN IDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" CONFORMANCE WITH ALL CONDITIONS STATED IN THE CAPTIONED PERMIT, AND THAT THE INFORMATION NTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST KNOWLEDGE.

ERS IDENT. NO. 337

ERS SIGNATURE
MATCH SIGNATURE ON APPLICATION)

UPERVISOR (sign. of driller or journeyman sible for sitework if different from permittee)

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y (44) no N (44)

TYPE OF GROUTING MATERIAL

CEMENT C M (45–46) BENTONITE CLAY B C (45–46)

NO. OF BAGS _____ NO. OF POUNDS 100

GALLONS OF WATER 100

DEPTH OF GROUT SEAL (to nearest foot)

from 3 (48–52 TOP) ft. to 2 6 (54–58 BOTTOM) ft.

(enter 0 if from surface)

CASING RECORD

casing types insert appropriate code below

S T STEEL C O CONCRETE P L PLASTIC O T OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
P L (60–61)	4 (63–64)	2 0 0 (66–70)

OTHER CASING (if used) EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD

screen type or open hole insert appropriate code below

S T STEEL B R BRASS BRONZE H O OPEN HOLE P L PLASTIC O T OTHER

C 2 (1–2)

EACH SCREEN		DEPTH (nearest ft.)	
1	P L (8–9)	2 0 0 (11–15)	2 0 5 (17–21)
2	(23–24)	(26–30)	(32–36)
3	(38–39)	(41–45)	(47–51)

SLOT SIZE 1 0 2 20 3 _____

DIAMETER OF SCREEN 2 (56–60) (NEAREST INCH)

GRAVEL PACK from 195 to 205

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) TELESCOPE CASING (E.R.O.S.) (72) LOG INDICATOR WQ (74–76) OTHER DATA

C 3 (1–2)

PUMPING TEST

HOURS PUMPED (nearest hour) 1 (8–9)

PUMPING RATE (gal. per min. to nearest gal.) 1 5 (11–15)

METHOD USED TO MEASURE PUMPING RATE Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 1 1 0 (17–20)

WHEN PUMPING 1 3 0 (22–25)

TYPE OF PUMP USED (for test)

A (27) air P (27) piston T (27) turbine C (27) centrifugal R (27) rotary O (27) other (describe below) J (27) jet S (27) submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 7 (31–35)

PUMP HORSE POWER .5 0 (37–41)

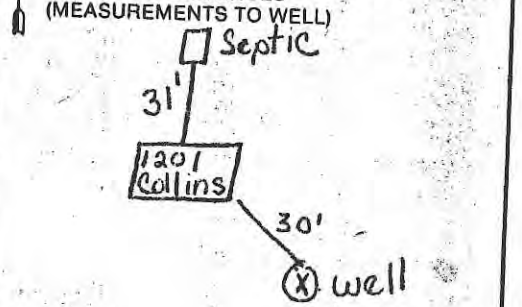
PUMP COLUMN LENGTH (nearest ft.) 1 6 0 (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ (49) above – (49) below } LAND SURFACE 1 (50–51) (nearest foot)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



HEALTH

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 07

DATE WELL COMPLETED 8/13/86

Depth of Well 150 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" A1-81-685K

Bill Seuss
last name — first name

STREET OR RFD 183 12th Street

SUBDIVISION Woodwardville SECTION 963 Patuxent Rd. TOWN Pasadena, Md. 21122 LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown/White Sand and Gravel	0	109	
Red/White Clay	10	40	
Gray Clay	40	70	
Brown /White SAnd	70	87	
RED/White Sand	87	130	
Brown/White Sand	130	150	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] no [N]

TYPE OF GROUTING MATERIAL

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS 4 1/2 NO. OF POUNDS 225

GALLONS OF WATER 112 1/2

DEPTH OF GROUT SEAL (to nearest foot)

from 30 ft. TOP to 50 ft. BOTTOM (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	143

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole: insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL		
2			
3			

SLOT SIZE 1 .020 2 ____ 3 ____

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 138 to 150

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 [ ] 68

C3

PUMPING TEST
HOURS PUMPED (nearest hour) 2

PUMPING RATE (gal. per min. to nearest gal.) 50

METHOD USED TO MEASURE PUMPING RATE AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING 15

WHEN PUMPING 35

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER .5

PUMP COLUMN LENGTH (nearest ft.) 50

CASING HEIGHT (circle appropriate box and enter casing height) [+] above [−] below LAND SURFACE (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES. (MEASUREMENTS TO WELL)

N

PATUXENT RD

95' 51'

CIRCLE APPROPRIATE LETTER
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
T TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 288

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

DENTON T. WOLFORD

DRILLER SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) WQ

70 [ ] TELESCOPE CASING 72 [ ] LOG INDICATOR 74 75 76 [ ] OTHER DATA

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED

COUNTY NUMBER: 02

Received: 8 13

DATE WELL COMPLETED: 15 10 3 1 8 6 20

Depth of Well: 22 2 1 5 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": 28 A1 29 30 - 31 S1 32 33 - 34 35 4016 36 37

OWNER: Garland (last name) Thomas A. (first name)

STREET OR RFD: 2227 Collins Ave. TOWN: Odenton

SUBDIVISION: Old Wilsontown SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sand	0	6	
Rainbow clay	6	95	
White sand	95	100	
White clay	100	110	
Red clay	110	190	
White sand	190	215	✓

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y 43 / no N 44

TYPE OF GROUTING MATERIAL

CEMENT CM 45 46 BENTONITE CLAY BC 45 46

NO. OF BAGS 3 NO. OF POUNDS 150

GALLONS OF WATER 75

DEPTH OF GROUT SEAL (to nearest foot)

from 0 48 TOP 52 ft. to 23 54 BOTTOM 58 ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE: PL 60 61 Nominal diameter top (main) casing (nearest inch): 4 63 64 Total depth of main casing (nearest foot): 208 66 70

OTHER CASING (if used) EACH CASING — diameter inch / depth (feet) from / to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2 1 2

DEPTH (nearest ft.) EACH SCREEN

1: PL 8 9 208 11 15 215 17 21

2: 23 24 26 30 32 36

3: 38 39 41 45 47 51

SLOT SIZE 1 0 2 2 3 0

DIAMETER OF SCREEN 2 56 60 (NEAREST INCH)

GRAVEL PACK from 201 to 215

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 68

C 3 1 2

PUMPING TEST
HOURS PUMPED (nearest hour) 6 8 9

PUMPING RATE (gal. per min. to nearest gal.) 40+ 11 15

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 140 17 20

WHEN PUMPING 180 22 25

TYPE OF PUMP USED (for test)

A air 27 P piston 27 T turbine 27

C centrifugal 27 R rotary 27 O other (describe below) 27

J jet 27 S submersible 27

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S 29

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 12 31 35

PUMP HORSE POWER 7.5 37 41

PUMP COLUMN LENGTH (nearest ft.) 180 43 47

CASING HEIGHT (circle appropriate box and enter casing height): + above 49 / − below 49 — LAND SURFACE 1 60 51 (nearest foot)

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 80

John E. Branham (KB)
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

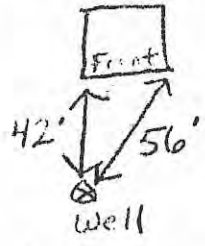
(KB)
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY
(NOT TO BE FILLED IN BY DRILLER)

T 70 TELESCOPE CASING — (E.R.O.S.) 72 LOG INDICATOR — WQ 74 75 76 OTHER DATA

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N



HEALTH

C1 8244 — SEQUENCE NO. (OEP USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

DATE Received: ____

DATE WELL COMPLETED: 07 30 87

Depth of Well: 125 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-811-8761

OWNER: NOWOTNICK, P.L. JR.

STREET OR RFD: 1196 Patuxent Road (last name / first name) TOWN: Odenton

SUBDIVISION: ____ SECTION: ____ LOT: ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Gravel & Clay	0	10	
Gravel Clay	10	15	
Sand & Gravel	15	27	
White Clay	27	53	
Brown Sand & Wood	53	65	
Red Clay	65	110	
Coarse Brown Sand	110	125	X

CIRCLE APPROPRIATE LETTER

A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337

X [signature]
DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y (44) / no N (44)

TYPE OF GROUTING MATERIAL

CEMENT CM (45 46) BENTONITE CLAY BC (45 46)

NO. OF BAGS 3 NO. OF POUNDS 150

GALLONS OF WATER 150

DEPTH OF GROUT SEAL (to nearest foot)

from 4 ft. (48 TOP 52) to 30 ft. (54 BOTTOM 58)
(enter 0 if from surface)

CASING RECORD
casing types — Insert appropriate code below

ST STEEL | CO CONCRETE | PL PLASTIC | OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	120 (66 70)

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — Insert appropriate code below

ST STEEL | BR BRASS BRONZE | HO OPEN HOLE | PL PLASTIC | OT OTHER

C2 (1 2)

EACH SCREEN — DEPTH (nearest ft.)

1	PL (8 9)	120 (11 15)	125 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 0 2 20 3

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK from 115 to 125

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

OEP USE ONLY
(NOT TO BE FILLED IN BY DRILLER)

T (70) TELESCOPE CASING | (E.R.O.S.) (72) LOG INDICATOR | WQ (74 75 76) OTHER DATA

C3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 1 (8 9)

PUMPING RATE (gal. per min. to nearest gal.) 10 (11 15)

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 25 (17 20)

WHEN PUMPING 40 (22 25)

TYPE OF PUMP USED (for test)

A air (27) | P piston (27) | T turbine (27)
C centrifugal (27) | R rotary (27) | O other (describe below) (27)
J jet (27) | S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10 (31 35)

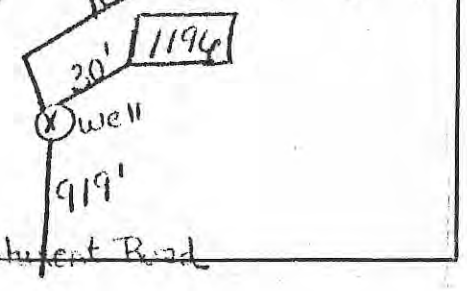
PUMP HORSE POWER 5 (37 41)

PUMP COLUMN LENGTH (nearest ft.) 60 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ above (48) / − below (49) — LAND SURFACE 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



IC|1| 2637 SEQUENCE NO. (OEP USE ONLY)

NUMBER IS TO BE PUNCHED COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

DATE Received

DATE WELL COMPLETED: 0 7 0 5 8 8

Depth of Well: 2 4 0 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": A A - 8 1 - 9 3 9 5

OWNER: Rollins, Nathan (last name)

STREET OR RFD: 2981 Conway Road (first name)

TOWN: Odenton

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown Clay	0	6	
Red Clay	6	35	
Sand & Gravel	35	6.	
Red Clay	62	90	
White Clay	90	127	
Fine Brown Sand	127	144	
Pink Clay	144	180	
Coarse Brown Sand	180	240	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y (44) no N (44)

TYPE OF GROUTING MATERIAL

CEMENT CM (45 46) BENTONITE CLAY BC (45 46)

NO. OF BAGS 6 NO. OF POUNDS 300

GALLONS OF WATER 150

DEPTH OF GROUT SEAL (to nearest foot)

from 4 (48 TOP 52) ft. to 70 (54 BOTTOM 58) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL | CO CONCRETE | PL PLASTIC | OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	1 (63 64)	235 (66 70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL | BR BRASS BRONZE | HO OPEN HOLE | PL PLASTIC | OT OTHER

C 2 (1 2)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL (8 9)	235 (11 15)	240 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 0 2 20 3

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK from 230 to 240

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 7 (8 9)

PUMPING RATE (gal. per min. to nearest gal.) 700 (11 15)

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING 00 (17 20)

WHEN PUMPING 100 (22 25)

TYPE OF PUMP USED (for test)

A air (27) | P piston (27) | T turbine (27) | C centrifugal (27) | R rotary (27) | O other (describe below) (27) | J jet (27) | S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX-SEE ABOVE: S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10 (31 35)

PUMP HORSE POWER .50 (37 41)

PUMP COLUMN LENGTH (nearest ft.) 130 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ above (49) / − below (49) LAND SURFACE 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

2981

Conway Road

CIRCLE APPROPRIATE LETTER

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) TELESCOPE CASING | (E.R.O.S.) (72) LOG INDICATOR | WQ (74 75 76) OTHER DATA

C1 0597 SEQUENCE NO. (OEP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

DATE Received: 8 – 13

DATE WELL COMPLETED: 10 12 87 (16 – 20)

Depth of Well: 22 122 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-811-9409 (28 29 30 31 32 33 34 35 36 37)

OWNER: RIDEN (last name) DONALD (first name)

STREET OR RFD: 946 Patuxent Rd. TOWN: Odenton, Md. 21113

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Sand & gravel	0	10	
Rock	10	11	
Red clay	11	31	
Sand, white clay & gravel	31	68	
Red & gray clay	68	110	
Tan sand & shell	110	122	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y (44) no N (44)

TYPE OF GROUTING MATERIAL

CEMENT CM (45 46) BENTONITE CLAY BC (46 46)

NO. OF BAGS 4 NO. OF POUNDS 200

GALLONS OF WATER 100

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48 TOP 52) ft. to 23 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types — Insert appropriate code below

ST STEEL | CO CONCRETE | PL PLASTIC | OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	117 (66 – 70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — Insert appropriate code below

ST STEEL | BR BRASS BRONZE | HO OPEN HOLE | PL PLASTIC | OT OTHER

C2 (1 2)

EACH SCREEN — DEPTH (nearest ft.)

1	PL (8 9)	115 (11 – 15)	122 (17 – 21)
2	(23 24)	(26 – 30)	(32 – 36)
3	(38 39)	(41 – 45)	(47 – 51)

SLOT SIZE 1 030 2 3

DIAMETER OF SCREEN 2 (56 – 60) (NEAREST INCH)

GRAVEL PACK from 112 to 122

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

C3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 2 (8 9)

PUMPING RATE (gal. per min. to nearest gal.) 15 (11 – 15)

METHOD USED TO MEASURE PUMPING RATE: Bucket

WATER LEVEL (distance from land surface)

BEFORE PUMPING 13 (17 – 20)

WHEN PUMPING 17 (22 – 25)

TYPE OF PUMP USED (for test)

A air (27) | P piston (27) | T turbine (27)
C centrifugal (27) | R rotary (27) | O other (describe below) (27)
J jet (27) | S submersible (27)

Bailer

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 – 35)

PUMP HORSE POWER (37 – 41)

PUMP COLUMN LENGTH (nearest ft.) (43 – 47)

CASING HEIGHT (circle appropriate box and enter casing height)
+ above (48) / – below (49) — LAND SURFACE 1 (50 51) (nearest foot)

CIRCLE APPROPRIATE LETTER
A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E — ELECTRIC LOG OBTAINED
P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 56

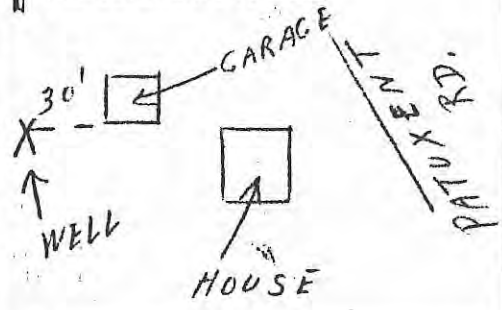
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) TELESCOPE CASING | (E.R.O.S.) (72) LOG INDICATOR | WQ (74 75 76) OTHER DATA

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



C 1 1621 SEQUENCE NO. (OEP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

DATE Received

DATE WELL COMPLETED 10 30 87

Depth of Well 199 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" A1-K1-949

OWNER ROBINSON DANIEL (last name, first name)

STREET OR RFD 11370 Cherry Hill Rd. TOWN Beltsville, Md. 20705

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Sand & gravel	0	15	
Red clay	15	40	
Red & white clay & sand	40	80	
White clay & sand	80	140	
Red clay	140	190	
Sand	190	199	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N

TYPE OF GROUTING MATERIAL

CEMENT CM BENTONITE CLAY BC

NO. OF BAGS 3 NO. OF POUNDS 150

GALLONS OF WATER 75

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. (TOP) to 23 ft. (BOTTOM)
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	194

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	192	199
2			
3			

SLOT SIZE 030 2 ____ 3 ____

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 189 to 199

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) WQ

TELESCOPE CASING LOG INDICATOR OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 1

PUMPING RATE (gal. per min. to nearest gal.) 20

METHOD USED TO MEASURE PUMPING RATE Bucket

WATER LEVEL (distance from land surface)

BEFORE PUMPING 100

WHEN PUMPING 110

TYPE OF PUMP USED (for test)

A air P piston T turbine C centrifugal R rotary O other (describe below) J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE:

CAPACITY: GALLONS PER MINUTE (to nearest gallon)

PUMP HORSE POWER

PUMP COLUMN LENGTH (nearest ft.)

CASING HEIGHT (circle appropriate box and enter casing height) + above − below

LAND SURFACE 1 (nearest foot)

CIRCLE APPROPRIATE LETTER

A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 56

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

COLLINS RD.

WELL → X 30'

HOUSE →

C 1 5830 — SEQUENCE NO. (OEP USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

DATE Received

DATE WELL COMPLETED 11/12/88

Depth of Well 125 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" A11-811-9687

OWNER MILTON CHARLES (last name, first name)

STREET OR RFD 2321 5TH AVENUE TOWN DENTON

SUBDIVISION _____ SECTION _____ LOT _____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown Sand	0	15	
White Clay	15	45	
Gravel	45	56	
Blue White clay	56	105	
TAN SAND	105	125	—

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y / no N

TYPE OF GROUTING MATERIAL

CEMENT CM — BENTONITE CLAY BC

NO. OF BAGS 3 — NO. OF POUNDS 150

GALLONS OF WATER 25

DEPTH OF GROUT SEAL (to nearest foot)

from 0 ft. (TOP) to 35 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL — CO CONCRETE — PL PLASTIC — OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	120

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL — BR BRASS BRONZE — HO OPEN HOLE — PL PLASTIC — OT OTHER

C 2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	120	125
2			
3			

SLOT SIZE 1 .030 2 _____ 3 _____

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 100 to 125

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 2

PUMPING RATE (gal. per min. to nearest gal.) 30

METHOD USED TO MEASURE PUMPING RATE Bucket

WATER LEVEL (distance from land surface)

BEFORE PUMPING 16

WHEN PUMPING 28

TYPE OF PUMP USED (for test)

A air — P piston — T turbine — C centrifugal — R rotary — O other (describe below) — J jet — S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10

PUMP HORSE POWER .5

PUMP COLUMN LENGTH (nearest ft.) 80

CASING HEIGHT (circle appropriate box and enter casing height) + above / − below — LAND SURFACE 1 (nearest foot)

CIRCLE APPROPRIATE LETTER
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E ELECTRIC LOG OBTAINED

P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 121

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

5th AVE

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T — (E.R.O.S.) — WQ

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

CT 7552 — SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

DATE Received:

DATE WELL COMPLETED: 10 26 88

Depth of Well: 350 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": A1-38-1020

OWNER: Harris, Ellsworth (last name, first name)

STREET OR RFD: 1254 Collins Avenue TOWN: Odenton

SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown Sand	0	8	
White Clay	8	15	
Brown Sand	15	30	
Red Clay	30	210	
White Clay	210	255	
Fine Brown Sand	255	330	
Coarse Brown Sand	330	350	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y (44) no N (44)

TYPE OF GROUTING MATERIAL

CEMENT CM (45 46) BENTONITE CLAY BC (45 46)

NO. OF BAGS 4 NO. OF POUNDS 200

GALLONS OF WATER 100

DEPTH OF GROUT SEAL (to nearest foot)

from 4 ft. (48 TOP 52) to 40 ft. (54 BOTTOM 58)

(enter 0 if from surface)

CASING RECORD
casing types — Insert appropriate code below

ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE: PI (60 61)

Nominal diameter top (main) casing (nearest inch): 4 (63 64)

Total depth of main casing (nearest foot): 345 (66 70)

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — Insert appropriate code below

ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C2 (1 2)

EACH SCREEN — DEPTH (nearest ft.)

1	11 (8 9)	345 (11 15) — 350 (17 21)
2	(23 24)	(26 30) — (32 36)
3	(38 39)	(41 45) — (47 51)

SLOT SIZE 1 0 2 20 3

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK from 340 to 350

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) TELESCOPE CASING — (E.R.O.S.) (72) LOG INDICATOR — WQ (74 75 76) OTHER DATA

C3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour): 1 (8 9)

PUMPING RATE (gal. per min. to nearest gal.): 30 (11 15)

METHOD USED TO MEASURE PUMPING RATE: Air

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 160 (17 20)

WHEN PUMPING: 180 (22 25)

TYPE OF PUMP USED (for test) (27)

A air, P piston, T turbine, C centrifugal, R rotary, O other (describe below), J jet, S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX-SEE ABOVE: S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon): 15 (31 35)

PUMP HORSE POWER: .75 (37 41)

PUMP COLUMN LENGTH (nearest ft.): 210 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height): + above (49) / − below (49) LAND SURFACE 1 (50 51) (nearest foot)

CIRCLE APPROPRIATE LETTER

A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED

E — ELECTRIC LOG OBTAINED

P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 10.17.13 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

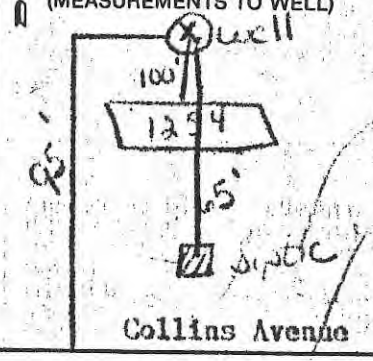
DRILLERS IDENT. NO. 337

X [signature]

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



C 1 4951 — SEQUENCE NO. (DENR USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

SWCO USE ONLY
DATE Received

DATE WELL COMPLETED: 05 11 89

Depth of Well: 114 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-SB-2615

OWNER: Corzone, Wendy
STREET OR RFD: 1200 Patuxent Road (last name / first name)
TOWN: Odenton
SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells
STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IS WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Sand & Gravel	0	10	
White Clay	10	15	
Gray Clay	15	25	
Brown Sand	25	40	
Red Clay	40	85	
Medium Brown Sand	85	114	

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y (44) / no N (44)
TYPE OF GROUTING MATERIAL
CEMENT CM (45 46) BENTONITE CLAY BC (45 46)
NO. OF BAGS 9 NO. OF POUNDS 150
GALLONS OF WATER 75
DEPTH OF GROUT SEAL (to nearest foot)
from 4 (48 TOP 52) ft. to 45 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER

MAIN CASING TYPE: PL (60 61)
Nominal diameter top (main) casing (nearest inch): 4 (63 64)
Total depth of main casing (nearest foot): 109 (66 70)

OTHER CASING (If used) — EACH CASING
diameter inch / depth (feet) from / to

SCREEN RECORD
screen type or open hole — insert appropriate code below
ST STEEL, BR BRASS BRONZE, HO OPEN HOLE, PL PLASTIC, OT OTHER

C 2

EACH SCREEN	TYPE	DEPTH (nearest ft.) from	to
1	PL (8 9)	109 (11 15)	114 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 0 2 20 3
DIAMETER OF SCREEN 5 (56 60) (NEAREST INCH)

GRAVEL PACK from 104 to 115
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

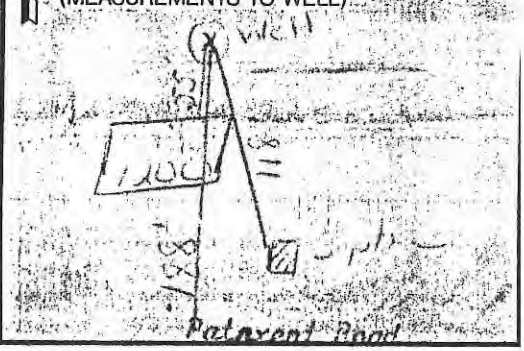
OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING; (E.R.O.S.) (72) LOG INDICATOR; W Q (74 75 76) OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour): 1 (8 9)
PUMPING RATE (gal. per min. to nearest gal.): 20 (11 15)
METHOD USED TO MEASURE PUMPING RATE: Air
WATER LEVEL (distance from land surface)
BEFORE PUMPING: 40 (17 20)
WHEN PUMPING: 50 (22 25)
TYPE OF PUMP USED (for test)
A air, P piston, T turbine, C centrifugal, R rotary, O other (describe below), J jet, S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES / NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10 (31 35)
PUMP HORSE POWER: .5 (37 41)
PUMP COLUMN LENGTH (nearest ft.): 90 (43 47)
CASING HEIGHT (circle appropriate box and enter casing height)
+ above / − below (49) LAND SURFACE: 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE LETTER
A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E — ELECTRIC LOG OBTAINED
P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

C 1 6453 — SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

ST/CO USE ONLY
DATE Received NOV 29 1989

DATE WELL COMPLETED 11 18 89

Depth of Well 283 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-88-2979

OWNER Stachitas Frank (last name) (first name)
STREET OR RFD 2754 Conway Rd TOWN Odenton, Md.
SUBDIVISION ____ SECTION ____ LOT ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sandy clay	0	6	
Grey sandy clay	6	10	
Grey soft clay w/ fine white sd	10	30	
Brown sand, grits and gravel	30	70	
Red clay w/white clay/clay	70	83	
Solid red clay	83	97	
Grey soft clay	97	103	
Grey clay w/brown sand	103	109	
Grey soft clay	109	125	
Solid grey clay	125	136	
white soft clay	136	142	
Layers of multi color clay & sd	142	150	
Solid red & white clay	150	187	
Grey soft clay	187	205	
fine sand w/white clay	205	222	
Clay white & fine sand layer	222	262	
Sand fine	262	270	
Sand Med Brown	270	283	✓

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 173
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) — yes Y (44) no N (44)
TYPE OF GROUTING MATERIAL
CEMENT CM (45 46) BENTONITE CLAY BC (45 46)
NO. OF BAGS 10 NO. OF POUNDS 940
GALLONS OF WATER 50
DEPTH OF GROUT SEAL (to nearest foot)
from 4 (48 TOP 52) ft. to 30 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL — CO CONCRETE — PL PLASTIC — OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	45 (63 64)	273 (66 70)

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below
ST STEEL — BR BRASS BRONZE — HO OPEN HOLE — PL PLASTIC — OT OTHER

C 2

EACH SCREEN

		DEPTH (nearest ft.)	
1	PL (8 9)	273 (11 15)	283 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE .030 2 ____ 3 ____
DIAMETER OF SCREEN 3 (58 60) (NEAREST INCH)

GRAVEL PACK from 265 to 283
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

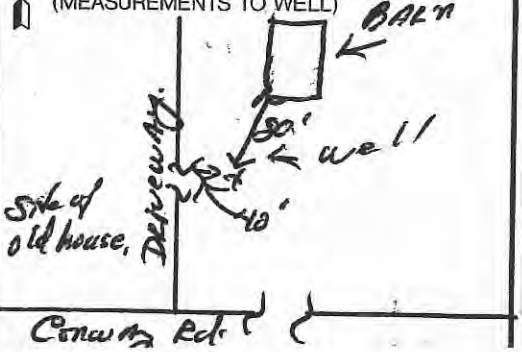
OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING — (E.R.O.S.) (72) LOG INDICATOR — W Q (74 75 76) A OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 4 (8 9)
PUMPING RATE (gal. per min. to nearest gal.) 150 (11 15)
METHOD USED TO MEASURE PUMPING RATE bucket
WATER LEVEL (distance from land surface)
BEFORE PUMPING 45 (17 20)
WHEN PUMPING 120 (22 25)
TYPE OF PUMP USED (for test)
A air (27) — P piston (27) — T turbine (27) — C centrifugal (27) — R rotary (27) — O other (describe below) (27) — J jet (27) — S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) — YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 12 (31 35)
PUMP HORSE POWER .7 (37 41)
PUMP COLUMN LENGTH (nearest ft.) 90 (43 47)
CASING HEIGHT (circle appropriate box and enter casing height)
+ above (49) / − below (49) — LAND SURFACE 2 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



SEND --WHITE-Health Dept.-A.A.Co.
YELLOW - State Health Dept.
PINK - Well Driller

MAY 1 1 1990

ANNE ARUNDEL COUNTY

OFFICE OF ENVIRONMENTAL PROGRAMS

WELL ABANDONMENT REPORT

Date 25 Jan 90

Permit Number of abandoned well (if any) None

Permit Number of replacement well AA-88-2979

Driller's Name Kwiatkowski, Stanley
Last First

Owner's Name Stachias, Frank
Last First

Well Location:

County Anne Arundel
Subdivision
Section Lot
Nearest Town Crofton
Maryland Grid Location:

E 870
N 430

Box Number

0/5	X 5/5
0/0	5/0

Show well location by (X) within box

Type of Well

__ Drilled
__ Jetted
X Bored or Augered
__ Other, specify

Depth of Well 12 feet

Type of Casing

__ Steel
__ Plastic
X Concrete
__ Other, specify

Size of Casing 36 inches.

Was any case removed ☐ Yes ☐ No
If yes amount removed _____ feet

Was casing ripped or perforated ☐ Yes ☐ No

Log of Sealing Material

Material	Feet From	Feet To
Mixture of Bentonite and Select fill	0	12

Driller [signature] (Signature)

License Number 173

AADH-778 (1-78)

C 1 7130 (1 2 3 6)
SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received JAN 11 1990 (8 13)

DATE WELL COMPLETED 120889 (15 20)

Depth of Well 190 (22 26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" A4-88-3690 (28 29 30 31 32 33 34 35 36 37)

OWNER BR G & H Partnership (last name) (first name)
STREET OR RFD 1177 Patuxent Road TOWN Gambrills
SUBDIVISION ____ SECTION ____ LOT ____

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Gravel	0	3	
Gray Clay	3	10	
Brown Sand	10	25	
Red Clay	25	140	
White Clay	140	~~122~~	172
Coarse Brown Sand	~~122~~	190	
	172		

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] (44) no [N] (44)
TYPE OF GROUTING MATERIAL
CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)
NO. OF BAGS 3 NO. OF POUNDS 150
GALLONS OF WATER 75
DEPTH OF GROUT SEAL (to nearest foot)
from 4 (48 TOP 52) ft. to 30 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	185 (66 70)

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below
[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

EACH SCREEN — DEPTH (nearest ft.)

1	PL (8 9)	185 (11 15)	190 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 0 2 20 3 ____
DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

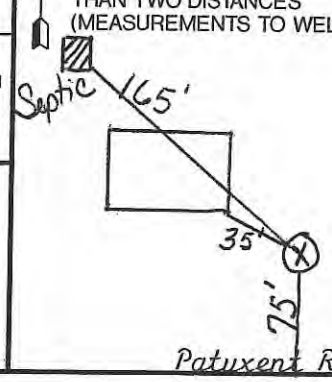
GRAVEL PACK from 180 to 190
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 [ ] (68)

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 1 (8 9)
PUMPING RATE (gal. per min. to nearest gal.) 50 (11 15)
METHOD USED TO MEASURE PUMPING RATE Air
WATER LEVEL (distance from land surface)
BEFORE PUMPING 10 (17 20)
WHEN PUMPING 30 (22 25)
TYPE OF PUMP USED (for test)
[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)
CAPACITY:
GALLONS PER MINUTE (to nearest gallon) 12 (31 35)
PUMP HORSE POWER .50 (37 41)
PUMP COLUMN LENGTH (nearest ft.) 60 (43 47)
CASING HEIGHT (circle appropriate box and enter casing height)
[+] above (48) / [−] below (49) LAND SURFACE 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337
X [signature]
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING
(E.R.O.S.) (72) LOG INDICATOR
W Q (74 75 76) OTHER DATA

C 1 | 8849 | SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER

ST/CO USE ONLY
DATE Received JAN 23 1992

DATE WELL COMPLETED 11 29 91

Depth of Well 84 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" 44-88-7182

OWNER Smith, Melvin (last name) (first name)

STREET OR RFD 962 Patuxent Road TOWN Odenton

SUBDIVISION Woodwardville SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Top Soil	0	2	
Gravel	2	19	
Brown Sand	19	26	
Red Clay	26	55	
Gray Clay	55	72	
Red. Brown Sand	72	84	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y no N
TYPE OF GROUTING MATERIAL
CEMENT CM BENTONITE CLAY BC
NO. OF BAGS 4 NO. OF POUNDS 200
GALLONS OF WATER 100
DEPTH OF GROUT SEAL (to nearest foot)
from 4 ft. TOP to 30 ft. BOTTOM
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	4	79

OTHER CASING (if used) EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below
ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C 2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	79	84
2			
3			

SLOT SIZE 1 0 2 20 3
DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 74 to 84
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
TELESCOPE CASING LOG INDICATOR OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour) 1
PUMPING RATE (gal. per min. to nearest gal.) 20
METHOD USED TO MEASURE PUMPING RATE AIR
WATER LEVEL (distance from land surface)
BEFORE PUMPING 20
WHEN PUMPING 30

TYPE OF PUMP USED (for test)
A air P piston T turbine
C centrifugal R rotary O other (describe below)
J jet S submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10
PUMP HORSE POWER .50
PUMP COLUMN LENGTH (nearest ft.) 50
CASING HEIGHT (circle appropriate box and enter casing height) + above – below LAND SURFACE 1 (nearest foot)

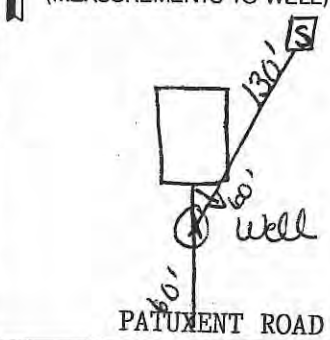
CIRCLE APPROPRIATE LETTER
A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
TEST WELL CONVERTED TO PRODUCTION WELL

HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 337
X SIGNATURE (MATCH SIGNATURE ON APPLICATION)

SUPERVISOR (sign. of driller or journeyman if work if different from permittee)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



SEND --WHITE-Health Dept.-A.A.Co.
YELLOW - State Health Dept.
PINK - Well Driller

DEC X 6 1991

ANNE ARUNDEL COUNTY

OFFICE OF ENVIRONMENTAL PROGRAMS

WELL ABANDONMENT REPORT

Date Dec. 4, 1991

Permit Number of abandoned well (if any) (dog well) | | | - | | | - | | | | |

Permit Number of replacement well | A | A | - | 8 | 8 | - | 7 | 1 | 8 | 2 |

Driller's Name Greer, JOHN
Last First

Owner's Name Smith, Melvin
Last First

Well Location: 962 PATUXENT RD.
County ANNE ARUNDEL
Subdivision WOODWARDVILLE
Section _____ Lot _____
Nearest Town ODENTON
Maryland Grid Location:
E 870
N 440
Box Number

0/5	5/5
X	
0/0	5/0

Show well location by (X) within box

Type of Well

___ Drilled
___ Jetted
✓ Bored or Augered
___ Other, specify

Depth of Well 10 feet

Type of Casing

___ Steel
___ Plastic
✓ Concrete
___ Other, specify

Size of Casing 24 inches.

Was any case removed ☐ Yes ☑ No
If yes amount removed _____ feet

Was casing ripped or perforated ☐ Yes ☑ No

Log of Sealing Material

Material	Feet From	Feet To
Sand	10	5
Portland Cement	5	0

Driller [signature] (Signature)

License Number 337

AADH-778 11/81

C1 1341 (1 2 3 6) SEQUENCE NO. (DENV USE ONLY)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received DEC X 3 1992 (8–13)

DATE WELL COMPLETED 112492 (15–20)

Depth of Well 287 (22–26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-88-8563 (28–37)

OWNER Mandrin COnstruction (last name / first name)
STREET OR RFD 8174 Ritchie Highway TOWN Pasadena, Maryland 21122
SUBDIVISION SECTION 2966 Conway Road LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
op Soil	0	2	
Brown Sand & Gravel	2	17	
hite Clay	17	25	
rown Sand	25	35	
Gray Clay	35	55	
Red White Clay	55	70	
rown Sand & White - Lay	70	100	
Red Clay	100	198	
hite Clay	198	210	
hite Red Clay	210	250	
Brown White Sand	250	287	X

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y (44) no N (44)
TYPE OF GROUTING MATERIAL
CEMENT CM (45–46) BENTONITE CLAY BC (45–46)
NO. OF BAGS 14 NO. OF POUNDS 700
GALLONS OF WATER 350
DEPTH OF GROUT SEAL (to nearest foot)
from 3 (48–52 TOP) ft. to 150 (54–58 BOTTOM) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
ST STEEL CO CONCRETE PL PLASTIC OT OTHER

MAIN CASING TYPE PL (60–61) Nominal diameter top (main) casing (nearest inch) 4 (63–64) Total depth of main casing (nearest foot) 280 (66–70)

EACH CASING — OTHER CASING (if used) diameter inch / depth (feet) from / to

SCREEN RECORD
screen type or open hole insert appropriate code below
ST STEEL BR BRASS BRONZE HO OPEN HOLE PL PLASTIC OT OTHER

C2 (1–2)

EACH SCREEN — DEPTH (nearest ft.)
1 PL (8–9) 280 (11–15) 287 (17–21)
2 (23–24) (26–30) (32–36)
3 (38–39) (41–45) (47–51)

SLOT SIZE 1 020 3
DIAMETER OF SCREEN 2 (56–60) (NEAREST INCH)

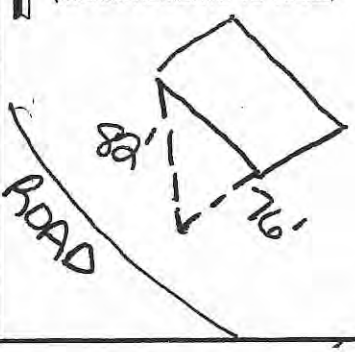
GRAVEL PACK from 275 to 287
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

C3 (1–2)

PUMPING TEST
HOURS PUMPED (nearest hour) 2 (8–9)
PUMPING RATE (gal. per min. to nearest gal.) 60 (11–15)
METHOD USED TO MEASURE PUMPING RATE AIR
WATER LEVEL (distance from land surface)
BEFORE PUMPING 125 (17–20)
WHEN PUMPING 160 (22–25)
TYPE OF PUMP USED (for test)
A air (27) P piston (27) T turbine (27)
C centrifugal (27) R rotary (27) O other (describe below) (27)
J jet (27) S submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 15 (31–35)
PUMP HORSE POWER .75 (37–41)
PUMP COLUMN LENGTH (nearest ft.) 175 (43–47)
CASING HEIGHT (circle appropriate box and enter casing height)
+ above (49) / − below (49) LAND SURFACE 1 (50–51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 288
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)
DENTON J. WOLFORD
SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

OEP USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING
(E.R.O.S.) (72) LOG INDICATOR
W Q (74 75 76) OTHER DATA

C1 4302 (1 2 3 – 6)
(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

SEQUENCE NO. (DENV USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received: APR X 7 1995 (8 – 13)

DATE WELL COMPLETED: 0 2 0 6 9 5 (15 – 20)

Depth of Well: 2 4 5 (22 – 26) (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-92-1911 (28 29 30 31 32 33 34 35 36 37)

OWNER: HARRIS, JOEL (last name, first name)
STREET OR RFD: 2989 CONWAY ROAD TOWN: ODENTON
SUBDIVISION: SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
TOP SOIL	0	4	
BROWN SAND	4	18	
WHITE CLAY	18	30	
BROWN SAND	30	62	
RED CLAY	62	140	
WHITE CLAY	140	200	
MEDIUM BROWN SAND	200	220	
COARSE BROWN SAND	220	245	XXX

IN HARD ROCK AREAS, IDENTIFY SPECIFICALLY WHERE SATURATED FRACTURES WERE OBSERVED.

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. 086

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [X] (44) no [N] (44)
TYPE OF GROUTING MATERIAL
CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)
NO. OF BAGS 8 NO. OF POUNDS 400
GALLONS OF WATER 200
DEPTH OF GROUT SEAL (to nearest foot)
from 4 (48 TOP 52) ft. to 70 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	240 (66 – 70)

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below
[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C2 (1 2)

EACH SCREEN

		DEPTH (nearest ft.)	
1	PL (8 9)	240 (11 – 15)	245 (17 – 21)
2	(23 24)	(26 – 30)	(32 – 36)
3	(38 39)	(41 – 45)	(47 – 51)

SLOT SIZE 1 0 2 20 3
DIAMETER OF SCREEN 2 (56 – 60) (NEAREST INCH)

GRAVEL PACK from 235 to 245
IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 [ ] (68)

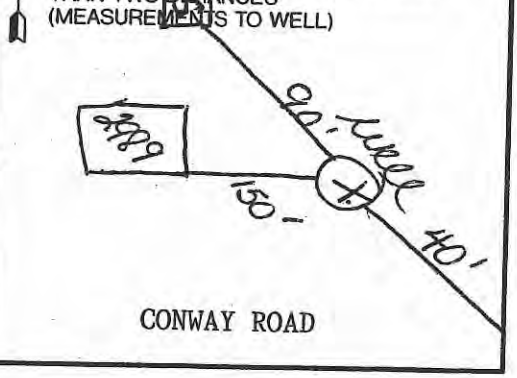
MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T [ ] (70) TELESCOPE CASING
(E.R.O.S.) [ ] (72) LOG INDICATOR
W Q (74 75 76) OTHER DATA

C3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 1 (8 9)
PUMPING RATE (gal. per min. to nearest gal.) 20 (11 – 15)
METHOD USED TO MEASURE PUMPING RATE: AIR
WATER LEVEL (distance from land surface)
BEFORE PUMPING 60 (17 – 20)
WHEN PUMPING 80 (22 – 25)
TYPE OF PUMP USED (for test)
[X] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): ~~YES~~ NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10 (31 – 35)
PUMP HORSE POWER .75 (37 – 41)
PUMP COLUMN LENGTH (nearest ft.) 120 (43 – 47)
CASING HEIGHT (circle appropriate box and enter casing height)
[X] above (49) [–] below (49) LAND SURFACE 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



C 1 4620 — SEQUENCE NO. (DENV USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received: JAN X 4 1995

DATE WELL COMPLETED: 09 29 94

Depth of Well: 250 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-92-2014

OWNER: Cook, Donald (last name, first name)

STREET OR RFD: 12703 Mingude Ln

TOWN: Boyce, Md.

SUBDIVISION: Wilson Town

SECTION: 2881 Cmun Md

LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	Check if water bearing
Brown sand	0	6	
White clay	6	7	
Red sand	7	38	
Fine sand	38	54	
Red clay	54	60	
Multi color clay	60	205	
Sand and clay layers	205	210	
Fine sand Brown w/clay	210	235	
Med Sand Tan	235	250	X

IN HARD ROCK AREAS, IDENTIFY SPECIFICALLY WHERE SATURATED FRACTURES WERE OBSERVED.

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS IDENT. NO. V73

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N]

TYPE OF GROUTING MATERIAL

CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS 9 NO. OF POUNDS 900

GALLONS OF WATER 200

DEPTH OF GROUT SEAL (to nearest foot)

from 4 ft. to 75 ft. (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL	5	240

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2

EACH SCREEN — DEPTH (nearest ft.)

		DEPTH from	DEPTH to
1	PL	240	250
2			
3			

SLOT SIZE 020 2 3

DIAMETER OF SCREEN 3.25 (NEAREST INCH)

GRAVEL PACK from 235 to 250

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour): 3

PUMPING RATE (gal. per min. to nearest gal.): 100

METHOD USED TO MEASURE PUMPING RATE: Jumper

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 66

WHEN PUMPING: 120

TYPE OF PUMP USED (for test)

[A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS EXCEPT HOME USE

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX - SEE ABOVE: S

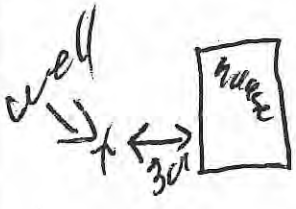
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 12

PUMP HORSE POWER: .7

PUMP COLUMN LENGTH (nearest ft.): 110

CASING HEIGHT (circle appropriate box and enter casing height): [+] above / [−] below LAND SURFACE: 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND/OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



C 1 | 4433 ·

SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT

FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received: JUN 10 1996

DATE WELL COMPLETED: 04 16 96

Depth of Well: 229 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-94-0320

OWNER: ST. JOHN'S CHURCH (last name / first name)

STREET OR RFD: 2993 CONWAY ROAD TOWN: ODENTON 21113

SUBDIVISION: SECTION: LOT:

WELL LOG

Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
SAND & CLAY	0	15	
BROWN SAND	15	36	
RED CLAY	36	45	
WHITE CLAY	45	60	
BROWN SAND	60	75	
RED CLAY	75	185	
WHITE CLAY	185	200	
FINE BROWN SAND	200	215	
MED BROWN SAND	215	229	

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED: yes Y / no N

CIRCLE APPROPRIATE LETTER

- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

TYPE: MWD/MSD/MGD

DRILLERS LIC. NO. 086

(X) DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD

WELL HAS BEEN GROUTED (Circle Appropriate Box): yes Y / no N

TYPE OF GROUTING MATERIAL (Circle one): CEMENT CM / BENTONITE CLAY BC

NO. OF BAGS 6 NO. OF POUNDS 300

GALLONS OF WATER 162

DEPTH OF GROUT SEAL (to nearest foot): from 4 ft. (TOP) to 100 ft. (BOTTOM) (enter 0 if from surface)

CASING RECORD

casing types insert appropriate code below: ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	224

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD

screen type or open hole — insert appropriate code below: ST STEEL, BR BRASS BRONZE, HO OPEN HOLE, PL PLASTIC, OT OTHER

C 2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	224	229
2			
3			

SLOT SIZE 1 0 2 20 3

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK from 219 to 229

IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T	(E.R.O.S.)	W Q
		A

TELESCOPE CASING / LOG INDICATOR / OTHER DATA

C 3

PUMPING TEST

HOURS PUMPED (nearest hour): 1

PUMPING RATE (gal. per min.): 20.

METHOD USED TO MEASURE PUMPING RATE: AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 80 ft.

WHEN PUMPING: 90 ft.

TYPE OF PUMP USED (for test): A air, P piston, T turbine, C centrifugal, R rotary, O other (describe below), J jet, S submersible

PUMP INSTALLED

DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES / NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S

CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10

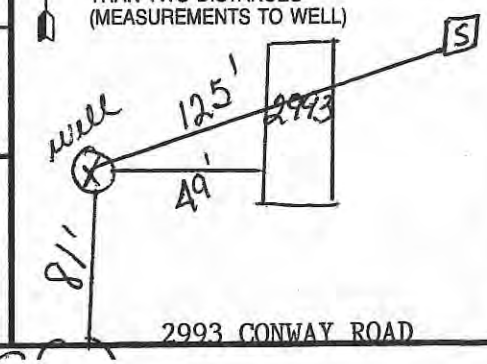
PUMP HORSE POWER: .50

PUMP COLUMN LENGTH (nearest ft.): 130

CASING HEIGHT (circle appropriate box and enter casing height): + above / − below LAND SURFACE: 1 (nearest foot)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



2993 CONWAY ROAD

MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

JUN 1996 Received Ind. Septic Systems & Wells Program

SUBMIT COPIES OF COMPLETED FORM TO:
- COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
- * WELL OWNER
- * MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 04-16-96 (month/day/year)

PERMIT NUMBER OF ABANDONED WELL (if any): AA-74-2547

* PERMIT NUMBER OF REPLACEMENT WELL: * AA-94-0320

PERSON ABANDONING WELL: John E. Greer

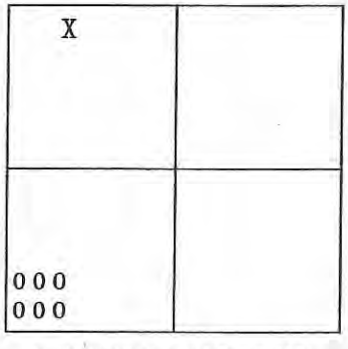
WELL DRILLERS LICENSE NUMBER: 086
CIRCLE: MWD/MSD/MGD

* OWNER'S NAME: ST. JOHN'S CHURCH

WELL LOCATION: 2993 CONWAY ROAD

COUNTY: ANNE ARUNDEL
NEAREST TOWN: ODENTON
TAX MAP 36 BLOCK 07 PARCEL 0174
SUBDIVISION:
SECTION: LOT:

MARYLAND GRID COORDINATES
BOX NUMBER E 870 N 430



SHOW WELL LOCATION BY X WITHIN BOX

* TYPE OF WELL BEING ABANDONED:

X DRILLED ___ JETTED
___ BORED/AUGUERED ___ HAND DUG
___ OTHER (specify) ___

USE CODE:

___ DOMESTIC ___ MUNICIPAL/PUBLIC
___ IRRIGATION X INDUSTRIAL
___ TEST/OBSERVATION

* TYPE OF CASING:

___ STEEL X PLASTIC
___ CONCRETE ___ OTHER (specify)

SIZE OF CASING: 4 INCHES IN DIAMETER

* DEPTH OF WELL: 72 FEET DEEP

WAS ANY CASING REMOVED? X YES ___ NO
if yes, length removed, in feet: 2

WAS CASING RIPPED OR PERFORATED? ___ YES X NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Sand	72	45
Bentonite Clay	45	3
Backfill	3	0

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN | 086 LICENSE # | MWD/MSD/MGD CIRCLE ONE | 4-16-96 DATE

DENV 828 JULY 1993

C 1 05989 — SEQUENCE NO. (MDE USE ONLY)

(THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY — DATE Received: SEP 2 1998

DATE WELL COMPLETED: MM 11 DD 10 YY 97

Depth of Well: 115 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-94-2136

OWNER: WARNICK (last name) MARY (first name)

STREET OR RFD: 1198 Patuxent Rd TOWN:

SUBDIVISION: Odenton SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Sand & Gravel	0	6	
Brown Clay	6	15	
Brown Sand	15	24	
Red Clay	24	61	
Brown Sand	61	74	
Red Clay	74	97	
Grey Clay	97	105	
Medium Brown Sand	105	115	

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- (A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M S D 086

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. M __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N]

TYPE OF GROUTING MATERIAL (Circle one): CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS 6 NO. OF POUNDS 300

GALLONS OF WATER 150

DEPTH OF GROUT SEAL (to nearest foot): from 4 ft. TOP to 80 ft. BOTTOM (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below: [ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	110

OTHER CASING (if used) — EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below: [ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	110	115
2			
3			

SLOT SIZE 1 0 2 2 3 0

DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 105 to 115

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T	(E.R.O.S.)	W Q
TELESCOPE CASING	LOG INDICATOR	OTHER DATA: A

PUMPING TEST
HOURS PUMPED (nearest hour): 1

PUMPING RATE (gal. per min.): 15.

METHOD USED TO MEASURE PUMPING RATE: BARREL

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 30 ft.

WHEN PUMPING: 40 ft.

TYPE OF PUMP USED (for test): [A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S

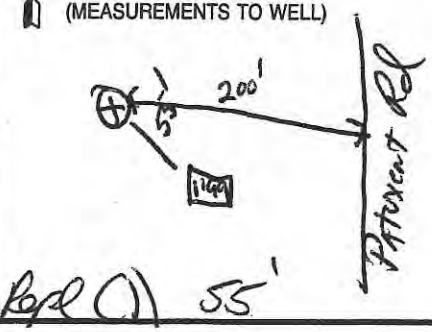
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10

PUMP HORSE POWER: .50

PUMP COLUMN LENGTH (nearest ft.): 80

CASING HEIGHT (circle appropriate box and enter casing height): [+] above [−] below — LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

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WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SEP 1998
Received
Ind. Septic
Systems & Wells
Program

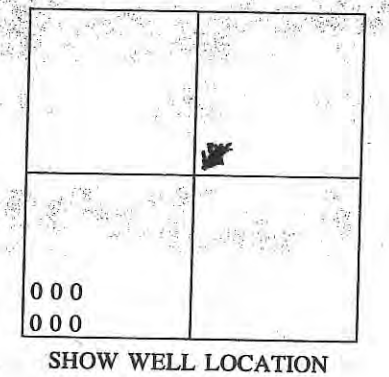
SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: _____ (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) — —
* PERMIT NUMBER OF REPLACEMENT WELL AA - 94 - 2136
* PERSON ABANDONING WELL: John Greer
WELL DRILLERS LICENSE NUMBER: 086
CIRCLE: MWD/MSD/MGD
* OWNER'S NAME: Mary Alice Warnick
* WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Odenton
TAX MAP 36 BLOCK 15 PARCEL 0025
SUBDIVISION: _____
SECTION: _____ LOT: _____
NEAREST ROAD: Patuxent Rd

MARYLAND GRID COORDINATES
BOX NUMBER E 880 N 430 <_____



SHOW WELL LOCATION BY X WITHIN BOX

TYPE OF WELL BEING ABANDONED:

_____ DRILLED _____ JETTED
_____ BORED/AUGUERED _____ HAND DUG
_____ OTHER (specify) _____

USE CODE:

_____ DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
_____ TEST/OBSERVATION

* TYPE OF CASING:

_____ STEEL _____ PLASTIC
_____ CONCRETE _____ OTHER (specify) _____

* SIZE OF CASING: 4 INCHES IN DIAMETER

DEPTH OF WELL: 115 FEET DEEP

* WAS ANY CASING REMOVED? ____ YES _____ NO
if yes, length removed, in feet: _____

* WAS CASING RIPPED OR PERFORATED? ____ YES _____ NO

LOG OF SEALING MATERIAL

MATERIAL	FEET	
	FROM	TO

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE # MWD/MSD/MGD CIRCLE ONE DATE

DENV 828 JULY 1993

C 1 | 08339 — SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE PRINT OR TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY — DATE Received: JUL 8 1998

DATE WELL COMPLETED: MM 6 DD 9 YY 86

Depth of Well: 87 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA-94-2705

OWNER: GROVES (last name) (first name)

STREET OR RFD: 981 PATUXENT RD — TOWN:

SUBDIVISION: — SECTION: — LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Sand + Gravel	0	26	
Red CLAY	26	60	
White CLAY	60	76	
Coarse Brown Sand	76	87	

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- (A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 086

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: M __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] no [N]

TYPE OF GROUTING MATERIAL (Circle one): CEMENT [CM] BENTONITE CLAY [BC]

NO. OF BAGS: 6 NO. OF POUNDS: 300

GALLONS OF WATER: 160

DEPTH OF GROUT SEAL (to nearest foot): from 4 ft. TOP to 70 ft. BOTTOM (enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below: [ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE: PL — Nominal diameter top (main) casing (nearest inch): 4 — Total depth of main casing (nearest foot): 82

OTHER CASING (if used) — EACH CASING: diameter (inch), depth (feet) from, to

SCREEN RECORD
screen type or open hole insert appropriate code below: [ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	82	87
2			
3			

SLOT SIZE 1 0 2 2 3 0

DIAMETER OF SCREEN: 2 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 77 to 87

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T — (E.R.O.S.) — W Q: A

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3

PUMPING TEST
HOURS PUMPED (nearest hour): 2

PUMPING RATE (gal. per min.): 70.

METHOD USED TO MEASURE PUMPING RATE: Barrel

WATER LEVEL (distance from land surface)

BEFORE PUMPING: 30 ft.

WHEN PUMPING: 40 ft.

TYPE OF PUMP USED (for test): [A] air [P] piston [T] turbine [C] centrifugal [R] rotary [O] other (describe below) [J] jet [S] submersible

PUMP INSTALLED
DRILLER WILL INSTALL PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S

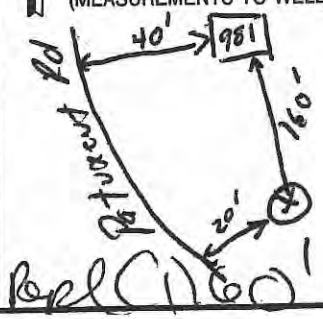
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10

PUMP HORSE POWER: .50

PUMP COLUMN LENGTH (nearest ft.): 60

CASING HEIGHT (circle appropriate box and enter casing height): [+] above [–] below LAND SURFACE: 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

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WATER WELL ABANDONMENT-SEALING REPORT FORM

****

JUL 1998
Received
Ind. Septic
Systems & Wells
Program

SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 6/12/98 (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) — —
* PERMIT NUMBER OF REPLACEMENT WELL AA-94-2705
* PERSON ABANDONING WELL: John Greer
  WELL DRILLERS LICENSE NUMBER: 086
  CIRCLE: MWD/(MSD)/MGD
* OWNER'S NAME: Holly Groves
* WELL LOCATION:
  COUNTY: Anne Arundel
  NEAREST TOWN: Odenton
  TAX MAP 36 BLOCK 2 PARCEL 127
  SUBDIVISION: Woodwardville
  SECTION: LOT:
  NEAREST ROAD: 981 Patuxent Rd

MARYLAND GRID COORDINATES
E 870
BOX NUMBER 440
N

000 000	X

SHOW WELL LOCATION BY X WITHIN BOX

* TYPE OF WELL BEING ABANDONED:
  X DRILLED ____ JETTED
  ____ BORED/AUGUERED ____ HAND DUG
  ____ OTHER (specify) ____
* USE CODE:
  X DOMESTIC ____ MUNICIPAL/PUBLIC
  ____ IRRIGATION ____ INDUSTRIAL
  ____ TEST/OBSERVATION
* TYPE OF CASING:
  ____ STEEL X PLASTIC
  ____ CONCRETE ____ OTHER (specify) ____
* SIZE OF CASING: 4 INCHES IN DIAMETER
* DEPTH OF WELL: 80 FEET DEEP
* WAS ANY CASING REMOVED? X YES ____ NO
  if yes, length removed, in feet: 4
* WAS CASING RIPPED OR PERFORATED? ____ YES X NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Bentonite Chip	80	4
Backfill	4	—

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN | 086 LICENSE # | MWD/(MSD)/MGD CIRCLE ONE | 6/20/98 DATE

C 1 6922 (1 2 3 6)

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received MM DD YY OCT 30 1998 (7 8 13)

DATE WELL COMPLETED MM 10 DD 22 YY 98 (15 20)

Depth of Well 22 123 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-94-3176 (28 29 30 31 32 33 34 35 36 37)

OWNER Pridgen, Micheal (last name first name)
STREET OR RFD 2815 5TH Avenue TOWN Odenton, Md 21113
SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Top Soil	0	2	
White Sand & Gravel	2	15	
Red Clay	15	20	
Gravel	20	40	
Red & White Clay	40	65	
Rock	65	70	
White Clay & Gravel	70	95	
White Sand	95	123	XX

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED yes Y no N

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. MWD 288

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. MWD 288

Denton J. Wolford

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y (44) no N (44)

TYPE OF GROUTING MATERIAL (Circle one)
CEMENT CM (45 46) BENTONITE CLAY BC

NO. OF BAGS 10 NO. OF POUNDS 500

GALLONS OF WATER 27

DEPTH OF GROUT SEAL (to nearest foot)
from 3 (48 TOP 52) ft. to 100 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL, CO CONCRETE, PL PLASTIC, OT OTHER

MAIN CASING TYPE PL (60 61)
Nominal diameter top (main) casing (nearest inch)! 4 (63 64)
Total depth of main casing (nearest foot) 116 (66 70)

OTHER CASING (if used) EACH CASING
diameter inch / depth (feet) from / to

SCREEN RECORD
screen type or open hole insert appropriate code below

ST STEEL, BR BRASS, HO OPEN HOLE, PL PLASTIC, OT OTHER

C 2 (1 2)

DEPTH (nearest ft.) EACH SCREEN
1 PL (8 9) 116 (11 15) 123 (17 21)
2 (23 24) (26 30) (32 36)
3 (38 39) (41 45) (47 51)

SLOT SIZE 1 020 2 3

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68
from 108 to 123 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) TELESCOPE CASING; (E.R.O.S.) (72) LOG INDICATOR; W Q (74 75 76) OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 2 (8 9)

PUMPING RATE (gal. per min.) 50 (11 15)

METHOD USED TO MEASURE PUMPING RATE AIR

WATER LEVEL (distance from land surface)

BEFORE PUMPING 10 (17 20) ft.

WHEN PUMPING 40 (22 25) ft.

TYPE OF PUMP USED (for test) (27)
A air, P piston, T turbine, C centrifugal, R rotary, O other (describe below), J jet, S submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)

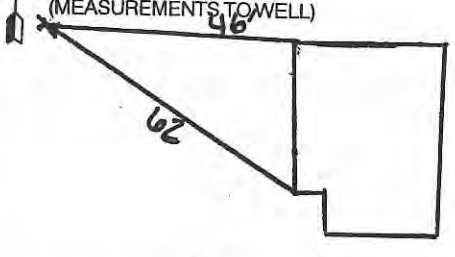
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 12 (31 35)

PUMP HORSE POWER .5 (37 41)

PUMP COLUMN LENGTH (nearest ft.) 50 (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)
+ above (49), – below (49)
LAND SURFACE 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

OCT 1998 Received Ind. Septic Systems & Well Program

DATE WELL ABANDONED: _____ (month/day/year)

* PERMIT NUMBER OF ABANDONED WELL (if any) — —

* PERMIT NUMBER OF REPLACEMENT WELL AA -94-3176

* PERSON ABANDONING WELL: _____

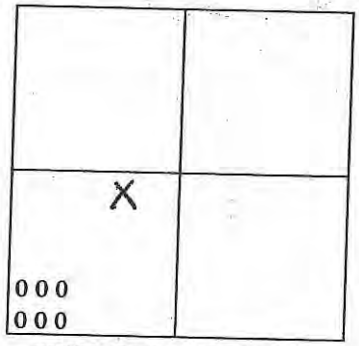
WELL DRILLERS LICENSE NUMBER: _____

CIRCLE: MWD/MSD/MGD

* OWNER'S NAME: MICHAEL PRIDGEN

* WELL LOCATION: 2815 5TH AVE
COUNTY: ANNE ARUNDEL
NEAREST TOWN: ODENTON
TAX MAP _____ BLOCK _____ PARCEL _____
SUBDIVISION: _____
SECTION: _____ LOT: _____
NEAREST ROAD: _____

MARYLAND GRID COORDINATES
BOX NUMBER E 870
N 440 <



SHOW WELL LOCATION BY X WITHIN BOX

* TYPE OF WELL BEING ABANDONED:

_____ DRILLED _____ JETTED
_____ BORED/AUGUERED _____ HAND DUG
_____ OTHER (specify) _____

* USE CODE:

_____ DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
_____ TEST/OBSERVATION

* TYPE OF CASING:

_____ STEEL _____ PLASTIC
_____ CONCRETE _____ OTHER (specify)
_____

* SIZE OF CASING: _____ INCHES IN DIAMETER

DEPTH OF WELL: _____ FEET DEEP

* WAS ANY CASING REMOVED? ____ YES _____ NO
if yes, length removed, in feet: _____

* WAS CASING RIPPED OR PERFORATED? ____ YES _____ NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
OWNER IS ABANDONING HIS OWN WELL.		

Dentry Wilhelm 288 MWD/MSD/MGD 10-27-98

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE # CIRCLE ONE DATE

DENV 828 JULY 1993

B 7 3261 (1 2 3 6) SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL
please type

STATE PERMIT NUMBER: AA -94 - 3264 (70 – 79)
fill in this form completely

Date Received (APA) 10-19-98 (8 MM DD YY 13)

OWNER INFORMATION

Turner B Eugene (15 Last Name, Owner, First Name 34)
1117 Patuxent Road (36 Street or RFD 55)
Odenton MD 21113 (57 Town, 70 State, 72 Zip 76)

DRILLER INFORMATION

John Green MSD086 (Driller's Name 76, License No. 81)
H.G. Green Drilling Co, Inc. (Firm Name)
P.O. Drawer A, Gambrills MD 21054 (Address)
Signature: J.G. Date: 10/19/98

B 2 (1 2) **WELL INFORMATION**
APPROX. PUMPING RATE (GAL. PER MIN.) 10 (6 12)
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY) 500 (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- (D) DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- 22 [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL

APPROXIMATE DEPTH OF WELL 160 FEET (24 28)

APPROXIMATE DIAMETER OF WELL 4 NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) JETTED Jetted & DRIVEN
30 AIR-ROTary AIR-PERcussion (ROTARY (Hydraulic Rotary))
37 CABLE REVerse-ROTary DRive-POINT
other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- (N) THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) 41 — — — — — — 52

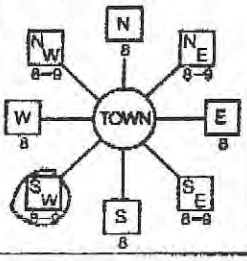
Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER GAP (54 63)

PERMIT No. AA-94-3264 (70 71 72 73 74 75 76 77 78 79)

B 3 **LOCATION OF WELL**
Anne Arundel (8 COUNTY 21)
23 SUBDIVISION 42
SECTION (44 46) LOT (48 50)
Odenton (52 NEAREST TOWN 71)
MILES FROM TOWN (enter 0 if in town) 6 M I (73 76 77 78)

B 4 (1 2) DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



1239 Collins Ave (11 NEAR WHAT ROAD 30)

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX) NORTH (N) W 32 E WEST EAST S SOUTH

34 92 37 DISTANCE FROM ROAD ft ENTER FT OR MI 38 39

TAX MAP: 36 BLK: 07 PARCEL 0017

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Anne Arundel 02
COUNTY NAME COUNTY NO.
STATE SIGNATURE INSERT $ (41)
DATE ISSUED 10 21 98 (43 MM DD YY 48) Barry D. Adams (CO SIGNATURE) 10 21 99 (EXP. DATE)
NORTH GRID 437000 (50 55) EAST GRID 0875000 (57 63)

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER
1. Well Drillers
2. TA# 4000-0167-1600
3. T020145600
93c Duckett Lane

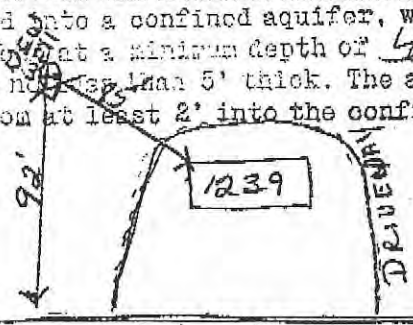
WRITE THE BOX NUMBER, FROM THE MAP HERE

E 870
N 430

000
000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION

The well must be drilled into a confined aquifer, with the bottom of the confining bed at a minimum depth of 40 feet. The confining bed must be no less than 5' thick. The annular space must be grouted from at least 2' into the confining bed to the land surface.



SPECIAL CONDITIONS Radium Sampling Rod Collins Ave

09/25/2003 07:55 4105373613 MDE WMA PAGE 01/02

C 1 5518 SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY DATE Received MM DD YY 1998

DATE WELL COMPLETED MM DD YY 10/31/98

Depth of Well 260 (TO NEAREST FOOT) GRADE ELE. 187' MSL

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-94-3262

OWNER Turner B Eugene (last name first name)

STREET OR RFD 139 Collins Ave TOWN Oldenton

SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Brown Sand	0	37	
Red Clay	37	50	
White Clay	50	62	
Brown Sand	62	80	
Red Clay	80	165	
Gray Clay	165	180	
White Clay	180	235	
Med Brown Sand	235	260	

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED yes Y no N

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 0 8 6

DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes Y 44 no N 44

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT CM 45 46 BENTONITE CLAY BC 45 46

NO. OF BAGS 8 NO. OF POUNDS 400

GALLONS OF WATER 200

DEPTH OF GROUT SEAL (to nearest foot)

from 4 ft. (TOP 48–52) to 85 ft. (BOTTOM 54–58)

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

ST STEEL; CO CONCRETE; ~~PL~~ PLASTIC; OT OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60–61)	4 (63–64)	255 (66–70)

EACH CASING — OTHER CASING (if used)

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

ST STEEL; BR BRASS BRONZE; HO OPEN HOLE; ~~PL~~ PLASTIC; OT OTHER

C 2 DEPTH (nearest ft.)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL (8–9)	255 (11–15)	260 (17–21)
2	(23–24)	(26–30)	(32–36)
3	(38–39)	(41–45)	(47–51)

SLOT SIZE 1 020 2 ___ 3 ___

DIAMETER OF SCREEN 2 (55–60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 66 — from 250 to 260

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (E.R.O.S.) W Q

70 TELESCOPE CASING; 72 LOG INDICATOR; 74 75 76 OTHER DATA

C 3 PUMPING TEST
HOURS PUMPED (nearest hour) 2 (8–9)

PUMPING RATE (gal. per min.) 25 (11–15)

METHOD USED TO MEASURE PUMPING RATE Barrel

WATER LEVEL (distance from land surface)

BEFORE PUMPING 130' (17–20) ft.

WHEN PUMPING 140' (22–25) ft.

TYPE OF PUMP USED (for test)

A air (27); P piston (27); T turbine (27); C centrifugal (27); R rotary (27); O other (describe below) (27); J jet (27); S submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) 10 (31–35)

PUMP HORSE POWER .75 (37–41)

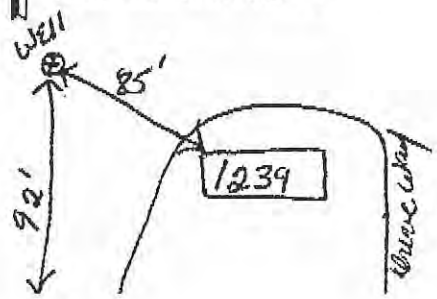
PUMP COLUMN LENGTH (nearest ft.) 200' (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

+ above (49); − below (49) — LAND SURFACE (nearest foot) (50–51)

LOCATION OF WELL ON LOT

SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



C 1 8702 (1 2 3 6) SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER: 02

ST/CO USE ONLY
DATE Received: JAN 19 1999 (8 13)

DATE WELL COMPLETED: MM 11 DD 17 YY 98 (15 20)

Depth of Well: 137 (TO NEAREST FOOT) (22 26)

PERMIT NO. FROM "PERMIT TO DRILL WELL": AA - 94 - 3366 (28 29 30 31 32 33 34 35 36 37)

OWNER: Hogsboom (last name) Milton (first name)
STREET OR RFD: 2815 5th Ave TOWN: Oldenton
SUBDIVISION: Woodwardville SECTION: LOT:

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Sand + Gravel	0	14	
Red Clay	14	50	
Brown Sand	50	62	
Red Clay	62	95	
White Clay	95	114	
Fine Brown Sand	114	130	
Med Brown Sand	130	137	

NUMBER OF UNSUCCESSFUL WELLS: ____

WELL HYDROFRACTURED: yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A — A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E — ELECTRIC LOG OBTAINED
- P — TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 0 8 6

DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box): yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)
CEMENT [CM] (45 46) BENTONITE CLAY [BC] (45 46)

NO. OF BAGS: 8 NO. OF POUNDS: 400
GALLONS OF WATER: 200
DEPTH OF GROUT SEAL (to nearest foot)
from 4 ft. (48 TOP 52) to 70 ft. (54 BOTTOM 58)
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL (60 61)	4 (63 64)	132 (66 70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below
[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2) DEPTH (nearest ft.)

EACH SCREEN			
1	PL (8 9)	132 (11 15)	137 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 020 2 ____ 3 ____

DIAMETER OF SCREEN: 2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 127 to 137 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
70 ____ TELESCOPE CASING; 72 ____ LOG INDICATOR; A (74 75 76) OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour): 2 (8 9)
PUMPING RATE (gal. per min.): 50 (11 15)
METHOD USED TO MEASURE PUMPING RATE: Barrel
WATER LEVEL (distance from land surface)
BEFORE PUMPING: 20' (17 20) ft.
WHEN PUMPING: 40' (22 25) ft.

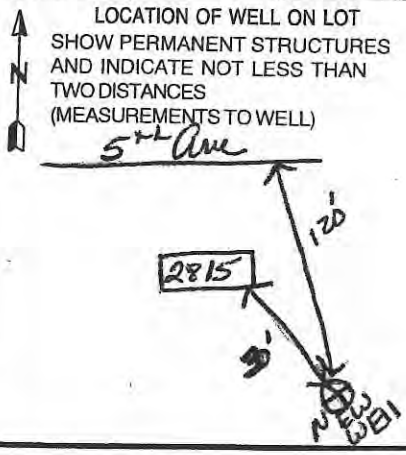
TYPE OF PUMP USED (for test)
[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO): YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29: S (29)
CAPACITY: GALLONS PER MINUTE (to nearest gallon): 10 (31 35)
PUMP HORSE POWER: .50 (37 41)
PUMP COLUMN LENGTH (nearest ft.): 60' (43 47)
CASING HEIGHT (circle appropriate box and enter casing height)
[+] above (49) / [–] below (49) LAND SURFACE: 1 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

JAN 1999 Received Ind. Septic Systems & Wells Program

SUBMIT COPIES OF COMPLETED FORM TO:

* COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
* WELL OWNER
* MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: 11-15-98 (month/day/year)

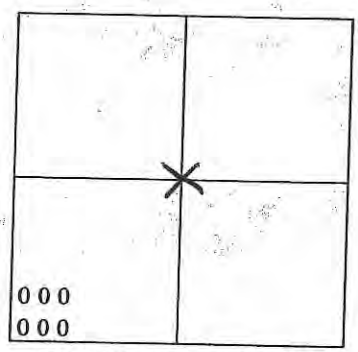
* PERMIT NUMBER OF ABANDONED WELL (if any) — —
* PERMIT NUMBER OF REPLACEMENT WELL AA - 94 - 3366
* PERSON ABANDONING WELL: John Green
* OWNER'S NAME: Melton Hogeboom

WELL DRILLERS LICENSE NUMBER: 086

CIRCLE: MWD (MSD) MGD

* WELL LOCATION:
COUNTY: Anne Arundel
NEAREST TOWN: Odenton
TAX MAP 29 BLOCK 19 PARCEL 020
SUBDIVISION: Woodwardville
SECTION: _____ LOT: _____
NEAREST ROAD: ~~[illegible]~~ 2815 5th Ave

MARYLAND GRID COORDINATES
BOX NUMBER
E 870
N 440



SHOW WELL LOCATION BY X WITHIN BOX

TYPE OF WELL BEING ABANDONED:

X DRILLED ____ JETTED
____ BORED/AUGUERED ____ HAND DUG
____ OTHER (specify) _____

USE CODE:

X DOMESTIC ____ MUNICIPAL/PUBLIC
____ IRRIGATION ____ INDUSTRIAL
____ TEST/OBSERVATION

* TYPE OF CASING:

____ STEEL ____ PLASTIC
X CONCRETE ____ OTHER (specify) _____

* SIZE OF CASING: 36 INCHES IN DIAMETER

DEPTH OF WELL: 18 FEET DEEP

WAS ANY CASING REMOVED? ____ YES X NO
if yes, length removed, in feet: _____

WAS CASING RIPPED OR PERFORATED? ____ YES X NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
Sand	18	5
Bentonite Clay	5	2
Backfill	2	—

[signature] 086 MWD/(MSD)/MGD 11-15-98

SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN — LICENSE # — CIRCLE ONE — DATE

ENV 828

C 1 8674 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 02

ST/CO USE ONLY
DATE Received NOV 13 2000

DATE WELL COMPLETED 7 5 99

Depth of Well 90 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" AA-94-3612

OWNER GREG LANE (last name / first name)
STREET OR RFD 987 PATUXENT Rd TOWN PINEY ORCHARD
SUBDIVISION WOODWARDVILLE SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
RED GRAVEL + SAND	0	15	
WHITE CLAY	15	22	
WHITE SAND	22	27	X
RED + WHITE CLAY	27	70	
WHITE SAND	70	90	X

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
(A) A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. MW D 437
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)
LIC. NO. __ D ___

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] no [N]
TYPE OF GROUTING MATERIAL (Circle one)
CEMENT [CM] BENTONITE CLAY [BC]
NO. OF BAGS 6 NO. OF POUNDS 300
GALLONS OF WATER 200
DEPTH OF GROUT SEAL (to nearest foot)
from 0 ft. (TOP) to 70 ft. (BOTTOM)
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below
[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)!	Total depth of main casing (nearest foot)
PL	4	80

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to
PL			

SCREEN RECORD
screen type or open hole — insert appropriate code below
[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

EACH SCREEN		DEPTH (nearest ft.)	
1	PL	80	90
2			
3			

SLOT SIZE 1 ~~0.10~~ 2 0.02 3
DIAMETER OF SCREEN 2 (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68: from 70 to 90

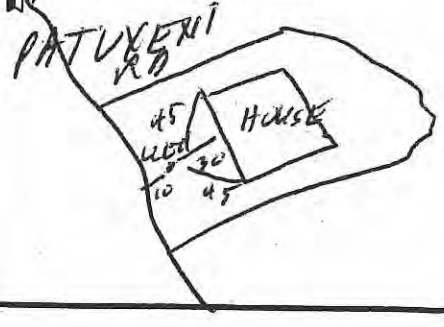
MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (E.R.O.S.) W Q
TELESCOPE CASING: ___ LOG INDICATOR: ___ OTHER DATA: A

PUMPING TEST
HOURS PUMPED (nearest hour) 3
PUMPING RATE (gal. per min.) 20.0
METHOD USED TO MEASURE PUMPING RATE Bucket + Time
WATER LEVEL (distance from land surface)
BEFORE PUMPING 65 ft.
WHEN PUMPING 80 ft.

TYPE OF PUMP USED (for test)
[A] air [P] piston [T] turbine
[C] centrifugal [R] rotary [O] other (describe below)
[J] jet [S] submersible

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO
IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.
TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. S
CAPACITY: GALLONS PER MINUTE (to nearest gallon) 7
PUMP HORSE POWER 1/2
PUMP COLUMN LENGTH (nearest ft.) 85
CASING HEIGHT (circle appropriate box and enter casing height)
4 above / — below
LAND SURFACE 1 (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



MARYLAND DEPARTMENT OF THE ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION
2500 BROENING HIGHWAY, BALTIMORE, MARYLAND 21224, (410) 631-3784

****

WATER WELL ABANDONMENT-SEALING REPORT FORM

****

NOV 2000 Received Onsite Septic Systems & Wells Program

SUBMIT COPIES OF COMPLETED FORM TO:

- ★ COUNTY ENVIRONMENT AGENCY (contact MDE, WMA if address needed)
- ★ WELL OWNER
- ★ MDE, WATER MANAGEMENT ADMINISTRATION, WELL PROGRAM

DATE WELL ABANDONED: FEB. 6, 1999 (month/day/year)

PERMIT NUMBER OF ABANDONED WELL (if any) — —

★ PERMIT NUMBER OF REPLACEMENT WELL AA - 94-3612

PERSON ABANDONING WELL: JOE GRIMSHAW

WELL DRILLERS LICENSE NUMBER: _____

CIRCLE: MWD/MSD/MGD

★ OWNER'S NAME: GREG LANE

WELL LOCATION:
COUNTY: AA
NEAREST TOWN: PINEY ORCHARD
TAX MAP 36 BLOCK 02 PARCEL 140
SUBDIVISION: WOODWARD VILLE
SECTION: _____ LOT: _____
NEAREST ROAD: PATUXENT

MARYLAND GRID COORDINATES
BOX NUMBER E 160 N 440 <———

X 000 000	

SHOW WELL LOCATION BY X WITHIN BOX

TYPE OF WELL BEING ABANDONED:

_____ DRILLED _____ JETTED
_____ BORED/AUGUERED _____ HAND DUG
X OTHER (specify) DRIVE PT. ~~36~~ 3"

USE CODE:

X DOMESTIC _____ MUNICIPAL/PUBLIC
_____ IRRIGATION _____ INDUSTRIAL
_____ TEST/OBSERVATION

★ TYPE OF CASING:

X STEEL _____ PLASTIC
_____ CONCRETE _____ OTHER (specify) _____

★ SIZE OF CASING: 3 INCHES IN DIAMETER

DEPTH OF WELL: 23 FEET DEEP

WAS ANY CASING REMOVED? ____ YES X NO
if yes, length removed, in feet: _____

WAS CASING RIPPED OR PERFORATED? ____ YES X NO

LOG OF SEALING MATERIAL

MATERIAL	FEET FROM	FEET TO
BENTONITE CLAY	0	23

[signature] 437 (MWD)/MSD/MGD APR 10 1999

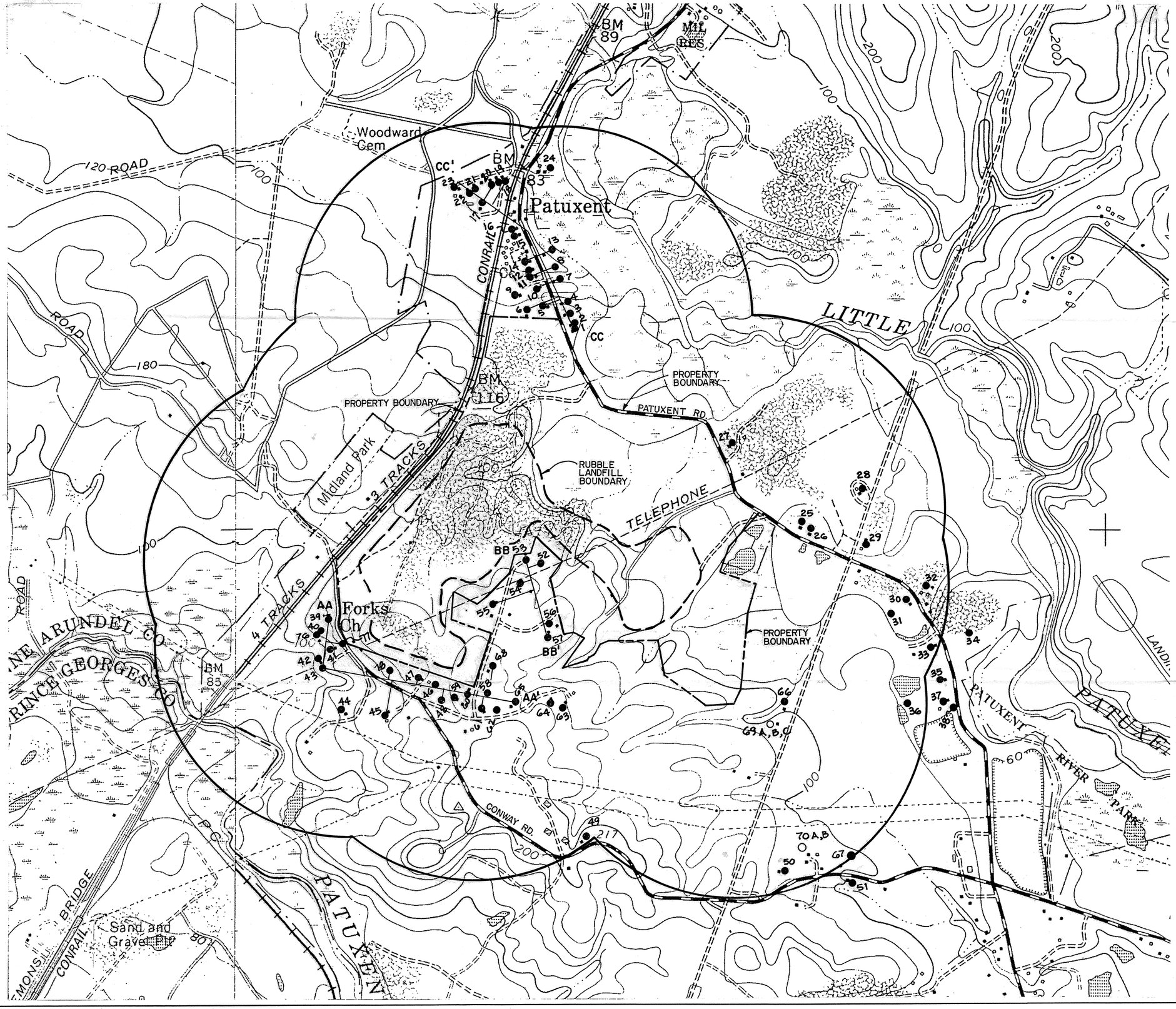
SIGNATURE-MASTER WELL DRILLER OR SUPERVISING SANITARIAN LICENSE # CIRCLE ONE DATE

MENV 828 JULY 1993

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX D

Residential Well Sections



GROUNDWATER CONSULTANTS
MARK SCHULTZ ASSOCIATES
ANNAPOLIS, MARYLAND 21401

PLATE 9

CHESAPEAKE RUBBLE LANDFILL
WATER WELLS & SPRINGS WITHIN
1/2 MILE OF PROPERTY BOUNDARY

NOVEMBER 2003

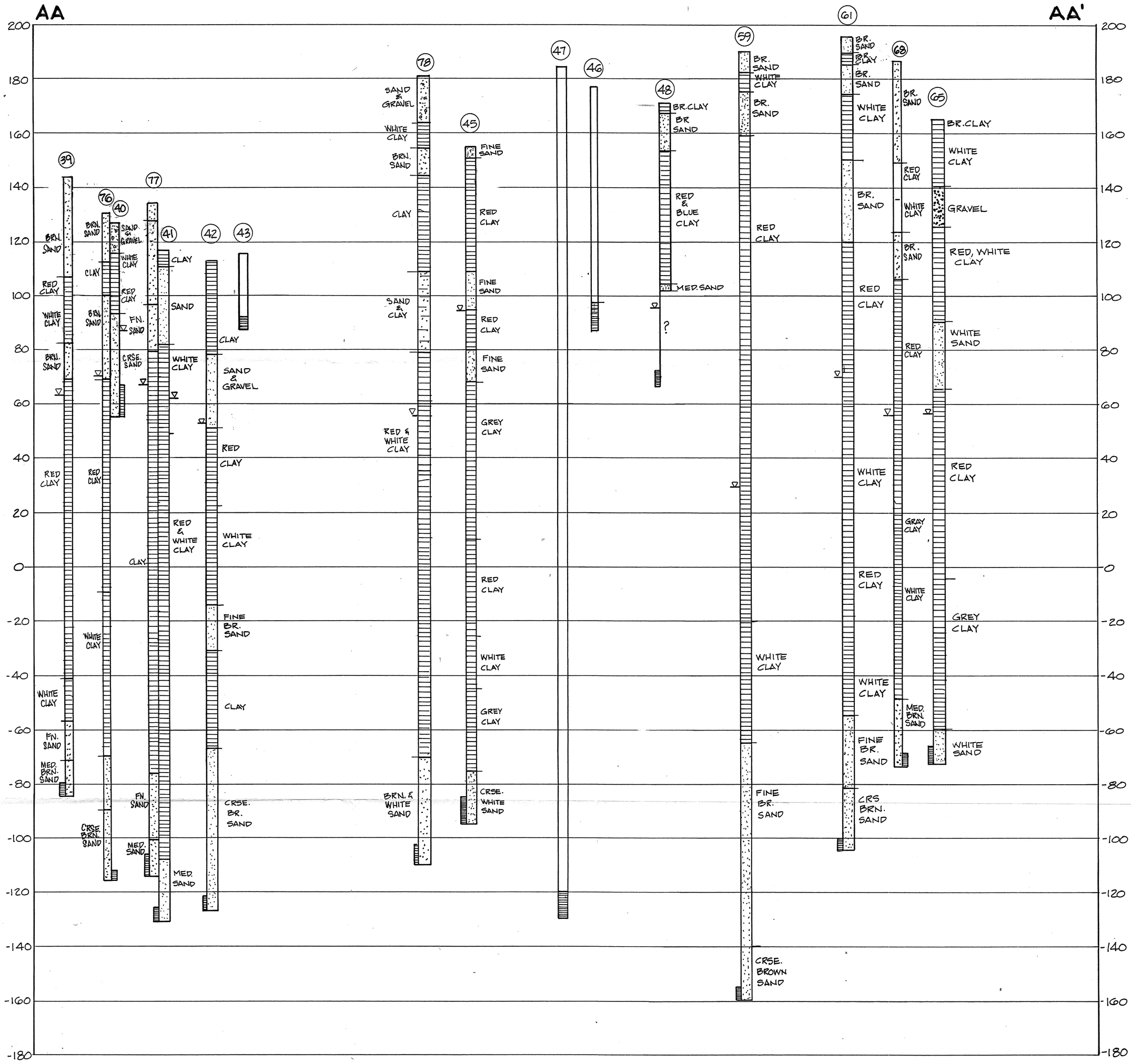


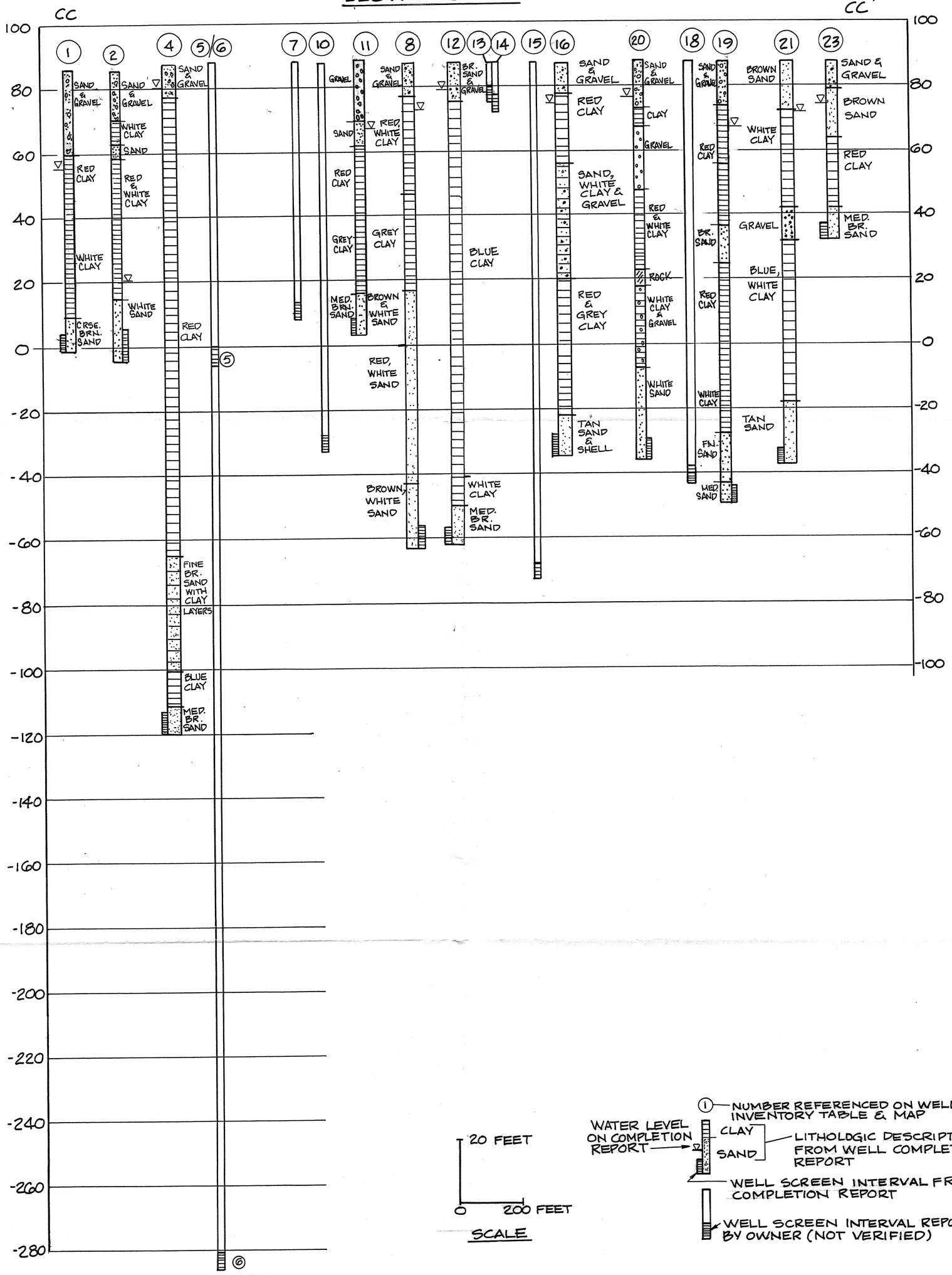
PLATE 10

GEOLOGIC SECTION AA-AA'
RESIDENTIAL WELLS

CHESAPEAKE RUBBLE LANDFILL

NOVEMBER 2003

SECTION CC-CC'



SECTION BB-BB'

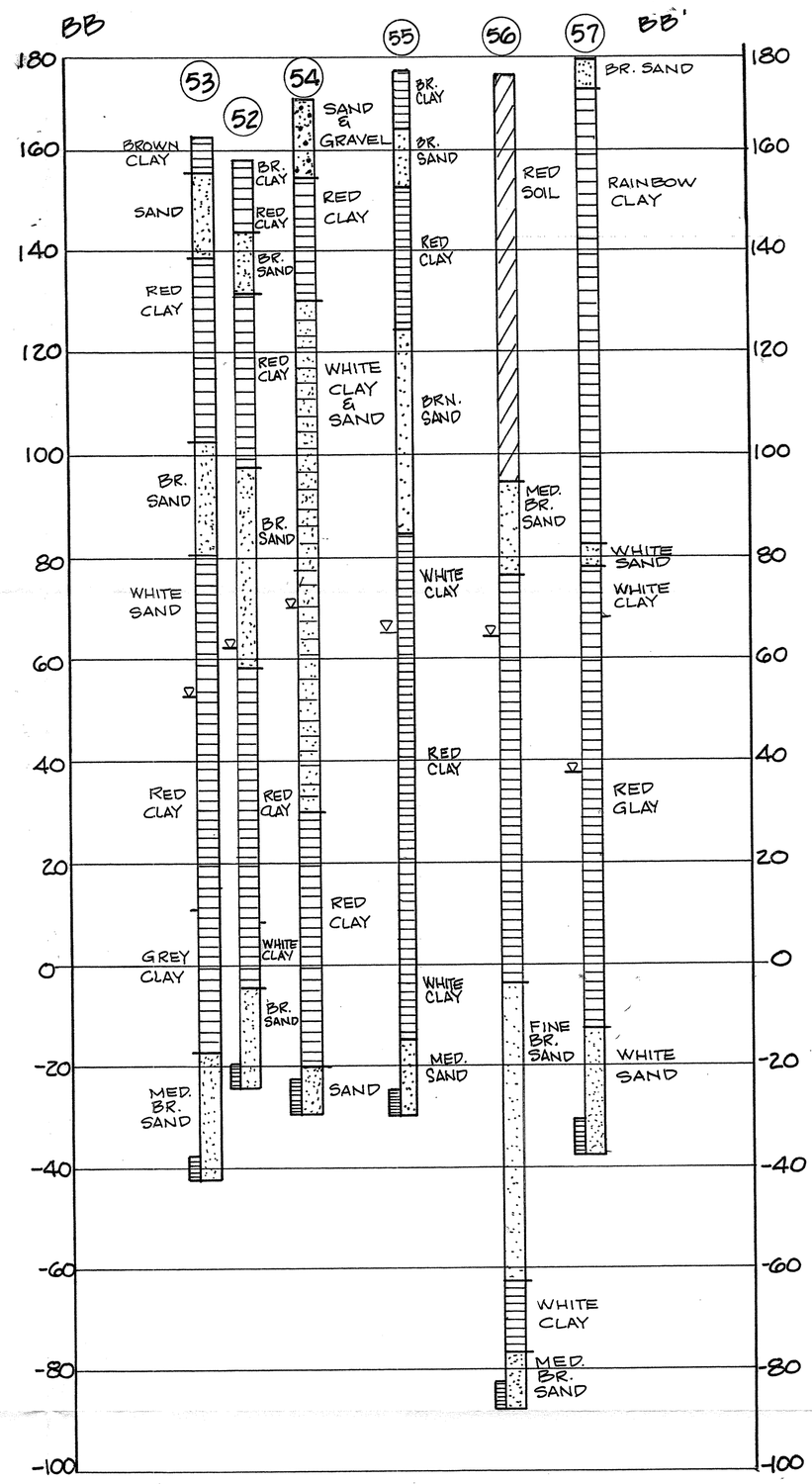


PLATE 11

GEOLOGIC SECTIONS BB-BB', CC-CC'
RESIDENTIAL WELLS

CHESAPEAKE RUBBLE LANDFILL

NOVEMBER 2003

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX E

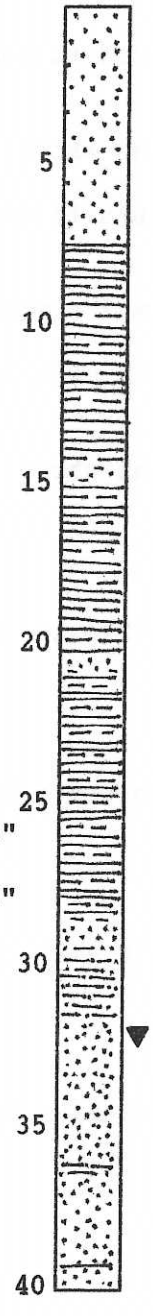
Historical Boring and Well Logs

BORING NUMBER: B-1

DATE INSTALLED: 8-1-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: MUD ROTARY
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	2-2-3-4 (10)	SAND, med to coarse, tan
2	2.5-4.5	3-5-11-13 (0)	No recovery - cuttings indicate sand
3	5 - 7	4-6-10-10 (19)	SAND, med to coarse, some silt and clay, gray-tan
4	7.5-9.5	4-8-12-13 (20)	CLAY, some silt, tr lignite, gray
5	10-12	9-12-13-14 (21)	CLAY, some silt, dark gray
6	12.5-14.5	7-12-16-17 (21)	17" CLAY, as above 4" SAND, some clay, gray
7	15-17	6-8-10-11 (23)	CLAY, some silt, with occasional thin silt lenses, gray
8	17.5-19.5	6-8-10-14 (23)	CLAY, some silt, dark gray
9	20-22	5-6-12-13 (21)	6" SAND, med, some silt, tr clay, gray 16" CLAY, some silt, tr sand, gray
10	22.5-24.5	6-7-15-17 (23)	7" CLAY, some silt, tr sand, gray 16" CLAY, some silt and thin silt lenses, red
11	25-27	17-24-30-51/5" (20)	CLAY, some silt and silt lenses, red with white streaks
12	27.5-29.5	16-24-30-51/5" (23)	6" CLAY, as above 10" SAND, some silt, tr clay, pink and white 7" SILT, some clay, white
13	30-32	21-41-51/6" (20)	SILT, some clay, tr sand, white to tan
14	32.5-34.5	21-30-46-45 (18)	SAND, med to fn, tr silt, tan, <u>saturated</u>
15	35-37	20-21-51/4" (22)	17" SAND, as above 5" SILT, some clay, white
16	37.5-39.5	51/5" (5)	SAND, med, tan, with 2.5" white CLAY lens

Graphic Log



BORING NUMBER: B-1 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
17	40-42	28-50/5" (11)	40	SAND, med, tan, with 2"white CLAY lens
18	42.5-44.5	28-51/3" (9)		SAND, fn, some clay & silt, lt gray, saturated
19	45-47	25-51/4" (12)	45	SAND, as above
20	47.5-49.5	51/4" (4)		SAND, med to coarse, tr silt, tan, saturated
21	50-52	34-51/3" (9)	50	SAND, as above
22	52.5-54.5	51/5" (5)		SAND, med to coarse, some clay, tr silt, tan
23	55-57	13-51/5" (11)	55	SAND, med-coarse, some silt, tan, 1" clay lens
24	57.5-59.5	40-51/5" (11)		CLAY, tr silt, hard, rd-br with black streaks
25	60-62	40-40-51/5" (15)	60	CLAY, as above
26	65-67	33-51/5" (18)	65	CLAY, tr silt, mottled gray-red
27	70-72	31-44-51/4" (0)	70	No recovery - drilled like clay
28	75-77	28-51/5" (5)	75	CLAY, tr silt, mottled gray-red
29	80-82	25-40-51/4" (0)	80	No recovery - drilled like clay
			85	

BORING NUMBER: B-1 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
30	85-87	32-51/5" (0)	85	No recovery - drilled liked clay
31	90-92	46-51/4" (0)	90	No recovery - drilled like clay
32	95-97	44-51/4" (12)	95	CLAY, tr silt, gray with red mottles
33	100-102	46-51/2" (5)	100	CLAY, as above, gray with white streaks
34	105-107	36-51/4" (0)	105	No recovery - drilled like clay
35	110-112	42-51/4" (12)	110	CLAY, some silt, tr sand, blue-gray
36	115-117	51/5" (14)	115	CLAY, as above, mottled gray and red
37	120-122	51/4" (0)	120	No recovery - drilled like clay
38	125-127	51/4" (12)	125	CLAY, some silt, tr sand, mottled gray-red
			130	

BORING NUMBER: B-1 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
39	130-132	51/5" (11)	130	CLAY, as above
40	133-135	44-51/4" (10)	135	CLAY, as above

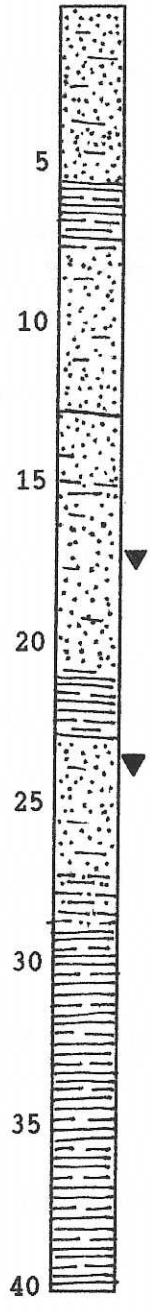
Groundwater encountered above the clay at 32.5 feet.

BORING NUMBER: B-2

DATE INSTALLED: 8-8-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-3-3-4 (10)	SAND, some clay, silt and gravel, brown
2	2.5-4.5	3-3-4-5 (12)	SAND, as above
3	5 - 7	2-3-4-6 (12)	CLAY, some silt, tr sand and organic matter, lt brown
4	7.5-9.5	2-4-8-10 (20)	6" CLAY, as above 14" SAND, some silt, tr clay, brown-tan
5	10-12	7-5-3-7 (20)	3" SAND, as above 17" SAND, some silt, tr clay, brown
6	12.5-14.5	6-4-5-10 (12)	6" SAND, as above, red-brown 6" SAND, some clay and silt, gray
7	15-17	28-51/5" (10)	4" SILT, some clay and sand, blue-gray 6" SAND, some gravel and silt, tan
8	17.5-19.5	28-17-25-32 (14)	6" SAND, v crs, some silt, tr clay, tan, wet 8" SAND, v crs, some clay and silt, tan, moist
9	20-22	10-9-12-16 (19)	7" SAND, as above, red to gray 12" CLAY, some silt, gray and red
10	22.5-24.5	28-51/5" (16)	6" CLAY, as above 10" SAND, coarse, some silt, red-tan, wet with 3 " silt layer at top
11	25-27	9-19-31-43 (20)	SAND, some silt and clay, gray, v moist
12	27.5-29.5	15-18-16-23 (16)	12" SILT, some sand, tr clay, red-tan, moist 4" CLAY, some silt, red and gray
13	30-32	10-15-23-24 (23)	CLAY, some silt, gray with red silt lenses
14	35-37	10-20-23-43 (0)	No recovery - drilled like clay

Graphic Log



BORING NUMBER: B-2 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
15	40-42	13-28-32-40 (0)	40	No recovery - drilled like clay
16	45-47	16-20-28-36 (20)	45	CLAY, slightly silty, red and gray mottled
17	50-52	13-11-32-40 (24)	50	CLAY, with sporadic v thin silt lenses, mottled red and gray
18	55-57	27-30-51/6" (0)	55	No recovery - drilled like clay
19	60-62	22-30-42-51/5" (0)	60	No recovery - drilled like clay
20	65-67	28-30-51/5" (10)	65	CLAY, stiff, mottled red and gray
21	70-72	17-28-35-45 (21)	70	CLAY, as above
22	75-77	34-38-51/5" (8)	75	CLAY and (to some) silt, mottled red and gray
23	80-82	40-44-51/5" (20)	80	CLAY, as above
			85	

BORING NUMBER: B-2 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
24	85-87	30-45-51/4" (20)	85	CLAY, as above
25	90-92	19-34-51/4" (10)	90	3" SAND, some clay and silt, blue-gray, wet 7" CLAY, little silt, hard, red and gray
26	95-97	38-45-48-51/1 (16)	95	CLAY, as above
27	100-102	33-51/6" (0)	100	No recovery - drilled like clay
28	105-107	30-40-51/5" (18)	105	CLAY, tr silt, hard, red and gray
29	110-112	30-51/2" (0)	110	No recovery
30	115-117	38-51/2" (22)	115	CLAY, some silt, red and gray with yellow-brown streaks

Groundwater encountered above the clay at 18 feet.

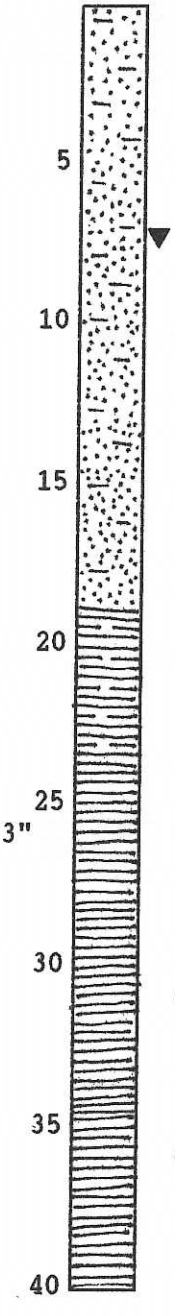
BORING NUMBER: B-3

MONITOR WELLS: MW-10

DATE INSTALLED: 8-7-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

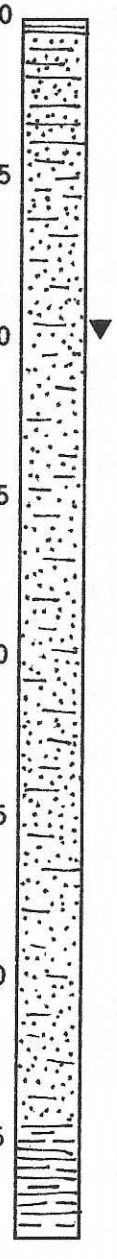
Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	2-2-3-8 (20)	SAND, some silt, little gravel, tr clay, tan-brown
2	2.5-4.5	5-4-3-8 (21)	SAND, as above
3	5 - 7	7-8-13-14 (17)	SAND, as above
4	7.5-9.5	12-16-17-18 (8)	SAND, as above, saturated
5	10-12	7-12-8-9 (20)	SAND, some silt, tan and red-tan, saturated
6	12.5-14.5	1-2-2-3 (15)	SAND, as above
7	15-17	7-8-13-41 (18)	SAND, as above
8	17.5-19.5	18-24-34-36 (18)	6" SAND, as above 12" CLAY, some silt, mottled red and gray
9	20-22	9-28-32-49 (6)	CLAY, some silt, mottled red and gray
10	25-27	26-34-38-51/3" (24)	CLAY, tr silt, hard, mottled red and gray
11	30-32	38-43-51/3" (22)	CLAY, as above
12	35-37	38-51/4" (15)	CLAY, as above

Graphic Log



BORING NUMBER: B-3 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
13	40-42	51/6" (6)		2" CLAY, as above 4" SAND, some (to and) clay, dense, gray
			45	
14	45-47	42-51/5" (10)		SAND, fn, some clay, gray, v moist
15	47.5-49.5	42-51/4" (10)		SAND, fn, some silt, trace clay, gray, v moist
			50	
16	50-52	48-51/4" (10)		SAND, as above, <u>saturated</u>
17	52.5-54.5	51/6" (6)		SAND, as above
			55	
18	55-57	35-51/5" (15)		SAND, fine, some clay and silt, dense, gray, slightly moist
19	57.5-59.5	45-51/5" (7)		SAND,as above, with 1" clay lens
			60	
20	60-62	40-51/5" (11)		SAND, med, some silt and clay, gray
21	62.5-64.5	44-51/4" (3)		SAND, med, some silt and clay, gray, saturated
			65	
22	65-67	51/5" (5)		SAND, as above (tr clay)
23	67.5-69.5	48-51/3" (12)		SAND, fn, some silt and clay, gray
			70	
24	70-72	51/6" (0)		No recovery
			75	
25	75-77	51/5" (5)		CLAY, gray, some sand and silt
			80	



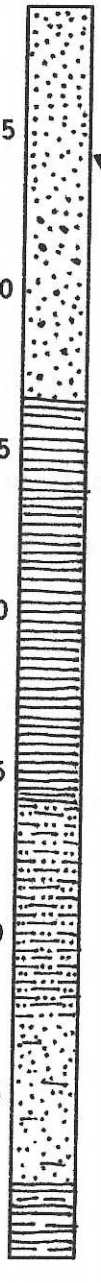
Groundwater encountered above the clay at 8 feet and below the clay at 50 feet.

BORING NUMBER: B-4

MONITOR WELLS: MW-1 and MW-11

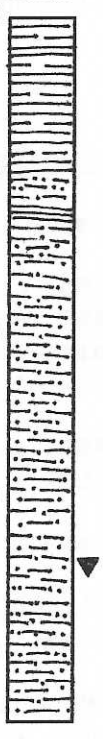
DATE INSTALLED: 7-13-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0-1.5	2-4-8 (15)		SAND, fn to v fn, ltl med, tr silt and clay, red-br-yell-gr-blk
2	2.5-4	2-2-3 (18)	5	SAND, as above
3	5 - 7	3-6-7-6 (17)		▼ 15" SAND, as above, red-orange 2" GRAVEL, some sand, saturated
4	7.5-9.5	7-10-13-12 (17)	10	SAND, coarse,and GRAVEL, some finer sand, tr silt and clay, tan-red-gray-yellow
5	10-12	6-12-21-24 (15)		GRAVEL and SAND, fine to coarse, tr silt yellow
6	12.5-14.5	5-21-34-36 (11)	15	3" GRAVEL, some coarse sand, tr silt, yellow 8" CLAY, tr silt, mottled red-gray-purple
7	15-17	22-29-31-35 (9)		CLAY, as above
8	17.5-19.5	21-31-49-51 (12)	20	CLAY, as above
9	20-22	25-27-49-50 (17)		CLAY, as above
10	22.5-24.5	15-31-44-42 (15)	25	CLAY, as above
11	25-27	5-15-19-25 (22)		10" CLAY, as above 12" SILT, some clay, mottled gray-red
12	27.5-29.5	12-17-16-28 (22)	30	SILT and SAND, v fn, tr clay mottled gray-red-brown
13	30-32	15-22-25-28 (20)		SILT and SAND, v fn, as above
14	32.5-34.5	15-22-28-35 (22)	35	SAND, v fn, some silt, tr clay, gray, moist
15	35-37	19-21-34-35 (17)		SAND, v fn, as above
16	37.5-39.5	21-28-40-41 (21)	40	CLAY, some silt, tr sand, mottled red-gray



BORING NUMBER: B-4 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
17	40-42	20-28-38-42 (18)	40	CLAY, some silt, tr sand, mottled red-gray
18	42.5-44.5	21-41-51/5" (18)		CLAY, as above, brown-gray
19	45-47	15-27-41-45 (24)	45	12" SILT and SAND, v fn, CLAY stringers, gray 12" CLAY, some silt, tr sand, brown-gray
20	47.5-49.5	15-22-31-34 (17)		SILT, some v fn sand, tr clay with CLAY stringers, gray
21	50-52	20-33-44-45 (22)	50	SILT, some v fn sand, tr clay, gray
22	52.5-54.5	19-44-51/3" (21)		SILT, as above
23	55-57	30-50/5" (12)	55	SILT, as above
24	57.5-59.5	30-50-51/3" (18)		SILT and SAND, v fn, tr clay and coarser sand, gray, <u>saturated</u>
25	60-62	34-51/5" (12)	60	SILT and SAND, as above, mottled gray-red



Groundwater encountered above clay at 7 feet and below clay at 57 feet.
The sample from 32.5 to 34.5 feet was moist.

El. 100±

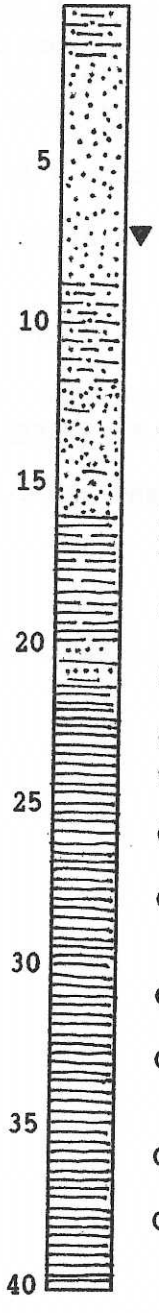
BORING NUMBER: B-5

MONITOR WELLS: MW-9 and MW-14

DATE INSTALLED: 7-14-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	8-15-18-21 (17)	SILT, some clay and v fn sand, gray-yellow
2	2.5-4.5	5-7-8-10 (20)	14" SAND, v fn to fn, little med and clay, gray 3" SAND, med, little fn and coarse, tr clay, white-gray-yellow
3	5 - 7	5-7-8-10 (17)	SAND, as above
4	7.5-9.5	6-3-7-7 (18)	5" SAND, as above, saturated 13" SILT, little v fn sand and clay, gray
5	10-12	21-19-11-17 (15)	SILT, as above
6	12.5-14.5	7-9-12-13 (24)	SAND, fn and v fn, little silt, tr clay, gray, saturated
7	15-17	9-21-27-30 (24)	13" SAND vf and SILT, gray-red-brown, saturated 11" CLAY, little silt, tr sand, mottled red-brown-gray
8	17.5-19.5	4-18-31-34 (17)	CLAY, as above
9	20-22	8-18-24-25 (18)	CLAY, some lenses vf sand, gray
10	22.5-24.5	5-10-19-17 (24)	CLAY, little silt, tr sand, mottled red-brown-gray
11	25-27	2-6-12-20 (21)	CLAY, as above
12	27.5-29.5	5-11-16-17 (21)	CLAY, as above
13	30-32	10-17-18-20 (23)	CLAY, as above
14	32.5-34.5	10-13-20-17 (18)	CLAY, as above
15	35-37	10-15-17-22 (20)	CLAY, as above
16	37.5-39.5	12-17-21-23 (23)	CLAY, as above

Graphic Log



BORING NUMBER: B-5 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
17	40-42	9-11-17-14 (16)		CLAY, little silt, tr sand, mottled brown-gray
18	42.5-44.5	13-19-21-22 (24)		CLAY, as above
			45	
19	45-47	12-13-14-17 (24)		CLAY, as above, lower 12" mottled red-gray
20	47.5-49.5	16-30-51/6" (18)		CLAY, as above, mottled red-gray
			50	
21	50-52	16-32-31-40 (22)		CLAY, as above
22	52.5-54.5	11-21-32-41 (22)		SILT, some vf sand, little clay, mottled gray-red
			55	
23	55-57	14-28-38-40 (23)		SILT, as above, gray
24	57.5-59.5	16-24-31-37 (23)		SILT and SAND, v fn, little clay, gray
			60	
25	60-62	12-20-28-38 (19)		SILT and SAND, as above, some CLAY lenses, gray
26	62.5-64.5	12-18-22-32 (17)		CLAY, trace silt and sand, mottled red-brown-yellow
			65	
27	65-67	24-34-51/5" (18)		2" CLAY, as above 16" SAND, vf, ltl fn sand, silt and clay, gray
28	67.5-69.5	14-20-28-32 (13)		CLAY, little silt, tr sand, gray
			70	
29	70-72	14-28-35-38 (24)		SILT and SAND, vf, little clay, gray
30	72.5-74.5	13-26-37-42 (24)		SILT and vf SAND, as above
			75	
31	75-77	4-22-30-35 (19)		SILT and vf SAND, as above
32	77.5-79.5	25-35-51/5" (12)		SILT and vf SAND, as above
			80	

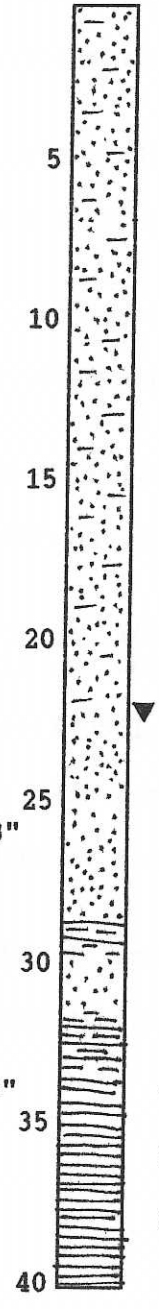
Groundwater encountered above clay at 7.5 feet.

BORING NUMBER: B-6

DATE INSTALLED: 7-28-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON
DRILLING METHOD: HOLLOW STEM AUGER AND MUD ROTARY
DRILLER: HARDIN-HUBER, INC.
LOGGED BY: GREG ADAMSON

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	4-9-10-12 (11)	SAND, fn to med, little vf sand and clay, tr silt, yellow
2	2.5-4.5	3-3-3-3 (22)	SAND, as above, yellow-red-brown
3	5 - 7	2-2-2-2 (14)	SAND, as above, yellow-red-brown
4	7.5-9.5	5-6-6-6 (9)	SAND, as above
5	10-12	3-4-6-8 (23)	SAND, as above
6	12.5-14.5	2-2-3-3 (18)	SAND, as above, tan-red-brown
7	15-17	4-5-6-6 (17)	SAND, as above, red-brown
8	17.5-19.5	3-3-3-5 (16)	SAND, as above
9	20-22	3-3-3-6 (20)	SAND, as above
10	22.5-24.5	22-36-51/3" (16)	9" SAND, fn, some vf, little med to coarse, tr silt and clay, gray-tan, <u>saturated</u> 7" SAND, crs, ltl med, tr silt & clay, tan-br
11	25-27	21-36-33-51/3" (18)	SAND, as above, saturated
12	27.5-29.5	7-12-21-36 (24)	14" SAND, as above 10" SILT & CLAY, tr sand, mottled red-gray
13	30-32	8-21-51/3" (24)	14" SAND, coarse, ltl med, tr silt & clay, tan 10" SILT & CLAY, tr sand, 1" crs SAND layer at bottom, red-gray
14	32.5-34.5	20-31-36-51/3" (10)	CLAY, tr to little silt, tr sand, dark red
15	35-37	19-24-39-35 (0)	No recovery - drilled like clay
16	37.5-39.5	21-28-35-43 (0)	No recovery - drilled like clay

Graphic Log



BORING NUMBER: B-6 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
17	40-42	18-25-51/3" (0)		No recovery, drilled like clay
18	42.5-44.5	16-30-40-51/4" (0)		No recovery, drilled like clay
			45	
19	45-47	16-30-40-51/4" (16)		CLAY, tr silt and sand, mottled red-purple and gray
			50	
20	50-52	18-20-30-43 (19)		CLAY, as above
			55	
21	55-57	16-30-51/3" (0)		No recovery - drilled like clay
			60	
22	60-62	22-43-51/4" (17)		CLAY, as above
			65	
23	65-67	20-51-5" (11)		CLAY, as above
			70	
24	70-72	30-51/5" (11)		CLAY, as above
			75	
25	75-77	24-36-46-50 (18)		CLAY, as above
			80	
26	80-82	35-42-51/5" (16)		CLAY, as above, with occasional very thin streaks of silt
			85	

BORING NUMBER: B-6 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
27	85-87	30-38-51/5" (4)	85	CLAY, as above
28	90-92	37-51/3" (9)	90	CLAY, tr silt and sand, purple-gray
29	95-97	42-51/4" (8)	95	CLAY, as above
30	100-102	40-51/5" (8)	100	CLAY, as above
31	105-107	36-42-51/3" (0)	105	No recovery - drilled like clay

Groundwater encountered above the clay at 22.5 feet.

BORING NUMBER: B-7

MONITOR WELLS: MW-12

DATE INSTALLED: 8-3-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	2-2-4-6 (10)		SAND, some silt, tan
2	2.5-4.5	14-27-28-30 (14)		4" SAND, some gravel and silt, wet 6" CLAY, some silt, white 4" SAND, fn, some silt, white, slightly moist
3	5 - 7	22-46-51/5" (12)	5	SAND, fn, some silt, white
4	7.5-9.5	28-51/4" (11)		SAND, as above
5	10-12	27-51/4" (10)	10	SAND, as above
6	12.5-14.5	28-51/4" (12)		SAND, as above
7	15-17	26-28-51/5" (12)	15	2" SAND, as above 10" SAND, some silt, tr clay, tan
8	17.5-19.5	17-23-36-24 (18)		SAND, as above, with 2 thin white clay lenses
9	20-22	17-30-37-51/3" (20)	20	SAND, vf, some silt, tan, saturated, with 1" clay layer at top
10	22.5-24.5	12-17-30-51/2" (22)		4" SAND, fn, some clay, white 10" CLAY, some silt, gray-white 8" SAND, some silt, tr clay, white
11	25-27	17-18-8-26 (23)	25	SAND, med, some silt, white and tan , saturated
12	27.5-29.5	51/5" (18)		SAND, fn, some silt, tan, saturated
13	30-32	10-51/5" (11)	30	SAND, as above, white-tan
14	32.5-34.5	18-27-51/5" (18)		SAND, vf,some silt, white-tan, saturated
15	35-37	29-51/4" (18)	35	SAND, fn, some silt, white-tan, saturated, with 2" white clay lens
16	37.5-39.5	21-51/4" (10)	40	SAND, fn, some silt, tr clay, white-tan saturated with 3" clay lens

BORING NUMBER: B-7 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
17	40-42	36-51/4" (11)		SAND, med, some silt, white-tan, saturated
18	42.5-44.5	51/5" (5)		SAND, as above
			45	
19	45-47	38-44-51/4" (12)		2" SAND, some silt, tr clay, red and white 10" CLAY, some silt, tr sand, hard, tan-white
20	47.5-49.5	33-33-51/4" (4)		SAND, some silt, tan, wet, 2" clayey
			50	
21	50-52	38-51/2" (5)		SAND, med-coarse, some silt, tan, saturated
22	52.5-54.5	51/3" (0)		No recovery
			55	
23	55-57	51/6" (6)		2" SAND, some clay, white-tan 4" CLAY, some silt, hard, white
24	57.5-59.5	51/3" (3)		CLAY, tr to some silt and sand, white
			60	
25	60-62	38-51/5" (10)		2" SAND, some clay, white-gray 8" CLAY, some silt, tr sand, gray-white
26	62.5-64.5	51/4" (4)		SAND, little clay, white-tan
			65	
27	65-67	51/4" (4)		SAND, some silt, tan-brown, wet
28	67.5-69.5	51/3" (4)		SAND, some silt, tr clay, tan-white, wet
			70	
29	70-72	51/3" (3)		SAND, as above, tan
30	72.5-74.5	51/5" (5)		SAND, as above
			75	
31	75-77	100/3" (3)		SAND, as above
32				Omitted
			80	
33	80-82	100/3" (0)		No recovery

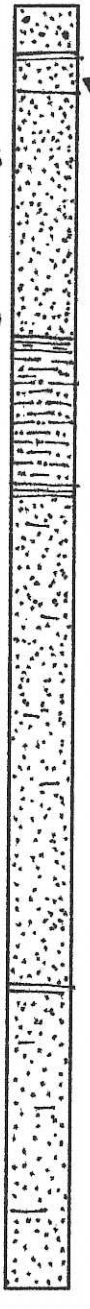
Groundwater encountered at 20 feet.

BORING NUMBER: B-8 OFFSITE BORING & WELL

MONITOR WELLS: MW-7

DATE INSTALLED: 7-27-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	1-2-2-3 (13)		9" GRAVEL and coarse SAND, some fn, brn-yellow 4" CLAY and SILT, tr sand, gray
2	2.5-4.5	15-30-33-48 (24)		SAND, fn and vf, little med, tr silt and clay, 2" CLAY layer at top, tan-yellow, saturated
			5	
3	5 - 7	15-41-51/5" (17)		SAND, fn to vf, little med, tr silt and clay, gray-tan, saturated
4	7.5-9.5	30-51/5" (11)		SAND, as above
			10	
5	10-12	15-51/5" (11)		5" CLAY and SILT, some sand, gray 6" SAND, vf and SILT, little clay, gray
			15	
6	15-17	25-36-29-51/5" (23)		3" CLAY, little silt, tr sand, gray 20" SAND, vf to fn. little silt and clay, gray
			20	
7	20-22	21-29-51/5" (17)		SAND, vf to fn, some silt, little clay, gray
			25	
8	25-27	49-51/4" (10)		SAND, fn, some vf, little med, tr silt and clay, tan-yellow
			30	
9	30-32	48-51/4" (10)		SAND, med, little fn sand, tr silt and clay, tan, with 2" CLAY layer
			35	
10	35-37	21-51/5" (11)		SAND, as above, with clay stringers
			40	



BORING NUMBER: B-8 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
11	40-42	22-51/4" (10)		SAND, as above, with 2" clay layer
			45	
12	45-47	24-51/4" (10)		SAND, med, little fn sand, tr silt & sand, tan
13	48-50	26-34-51/4" (16)		13" SAND, as above 3" CLAY, little silt, tr sand, mottled gray-red
			50	
14	50-52	10-31-51/5" (17)		SAND, med, little fn sand, tr silt and clay, tan
			55	

Groundwater encountered at 3 feet.

BORING NUMBER: B-9

OFFSITE BORING & WELL

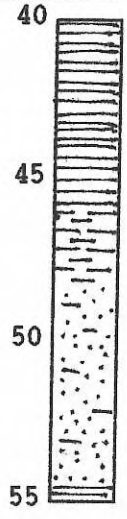
MONITOR WELLS: MW-8

DATE INSTALLED: 7-27-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	1-2-2-2 (3)		SAND, coarse, some gravel, tr silt and clay, red-brown
2	2.5-4.5	1-3-3-2 (14)		SAND, coarse, little med, tr silt and clay, 2" clayey layer at bottom, tan-red-brown, saturated
			5	
3	5 - 7	2-10-8-16 (12)		8" SAND, coarse, ltl med & ltl clay, yel-red-br with 1.5" gray CLAY layer at bottom 4" SAND, med, tr silt and clay, gray
4	7.5-9.5	12-24-16-17 (6)	10	CLAY, tr silt and sand, mottled gray-red
5	10-12	8-19-20-21 (22)		CLAY, as above
6	12.5-14.5	5-9-23-33 (0)		No recovery - drilled like clay
			15	
7	15-17	8-13-20-28 (0)		No recovery - drilled like clay
8	17.5-19.5	12-22-26-30 (16)		CLAY, as above
			20	
9	20-22	12-20-25-27 (14)		CLAY, as above
10	22.5-24.5	12-22-26-30 (21)		SILT and CLAY, tr sand, gray
			25	
11	25-27	12-22-28-30 (23)		CLAY, tr silt and sand, gray
12	27.5-29.5	10-16-19-29 (21)		CLAY, as above, mottled gray-red
			30	
13	30-32	6-19-20-24 (23)		CLAY, as above
14	32.5-34.5	Shelby Tube		CLAY, as above
			35	
15	35-37	12-17-25-28 (24)		CLAY, as above with white nodules of coarse sand size
16	37.5-39.5	20-26-46-51/4" (24)	40	CLAY, as above

BORING NUMBER: B-9 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
17	40-42	8-14-24-32 (20)		CLAY, as above
18	42.4-44.5	12-14-23-28 (22)		CLAY, as above
19	45-47	16-24-28-30 (24)		10" CLAY, as above 14" SILT, some clay, little sand mottled gray-red
20	47.5-49.5	30-31-51/3" (22)		SAND, vf and fn, little silt and clay, gray
21	50-52	28-44-51/5" (17)		SAND, as above
22	52.5-54.5	19-27-51/3" (19)		13" SAND, as above 6" CLAY, little silt, tr sand, gray-yellow-green



Groundwater encountered at 2.5 feet.

BORING NUMBER: B-10

OFFSITE BORING & WELL

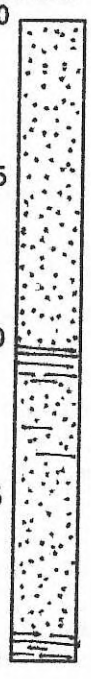
MONITOR WELLS: MW-2

DATE INSTALLED: 7-26-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	1-1-1-1 (15)		SAND, med, little fn, yellow
2	2.5-4.5	3-3-3-5 (12)		SAND, coarse, some med, tr silt and clay, tan-yellow, saturated
			5	
3	5 - 7	8-30-51/5" (17)		SAND, as above
4	7.5-9.5	22-32-31-44 (24)		SAND, as above
			10	
5	10-12	16-23-51/5" (24)		9" SAND, as above, some thin clay lenses 15" SILT, some sand, tr clay, gray, moist
6	12.5-14.5	15-30-51/4" (21)		7" CLAY & SILT, tr sand, gray, moist 14" SAND, fn-vf, tr silt & clay, tn-gray, wet
			15	
7	15-17	21-27-36-51/5" (23)		SAND, as above
8	17.5-19.5	14-27-51/4" (16)		9" SAND, as above 7" CLAY and SILT, little sand, gray
			20	
9	20-22	19-22-51/5" (17)		SAND, fn to vf, tr silt and clay, gray
10	22.5-24.5	22-36-51/3" (15)		SAND, as above
			25	
11	25-27	9-43-51/3" (15)		3" SAND, as above 7" SILT and CLAY, little sand, gray 5" SAND, vf to fn, little silt and clay, gray
12	27.5-29.5	30-27-51/5" (17)		SAND, as above
			30	
13	30-32	43-51/5" (11)		SAND, fn, some vf, tr silt and clay, gray-tan
14	32.5-34.5	36-51/5" (11)		SAND, med, some fn, tr silt and clay, gray
			35	
15	35-37	30-40-51/5" (17)		SAND, as above
16	37.5-39.5	48-51/3" (9)		SAND, fn to med, some vf, tr silt and clay, tan
			40	

BORING NUMBER: B-10 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
17	40-42	23-24-51/5" (17)		SAND, as above, yellow
18	42.5-44.5	18-24-51/4" (16)		SAND, med, some fn, tr silt & clay, yellow-gray-tan
			45	
19	45-47	51/4" (4)		SAND, as above, gray-tan
20	47.5-49.5	51/5" (5)		SAND, as above, tan
			50	
21	50-52	35-51/5" (11)		CLAY, some silt, tr sand, mottled gray-red-br
22	52.5-54.5	41-51/5" (11)		SAND, f to vf, some silt, tr clay, gray
			55	
23	55-57	34-51/5" (11)		SAND, as above
24	57.5-59.5	37-42-51/3" (15)		8" SAND, as above 7" SILT and CLAY, some sand, little clay, mottled gray-red-brown
			60	



Saturated below 2.5 feet.

BORING NUMBER: B-11

MONITOR WELLS: MW-13

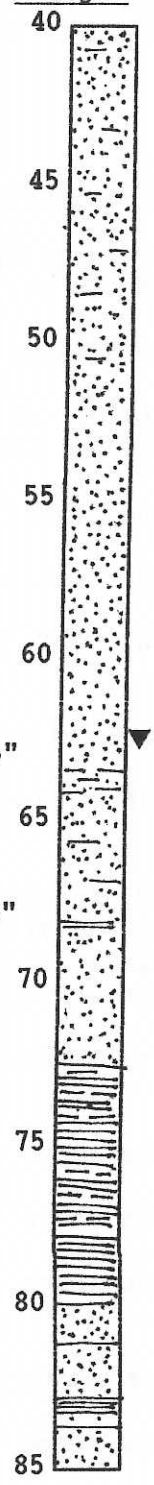
DATE INSTALLED: 7-20-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	2-5-10-14 (17)		8" CLAY, some silt, tr sand, brown 9" SAND, fn to vf, tr silt and clay, brown
2	2.5-4.5	10-21-23-36 (15)	5	SAND, med, some fn, tr silt and clay, yellow
3	5 - 7	8-16-12-16 (20)		9" SILT and vf SAND, red-br-gray 11" CLAY and SILT, tr sand and gravel, red-br
4	7.5-9.5	8-9-13-13 (21)	10	CLAY and SILT, little sand, red-br-gray
5	10-12	6-8-11-11 (15)		CLAY and SILT, as above, gray-yellow
6	12.5-14.5	6-11-18-22 (14)	15	CLAY and SILT, as above, gray-red-yellow
7	15-17	6-8-7-6 (20)		SILT, some vf to fn sand, tr clay, gray-yellow
8	17.5-19.5	4-5-6-5 (22)	20	SAND, vf to fn, ltl silt, tr clay, gray-yellow
9	20-22	5-8-12-16 (19)		4" SAND, as above 7" SILT and vf SAND, ltl fn and clay, gray 8" SAND, vf to fn, tr silt and clay, gray
10	22.5-24.5	12-11-9-8 (20)	25	SAND, as above
11	25-27	9-24-31-38 (18)		SAND, vf to fn, little silt, tr clay, gray-yellow
12	27.5-29.5	18-26-26-36 (19)	30	SAND, as above
13	30-32	8-12-18-18 (22)		SAND, as above
14	32.5-34.5	18-23-13-17 (19)	35	SAND, as above
15	35-37	5-15-9-12 (21)		SAND, as above, some layers contain little clay
16	37.5-39.5	12-23-51/6" (18)	40	SAND, as above

BORING NUMBER: B-11 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
17	40-42	27-35-51/5" (15)	SAND, vf to fn, little silt, tr clay, gray-yellow
18	42.5-44.5	34-51/3" (9)	SAND, as above
19	45-47	27-51/5 (11)	SAND, as above
20	47.5-49.5	30-51/5" (11)	SAND, as above
21	50-52	31-37-51/2" (14)	7" SAND, as above 7" SAND, med, little fn, yellow-gray
22	52.5-54.5	30-50-51/3" (15)	SAND, as above
23	55-57	47-51/3" (9)	SAND, as above
24	57.5-59.5	49-51/2" (13)	SAND, as above
25	60-62	28-41-51/5" (18)	SAND, as above, tr silt and clay
26	62.5-64.5	14-27-38-51/5" (21)	7" SAND, as above, <u>saturated</u> 8" SAND, vf,and SILT, little clay, gray 6" SAND, fn to vf, tr silt and clay, gray
27	65-67	18-26-34-49 (24)	SAND, fn to vf, little clay, tr silt, gray
28	67.5-69.5	27-38-30-51/5" (23)	SAND, as above, 2" clay layer at bottom
29	70-72	36-51/3" (9)	SAND, f to vf, some med, tr silt, gray-yellow
30	72.5-74.5	20-33-51/4" (16)	CLAY, little silt and sand, gray
31	75-77	33-37-51/5" (17)	CLAY, as above
32	77.5-79.5	23-27-51/3" (15)	CLAY, tr sand silt, gray
33	80-82	23-28-51/5" (17)	SAND, fn, some vf, ltl med, tr silt and clay, few thin lenses clay, gray
34	82.5-84.5	24-31-51/7" (8)	7" CLAY, ltl silt, tr sand, gray 1" SAND, fn, tr silt and clay, gray-yellow

Graphic Log



BORING NUMBER: B-11 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			85	
35	85-87	51/5" (5)		SAND, med, some fn, tr silt and clay, gray-yellow
36	87.5-89.5	23-32-51/4" (16)		10" CLAY, tr sand and silt, gray-yellow-red 6" SAND, fn to vf, tr silt and clay, lt tan
			90	
37	90-92	52/3" (0)		No recovery (probably sand - lost circulation drilling with mud)
38	92.5-94.5	134/1" (1)		SAND, med, some fn, tr silt and clay, lt tan
			95	
39	95-97	37-51/5" (10)		4" CLAY, tr silt and sand, gray-yellow 6" SAND, med, some fn, tr silt & clay, tan
40	97.5-99.5	49-49-49 (9)		SAND, as above, lt tan-yellow
			100	
41	100-102	38-35-51/2" (14)		SAND, as above
42	102.5-104.5	100/4" (4)		CLAY, tr sand, v dense, gray-red-yellow
			105	
43	105-107	101/5" (5)		CLAY, tr silt, v dense, red, some gray streaks
44	107.5-109.5	85-100/3" (9)		CLAY, as above
			110	
45	110-112	45-45-51/3" (0)		No recovery - drilled like clay
46	112.5-114.5	45-51/3" (0)		No recovery - drilled like clay
			115	
47	115-117	47-51/4" (10)		CLAY, as above
48	117.5-119.5	50-51/2" (8)		CLAY, as above
			120	

Groundwater encountered at 63 feet.

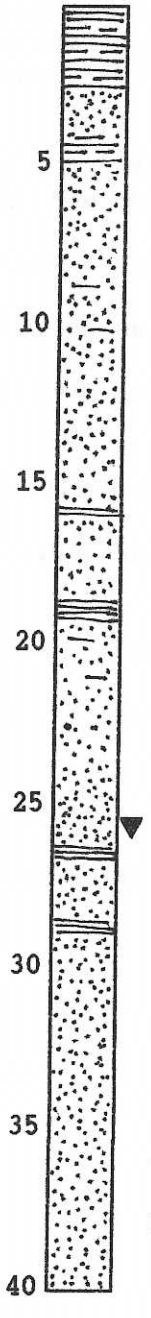
BORING NUMBER: B-12

MONITOR WELLS: MW-4

DATE INSTALLED: 7-22-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER and MUD
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-3-4-6 (16)	CLAY, little silt and sand, red-br-yellow
2	2.5-4.5	3-7-9-11 (21)	16" SAND, fn & vf, tr silt & clay, rd-br-yellow 5" SILT and CLAY, little sand, yellow-red
3	5 - 7	9-19-19-30 (17)	SAND, med, some fn, tr silt and clay, red-brown-lt tan
4	7.5-9.5	6-18-21-26 (20)	8" SAND, as above 12" SAND, fn to vf, some silt, tr clay, lt tan-red-brown
5	10-12	7-13-13-16 (19)	SAND, med, some fn, tr silt, lt tan-red-brown
6	12.5-14.5	6-10-11-13 (21)	SAND, fn and vf, little med, tr silt and clay, lt tan-red-brown
7	15-17	3-3-5-3 (20)	SAND, as above, gray and red-brown, with 2" clay layer
8	17.5-19.5	3-5-11-24 (18)	5" SAND, as above 13" CLAY, some silt, tr sand, gray
9	20-22	3-5-16-24 (17)	SAND, med, some fn, some silt and clay stringers,gray-red-brown-yellow
10	22.5-24.5	30-33-27-18 (17)	8" GRAVEL, some sand, tr silt, red-brown 9" SAND, fn to vf, tr silt & clay, red-br-gray
11	25-27	5-20-41-51/5" (24)	6" SAND, as above 6" CLAY, ltl silt, thin sand lenses, gray 8" SAND, med-fn, gray-rd-br, <u>saturated</u>
12	27.5-29.5	20-24-30-38 (20)	10" CLAY, ltl sand and silt, gray-rd-br 10" SAND, med, ltl fn, tr silt & clay, gray
13	30-32	22-28-36-40 (20)	SAND, as above, saturated
14	32.5-34.5	27-38-43-51 (24)	SAND, as above
15	35-37	33-51/6" (12)	SAND, as above
16	37.5-39.5	15-51/6" (12)	SAND, as above

Graphic Log



BORING NUMBER: B-12 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
17	40-42	4-14-51/5" (8)		SAND, as above
18	42.5-44.5	45-51/3" (8)		CLAY, little silt and sand, with thin sand lenses, mottled red-gray
			45	
19	45-47	14-45-48 (18)		11" SAND, med and coarse, tr silt & clay, gray 7" CLAY, tr silt and sand, dense, gray
20	47.5-49.5	35-47-51/4" (16)	50	CLAY, as above
21	50-52	33-51/4" (0)		No recovery - drilled like clay
22	52.5-54.5	29-51/6" (12)		CLAY, as above, mottled gray-red-br-purple
			55	
23	55-57	43-51/5" (11)		CLAY, as above
24	57.5-59.5	34-51/5" (0)		No recovery, drilled like clay
			60	
25	60-62	36-51/5" (11)		CLAY, as above
26	62.5-64.5	41-33-42-47 (21)		6" CLAY, as above 15" CLAY and SILT, little sand, gray
			65	
27	65-67	45-51/5" (0)		No recovery
28	67.5-69.5	37-45-47-51/5" (15)		CLAY, some silt, tr sand, red-br-gray
29	70-72	19-29-33-42 (21)	70	10" CLAY, as above 5" CLAY & SILT, tr sand, mottled red-br-gray 6" SAND, vf, some silt, tr clay, gray
30	72.5-74.5	10-27-36-49 (0)		No recovery
			75	
31	75-77	19-29-38-51/5" (21)		7" SILT & vf SAND, tr clay, mott rd-br-gray 14" SILT & CLAY, little vf sand, red-br-gray
32	77.5-79.5	21-28-51/5" (17)	80	SILT and CLAY, as above

Groundwater on the drill rods at 34 feet.

BORING NUMBER: B-13

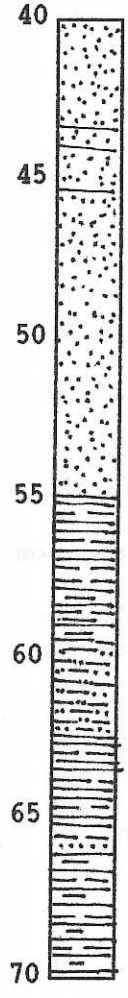
MONITOR WELLS: MW-3

DATE INSTALLED: 7-18-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	2-2-2-2 (18)		SAND, med, some v fn, tr silt and clay, yellow
2	2.5-4.5	2-2-3-4 (24)	5	SILT and fn SAND, tr clay, brown
3	5 - 7	2-12-17-22 (15)		2" SILT and fn SAND, as above 9" GRAVEL, little coarse sand, yellow
4	7.5-9.5	15-11-11-15 (19)	10	CLAY, little silt, with lenses of SILT, gray
5	10-12	8-8-12-14 (12)		6" CLAY, as above 6" SAND, med, some fn, yellow
6	12.5-14.5	17-34-51-51/5" (16)	▼	SAND, as above with thin CLAY lenses, gray, saturated
7	15-17	12-12-14-22 (24)	15	CLAY, little fn sand and silt, gray
8	17.5-19.5	7-12-17-17 (19)		CLAY, little vf sand and silt, gray
9	20-22	30-51/7" (9)	20 ▼	SAND, med, little fn, tr silt and clay, gray-yellow, saturated
10	22.5-24.5	32-34-51/5" (18)	25	SAND, as above
11	25-27	22-34-51/5" (18)		SAND, as above, clay stringers in lower 11"
12	27.5-29.5	17-35-51/5" (18)	30	SAND, as above, with 3" CLAY layer
13	30-32	9-13-51/5" (18)		SAND, as above, some thin lenses of clay, gray
14	32.5-37.5	40-51/3" (0)	35	No recovery
15	35-37	13-25-51/5" (18)		SAND, vf to med, tr silt and clay, yellow-gray, saturated and CLAY layers 2 and 4" thick
16	37.5-39.5	17-28-40-51/5"	40	SAND, med, some fine, tr silt, lt tan, (24) saturated, with a 2" CLAY layer

BORING NUMBER: B-13 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
17	40-42	17-24-51/5" (18)	40	SAND, med and fn, little vf, tr silt and clay, few thin clay lenses, lt tan-gray
18	42.5-44.5	10-30-51/5" (18)		SAND, med and fn, little vf, tr silt, few thin clay lenses, tan, saturated
19	45-47	12-30-51/6" (18)	45	SAND, as above
20	47.5-49.5	45-51/2" (12)		SAND, as above, no clay lenses
21	50-52	45-51/6" (12)	50	SAND, as above
22	52.5-54.5	51/4" (4)		SAND, as above
23	55-57	25-51/5" (10)	55	CLAY, little silt, tr sand, mottled red-gray
24	57.5-59.5	51/5" (6)		SILT and CLAY, some sand, gray
25	60-62	28-46-51/2" (14)	60	SILT and vf SAND, little clay, gray
26	62.5-64.5	18-31-51/5" (17)		CLAY, some silt, tr sand, gray
27	65-67	31-51/5" (11)	65	7" CLAY, as above 2" SAND, vf, little silt, gray 2" CLAY and SILT, tr sand, brown-gray
28	67.5-69.5	45-51/5" (12)	70	CLAY and SILT, some sand, gray



Groundwater encountered at 14 feet.

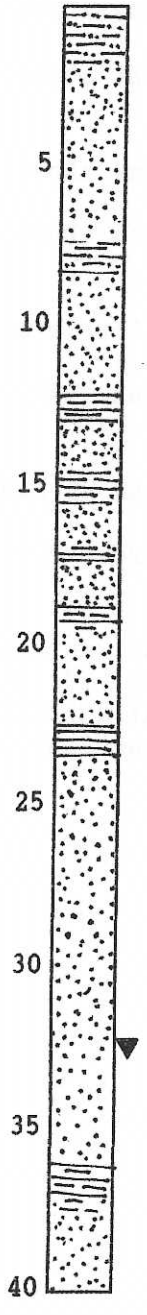
BORING NUMBER: B-14

MONITOR WELLS: MW-5

DATE INSTALLED: 7-25-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	2-2-4-5 (18)	SAND, vf, and SILT, tr clay, red-brown
2	2.5-4.5	14-18-18-37 (17)	SAND, fn, some vf and med, tr silt and clay, red-brown-yellow
3	5 - 7	51/2" (2)	SAND, med, some grvel, tr silt & clay, red-br
4	7.5-9.5	11-19-27-36 (19)	5" SILT, CLAY, and SAND, vf, gray-red-brown 14" SAND, fn and med, tr silt & clay, red-br
5	10-12	18-20-21-18 (16)	SAND, med, some fn, tr silt & clay, red-brown
6	12.5-14.5	4-8-10-14 (14)	11" CLAY, ltl silt, few thin sand lenses, gray 3" SAND, fn to vf, some silt, tr clay, gray
7	15-17	7-7-5-6 (24)	6" CLAY, little silt , tr sand, gray 13" SAND, fn, some vf, tr silt & clay, yl-gry 5" CLAY and SILT, tr sand, gray
8	17.5-19.5	5-7-8-9 (20)	13" CLAY and SILT, as above 7" SAND, fn to vf, tr silt and clay, gray
9	20-22	3-5-7-3 (23)	SAND, as above, tan-gray, 3" CLAY layer at top
10	22.5-24.5	41-51/4" (22)	16" CLAY, tr silt and sand, brown 6" SAND, crs, & GRAVEL, tr silt & cly, yl-br
11	25-27	42-51/1" (7)	SAND, med and coarse, little gravel, tr silt and clay, yellow-brown
12	27.5-29.5	20-21-18-19 (6)	GRAVEL and coarse SAND, tr fn sand, yellow
13	30-32	19-22-25-21 (12)	SAND, med and coarse, little gravel, tr fn sand, silt, and clay, yellow
14	32.5-34.5	31-51/5" (9)	SAND, coarse, little med, tr fn sand, silt and clay, yellow, <u>saturated</u>
15	35-37	8-10-16-18 (24)	14" SAND, as above 10" CLAY and SILT, tr sand, gray
16	37.5-39.5	9-29-51/3" (15)	SAND, fn to med, tr silt and clay, gray

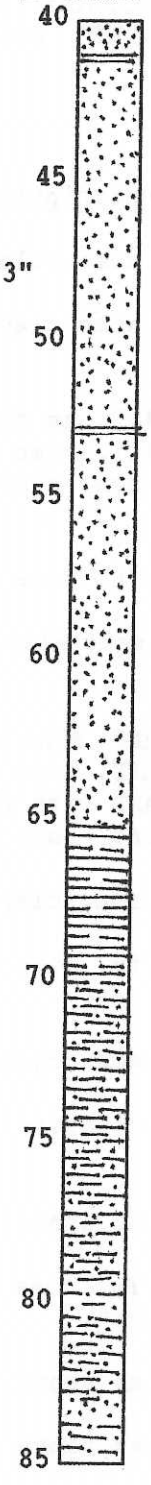
Graphic Log



BORING NUMBER: B-14 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
17	40-42	9-15-51/5" (17)	13" SAND, as above, saturated 4" CLAY, little silt, tr sand, gray
18	42.5-44.5	32-51/5" (11)	SAND, med, some fn, gray, saturated
19	45-47	21-34-51/4" (16)	SAND, as above
20	47.5-49.5	15-23-40-51/3" (21)	SAND, as above
21	50-52	51/5" (5)	SAND, med & crse, ltl fn, tr silt & clay, yel
22	52.5-54.5	8-51/5" (11)	9" SAND, as above with 2" CLAY layer at bottom 2" SAND, med some fn, tr silt and clay, gray
23	55-57	32-51/2" (8)	SAND, as above, saturated
24	57.5-59.5	33-51/4" (10)	SAND, med, little fn, tr silt and clay, lt tan, saturated
25	60-62	25-51/3" (9)	SAND, as above
26	62.5-64.5	15-35-51/5" (17)	SAND, as above (flowing)
27	65-67	34-51/5" (11)	CLAY, some silt, tr sand, red-brown
28	67.5-69.5	51/5" (5)	CLAY, as above
29	70-72	34-51/5" (11)	SILT, little clay and sand, red-brown-gray
30	72.5-74.5	51/5" (0)	No recovery
31	75-77	42-51/4" (0)	No recovery
32	77.5-79.5	39-37-51/4" (16)	SILT, some sand, little clay, gray
33	80-82	28-35-51/5" (17)	SILT, as above, saturated
34	82.5-84.5	22-36-51	7" SAND, md, ltl crs, tr silt & clay rd-br 11" SILT, some sand, tr clay, gray

Graphic Log



Groundwater encountered at 33 feet and noted on drill rods at 18 feet.

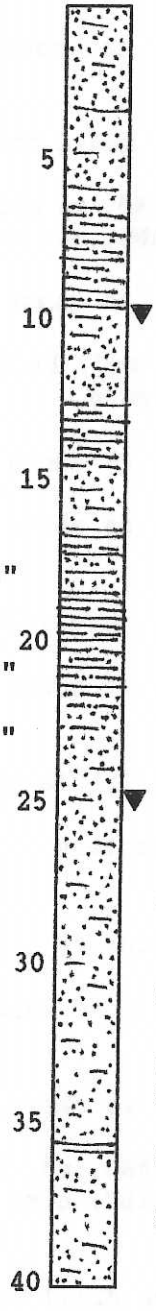
BORING NUMBER: B-15

MONITOR WELLS: MW-6

DATE INSTALLED: 8-10-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: GREG ADAMSON DRILLER: HARDIN-HUBER, INC

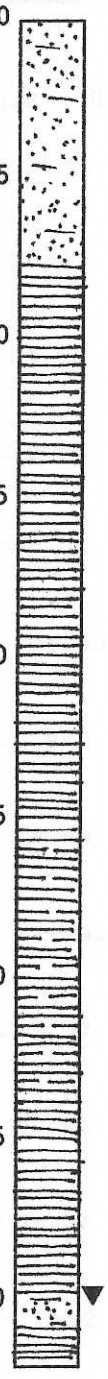
Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	5-7-10-12 (19)	SAND, some silt, tr gravel, tan
2	2.5-4.5	9-11-13-5 (20)	SAND, some clay, tan
3	5 - 7	6-9-9-13 (24)	18" SAND, as above 6" SILT, some clay, tr sand, tan to gray
4	7.5-9.5	7-14-21-16 (17)	SILT, some clay, tr sand, gray
5	10-12	8-17-25-32 (17)	SAND, fn, some silt, tr clay, gray-tan, wet
6	12.5-14.5	7-19-25-38 (21)	SILT, some clay, gray, with 2" silty sand lens
7	15-17	7-15-24-32 (16)	11" SAND, some silt and clay, tan, wet to moist 5" CLAY, some silt, gray
8	17.5-19.5	17-25-40-51/3" (21)	5" SAND with thin clay lenses, gray 16" CLAY, some silt, gray
9	20-22	15-25-40-51/3" (20)	SILT, some clay, gray with 2 v thin sand lenses
10	22.5-24.5	12-22-38-51/3" (22)	SAND, fn, some clay and silt, gray, v moist
11	25-27	25-40-51/3" (18)	SAND, med-coarse some silt, tan, wet
12	27.5-29.5	51/5" (14)	SAND, as above (running sand)
13	30-32	51/6" (17)	SAND, as above
14	32.5-34.5	25-36-51/5" (13)	SAND, fn, some silt, with thin clay layers, gray, wet
15	35-37	33-40-51/3" (15)	SAND, as above, with 2" clay lens
16	37.5-39.5	10-51/5" (10)	SAND, as above

Graphic Log



BORING NUMBER: B-15 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
17	40-42	20-51/3" (9)	40	SAND, as above
18	42.5-44.5	30-40-51/5" (5)		SAND, as above
19	45-47	40-51/5" (6)	45	SAND, as above, tr clay
20	47.5-49.5	20-51/5" (20)		CLAY, tr silt, red-brown and gray
21	50-52	51/5" (20)	50	CLAY, as above
22	55-57	38-51/6" (20)	55	CLAY, as above
23	60-62	45-51/5" (3)	60	CLAY, as above
24	65-67	40-51/5" (15)	65	CLAY, some silt, red-brown-gray with occasional yellow-brown streaks
25	70-72	30-51/6" (10)	70	CLAY, as above
26	75-77	25-32-51/5" (10)	75	CLAY, tr silt, charcoal gray
27	80-82	36-42-51/6" (17)	80	2" SAND, some clay, gray, wet 15" CLAY, tr silt, charcoal gray



Groundwater encountered above the clay at 10 feet and then definitively at 25 feet. Wet layer encountered below the clay at 80 feet.

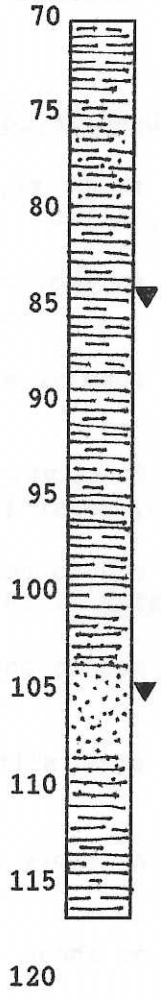
BORING NUMBER: B-16

DATE INSTALLED: 11-22-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	5-1-1-1 (14)		SAND, fn to med, tr silt and clay, brown, moist
2	5 - 7	3-6-10-11 (11)	5	CLAY, red and gray, moist
3	10-12	4-7-9-11 (4)	10	CLAY, as above
4	15-17	4-7-12-14 (17)	15	CLAY, tr sand, red and gray, moist
5	20-22	4-7-10-13 (4)	20	CLAY, as above
6	25-27	5-10-12-9 (0)	25	No recovery - drilled like clay
7	30-32	9-13-21-27 (20)	30	CLAY, red and gray, moist
8	35-37	10-16-23-50 (17)	35	CLAY, as above
9	40-42	18-36-51/4" (0)	40	No recovery - drilled like clay
10	45-47	24-39-51/4" (12)	45	CLAY, tr sand, red and gray, moist
11	50-52	29-39-51/4" (10)	50	CLAY, as above
12	55-57	28-42-51/5" (12)	55	CLAY, as above
13	60-62	30-41-51/5" (12)	60	CLAY, some silt and sand, red and gray, moist
14	65-67	36-45-51/4" (15)	65	CLAY, as above
			70	

BORING NUMBER: B-16 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
15	70-72	29-32-51/5" (9)		CLAY, silt and sand, red and gray, moist
16	75-77	29-35-51/5" (15)		SILT, some clay and vf sand, gray, moist
17	80-82	25-36-51/5" (14)		SILT and CLAY, dark gray, slightly moist
18	85-87	15-25-34-51/5 (11)		CLAY and SILT, mottled lt gray and red-brown, wet
19	90-92	33-45-51/4" (0)		No recovery
20	95-97	51/4" (4)		CLAY, some silt, mottled gray and dk maroon, slightly moist
21	100-102	51/3" (0)		No recovery
22	105-107	51/3" (2)		SAND, fn to med, red-brown, wet
23	110-112	51/4" (0)		No recovery
24	115-117	51/3" (5)		CLAY and SILT, gray, moist



Wet layers encountered below the clay beginning at about 85 feet.

BORING NUMBER: B-17

DATE INSTALLED: 11/20/89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	2-4-4-5 (18)		SAND, fn to vf, some silt, tr clay, lt red-brown, moist
			5	
2	5 - 7	3-3-2-3 (24)		SAND, as above, tan
			10	
3	10-12	7-9-13-19 (24)		SILT, some vf sand, tan
			15	
4	15-17	13-9-9-9 (24)		SAND, fn to vf, some silt, tr to little clay, lt tan, moist (soft clay in tip)
			20	
5	20-22	5-8-10-11 (24)		SAND, med to coarse, clean, lt red-brown, saturated at 19 feet
			25	
6	25-27	5-4-5-8 (12)		SAND, med to coarse, tr clay, lt red-brown
			30	
7	30-32	9-11-14-16 (12)		CLAY, some silt, variegated red-gray-brown, moist
			35	
8	35-37	6-8-12-17 (24)		CLAY, as above
			40	
9	40-42	12-20-33-39 (20)		CLAY, as above
			45	
10	45-47	10-17-25-39 (20)		CLAY, as above
			50	
11	50-52	13-20-29-40 (17)		CLAY, as above
			55	
12	55-57	12-20-31-45 (20)		CLAY, as above
			60	
13	60-62	12-17-31-49		CLAY, as above, dry
			65	
14	65-67	26-39-59-59		CLAY, as above, slightly moist
			70	

BORING NUMBER: B-17 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			70	
15	70-72	12-18-39-51		CLAY, as above
			75	
16	75-77	20-31-51-56		CLAY, mottled red-gray-brown, moist
			80	
17	80-82	21-37-51-51		CLAY, as above
			85	
18	85-87	51/5" (5)		CLAY, some silt and sand, pink, moist
			90	
19	90-92	19-40-51-56 (24)		CLAY, some silt and sand, mottled red-gray-brown, moist
			95	
20	95-97	31-51/5" (11)		CLAY, tr sand, red and gray
			100	
21	100-102	28-42-51/3" (15)		CLAY, as above
			105	
22	105-107	31-43-51/4" (8)		CLAY, as above
			110	
23	110-112	39-41-51/4" (12)		CLAY, as above
			115	
24	115-117	36-43-51/5" (15)		CLAY, as above
			120	

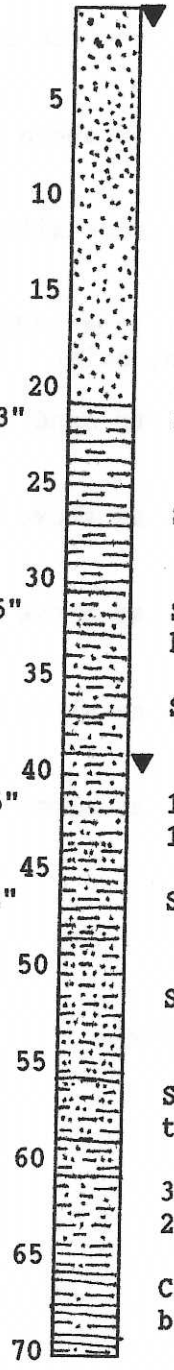
Groundwater encountered above the clay at 19 feet.

BORING NUMBER: B-18

DATE INSTALLED: 11-27-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: PHYLLIS BUFF DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-3-4-5 (8)	GRAVEL and SAND, coarse, brown, saturated
2	5 - 7	6-9-10-13 (24)	SAND, med to vf, lt tn, saturated
3	10-12	30-81-100/5" (19)	SAND, coarse to med, lt tan, saturated
4	15-17	37-81/6" (12)	SAND, as above
5	20-22	17-22-37-51/3" (20)	SILT and CLAY, gray to red, slightly moist
6	25-27	45-51/4" (12)	SILT and CLAY, gray, slightly moist
7	30-32	21-35-44-51/5" (23)	SILT, some clay, mottled lt gray and brown, slightly moist
8	35-37	18-51/4" (11)	SILT, some clay, lt gray, slightly moist
9	40-42	16-24-33-51/5" (22)	12" SILT, as above, wet 10" SILT, and SAND, vf, dark gray, wet
10	45-47	21-27-33-51/4" (22)	SILT, some clay, little vf sand, dark gray, wet
11	50-52	28-51/4" (10)	SILT, and SAND, vf, some clay, gray, wet
12	55-57	51/5" (5)	SILT, CLAY, and SAND, vf, gray, slightly moist to dry
13	60-62	51/4" (4)	3" as above 2" SILT, lt red-brown
14	65-67	38-51/4" (10)	CLAY, interlayered with some fn sand, yellow-brown, moist

Graphic Log



BORING NUMBER: B-18 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			70	
15	70-72	51/1.5"-200/5" (6)		CLAY, as above
			75	

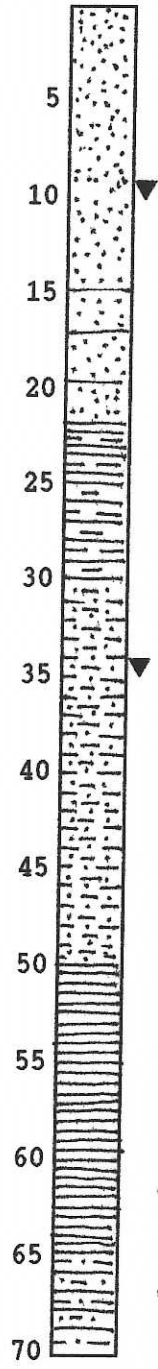
Groundwater encountered above the clay at 40 feet.

BORING NUMBER: B-19

DATE INSTALLED: 11-28-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

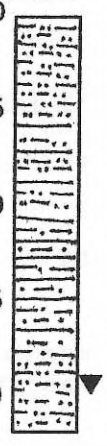
Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	1-2-3-6 (4)	SAND, fn to med, some clay, yellow-brown
2	5 - 7	14-17-18-20 (17)	SAND, as above, tr to little clay
3	10-12	3-3-2-3 (18)	SAND, coarse, yellow-brown, wet
4	15-17	3-5-9-12 (20)	SAND, as above with clay layers
5	20-22	9-11-16-20 (17)	2" SAND, as above 15" CLAY, some silt, moist, top 4" dark red, bottom 11" dark gray
6	25-27	13-19-28-40 (18)	SILT and CLAY, mottled red and gray, moist
7	30-32	12-14-18-22 (24)	SILT, tr clay, gray, moist
8	35-37	13-19-21-35 (24)	SILT, as above, wet
9	40-42	14-19-26-32 (18)	SILT, as above, wet
10	45-47	28-36-51/5" (23)	SILT, as above, wet
11	50-52	12-16-21-27 (12)	CLAY, tr silt, mottled maroon and gray, slightly moist
12	55-57	10-14-20-25 (24)	CLAY, as above
13	60-62	12-22-33-40 (24)	CLAY, as above
14	65-67	28-35-51/5" (17)	SILT, some clay, gray, moist

Graphic Log



BORING NUMBER: B-19 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			70	
15	70-72	18-33-38-45 (6)		SILT and SAND, vf, some clay, mottled gray-pink-yellow-brown, moist (not water bearing)
			75	
16	75-77	30-45-51/5" (17)		SILT, vf SAND, and CLAY, mottled as above
			80	
17	80-82	24-30-38-46 (22)		CLAY and SILT, mottled as above, slightly moist
			85	
18	85-87	22-47-51/5" (24)		SILT, tr to some clay, maroon at top and dark gray at bottom (not water bearing)
			90	
19	90-92	23-57-51/3" (15)		SILT and SAND, vf, tr clay, dark gray, wet
			95	



Shallow perched water at 10 feet.

Groundwater encountered above the clay at 35 feet and below the clay at 90 feet.

BORING NUMBER: B-20

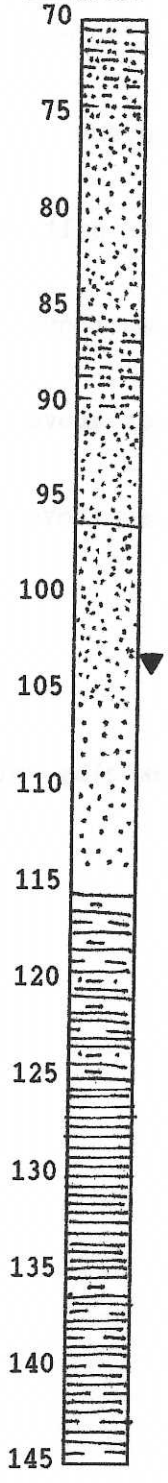
DATE INSTALLED: 11-28-89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	2-3-3-4 (15)		SAND, vf, and SILT, tr clay, brown, moist
			5	
2	5 - 7	1-3-5-7 (12)		SILT and vf SAND, little clay, brown, moist
			10	
3	10-12	4-6-9-10 (16)		SAND, med to coarse, little clay, lt yellow-brown, moist
			15	
4	15-17	12-11-19-22 (14)		SAND, fine, lt tan, moist
			20	
5	20-22	5-8-13-13 (15)		SILT and SAND, vf, little clay, variegated mostly maroon, slightly moist
			25	
6	25-27	9-12-18-25 (18)		SILT and CLAY, variegated, mostly maroon, slightly moist
			30	
7	30-32	9-15-21-24 (18)		CLAY and SILT, as above
			35	
8	35-37	11-17-24-29 (15)		CLAY, tr silt, variegated maroon with some gray, sightly moist
			40	
9	40-42	22-36-43-51/3 (13)		CLAY, as above
			45	
10	45-47	23-39-51/5" (16)		CLAY, tr silt, yellow-olive, slightly moist
			50	
11	50-52	27-37-51/5" (17)		CLAY, tr silt, mottled gray-brown, slightly moist
			55	
12	55-57	17-33-44-51/4" (16)		CLAY, tr silt, mottled red and gray, slightly moist
			60	
13	60-62	27-25-30-41 (17)		SILT and vf SAND, with some occasional clay, lt tan with some red, slightly moist
			65	
14	65-67	33-51/5"		SAND, vf, some silt, tr clay, lt tan, saturated
			70	

BORING NUMBER: B-20 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
15	70-72	39-51/5" (15)	SILT and vf SAND, tr clay, lt tan, wet
16	75-77	51/4" (1.5)	SAND, fn to vf, tr silt and clay, lt tan-yellow, wet
17	80-82	51/3" (0)	No recovery
18	85-87	51/3" (4)	SAND, vf and SILT, lt gray-white, moist
19	90-92	51/3" (1)	SAND, fn to vf, tr silt, lt red-tan, wet
20	95-97	12-27-51/5" (8)	SAND, fn to vf, clay inclusion, lt tan-gray, v moist to wet
21	100-102	51/2" (0)	No recovery
22	105-107	43-45-51/3" (3)	SAND, coarse, tr fines, lt yellow-brown, saturated
23	110-112	38-44-51/3" (6)	SAND, as above
24	115-117	30-48-51/5" (12)	SILT, some clay, gray, moist
25	120-122	34-47-51/4" (17)	CLAY, some thin fn sand and silt lenses, stiff, gray, moist
26	125-127	30-40-51/3"	CLAY, tr silt, mottled red and gray, moist
27	130-132	30-40-51/5"	CLAY, tr silt, stiff, red and gray, moist
28	135-137	38-44-51/4" (14)	CLAY, red and gray, stiff with some thin silt lenses, slightly moist
29	140-142	32-46-51/4" (11)	CLAY, as above

Graphic Log



BORING NUMBER: B-20 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			145	
30	145-147	30-40-51/4" (11)		SILT, some clay, tr sand, gray, moist
			150	
31	150-152	37-51/5" (0)		No recovery
			155	
32	155-157	39-49-51/3" (15)		CLAY, tr silt, v stiff, red and gray, moist
			160	
33	160-162	47-51/5" (11)		CLAY, as above
			165	
34	165-167	51/4" (11)		CLAY, as above
			170	
35	170-172	48-51/3"		CLAY, as above
			175	

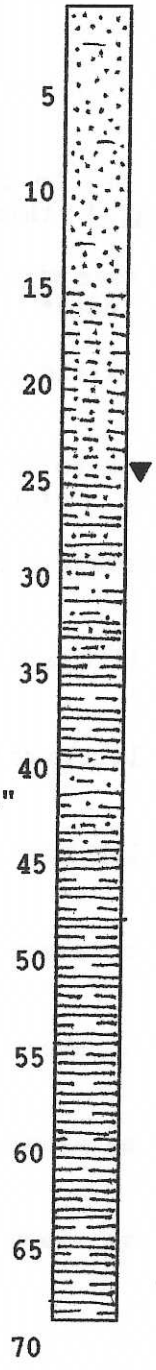
Groundwater encountered at 65 feet between thick clay units.

BORING NUMBER: B-21

DATE INSTALLED: 12/1/89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: PHYLLIS BUFF DRILLER: HARDIN-HUBER, INC

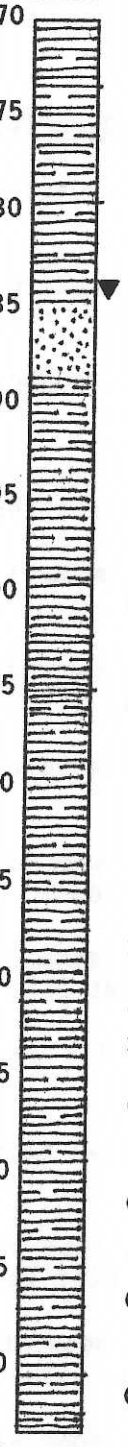
Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-5-8-4 (14)	SAND, coarse, some silt, yellow-brown, moist
2	5 - 7	5-6-9-15 (13)	SAND, med to coarse, little silt, tan, slightly moist
3	10-12	5-7-12-19 (14)	SAND, as above
4	15-17	7-11-15-17 (17)	SILT, some v fn sand, gray-tan with yellow-brown mottles, moist
5	20-22	4-5-16-15 (23)	SILT, some vf sand, tan with red-brown mottles, moist
6	25-27	9-10-14-18 (24)	SILT, some clay, tr sand, gray and maroon, very moist, (2" lens wet silt)
7	30-32	7-9-11-13 (21)	SILT, some clay, lt gray, v moist
8	35-37	9-15-17-20 (20)	CLAY, some silt, lignitic, gray, moist, (2" wet silt lens)
9	40-42	18-20-33-51/4" (22)	SILT, some clay, hard, gray, slightly moist, (4" wet silt lens)
10	45-47	15-31-37-45 (24)	CLAY, little to some silt, dark gray, slightly moist
11	50-52	14-23-36-41 (24)	CLAY, as above, 1" lignite lens
12	55-57	31-41-51/5" (24)	CLAY, some silt, stiff, red-brown and pink, v thin silt lenses throughout
13	60-62	25-31-37-45 (24)	CLAY, some silt, mottled yellow-brown and red-brown, moist
14	65-67	15-25-35-51/2 (24)	CLAY, some silt, stiff, red-brown, moist

Graphic Log



BORING NUMBER: B-21 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
15	70-72	70/6" (6)	70	CLAY, little silt, stiff, tan and pink, moist
16	75-77	35-51/5" (3)	75	CLAY, as above
17	80-82	100/4" (4)	80	CLAY, as above
18	85-87	51/6" (4)	85	SAND, med to coarse, some silt, red and tn, saturated, thin clay lens
19	90-92	51/5" (5)	90	CLAY, some silt, lt gray, yellow-brown and red-brown, moist
20	95-97	44-36-51/6" (24)	95	CLAY, little silt, lt gray and maroon, moist
21	100-102	33-41-51/6" (18)	100	CLAY, tr to little silt, lt gray and maroon, v stiff, moist
22	105-107	22-33-51/4" (0)	105	No recovery - drilled like clay
23	110-112	41-51/5" (11)	110	CLAY, little silt, lt gray and maroon, v stiff, moist
24	115-117	45-51/5" (11)	115	CLAY, little silt, v stiff, lt gray and maroon, moist
25	120-122	37-51/5" (9)	120	CLAY, little silt, v stiff, lt gray and maroon, moist
26	125-127	48-51/5" (11)	125	CLAY, as above
27	130-132	47-51/6" (10)	130	CLAY, as above
28	135-137	41-51/5" (18)	135	CLAY, as above, slightly moist
29	140-142	47-51/6" (15)	140	CLAY, as above
			145	



BORING NUMBER: B-21 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			145	
30	145-147	42-51/5" (11)		CLAY and SILT, v stiff, lt gray and maroon, slightly moist
			150	
31	150-152	42-51/4" (9)		CLAY and SILT, as above
			155	
32	155-157	36-51/5" (0)		No recovery
			160	
33	160-162	47-51/5" (12)		CLAY, some silt, red-brown and lt gray, moist
			165	

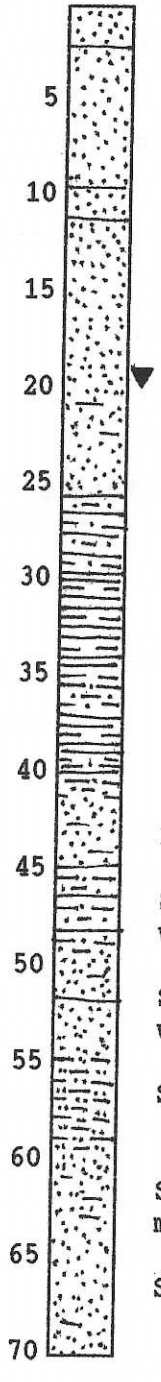
Groundwater encountered in silt lenses above the clay beginning at 25 feet and in a sand bed in the clay at 85 feet.

BORING NUMBER: B-22

DATE INSTALLED: 12/6/89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: PHYLLIS BUFF DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-4-3-3 (11)	SAND, med-coarse, some clay, tr silt, lt brown, v moist
2	5 - 7	8-5-7-8 (11)	SAND, med-coarse, tr clay and silt, yellow-brown, moist
3	10-12	8-14-17-21 (17)	SAND, med-coarse, some clay, tr silt, lt brown, v moist
4	15-17	8-12-14-20 (13)	SAND, fn to med-coarse, tr silt, tan and yellow-brown, slt moist
5	20-22	15-25-22-41 (11)	SAND, fn, some silt, 2" white clay lens, wet
6	25-27	18-23-34-41 (17)	SILT, some clay, firm, gray-white, moist, not water bearing
7	30-32	10-24-30-41 (24)	CLAY, some silt, v firm, lt gray-white
8	35-37	4-11-32-40 (24)	10" SILT, ltl clay, lt gry w/ maroon motls, mst 14" CLAY, some silt, lt gray
9	40-42	15-15-23-43 (21)	4" SILT, tr clay, lt gray and maroon 17" SAND, fn-crs, some silt, yl-br-gry, v mst
10	45-47	15-24-34-51/3 (24)	SILT, some to little clay, lt gray-white, mst, with 2" white sand-silt lens
11	50-52	14-27-39-51/2 (20)	SAND, fn, some silt, thin clay lenses, lt gray-white, v moist
12	55-57	35-41-51/4" (16)	SAND, fn and silt, gray-white, v moist to wet
13	60-62	15-34-51/5" (17)	SAND, fn, some silt, tr clay, gray-white, moist
14	65-67	51/6" (6)	SAND, fn, little silt, white-tan, slt mst

Graphic Log



BORING NUMBER: B-22 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
15	70-72	24-25-36-51/4 (20)	70	SAND, med-coarse, some silt and clay, red-tan, wet
16	75-77	34-51/4" (10)	75	2" SAND, as above, red, v moist 8" CLAY, with some silt, firm, red-brown and lt gray
17	80-82	41-45-51/4" (7)	80	CLAY, tr silt, v firm, maroon and lt gray, mst
18	85-87	47-49-51/5" (5)	85	CLAY, as above
19	90-92	33-41-51/4" (11)	90	CLAY, as above
20	95-97	30-41-51/5" (16)	95	CLAY, as above, tr to little silt
21	100-102	41-49-51/5" (17)	100	CLAY, as above
22	105-107	39-42-51/4" (15)	105	CLAY, little silt, v stiff, lt gray and maroon, moist
23	110-112	43-49-51/3" (15)	110	CLAY, tr silt, v stiff, red-brown, moist
24	115-117	45-47-51/4" (13)	115	CLAY, little to some silt, v stiff, lt gray and red-brown, mst
25	120-122	28-34-51/5 (14)	120	CLAY, tr silt, v stiff, lt bluish gray-maroon, moist
26	125-127	31-43-51/3" (9)	125	CLAY, as above
27	130-132	47-50-51/3" (9)	130	CLAY and (to some) SILT, v firm, red-br to lt gray, moist
28	135-137	45-49-51/4" (13)	135	CLAY, as above
29	140-142	37-49-51/3" (11)	140	CLAY, little to some silt, v stiff, red-br and lt gray, moist
			145	

BORING NUMBER: B-22 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			145	
30	145-147	43-49-51/3" (7)		CLAY, as above
			150	

Thin layers of perched groundwater encountered at 20 feet and 55 feet and then, above the clay, at 70 feet.

BORING NUMBER: B-23

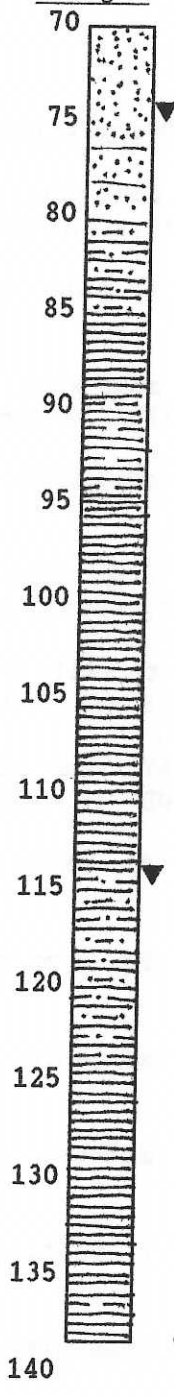
DATE INSTALLED: 12/12/89
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: PHYLLIS BUFF DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	4-3-6-7 (12)		SAND, some silt, tr clay, some organic matter, red-brown, moist
			5	
2	5 - 7	7-9-11-11 (15)		CLAY, tr silt, red-brown and tan, moist
			10	
3	10-12	7-14-14-17 (12)		CLAY, some silt, tr fn sand, red-brown and tan with thin fn sand lenses
			15	
4	15-17	1-2-10-11 (22)		CLAY, some silt, tr sand, tan-lt brown, moist
			20	
5	20-22	5-10-17-13 (12)		CLAY, some silt, tr sand, with v thin silt lenses, tan-lt br to red, moist
			25	
6	25-27	5-51/5" (9)		CLAY, tr silt, v stiff, red br to lt gray, 1"-2" sand and silt lenses, moist
			30	
7	30-32	51/5" (5)		2" CLAY, some silt, red-br and tan, moist 3" SAND, fn, some silt, white, slt moist
			35	
8	35-37	41-51/5" (11)		SAND, fn, white and tan, slt moist
			40	
9	40-42	51/4" (4)		SAND, fn, some silt, slt moist
			45	
10	45-47	51/5" (5)		SAND, as above
			50	
11	50-52	15-32-51/5" (16)		SAND, med-crs, some silt, slt moist
			55	
12	55-57	11-12-15-37 (20)		CLAY, tr silt, stiff, white
			60	
13	60-62	23-35-51/4" (14)		SILT, some clay, dense, white-lt gray, moist
			65	
14	65-67	15-24-40-51/4" (21)		SAND, fn, some silt, white, slt moist
			70	

BORING NUMBER: B-23 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
15	70-72	51/3" (3)	SAND, fn to med, tan, moist
16	75-77	41-51/3" (14)	SAND, med-crs, with clay and silt lenses, red-br-tan, wet
17	80-82	34-51/4" (14)	SILT, some clay, tr sand, tan with red-br mottles, moist
18	85-87	51/5" (5)	CLAY, tr silt, red-br and lt gray, moist
19	90-92	51/5" (5)	CLAY, some to little silt, thin silt lenses, red-br, maroon and lt gray, moist
20	95-97	51/5" (5)	CLAY, tr silt, v hard, red-br and lt gray, moist
21	100-102	51/4" (4)	CLAY, as above
22	105-107	49-51/4" (10)	CLAY, as above
23	110-112	31-49-51/4" (13)	CLAY, as above
24	115-117	51/5" (4)	SILT, some clay, lt gray, dense, wet
25	120-122	51/4" (0)	No recovery
26	125-127	97-51/3" (9)	CLAY, tr silt, maroon with some gray mottling
27	130-132	49-51/5" (11)	CLAY, as above
28	135-137	51/6" (6)	CLAY, little silt and sand, maroon with some gray mottling

Graphic Log



Groundwater encountered at 75 feet above the clay and in a silt layer in the clay at 115 feet.

BORING NUMBER: B-24[a]

DATE INSTALLED: 4-16-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	3-2-2-1 (4)		SAND, fn to med, tr silt and clay, yellow-brown, moist
2	2.5-4.5	2-3-2-3 (6)	5	SILT and fn SAND, some clay, yellow-brown, moist
3	5 - 7	3-2-3-3 (16)		CLAY and (to some) SILT, with thin clay and silt stringers, yellow-brown, moist
4	7.5-9.5	2-4-4-6 (12)	10	SILT and vf SAND, some clay, some large gravel, brown, moist with saturated planes
5[a]	10-12	1-2-2-2 (7)		SILT and CLAY, some vf SAND, wet - probably because of clay plug in tip
6	12.5-14.5	2-1-1-1 (4)	15	SILT and (to some) CLAY, little sand and large pieces gravel, near saturation but rods dry
7	15-17	2-2-5-5 (15)		SAND, fn to med, clean, yellow-brown, moist
8	17.5-19.5	3-2-3-3 (15)	20	SAND, fn, clean, wet
9	20-22	11-19-25-38 (24)		SAND, med to crs, tr silt and clay, yellow-brown, wet
10	22.5-24.5	19-48-25-27 (24)	25	SAND, as above. In tip - 2" red clay overlain by 1" black sand
S	24.2-25.8			**Shelby Tube Pushed**
11	26-28	10-18-21-28 (20)		CLAY, red and gray, mottled
			30	
12	30-32	14-18-27-49 (18)		CLAY, as above
			35	
13	35-37	10-23-50-60 (18)		CLAY, as above

a. B-24A was drilled 5' away and Shelby was pushed from 11 to 13 feet.

DTW is 20.3 feet below grade in open augers after 2 hours

BORING NUMBER: B-25

DATE INSTALLED: 4-17-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
1	0 - 2	2-2-3-5 (18)		SAND, fn, some silt, yellow-brown, moist
2	2.5-4.5	9-15-28-25 (20)		SAND, med and SILT, 2" indurated layer, red-brown, moist
			5	
3	5 - 7	6-6-7-8 (18)		SAND, med, lt red, moist
4	7.5-9.5	3-4-5-8 (15)	10	SAND, fn to med, tr silt, mottled red-beige, moist
5	10-12	5-8-13-26 (18)		SAND, as above
6	12.5-14.5	14-14-14-17 (16)	15	SAND, as above with silt stringers
7	15-17	6-11-16-28 (16)		SAND, as above, with fewer silt stringers
8	17.5-19.5	6-10-17-20 (14)	20	SAND, as above
9	20-22	5-12-18-17 (16)		SAND, as above w/ some wet clay in tip
S	22-24	**SHELBY**		**Shelby Tube Pushed**
			25	
10	25-27	3-4-5-9 (18)		SAND, crs, little clay, light red, wet (sample not retained)
11	27.5-29.5	3-4-7-9 (12)	30	CLAY, and SAND, crs, red and gray, wet
12	30-32	7-13-14-20 (6)		CLAY, some fn sand, wet to moist, bottom 5" is pure clay
13	32.5-34.5	5-9-13-22 (14)	35	CLAY, red, moist
14	35-37	6-10-15-22 (16)		CLAY, as above
			40	

BORING NUMBER: B-25 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
15	40-42	15-26-44-60 (24)	40	CLAY, red, v slightly moist
16	45-47	11-21-50/5 (12)	45	CLAY, as above
17	50-52	15-25-50/6 (15)	50	CLAY, as above, slightly moist
18	55-57	7-14-23-29 (24)	55	CLAY, as above
19	60-62	7-11-20-29 (22)	60	CLAY, as above
20	65-67	14-25-37-40 (24)	65	CLAY, green-brown-gray, v slightly moist (like candle wax)
21	70-72	8-14-40-49 (18)	70	CLAY, as above

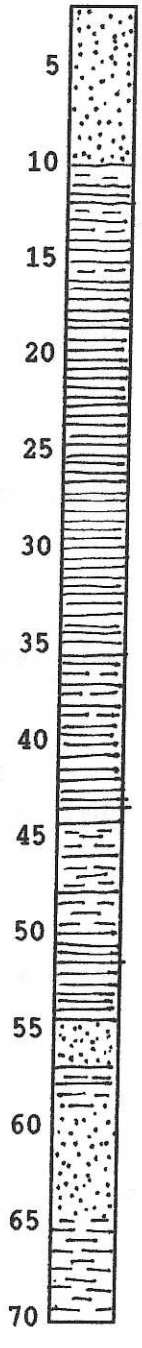
DTW after one hour is at 27.2 feet below grade with bottom of augers at 42 feet.

BORING NUMBER: B-26 (MW-16)

DATE INSTALLED: 4-18-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

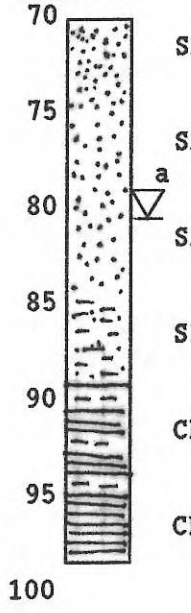
Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	10-7-8-7 (6)	SAND, med to v crs, some gravel and silt, moist
2	5 - 7	3-3-3-4 (16)	SAND, med to vf, tr clay
3	10-12	10-9-11-16 (18)	CLAY, little silt, mottled red and gray, moist
4	15-17	9-13-19-24 (18)	CLAY, as above
5	20-22	8-12-15-20 (15)	CLAY, red, moist
6	25-27	7-11-15-25 (18)	CLAY, red and gray mottled, moist
7	30-32	11-20-32-45 (24)	CLAY, tr silt, gray-green, moist
8	35-37	20-25-45-45 (24)	CLAY, tr to little silt, dk green-brown, v slightly moist, waxy consistency
9	40-42	18-25-35-50/5 (20)	CLAY, mottled brown and gray, moist to slightly moist
10	45-47	17-31-34-50/5 (22)	4" SILT, some (to and) clay 18" SILT, tr clay and vf sand
11	50-52	22-55/6 (12)	CLAY, tr silt, purple and gray, v slightly moist to dry
12	55-57	12-32-49 (18)	10" SAND, med, litl silt, tr cl, yellow, moist 8" SILT and CLAY with 1" mottled moist clay
13	60-62	30-80/6 (9)	SAND, vf, some silt, little clay, moist
14	65-67	30-100/2 (2)	SILT, some clay and vf sand, lt gray, moist

Graphic Log



BORING NUMBER: B-26 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
15	70-72	100/6 (6)		SAND, f to vf, tr silt, moist to wet
16	75-77	100/6 (3)		SAND, med to crs, yellow, moist to wet
17	80-82	52-80/6 (4)		SAND, med, yellow/tan, moist
18	85-87	28-31-55/6 (16)		SILT and SAND, vf, no to some clay, moist to slightly moist
19	90-92	40-50-75/6 (18)		CLAY, tr to little silt and vf sand, moist
20	95-97	12-30-40-50 (24)		CLAY, red and gray, moist



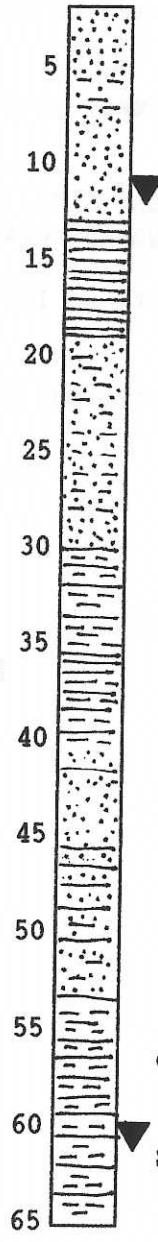
a. Water level measured in monitoring well MW-16.

BORING NUMBER: B-27

DATE INSTALLED: 4-24-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-5-5-12 (20)	SAND, med, tr to little clay, orange, dry
2	5 - 7	13-13-10-10 (20)	SAND, fn to vf and SILT, gray-brown-red, moist to wet
3	10-12	9-11-10-10 (15)	11" SAND, fn to vf, tr silt, tan, wet[a] 4" CLAY, tr to ltl silt, rd-gry mottled, moist
4	15-17	15-17-20-22 (24)	CLAY, tr silt, red, moist layered with SILT, tr clay
5	20-22	5-9-15-22 (24)	SAND, vf and SILT, layered with CLAY, some silt, gray, moist
6	25-27	9-14-21-25 (24)	SAND, vf, and SILT, gray, moist to wet
7	30-32	12-24-40-56 (20)	16" CLAY, some silt, red, moist 4" SILT, some clay, gray w/red-orange, moist
8	35-37	23-33-38-50/5 (16)	12" CLAY, tr silt, red, slightly moist 4" SILT and CLAY, gray, slightly moist
9	40-42	14-19-9-17 (5)	SAND, fn, little clay, yellow-tan, wet
10	45-47	15-16-19-27 (24)	SAND, med, and CLAY varying to CLAY, some sand, gray-orange, moist to wet
11	50-52	32-64-100/3 (16)	14" SAND, vf, some silt and clay, gray, moist 2" CLAY and SILT, gray, moist
12	55-57	36-65/6 (12)	CLAY and SILT, gray, v slightly moist
13	60-62	40-85-50/2 (4)	Silt, some clay, gray, moist to wet

Graphic Log



a. Rods wet at 11 feet.

BORING NUMBER: B-27 continued

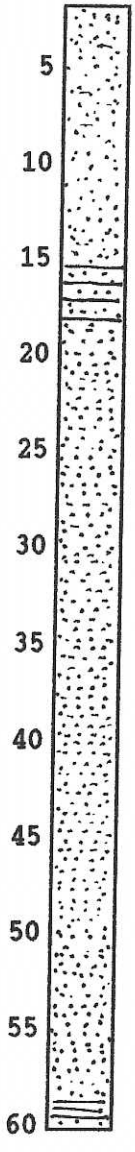
Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
14	65-67	200/5 (4)	65	SAND, med, tr clay, tan and gray, wet
15	70-72	75-100/5 (7)	70	CLAY, tr to little silt, red with gray, v slightly moist
16	75-77	52-75-80/6 (14)	75	CLAY, tr silt, red with gray mottles, slightly moist
			80	

BORING NUMBER: B-28

MONITOR WELL: MW-15

DATE INSTALLED: 4-22-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: LEWIS CRONIN DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
		Cuttings		SAND, med to fn, tr silt and clay, brown, moist
1	5 - 7	10-13-11-15 (12)		SAND, med, tr clay, brown, moist to wet
2	15-17	9-10-20-35 (18)		14" CLAY and SAND, fn to vf 4" SAND, fn, little clay
3	25-27	10-10-9-10 (18)		SAND, fn, some to little clay, yellow-brown, moist to wet
4	35-37	45-41-60/6 (11)		SAND, med to fn, tr clay
5	45-47	43-84-100/5 (12)		SAND, fn, little vf, tr clay, moist
6	55-57	37-37-36-50/5 (18)		12" SAND, med, little to some clay, moist 6" CLAY, little silt and med sand, moist



BORING NUMBER: B-28 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			60	
			65	
7	65-67	83-150/4 (5)		SAND, fn, little vf, tr clay, moist
			70	
			75	
8	75-77	150-150/4 (8)		SAND, fn to vf, tr clay, gray, moist
			a 80	
9	80-82	81-150/4 (7)		SAND, med, some fn, tr clay, red, moist
			85	
10	85-87	50-150/6 (7)		CLAY, tr to little silt, red, v slightly moist
			90	
11	90-92	31-46-51-66 (18)		CLAY, tr silt, red, v slightly moist
			95	

Change from silt to clay probably occurs at 83 feet since the drillers noted a change in the resistance to drilling at this depth.

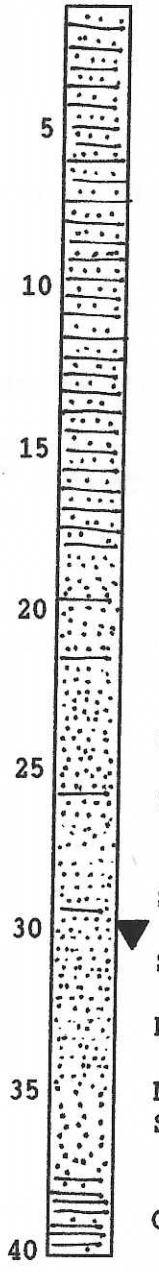
a. Water level measured in monitoring well MW-15.

BORING NUMBER: B-29

DATE INSTALLED: 4-23-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-4-5-5 (10)	SAND, med, some (to and) CLAY, little fine sand, moist
2	2.5-4.5	6-6-7-7 (8)	CLAY and SAND, fn, red-br, dry
3	5 - 7	5-6-7-8 (15)	SAND, fn and CLAY, dry
4	7.5-9.5	5-7-10-10 (16)	CLAY, same (to and) SAND, fn to med, dry moist
5	10-12	3-3-3-3 (14)	SAND, fn and CLAY, red-brown, dry
6	12.5-14.5	3-3-2-2 (13)	SAND and CLAY, as above, slightly moist
7	15-17	2-3-3-3 (16)	SAND and CLAY, as above, brown
8	17.5-19.5	3-3-3-3 (16)	14" SAND and CLAY, as above 2" SAND, vf, little to some clay, moist
9	20-22	2-3-3-4 (18)	SAND, fn, tr to little clay, gray-orange, dry, 1" clay layer near bottom
10	22.5-24.5	2-3-4-5 (15)	SAND, fn to vf, tr clay, lt gray-orange
11	25-27	3-5-10-25 (18)	SAND, fn tr to little clay, gray with orange, moist, 1.5" clay layer near bottom
12	27.5-29.5	15-45-51/5 (16)	SAND, med, tr clay, lt gray with orange, slightly moist
13[a]	30-32	17-44-50/5 (14)	SAND, med to crs, tr to little clay in lenses, gray and red-br, wet[a]
S	32-33.5	Shelby	No recovery
S	34-35	Shelby	No recovery
14	35-37	15-35-33-51/5 (15)	SAND, coarse, tr to little clay, gray, wet
S	38-40	Shelby	CLAY, some sand

Graphic Log



a. Rods wet at ≈31 feet

BORING NUMBER: B-29 continued

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Graphic Log	Description
			40	
			45	
15	45-47	25-33-51/6 (22)		CLAY, tr silt, mottled red-gray, moist
			50	
16	50-52	30-35-40-45 (24)		CLAY, as above

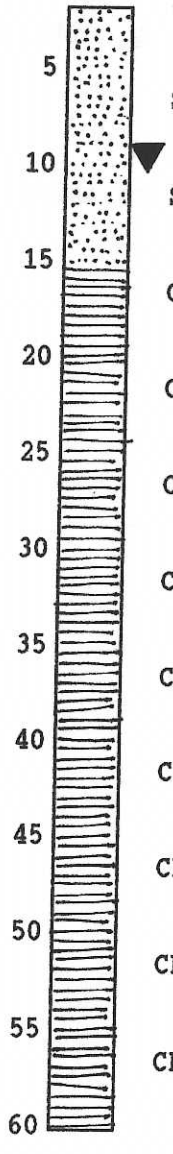
65 EL. 116±

BORING NUMBER: B-30

DATE INSTALLED: 4-25-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	2-3-4-5 (10)	SAND, med, little fn, tr clay, yellow-brown, moist
2	5 - 7	15-23-25-30 (15)	SAND, as above
3	10-12	9-24-32-30 (24)	SAND, med, little fn and little clay, yellow-brown, wet[a]
4	15-17	11-17-23-28 (22)	CLAY, tr silt, red, moist
5	20-22	10-18-22-26 (24)	CLAY, tr silt, gray-purple, moist
6	25-27	9-15-22-30 (24)	CLAY, tr silt, red-gray, moist
7	30-32	15-17-19-25 (24)	CLAY, tr silt, gray w/red, moist
8	35-37	10-14-18-20 (20)	CLAY, tr silt, red w/gray mottles, slightly moist
9	40-42	30-45-70 (18)	CLAY (no silt), gray w/red mottles, slightly moist
10	45-47	50-60-65 (18)	CLAY, brown-red, slightly moist
11	50-52	14-35-45-51/5 (18)	CLAY, brown, slightly moist
12	55-57	8-20-35-45 (20)	CLAY, brown w/red, slight to tr moist

Graphic Log



a. Rods wet at 10 feet.

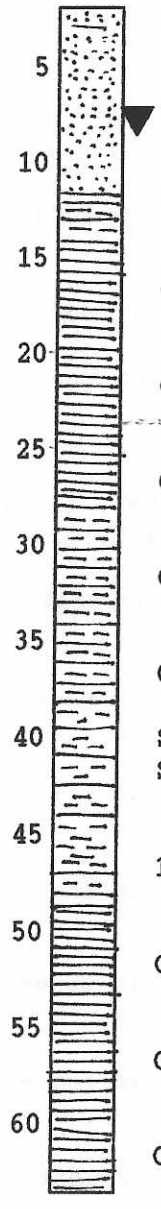
GS EL. 121±

BORING NUMBER: B-31

DATE INSTALLED: 4-29-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-8-8-9 (16)	7" SAND, med and CLAY, brown, dry to slt moist 9" SAND, med to fn, tr clay, tan-red, moist
2	5 - 7	5-7-7-6 (18)	SAND, med, yellow-tan, bottom 6" wet[a]
3	11-13	5-8-10-14 (6)	CLAY, tr to little silt, variegated-gray-yellow, moist
4	15-17	5-9-13-18 (24)	CLAY, tr silt, variegated red-gray, moist to wet
5	20-22	5-10-13-14 (24)	CLAY, tr silt, variegated red-gray, moist
6	25-27	6-10-10-15 (24)	CLAY, tr silt, variegated red-gray, moist
7	30-32	15-15-25-27 (6)	CLAY and SILT, variegated red-gray, moist to wet
8	35-37	11-13-19-22 (6)	CLAY, some (to and) silt, red-brown-gray, moist
9	37-39	10-12-20-27	SILT, some (to and) clay, gray, moist (24" rec)
10	40-42	8-13-23-26 (14)	SILT, some (to and) clay, gray w/green-brown, moist
11	45-47	21-16-26-34 (20)	18" SILT, some clay, green-gray, moist 2" CLAY, some silt, brown, moist
12	50-52	26-41-63-80 (18)	CLAY, tr silt, brown-red, slightly moist
13	55-57	19-28-31-42 (24)	CLAY, tr silt, variegated purple-red-blue-gray, moist
14	60-62	24-34-47-74 (14)	CLAY, tr to little silt, variegated red-purple-gray, moist

Graphic Log



a. Rods wet at 11 feet.

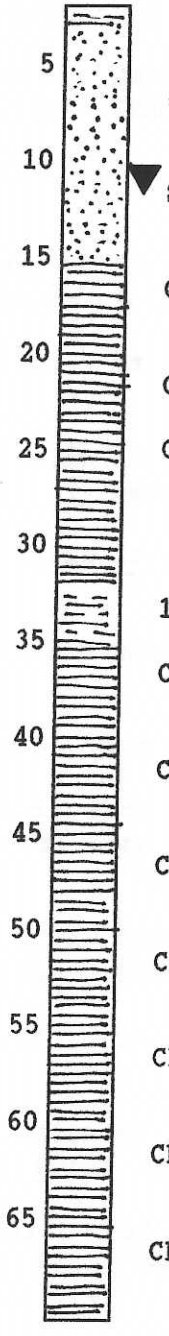
GSEL.128I

BORING NUMBER: B-32

DATE INSTALLED: 5-1-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	7-10-10-8 (18)	10" CLAY, little fn sand, red-brown, moist 8" SAND, med-fn, little clay, brown, sl moist
2	5 - 7	4-3-3-4 (6)	SAND, med, some crs, little clay, brown, moist
3	10-12	2-3-2-3 (16)	SAND, med, little fn, lt brown, moist to wet[a]
4	15-17	7-10-13-16 (13)	CLAY, tr silt, red-br-gray, sl moist
5	20-22	9-13-17-20 (16)	CLAY, tr silt, red and gray, moist
6	24-26	12-14-20-23 (14)	CLAY, tr silt, gray w red-purple mottles, moist
7	30-32	12-14-15-14 (18)	6" CLAY, tr silt, mottled gray-red, moist 12" SILT, little to some clay, gray, moist
8	35-37	7-10-13-16 (16)	CLAY, tr silt, mottled red-purple-gray, moist
9	40-42	13-20-43-51 (12)	CLAY, tr silt, red-gray, moist
10	45-47	14-13-21-25 (18)	CLAY (no silt), gray-red, moist
11	50-52	21-30-35-50 (16)	CLAY, as above
12	55-57	29-40-51-72 (18)	CLAY, as above
13	60-62	21-34-52-60 (22)	CLAY, as above
14	65-67	23-29-33-40 (24)	CLAY, as above

Graphic Log



a. Rods wet at 11.8 feet.

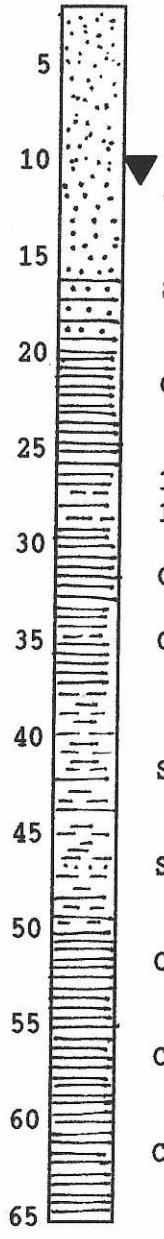
GSEL.1151

BORING NUMBER: B-33

DATE INSTALLED: 5-2-91
PROJECT: CHESAPEAKE RUBBLE FILL
SAMPLE METHOD: SPLIT SPOON DRILLING METHOD: HOLLOW STEM AUGER AND MUD
LOGGED BY: MARK SCHULTZ DRILLER: HARDIN-HUBER, INC

Sample No.	Depth (ft)	Blows per 6 inches (recovery in inches)	Description
1	0 - 2	3-3-4-5 (10)	SAND, med, some (to and) clay, little fn sand, moist, brown
2	5 - 7	52-70/1 (16)	SAND, med, yellow, moist
3	10-12	25-36-44-50 (18)	SAND, crs, little med, tr clay, yellow, wet
4	15-17	13-21-15-12 (17)	SAND, med-crs layered with CLAY in 3-4" layers, yellow-red-brown; sand wet, clay moist
5	20-22	13-16-21-28 (15)	CLAY, tr silt, gray-purple, sl moist
6	25-27	15-27-30-50 (20)	10" CLAY, some silt, red-gray, moist 10" CLAY, some silt, tr sand, red-gray, sl mst
7	30-32	10-15-22-30 (12)	CLAY, tr silt, gray, v slightly moist wet
8	34.5-36.5	8-15-28-40 (20)	CLAY, little silt, red-br-gray grading into SILT, tr clay, v slt moist
9	40-42	13-24-23-46 (12)	SILT, little to some clay, with increasing clay at bottom, gray, moist
10	45-47	23-19-18-24 (24)	SILT, some vf sand grading into SILT and CLAY, gray, moist
11	50-52	24-40-50/5 (12)	CLAY, tr silt, brown w gray mottles, sl moist
12	55-57	25-30-30-40 (24)	CLAY (no silt), red-brown, slightly moist
13	60-62	20-33-32-51 (24)	CLAY (no silt), red w gray, slightly moist

Graphic Log



MW-17

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	118. Feet
Date Drilled	4-8-03	Total Depth of Borehole	15 Feet
Borehole Diameter	8 Inches	Depth to Water	1.14 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, med-crs, tr fines, yellow-brn, wet	5		17	6-7-9-4	
	Clay, maroon and gray mottled, plastic, moist to wet	10		16	5-8-9-15	
		15		18	7-8-8-8	
		20				
		25				
		30				
		35				
		40				
		45				

Notes:

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Mark Schultz Associates

MW-18

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	126 Feet
Date Drilled	4-8-03	Total Depth of Borehole	23 Feet
Borehole Diameter	8 Inches	Depth to Water	11.24 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, med-crs, tr fines, yellow-brn-tan, moist to wet	5		14	3-5-4-5	
		10		15	4-5-8-10	
		15		17	3-4-5-7	
		20		18	3-5-7-9	
	Clay, tr silt, maroon and gray mottled, plastic, moist to wet	25		16	6-8-10-30	
		30				
		35				
		40				
		45				

Notes:

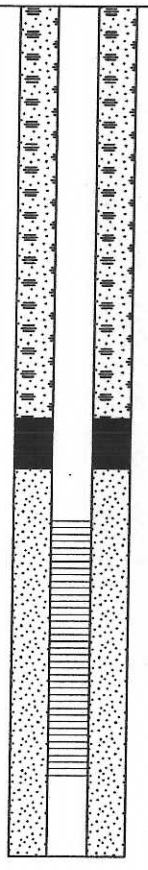
C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-19

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	
Date Drilled	4-10-03	Total Depth of Borehole	35 Feet
Borehole Diameter	8 Inches	Depth to Water	21.56 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Clay, maroon, moist	5		16	6-9-12-17	
		10		17	6-9-11-15	
	Sand, fn. lt tan, slt moist	15		12	15-27-20-21	
		20		16	15-25-31-37	
	Sand, med-crs, tr silt and clay, yellow-brn, wet	25		6	15-23-27-35	
		30		18	21-20-27-50/6	
	Clay, tr sand and silt, gray with maroon partings, moist	35		16	5-25-28-34	
		40				
		45				



Notes:

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-20

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	149 Feet
Date Drilled	4-10-03	Total Depth of Borehole	60 Feet
Borehole Diameter	8 Inches	Depth to Water	44.5 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, med, yellow-tan, moist	5		10	8-6-7-8	
	Silt and vf sand, some clay, slt plastic, v. moist to wet	10		14	8-7-10-9	
	Clay, silt & vf sand, red-pink variegated, v. mst to wet	15		14	5-4-6-7	
	Sand, fn, some silt & clay, pink, wet	20		16	4-4-5-6	
		25		12	28-30-50/5	
	Sand, fn-vf, white-tan, slt moist	30		15	22-29-39-45	
		35		12	19-30-48-50/5	
		40		14	26-36-50/6	
	Sand, fn-med-crs, coarsening with depth, tan, moist to wet	45		14	18-37-50/5	
				17	19-29-33-46	

Notes:

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-20

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	149 Feet
Date Drilled	4-10-03	Total Depth of Borehole	60 Feet
Borehole Diameter	8 Inches	Depth to Water	44.5 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
				12	12-19-32	
	Clay, tr silt, plastic, maroon and gray, moist	55				
				15	16-28-34-42	
		60				
		65				
		70				
		75				
		80				
		85				
		90				
		95				

Notes:

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-21

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	
Date Drilled	4-14-03	Total Depth of Borehole	70.0 Feet
Borehole Diameter	6 Inches	Depth to Water	55.77 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Silt, some clay, yell-brn, v. moist to wet	5		14	1-1-2-3	
	Sand, vf & silt, some clay, tan-red-brn, moist	10		16	9-14-18-18	
	Interlayered sand, f-vf & clay, yellow-brn, wet	15		14	5-7-5-6	
	Silt & vf sand, tan-brn, moist	20		18	8-14-22-34	
	Silt & clay, maroon and lt gray, slt moist	25		16	10-19-37-50/5.5	
	Sand, f-vf, some silt, tan-yellow-brown, moist, wet at 45 ft	30		16	14-24-39-50/5	
		35		14	16-21-19-22	
		40		14	19-37-50/5	
		45		6	50/6	
	Sand, fn-crs, coarsening w/depth, tr silt, red-yel-brn			8	40-50/45	

Notes: Drilling fluid was not removed from the casing after the well was installed. Th mud penetrated the formation, reducing the yield of the well. Water level data from this well are accurate.

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-21

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	
Date Drilled	4-14-03	Total Depth of Borehole	70.0 Feet
Borehole Diameter	6 Inches	Depth to Water	55.77 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
		55		8	26-50/4	
		60		10	28-50/3	
	Clay and clayey silt, maroon and gray, moist	65		16	14-24-50/4	
		70		17	23-36-37-45	
		75				
		80				
		85				
		90				
		95				

Notes: Drilling fluid was not removed from the casing after the well was installed. Th mud penetrated the formation, reducing the yield of the well. Water level data from this well are accurate.

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

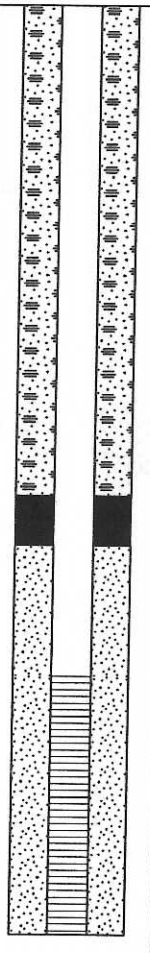
MW-22

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	127 Feet
Date Drilled	4-10-03	Total Depth of Borehole	40 Feet
Borehole Diameter	8 Inches	Depth to Water	26.49 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts
	Sand and gravel, some silt & clay, red-brown, moist med, yellow-tan, moist	5		14	4-6-5-6
		10		10	2-2-2-3
		15		14	2-2-1-2
		20		16	1-1-2-2
	Sand, med to crs, tan, moist to wet	25		15	1-2-10-13
		30		16	15-14-10-7
	Clay, maroon and gray, moist	35		16	10-14-17-21
		40		16	14-20-23-28
		45			

Completion



Notes:

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-23

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	124 Feet
Date Drilled	4-16-03	Total Depth of Borehole	70 Feet
Borehole Diameter	6 Inches	Depth to Water	18(a) Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, fn to vf and silt, tan-yellow-brn, moist to wet	5		16	14-20-23-38	
		10		16	5-10-27-38	
	Sand, fn to med, tr silt & clay, tan, wet	15		12	18-27-35-50/5.5	
		20		14	7-12-14-21	
		25		16	10-23-27-34	
	Sand, crs, tan-brn, wet	30		18	16-16-18-27	
	Clay, some silt and vf sand, maroon & gray, moist	35		16	12-14-22-28	
		40		17	14-27-45-50/3	
		45		18	19-27-31-46	
		50		18	12-18-28-42	
		55		18	10-14-18-26	
		60		18	14-17-21-32	
		65		17	19-25-50-50/5.5	
		70		16	25-32-49-50/3	
		75				

Notes: a. Depth to water is in sand unit above the clay.
This well is in a cluster with shallow sand-unit M

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

Mark Schultz Associates

MW-24

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow stem auger
Geologist	Mark Schultz	Ground Elevation	125 Feet
Date Drilled	4-17-03	Total Depth of Borehole	32.0 Feet
Borehole Diameter	8 Inches	Depth to Water	18.0 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, fn to vf and silt, tan-yellow-brn, moist to wet	5		16	14-20-23-38	
		10		16	5-10-27-38	
	Sand, fn to med, tr silt & clay, tan, wet	15		12	18-27-35-50/5.5	
		20		14	7-12-14-21	
		25		16	10-23-27-34	
	Sand, crs, tan-brn, wet	30		18	16-16-18-27	
	Clay, some silt and vf sand, maroon & gray, moist	35		16	12-14-22-28	
		40				
		45				

Notes: This well is in a cluster with deep clay-unit well MW-23.

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

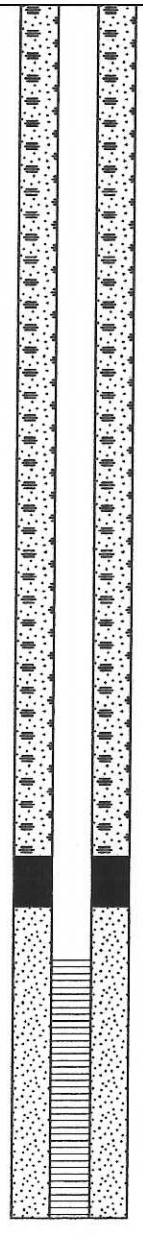
MW-25

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow stem
Geologist	Mark Schultz	Ground Elevation	114 Feet
Date Drilled	4-21-03	Total Depth of Borehole	55 Feet
Borehole Diameter	8 Inches	Depth to Water	36.27 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts
	Sand, fn-med & silt & clay, sticky, brown, wet	5		14	1-1-1-1
		10		15	1-2-2-2
		15		14	3-10-10-11
	Sand, med-crs, tan-brn, wet	20		14	19-24-37-40
	Silt, some to & clay, gray-white, plastic, v. moist	25		16	8-11-17-33
	Silt, some clay, gray-white, v moist, not plastic	30		17	12-22-31-50/5.5
	Sand, vf & silt, gray-tan-white, moist	35		16	9-13-26-50/3
	Interlayered silty vf sand, clay and med sand, tan-gray-white, wet	40		16	7-12-21-25
	Sand, fn-med, tr silt and clay, wet	45		14	13-14-33-50/3
	Clay & silt in thin layers, lt gray and maroon, moist			16	15-37-50/5.5

Completion



Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

Mark Schultz Associates

MW-25

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow stem
Geologist	Mark Schultz	Ground Elevation	114. Feet
Date Drilled	4-21-03	Total Depth of Borehole	55 Feet
Borehole Diameter	8 Inches	Depth to Water	36.27 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Clay, dk gray, moist	55		16	19-33-50/5	
		60				
		65				
		70				
		75				
		80				
		85				
		90				
		95				

Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

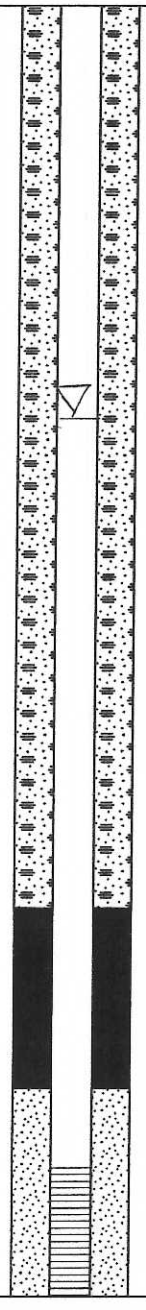
MW-26

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	110. Feet
Date Drilled	4-21-03	Total Depth of Borehole	55 Feet
Borehole Diameter	6 Inches	Depth to Water	1.16(a) Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts
	Sand, fn-med, tr to some silt & clay, yellow-red-brn, wet	5		14	12-20-15-20
	Clay, tr silt & clay, maroon and gray, moist	10		17	3-8-13-19
		15		16	3-9-14-22
	Clay & vf sand & silt, maroon and gray, slt moist	20		17	6-10-14-16
		25		18	7-14-21-23
		30		18	9-13-14-22
	Silt & clay, gray-green, plastic, slt moist	35		18	16-23-25-41
		40		16	15-21-26-30
	Clay, some silt, brn-grn-gray, slt moist	45		17	16-21-32-35
				16	11-16-19-24

Completion



Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

Mark Schultz Associates

MW-26

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	110 Feet
Date Drilled	4-21-03	Total Depth of Borehole	55 Feet
Borehole Diameter	6 Inches	Depth to Water	1.16(a) Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
		55		18	6-11-18-21	
		60				
		65				
		70				
		75				
		80				
		85				
		90				
		95				

Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-27

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow stem
Geologist	Mark Schultz	Ground Elevation	110 Feet
Date Drilled	4-21-03	Total Depth of Borehole	8 Feet
Borehole Diameter	8 Inches	Depth to Water	1.16 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, fn-med, tr to some silt & clay, yellow-red-brn, wet	5		14	12-20-15-20	
	Clay, tr silt & clay, maroon and gray, moist	10		17	3-8-13-19	
		15		16	3-9-14-22	
		20				
		25				
		30				
		35				
		40				
		45				

Notes: This well is in a cluster with deep clay-unit well MW-26.

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-28

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud Rotary
Geologist	Mark Schultz	Ground Elevation	103 Feet
Date Drilled	4-22-03	Total Depth of Borehole	70 Feet
Borehole Diameter	6 Inches	Depth to Water	39.15 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Clay, trace to some silt and sand, plastic, maroon and gray, moist			4	9-17-14-16	
				18	9-8-10-15	
		5		12	9-12-22-28	
				14	4-16-24-21	
		10		6	9-12-15-20	
		15		11	5-11-12-14	
		20		24	17-22-30-40	
		25		24	13-19-35-35	
		30		20	17-25-33-37	
		35		24	15-23-43-40	
		40		24	16-18-25-30	
		45		17	20-32-50/3	
				24	15-22-28-32	

Notes: Intalled in area in which clay is exposed at the surface.

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-28

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud Rotary
Geologist	Mark Schultz	Ground Elevation	103 Feet
Date Drilled	4-22-03	Total Depth of Borehole	70 Feet
Borehole Diameter	6 Inches	Depth to Water	39.15 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
		55		13	15-28-50/4	
	Clay and silt, maroon and gray, moist	60		24	9-20-26-30	
	Silt, some v fn sand, trace clay, white-gray, wet	65		24	27-22-27-50/4	
	Silt, some clay, white-gray, mod plastic, wet	70		16	20-30-50/<1	
		75				
		80				
		85				
		90				
		95				

Notes: Intalled in area in which clay is exposed at the surface.

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

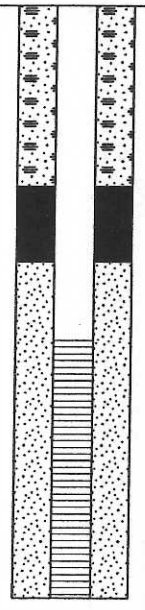
MW-29

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Hollow Stem
Geologist	Mark Schultz	Ground Elevation	100 ±
Date Drilled	4-24-03	Total Depth of Borehole	35 Feet
Borehole Diameter	8 Inches	Depth to Water	3.61 Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts
	Sand, med-crs, tr to some silt and clay, yellow-brn, wet	5		18	6-5-5-3
	Clay and silt, gray, plastic, moist	10		12	5-5-6-7
	Sand, v. fn and silt, dk gray, wet	15		22	5-9-9-7
	Silt, tr clay, dk gray, wet	20		24	5-5-7-5
	Silt and clay, mod plastic, dk gray, moist	25		24	5-5-7-8
	Clay, dk gray, plastic, moist	30		24	4-6-11-13
	Clay and silt in seams, dk gray, wet	35		18	8-11-20-22
		40			
		45			

Completion



Notes:

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Mark Schultz Associates

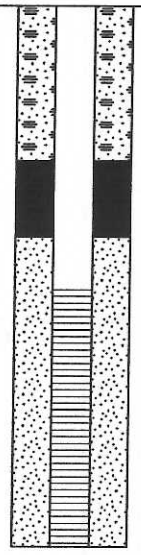
MW-30

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	115 Feet
Date Drilled	4-21-03	Total Depth of Borehole	60 Feet
Borehole Diameter	6 Inches	Depth to Water	9.47(a) Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts
	Sand, vf-m, lt tan-brn, moist	5		11	2-1-3-2
		10		12	1-1-1-2
	Sand, crs, zero to little clay, tan-brown, wet	15		16	14-17-22-18
		20		15	12-15-16-20
	Silt, tr to little clay, slt plastic, gray, moist	25		16	12-19-28-31
		30		16	19-22-26-37
	Silt, some clay, plastic, gray, slt moist	35		17	6-8-14-21
		40		18	5-6-10-15
	Clay & silt, plastic when moistened, gray-brn, slt moist	45		18	5-6-10-15
				18	7-14-24-30

Completion



Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

Mark Schultz Associates

MW-31

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	
Date Drilled	4-21-03	Total Depth of Borehole	60 Feet
Borehole Diameter	6 Inches	Depth to Water	9.47(a) Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
	Sand, vf-m, lt tan-brn, moist	5		11	2-1-3-2	
		10		12	1-1-1-2	
	Sand, crs, zero to little clay, tan-brown, wet	15		16	14-17-22-18	
		20		15	12-15-16-20	
	Silt, tr to little clay, slt plastic, gray, moist	25		16	12-19-28-31	
		30		16	19-22-26-37	
	Silt, some clay, plastic, gray, slt moist	35		17	6-8-14-21	
		40		18	5-6-10-15	
	Clay & silt, plastic when moistened, gray-brn, slt moist	45		18	5-6-10-15	
				18	7-14-24-30	

Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

C:\Program Files\Porpoise Media\Well Logger 2.7\Chesapeake Terrace\April 2003 Drilling Program.wl2

MW-31

Chesapeake Terrace

Client	National Waste Managers	Drill Rig	Mud rotary
Geologist	Mark Schultz	Ground Elevation	
Date Drilled	4-21-03	Total Depth of Borehole	60 Feet
Borehole Diameter	6 Inches	Depth to Water	9.47(a) Feet

Graphic Log	Description	Depth	Sample	Recovery (in)	Blow Counts	Completion
		55		18	7-8-21-25	
		60		18	7-11-24-34	
		65				
		70				
		75				
		80				
		85				
		90				
		95				

Notes: a. Depth to water is in sand unit above clay.
This well is in a cluster with shallow sand-unit well

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX F

SFI Borings and Well Logs

RECORD OF BOREHOLE B-101

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/18/13
DATE COMPLETED: 4/19/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,626.8 E: 1,387,224.4
GS ELEVATION: 97.8 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0		0.0 - 2.0 GRAVELLY SAND; fine to medium; ~15% fine to coarse rounded gravel; yellowish brown; trace organics (plant roots); noncohesive; moist; loose.	SP		95.8	S1	DO	3 -3 -3 -3	6	1.0/2.0	
	95	3.0 - 5.0 GRAVELLY SAND; medium to coarse, well graded; ~20% fine to coarse subrounded gravel; yellowish brown; moist; loose.	SW		92.8	S2	DO	3 -4 -4 -2	8	0.6/2.0	
5											
	90	8.0 - 10.0 GRAVELLY SAND; medium to coarse, well graded, subrounded; ~50% fine to coarse rounded gravel; brownish grey, some organics (plant matter); noncohesive; wet; compact.	SW		87.8	S3	DO	2 -6 -8 -10	14	0.6/2.0	
10											
	85	13.0 - 15.0 GRAVELLY SAND; medium to coarse, poorly graded, subrounded; ~30% fine to coarse subrounded gravel; brown, noncohesive; wet; loose.	SP		82.8	S4	DO	4 -4 -4 -5	8	0.6/2.0	
15											
	80	18.0 - 20.0 CLAY; medium to high plasticity; lenses of fine grey sand, some nonplastic fines; dark grey; cohesive; w~PL; stiff.	CH		77.8	S5	DO	5 -5 -7 -9	12	1.4/2.0	
20											
	75	23.0 - 25.0 SILTY CLAY; medium to high plasticity; lenses of grey fine silty sand; grey; trace organics; cohesive; w~PL; stiff.	CL		72.8	S6	DO	5 -7 -9 -8	16	1.6/2.0	
25											
	70	28.0 - 30.0 CLAY; high plasticity; trace of fine grey sand; grey; trace organics (plant); cohesive; w>PL; soft; 28-28.7 ft very soft.	CH		67.8	S7	DO	3 -3 -4 -5	7	1.9/2.0	
30											
	65	33.0 - 35.0 CLAY; high plasticity; some nonplastic fines, pockets of fine grey sand; grey, shiny; trace organics; cohesive; w>PL; stiff.	CH		62.8	S8	DO	4 -7 -11 -14	18	1.6/2.0	
35											
	60	38.0 - 40.0 SILTY CLAY; medium plasticity; lenses of fine grey sand; grey, slightly shiny; cohesive; w~PL; stiff.	CL		57.8	S9	DO	9 -18 -50/5"	N/A	1.4/2.0	Drilled w/o sampling. (39.4'-40')
40											
	55	43.0 - 45.0 CLAY; medium to high plasticity; trace nonplastic fines, pockets of fine grey sand; light grey mottled yellow, shiny; cohesive; w<PL; stiff.	CH		52.8	S10	DO	11 -16 -18 -30	34	1.7/2.0	
45											
	50	48.0 - 50.0 NO RECOVERY			47.8	S11	DO	12 -16 -23 -28	39	0.0/2.0	
50											

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-101

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/18/13
DATE COMPLETED: 4/19/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,626.8 E: 1,387,224.4
GS ELEVATION: 97.8 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
	45	53.0 - 55.0 SILTY CLAY; medium plasticity; dark red mottled light grey, slightly shiny; cohesive; w~PL; stiff.	CL		42.8	S12	DO	13 -18 -26 -30	44	1.2/2.0	
55	40	58.0 - 60.0 CLAYEY SILT; low to medium plasticity; pockets of fine sand; light grey mottled dark grey and yellowish brown; cohesive; w<PL; stiff. 58.0-58.3 ft: (CH) CLAY; dark red mottled light grey; very soft.	ML		37.8	S13	DO	18 -18 -35 -40	53	0.9/2.0	
60	35	63.0 - 65.0 CLAYEY SAND; fine, poorly graded (uniform), subrounded; pockets of grey clay; light grey; cohesive; moist; dense; 63-63.2 ft: (CH) CLAY; red; soft.	SC		32.8	S14	DO	23 -23 -23 -44	46	1.9/2.0	
65	30	68.0 - 70.0 CLAY; medium to high plasticity; some non-plastic fines, lenses of fine grey sand; dark red, shiny; cohesive; w~PL; stiff.	CH		27.8	S15	DO	16 -23 -43 -35	66	0.9/2.0	
70	25	73.0 - 75.0 SILTY CLAY and SAND; nonplastic to low plasticity; ~40% fine sand, lenses of fine sand; dark red; cohesive; stiff.	CL/SW		22.8	S16	DO	N/A		1.8/2.0	
75	20	78.0 - 80.0 CLAY and SAND; low plasticity; ~50% fine grey sand, lenses of fine silty sand; rust red mottled light grey; cohesive; stiff.	SC		17.8	S17	DO	30 -50/4"	N/A	0.8/2.0	Drilled w/o sampling. (78.8'-80')
80	15	83.0 - 85.0 CLAY and SAND; low plasticity; ~50% fine grey sand, pockets of light grey and dark red clay; rust red mottled light grey; cohesive; stiff.	CH		12.8	S18	DO	50/5"	N/A	0.5/2.0	Drilled w/o sampling. (83.4'-85')
85	10	88.0 - 90.0 SILTY SAND; fine to medium; brownish grey; noncohesive; moist; very dense. ~88-88.1 ft: dark red silty clay; very soft.	SM		7.8	S19	DO	50/3"	N/A	0.3/2.0	Drilled w/o sampling. (88.3'-90')
90	5	93.0 - 95.0 SAND; fine to medium; yellowish brown; lens of very soft dark red clay; noncohesive; moist; very dense.	SP		2.8	S20	DO	50/3"	N/A	0.3/2.0	Drilled w/o sampling. (93.3'-95')
95	0	98.0 - 100.0 SAND; fine to medium, poorly graded, subrounded; trace nonplastic fines; greyish brown; noncohesive; moist; very dense.	SP		-2.2	S21	DO	50/3"	N/A	0.3/2.0	Drilled w/o sampling. (98.3'-100')
100		Boring completed at 100.0 ft									

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-102

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/6/13
DATE COMPLETED: 5/6/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,516.4 E: 1,386,869.9
GS ELEVATION: 113.2 ft
TOC ELEVATION: NA
TEMPERATURE: 45 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0											
5	110	3.0 - 5.0 GRAVELLY SAND; fine to medium, well-graded, subrounded; some nonplastic fines, ~15% fine subangular gravel; brown; noncohesive; moist; loose.	SW		108.2	S1	DO	3 -5 -5 -4	10	0.6 / 2.0	
10	105	8.0 - 10.0 GRAVELLY SAND; fine to medium, well-graded, subrounded; some plastic fines, ~15% fine subrounded gravel; brown; some organics (plant matter); noncohesive; moist; loose.	SW		103.2	S2	DO	3 -4 -2 -3	6	0.4 / 2.0	
15	100	13.0 - 15.0 SAND; fine to medium; well-graded, subrounded; some fine subrounded gravel; brown; lens of firm dark red clay; ~50% organics (wood fragments); noncohesive; moist; loose.	SW		98.2	S3	DO	3 -4 -3 -1	7	0.5 / 2.0	
20	95	18.0 - 20.0 CLAY; high plasticity; trace nonplastic fines; dark red and white mottled maroon, shiny; thinly laminated; some yellow staining; cohesive; w~PL; firm.	CH		93.2	S4	DO	3 -5 -10 -14	15	0.7 / 2.0	
25	90	23.0 - 25.0 CLAY; high plasticity; some nonplastic fines, trace fine to coarse subangular gravel; dark red and white mottled maroon, shiny; thinly laminated; some yellow staining; cohesive; w~PL; stiff.	CH		88.2	S5	DO	7 -16 -28 -32	44	1.3 / 2.0	
30	85	28.0 - 30.0 CLAY; high plasticity; trace nonplastic fines; light grey mottled maroon, shiny; thinly laminated; some yellow-brown staining; cohesive; w>PL; stiff.	CH		83.2	S6	DO	7 -10 -15 -18	25	1.6 / 2.0	
35	80										
40	75	38.0 - 40.0 SILTY CLAY; low to medium plasticity; trace fine sand; dark brownish red mottled light grey, slight to shiny; cohesive, w<PL, stiff.	CL		73.2	S7	DO	15 -20 -33 -34	53	1.5 / 2.0	
45	70										
50	65	48.0 - 50.0 SILTY CLAY; low to medium plasticity; trace fine sand; dark brownish red mottled light grey, slight to shiny; cohesive, w<PL, stiff; 48.5-48.7 ft: soft clay.	CL		63.2	S8	DO	18 -28 -47 -32	75	0.7 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-102

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/6/13
DATE COMPLETED: 5/6/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,516.4 E: 1,386,869.9
GS ELEVATION: 113.2 ft
TOC ELEVATION: NA
TEMPERATURE: 45 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	60										
60	55	58.0 - 60.0 CLAY; medium to high plasticity; trace nonplastic fines, seams of fine sand; light grey and dark red mottled maroon, shiny; thinly laminated; cohesive; w~PL; stiff.	CH		53.2	S9	DO	15 -28 -30 -24	58	1.8 / 2.0	
65	50										
70	45	68.0 - 70.0 SILTY CLAY; low to medium plasticity; trace nonplastic fines, seams of fine sand; light grey and dark red mottled maroon, slightly shiny; thinly laminated; some yellow-brown staining; cohesive; w~PL; stiff.	CL		43.2	S10	DO	15 -26 -34 -39	60	1.9 / 2.0	Resumed standard 5 ft. sampling intervals.
75	40	73.0 - 75.0 CLAYEY SILT; low plasticity; some fine sand, pockets of fine sand, lens of very soft dark red clay; dark red mottled yellow-brown and light grey, dull; cohesive; w~PL; stiff.	ML		38.2	S11	DO	19 -35 -50/5"	N/A	1.5 / 2.0	Drilled w/o sampling. (74.4'-75')
80	35	78.0 - 80.0 CLAYEY SILT; low to medium plasticity; some fine sand, pockets of fine sand; grey mottled dark red and yellow-brown, slightly shiny; cohesive; w<PL; stiff.	MH		33.2	S12	DO	21 -32 -40 -42	72	2.0 / 2.0	
85	30	83.0 - 85.0 CLAYEY SILT; low plasticity; some fine sand, pockets of fine sand; grey, dull to slightly shiny; cohesive; w<PL; stiff.	ML		28.2	S13	DO	10 -29 -40 -50	69	1.9 / 2.0	
90	25	88.0 - 90.0 CLAYEY SILT; medium plasticity; some fine sand, seams of fine sand; dark grey, slightly shiny; cohesive; w<PL; stiff.	MH		23.2	S14	DO	30 -30 -43 -44	73	2.0 / 2.0	
95	20	93.0 - 95.0 CLAYEY SILT; low to medium plasticity; some fine sand, lenses of fine sand; grey mottled dark red, dull; cohesive; w<PL; stiff. 94.6-94.9 ft: very soft clay.	ML		18.2	S15	DO	27 -27 -35 -50	62	1.9 / 2.0	
100	15	98.0 - 100.0 CLAYEY SAND; fine, poorly graded, subrounded; lenses of firm clay; light grey mottled dark red; noncohesive; moist to wet; very dense.	SC		13.2	S16	DO	23 -30 -50/5"	N/A	1.6 / 2.0	Drilled w/o sampling. (99.4'-100')
		Boring completed at 100.0 ft									

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-103

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 120.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 4/24/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,415.4 E: 1,386,432.0
GS ELEVATION: 127.9 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0		0.0 - 2.0 GRAVELLY SAND; fine to medium, well graded, subrounded, some plastic fines; ~30% coarse, subrounded gravel, lens of clayey sand; orangeish brown; trace of organics; noncohesive; moist; compact.	SW		125.9	S1	DO	6 -9 -8 -8	17	1.0/2.0	
	125	3.0 - 5.0 NO RECOVERY			122.9	S2	DO	4 -3 -3 -3	6	0.0/2.0	
5											
	120	8.0 - 10.0 SAND; fine, poorly graded, subrounded; trace fine gravel, lens of medium sand, very thin bed of soft dark red and grey clay; tan to orangeish brown; thinly laminated; noncohesive; moist; compact.	SP		117.9	S3	DO	3 -4 -9 -7	13	1.4/2.0	
10											
	115	13.0 - 15.0 SILTY CLAY; low to medium plasticity; lens of fine to med sand and coarse gravel, lens of soft dark red and grey clay; rust red mottled white, slightly shiny; trace organics; cohesive; w<PL; stiff.	CL		112.9	S4	DO	3 -10 -16 -21	26	1.3/2.0	
15											
	110	18.0 - 20.0 SILTY CLAY; low to medium plasticity; lens of fine sand; light grey mottled red; thinly laminated; cohesive; w<PL; stiff.	CL		107.9	S5	DO	10 -16 -17 -21	33	1.2/2.0	
20											
	105	23.0 - 25.0 CLAY; high plasticity; some nonplastic fines; light grey mottled maroon, shiny; thinly laminated; cohesive; w<PL; stiff.	CH		102.9	S6	DO	10 -13 -16 -29	29	0.5/2.0	
25											
	100	28.0 - 30.0 NO RECOVERY			97.9	S7	DO	5 -12 -18 -22	30	0.0/2.0	
30											
	95	33.0 - 35.0 CLAY; high plasticity; some nonplastic fines; dark red mottled light grey, shiny; thinly laminated; cohesive; w<PL; stiff.	CH		92.9	S8	DO	10 -10 -12 -12	22	1.2/2.0	
35											
	90	38.0 - 40.0 CLAY; high plasticity; some nonplastic fines, trace fine sand; light grey and dark red, shiny; thinly laminated; cohesive; w~PL; stiff.	CH		87.9	S9	DO	5 -9 -11 -15	20	1.8/2.0	
40											
	85	43.0 - 45.0 SILTY CLAY; low to medium plasticity; trace fine sand; light grey mottled dark red; thinly laminated; cohesive; w~PL; stiff.	CL		82.9	S10	DO	9 -11 -18 -25	29	0.7/2.0	
45											
	80	48.0 - 50.0 CLAY; medium to high plasticity; some nonplastic fines, trace fine sand; light to dark grey mottled maroon, shiny; cohesive; w~PL; stiff.	CH		77.9	S11	DO	14 -18 -20 -26	38	1.5/2.0	
50											

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-103

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 120.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 4/24/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,415.4 E: 1,386,432.0
GS ELEVATION: 127.9 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	75	53.0 - 55.0 CLAY; medium to high plasticity; some nonplastic fines, trace fine sand; light to dark grey mottled maroon, shiny; cohesive; w~PL; stiff.	CH		72.9	S12	DO	15 -21 -18 -22	39	1.3/2.0	
60	70	58.0 - 60.0 CLAY; high plasticity; some nonplastic fines; dark gray to mottled reddish brown, shiny; cohesive; w~PL; very stiff.	CH		67.9	S13	DO	18 -20 -30 -43	50	1.2/2.0	
65	65	63.0 - 65.0 CLAY; high plasticity; some nonplastic fines; dark gray to mottled reddish brown, shiny; cohesive; w~PL; very stiff.	CH		62.9	S14	DO	14 -26 -37 -48	63	2.0/2.0	
70	60	68.0 - 70.0 CLAY; high plasticity; mottled light grey and dark red, shiny; cohesive; w~PL; very stiff. 69.5-69.7 ft: very soft.	CH		57.9	S15	DO	10 -18 -22 -30	40	1.7/2.0	
75	55	73.0 - 75.0 CLAY; high plasticity; light grey mottled dark red, shiny; thinly laminated; cohesive; w~PL; very stiff.	CH		52.9	S16	DO	14 -15 -22 -26	37	1.9/2.0	
80	50	78.0 - 80.0 CLAYEY SILT; low to medium plasticity; some fine sand, lenses of clay, pockets of fine sand; light grey mottled dark red, dull; slightly fissured, thinly laminated; cohesive; w>PL; stiff.	ML		47.9	S17	DO	18 -22 -30 -50	52	1.8/2.0	
85	45	83.0 - 85.0 CLAYEY SILT and SAND; low plasticity; ~40% fine sand, lens of soft clay; light grey mottled dark red, dull; cohesive; w~PL; firm.	ML		42.9	S18	DO	14 -15 -17 -25	32	2.0/2.0	
90	40	88.0 - 90.0 CLAYEY SILT and SAND; low plasticity; ~50% fine sand, lenses of fine sand; light grey mottled dark red, dull; cohesive; w~PL; firm.	ML		37.9	S19	DO	12 -20 -23 -30	43	2.0/2.0	
95	35	93.0 - 95.0 CLAYEY SAND; fine; lenses of silty clay; grey; cohesive; moist; dense.	SC		32.9	S20	DO	15 -16 -17 -45	33	2.0/2.0	
100	30	98.0 - 100.0 SILTY SAND; some plastic fines, lenses of stiff silty clay, lens of very soft grey and dark red clay; grey; noncohesive; moist; dense.	SM		27.9	S21	DO	25 -26 -23 -50/5"	49	2.0/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-103

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 120.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 4/24/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,415.4 E: 1,386,432.0
GS ELEVATION: 127.9 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
105	25	103.0 - 105.0 CLAYEY SAND; none to low plasticity; lenses of stiff dark grey clay; dark grey; trace organics, trace thin, soft, black, shiny material: possibly coal; cohesive; wet; very dense.	SC		22.9	S22	DO	25 -50/3"	N/A	0.7 / 2.0	Drilled w/o sampling. (103.8'-105')
110	20	108.0 - 110.0 CLAY; medium to high plasticity; trace coarse gravel, thin bed of fine to medium sand, pockets of fine sand; purplish grey, shiny; trace organics, lens of organics: possibly coal; cohesive; w<PL; very stiff.	CH		17.9	S23	DO	35 -35 -43 -50/5"	78	1.9 / 2.0	
115	15	113.0 - 115.0 CLAY; high plasticity; some nonplastic fines, trace coarse sand, purplish brown pockets of silt; shiny; cohesive; w~PL; very stiff.	CH		12.9	S24	DO	22 -41 -50/5"	N/A	1.5 / 2.0	Drilled w/o sampling. (114.4'-115')
120	10	118.0 - 120.0 CLAY; high plasticity; some nonplastic fines, trace fine sand, pockets of silt; purplish brown, shiny; cohesive; w~PL; very stiff.	CH		7.9	S25	DO	34 -50/5"	N/A	0.9 / 2.0	Drilled w/o sampling. (118.9'-120')
		Boring completed at 120.0 ft									
125	5										
130	0										
135	-5										
140	-10										
145	-15										
150	-20										
	-25										

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-104

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/22/13
DATE COMPLETED: 4/22/13
WEATHER: Partly Sunny

DATUM:
COORDS: N: 501,106.0 E: 1,386,593.8
GS ELEVATION: 109.9 ft
TOC ELEVATION: NA
TEMPERATURE: 55 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0		0.0 - 2.0 SAND; fine to medium, poorly graded, subrounded; lens of brown silty clay; yellowish brown; noncohesive; moist; compact.	SP		107.9	S1	DO	3 -5 -7 -9	12	0.9/2.0	
5	105	3.0 - 5.0 SAND; medium to coarse, poorly graded, subrounded; some nonplastic fines; reddish brown; noncohesive; moist to wet; very dense.	SP		104.9	S2	DO	26 -27 -27 -30	54	1.3/2.0	
10	100	8.0 - 10.0 CLAYEY SAND; medium to coarse, poorly graded; some medium to coarse subrounded gravel; yellowish brown to dark grey; cohesive to noncohesive; moist; dense.	SC		99.9	S3	DO	18 -25 -12 -12	37	0.8/2.0	
15	95	13.0 - 15.0 CLAY; high plasticity; light grey mottled maroon, shiny; thinly laminated; cohesive; w>PL; stiff.	CH		94.9	S4	DO	18 -12 -25 -28	37	1.2/2.0	
20	90	18.0 - 20.0 CLAY; high plasticity; light grey mottled maroon, shiny; thinly laminated; cohesive; w<PL; stiff.	CH		89.9	S5	DO	10 -12 -25 -28	37	1.3/2.0	Clay possibly swelling in borehole.
25	85	23.0 - 25.0 SILTY CLAY; medium plasticity; lens of fine to medium yellow-brown sand, pockets of fine grey sand; light grey mottled dark red, slightly shiny; thinly laminated; cohesive; w<PL; stiff.	CL		84.9	S6	DO	13 -26 -26 -33	52	1.5/2.0	Clay swelled enough to close borehole and refuse rods- used 15' of 4'1/4" HSAs to support hole and resumed drilling and sampling through augers from 0-15 ft bgs.
30	80	28.0 - 30.0 SILTY CLAY; medium plasticity; trace of coarse angular gravel, pockets of fine yellowish brown sand; light grey mottled dark red, slightly shiny; thinly laminated; cohesive; w<PL; stiff.	CL		79.9	S7	DO	10 -12 -24 -24	36	1.2/2.0	
35	75	33.0 - 35.0 CLAY; medium to high plasticity; some nonplastic fines; dark red mottled light grey, shiny; cohesive; w~PL; stiff.	CH		74.9	S8	DO	9 -12 -22 -31	34	2.0/2.0	
40	70	38.0 - 40.0 SILTY CLAY; low to medium plasticity; trace fine sand, pockets of fine sand; brownish red mottled light grey, slightly shiny; slightly fissured; cohesive; w<PL; very stiff.	CL		69.9	S9	DO	12 -22 -37 -40	59	1.4/2.0	
45	65	43.0 - 45.0 SILTY CLAY; low to medium plasticity; trace fine sand; brownish red, slightly shiny; cohesive; w>PL; stiff.	CL		64.9	S10	DO	12 -26 -35 -45	61	2.0/2.0	
50	60	48.0 - 50.0 SILTY CLAY; low to medium plasticity; trace fine sand; brownish red, slightly shiny; cohesive; w>PL; stiff.	CL		59.9	S11	DO	20 -30 -35 -40	65	0.1/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-104

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/22/13
DATE COMPLETED: 4/22/13
WEATHER: Partly Sunny

DATUM:
COORDS: N: 501,106.0 E: 1,386,593.8
GS ELEVATION: 109.9 ft
TOC ELEVATION: NA
TEMPERATURE: 55 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	55	53.0 - 55.0 CLAY; high plasticity; purplish grey, mottled light grey, shiny; cohesive, w<PL, very stiff.	CH		54.9	S12	DO	20 -20 -35 -40	55	1.1/2.0	
60	50	58.0 - 60.0 SILTY CLAY; medium plasticity; pockets of fine yellow-brown sand; mottled light grey and dark red; some yellow-brown staining; cohesive; w~PL; stiff. 58.8-59 ft: soft clay.	CL		49.9	S13	DO	14 -30 -35 -42	65	1.0/2.0	
65	45	63.0 - 65.0 CLAY; medium to high plasticity; some nonplastic fines, trace fine sand, lens of fine to medium yellowish brown sand; dark red mottled grey, shiny; thinly laminated; cohesive; w~PL; very stiff.	CH		44.9	S14	DO	12 -20 -30 -30	50	2.0/2.0	
70	40	68.0 - 70.0 SILTY CLAY; low to medium plasticity; some fine sand, pockets of fine grey sand; light grey mottled dark red, slightly shiny; cohesive; w<PL; very stiff.	CL		39.9	S15	DO	13 -23 -31 -39	54	0.4/2.0	
75	35	73.0 - 75.0 SILTY CLAY and SAND; low to medium plasticity; fine, grey, poorly graded, subrounded sand; grey and reddish brown; cohesive; w~PL; stiff.	CL		34.9	S16	DO	11 -17 -17 -50	34	1.7/2.0	
80	30	78.0 - 80.0 SILTY CLAY and SAND; low plasticity; fine, grey, poorly graded, subrounded sand, lenses of grey clay, lenses of fine to medium grey sand; light grey; cohesive; w~PL; firm.	CL		29.9	S17	DO	16 -22 -25 -50/5"	47	1.9/2.0	
85	25	83.0 - 85.0 CLAYEY SILTY SAND; fine, poorly graded, subrounded; lenses of grey clay, lenses of fine to medium grey sand; noncohesive; moist to wet; dense.	SM		24.9	S18	DO	31 -17 -33 -50/3"	50	1.8/2.0	Drilled w/o sampling. (84.6'-86')
90	20	88.0 - 90.0 SILTY SAND; fine to medium, poorly graded, subrounded; some plastic fines, lens of grey clay; light grey; noncohesive; moist; very dense.	SM		19.9	S19	DO	27 -43 -50/3"	N/A	1.0/2.0	Drilled w/o sampling. (89.3'-90')
95	15	93.0 - 95.0 SILTY SAND; fine to medium, well graded, subrounded; lens of soft dark red clay; light grey; trace thin, black, soft, shiny material: possibly coal; noncohesive; moist to wet; very dense.	SM		14.9	S20	DO	50/5"	N/A	0.5/2.0	Drilled w/o sampling. (93.4'-95')
100	10	98.0 - 100.0 CLAY; medium to high plasticity; some nonplastic fines, seams of fine dark grey sand; dark grey, shiny; cohesive; w<PL; very stiff.	CH		9.9	S21	DO	16 -35 -35 -40	70	2.0/2.0	
		Boring completed at 100.0 ft									

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-105

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/2/13
DATE COMPLETED:
WEATHER: Partly Cloudy

DATUM:
COORDS: N: 500,589.1 E: 1,386,809.5
GS ELEVATION: 115.7 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0	115										
5		3.0 - 5.0 SAND; fine to medium, well-graded, subrounded; trace plastic fines, trace fine gravel; light brown; noncohesive; moist; loose.	SW		110.7	S1	DO	2 -3 -3 -3	6	0.6 / 2.0	
10	110	8.0 - 10.0 SAND; fine, poorly graded, subrounded; some plastic fines, trace coarse subangular gravel, lenses of soft red and white clay; light brown; noncohesive; moist; loose.	SP		105.7	S2	DO	2 -3 -4 -3	7	1.0 / 2.0	
15	105	13.0 - 15.0 SAND; fine to medium, well-graded, subrounded; some nonplastic fines, trace subangular coarse gravel, seams of light grey clay, lenses of clayey sand; light grey to light brown; trace organics; noncohesive; moist; compact.	SW		100.7	S3	DO	3 -4 -8 -14	12	1.5 / 2.0	
20	100	18.0 - 20.0 SILTY CLAY; medium plasticity; seams of fine dark grey sand; dark red, slightly shiny; cohesive; w<PL; stiff.	CL		95.7	S4	DO	11 -19 -22 -23	41	1.6 / 2.0	
25	95	23.0 - 25.0 SILTY CLAY; medium plasticity; mottled dark grey and brownish red, slightly shiny; cohesive; w<PL; very stiff.	CL		90.7	S5	DO	17 -39 -45 -45	84	1.8 / 2.0	
30	90	28.0 - 30.0 CLAY; high plasticity; grey mottled dark red and maroon, shiny; thinly laminated; trace black material: possibly organics; cohesive; w~PL; stiff.	CH		85.7	S6	DO	12 -16 -16 -32	32	1.9 / 2.0	
35	85	33.0 - 35.0 CLAY; high plasticity; grey mottled dark red and maroon, shiny; thinly laminated; trace black material: possibly organics; cohesive; w~PL; stiff.	CH		80.7	S7	DO	11 -13 -15 -25	28	2.0 / 2.0	
40	80	38.0 - 40.0 SILTY CLAY; medium plasticity; some fine sand; light grey mottled dark red, slightly shiny; thinly laminated; cohesive;, w~PL; stiff.	CL		75.7	S8	DO	12 -15 -20 -22	35	1.0 / 2.0	
45	75	43.0 - 44.0 CLAYEY SILT, low to medium plasticity; some fine sand, trace of fine gravel; light grey, dull; cohesive; stiff.	ML / CH		71.7 / 44.0 / 70.7	S9	DO	12 -15 -18 -23	33	2.0 / 2.0	
	70	44.0 - 45.0 CLAY; medium to high plasticity; brown and purple mottled yellowish brown, shiny; thinly laminated; cohesive; stiff.									
50	65	48.0 - 50.0 SILTY CLAY; medium to high plasticity; trace fine sand, pockets of fine yellow-brown sand; light grey, slightly shiny; cohesive; w~PL; stiff.	CL		65.7	S10	DO	17 -26 -38 -40	64	0.7 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-105

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 100.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/2/13
DATE COMPLETED:
WEATHER: Partly Cloudy

DATUM:
COORDS: N: 500,589.1 E: 1,386,809.5
GS ELEVATION: 115.7 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	60	53.0 - 55.0 SILTY CLAY; medium plasticity; seams of fine sand; reddish brown mottled light grey, slightly shiny; cohesive; w~PL; stiff.	CL		60.7	S11	DO	21 -37 -47 -50/5"	84	1.2 / 2.0	
60	55	58.0 - 60.0 SILTY CLAY; medium to high plasticity; trace fine sand; light grey mottled reddish brown, lightly shiny; cohesive; w~PL; firm.	CL		55.7	S12	DO	16 -18 -22 -30	40	1.7 / 2.0	
65	50	63.0 - 65.0 SILTY CLAY; low to medium plasticity; light grey mottled reddish brown, slightly shiny; cohesive; w~PL; stiff.	CL		50.7	S13	DO	21 -33 -36 -42	99	0.7 / 2.0	
70	45	68.0 - 70.0 CLAY; high plasticity; purplish grey mottled dark red, shiny; cohesive; w<PL; very stiff.	CH		45.7	S14	DO	18 -24 -27 -30	51	2.0 / 2.0	
75	40	73.0 - 75.0 CLAY; high plasticity; some nonplastic fines, pockets of fine sand; grey and purple mottled dark red, shiny; thinly laminated; cohesive; w~PL; stiff to very stiff.	CH		40.7	S15	DO	17 -21 -31 -34	52	2.0 / 2.0	
80	35	78.0 - 80.0 SILTY CLAY; low to medium plasticity; trace fine sand, pockets of fine sand; light grey mottled dark red, slightly shiny; thinly laminated; cohesive; w~PL; stiff to very stiff.	CL		35.7	S16	DO	24 -26 -40 -50	76	1.9 / 2.0	
85	30	83.0 - 83.8 SILTY CLAY; medium to high plasticity; trace of fine sand; mottled light grey and dark red; cohesive; w~PL; stiff to very stiff.	CL / CH		31.9 / 83.8 / 30.9	S17	DO	22 -22 -23 -35	45	1.8 / 2.0	
		83.8 - 84.8 CLAY; medium to high plasticity; some nonplastic fines, trace of fine sand; dark red mottled light grey; cohesive; w~PL; firm to stiff.									
90	25	88.0 - 90.0 CLAYEY SILT and SAND; low to medium plasticity; ~35% fine sand, pockets of fine sand, lens of soft red clay; light grey mottled dark red and brown, slightly shiny; cohesive; w<PL; stiff.	MH		25.7	S18	DO	15 -22 -38 -39	60	2.0 / 2.0	
95	20	93.0 - 95.0 CLAYEY SILT; low to medium plasticity; some fine sand, pockets of fine sand, seams of clay and fine sand; light grey mottled dark red and brown, slightly shiny; cohesive; w<PL; stiff.	MH		20.7	S19	DO	30 -40 -50/5"	N/A	1.5 / 2.0	Drilled w/o sampling. (94.4'-95')
100	15	98.0 - 100.0 SILTY CLAY; medium to high plasticity; lenses of fine clayey sand; purplish brown, slightly shiny; cohesive; w<PL; stiff.	CL		15.7	S20	DO	19 -22 -37 -42	59	1.6 / 2.0	
		Boring completed at 100.0 ft									

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-106

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 95.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/25/13
DATE COMPLETED: 4/26/13
WEATHER: Sunny

DATUM:
COORDS: N: 500,667.9 E: 1,385,608.6
GS ELEVATION: 132.7 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0		0.0 - 2.0 SAND; fine to medium, well-graded, subrounded; some fine to coarse subangular gravel, some nonplastic fines; orangeish brown; trace organics (plants); noncohesive; moist; loose.	SW		130.7	S1	DO	3 -5 -5 -6	10	1.1/2.0	
	130	3.0 - 5.0 SAND; fine to medium, well-graded, subrounded; some plastic fines; orange to grey-brown; thinly laminated; trace organics (plants); noncohesive; moist; loose.	SW		127.7	S2	DO	3 -3 -4 -3	7	1.5/2.0	
5											
	125	8.0 - 10.0 CLAYEY SAND; fine to medium, well-graded, subrounded; lenses of light grey clay, lens of soft dark red clay; orange and brown; noncohesive; moist; loose.	SC		122.7	S3	DO	5 -5 -5 -7	10	1.3/2.0	
10											
	120	13.0 - 15.0 SAND; fine to medium, well-graded, subrounded; some plastic fines, thin beds of firm light grey silty clay; light to dark brown; trace organics. 14-14.3 ft: CLAY; dark red; noncohesive; moist; loose, very soft.	SW		117.7	S4	DO	3 -3 -4 -5	7	1.3/2.0	
15											
	115	18.0 - 20.0 CLAY; high plasticity; light grey; seams of fine grey and brown sand, thin bed of fine to medium wet light brown sand, trace organics; cohesive; w>PL; firm.	CH		112.7	S5	DO	3 -3 -3 -4	6	1.2/2.0	
20											
	110	23.0 - 25.0 SAND; fine to medium, poorly graded, subrounded; lens of soft light grey clay; reddish brown; noncohesive; moist to wet; very dense.	SP		107.7	S6	DO	45 -50/5"	N/A	1.0/2.0	Drilled w/o sampling. (23.9'-25')
25											
	105	28.0 - 30.0 SAND; fine to coarse, well-graded, subrounded; some nonplastic fines; light brown; wet; very dense.	SW		102.7	S7	DO	25 -30 -50/5"	N/A	1.6/2.0	Drilled w/o sampling. (29.4'-30')
30											
	100	33.0 - 35.0 CLAY; high plasticity; mottled light grey and maroon, shiny; thinly laminated; cohesive; w<PL; very stiff.	CH		97.7	S8	DO	15 -16 -30 -37	46	2.0/2.0	
35											
	95	38.0 - 40.0 CLAY; high plasticity; mottled light grey and maroon, shiny; thinly laminated; cohesive; w<PL; very stiff.	CH		92.7	S9	DO	20 -30 -40 -50/5"	70	1.7/2.0	
40											
	90	43.0 - 45.0 SILTY CLAY; medium to high plasticity; light grey mottled maroon, slightly shiny; thinly laminated; cohesive; w<PL; very stiff.	CL		87.7	S10	DO	20 -33 -37 -50	70	1.7/2.0	
45											
	85	48.0 - 50.0 CLAY; high plasticity; light grey mottled maroon, shiny; thinly laminated; cohesive; w<PL; stiff.	CH		82.7	S11	DO	14 -28 -40 -42	68	1.3/2.0	
50											

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-106

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 95.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/25/13
DATE COMPLETED: 4/26/13
WEATHER: Sunny

DATUM:
COORDS: N: 500,667.9 E: 1,385,608.6
GS ELEVATION: 132.7 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
	80	53.0 - 55.0 CLAY; high plasticity; trace nonplastic fines; light grey mottled maroon and dark red, shiny; cohesive; w<PL; stiff. 54.2-54.4 ft: CLAY; dark red; soft.	CH		77.7	S12	DO	14 -28 -37 -40	65	1.4 / 2.0	
55											
	75	58.0 - 60.0 CLAY; high plasticity; trace medium sand, thinly laminated pockets of silt; light grey mottled maroon and dark red, shiny; thinly laminated; some yellow-brown staining; cohesive; w<PL; stiff.	CH		72.7	S13	DO	15 -26 -35 -50/5"	61	1.8 / 2.0	
60											
	70	63.0 - 65.0 CLAY; high plasticity; some nonplastic fines; brown mottled dark red and grey, shiny; cohesive; w<PL; stiff.	CH		67.7	S14	DO	15 -26 -35 -45	61	1.9 / 2.0	
65											
	65	68.0 - 70.0 CLAY; high plasticity; some nonplastic fines, trace fine sand, pockets of silt; brownish red mottled light grey, shiny; cohesive; w<PL; stiff.	CH		62.7	S15	DO	16 -29 -30 -30	59	1.9 / 2.0	
70											
	60	73.0 - 75.0 CLAY; high plasticity; pockets of fine sand; dark grey mottled maroon, shiny; thinly laminated; cohesive; w<PL; stiff.	CH		57.7	S16	DO	16 -20 -29 -35	49	2.0 / 2.0	
75											
	55	78.0 - 80.0 CLAY; high plasticity; trace fine sand; light grey mottled dark red and maroon, shiny; cohesive; w<PL; very stiff.	CH		52.7	S17	DO	18 -21 -31 -37	52	2.0 / 2.0	
80											
	50	83.0 - 85.0 SILTY CLAY; medium to high plasticity; trace fine sand, lens of clayey silt, pockets of fine sand; light grey mottled dark red, slightly shiny; cohesive; w<PL; stiff.	CL		47.7	S18	DO	14 -21 -31 -43	52	1.5 / 2.0	
85											
	45	88.0 - 90.0 SILTY CLAY; medium plasticity; pockets of fine sand; mottled light grey and dark red, slightly shiny; cohesive; w<PL; very stiff.	CL		42.7	S19	DO	14 -31 -40 -50	71	1.9 / 2.0	
90											
	40	93.0 - 95.0 CLAY; high plasticity; trace nonplastic fines; light grey mottled dark red, shiny; cohesive; w<PL; very stiff.	CH		37.7	S20	DO	15 -28 -33 -45	61	0.6 / 2.0	
95		Boring completed at 95.0 ft									
	35										
100											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-107

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 140.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/9/13
DATE COMPLETED: 5/10/13
WEATHER: Overcast

DATUM:
COORDS: N: 499,767.4 E: 1,385,785.1
GS ELEVATION: 164.8 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0											
5	160	3.0 - 5.0 CLAYEY SAND; fine, poorly graded, subrounded; light brown to grey; noncohesive to cohesive; moist; compact.	SC		159.8	S1	DO	2 -4 -9 -6	13	1.3 / 2.0	
10	155	8.0 - 10.0 SAND; fine, poorly graded, subrounded; some plastic fines, seams of light grey clay; light brown to orange; noncohesive; moist; compact.	SP		154.8	S2	DO	4 -6 -7 -8	13	1.5 / 2.0	Longer time to drill than average.
15	150	13.0 - 15.0 CLAYEY SAND; fine, poorly graded, subrounded; trace of coarse elongated gravel (1"), seams of soft clay; light brown to orange-brown; wood fragments; noncohesive to cohesive; moist.	SC		149.8	S3	DO	N/A	N/A	0.6 / 2.0	SPT N value may have been affected by wood fragments. Drilled w/o sampling. (13.9'-15')
20	145	18.0 - 20.0 SAND; fine to medium, poorly graded, subrounded; pockets of light grey clay; light brown; very thinly bedded; noncohesive; moist to wet; dense.	SP		144.8	S4	DO	15 -16 -16 -17	32	1.2 / 2.0	
25	140	23.0 - 25.0 SAND; poorly graded, subrounded; some plastic fines, lens of light grey firm clay; light brown; noncohesive; moist; compact.	SP		139.8	S5	DO	5 -6 -9 -14	15	1.3 / 2.0	
30	135	28.0 - 30.0 SAND; fine to medium, poorly graded, subrounded; lenses of very soft light grey clay; light brownish grey; noncohesive; wet; very dense.	SP		134.8	S6	DO	30 -50/4"	N/A	0.8 / 2.0	Drilled w/o sampling. (28.9'-30')
35	130	33.0 - 35.0 SAND; medium, poorly graded, subrounded; trace fine sand, pockets of light grey clay; light brown and grey; noncohesive; moist to wet; very dense.	SP		129.8	S7	DO	26 -40 -26 -27	66	1.2 / 2.0	
40	125	38.0 - 40.0 SAND; fine, poorly graded, subrounded; trace nonplastic fines, lens of clayey silt; light brownish grey; noncohesive; moist; very dense.	SP		124.8	S8	DO	13 -23 -45 -50	68	1.1 / 2.0	
45	120	43.0 - 45.0 CLAYEY SAND; fine, poorly graded, subrounded; light grey. 43.0-43.3 ft: orange-brown fine sand; noncohesive to cohesive; wet; very dense.	SC		119.8	S9	DO	16 -31 -50/5"	N/A	1.3 / 2.0	Drilled w/o sampling. (44.4'-45')
50	115	48.0 - 50.0 SAND; fine, poorly graded, subrounded; some plastic fines, trace fine gravel, pocket of orange-brown fine sand; light grey; noncohesive; moist to wet; very dense.	SP		114.8	S10	DO	33 -43 -50/5"	N/A	1.2 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-107

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 140.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/9/13
DATE COMPLETED: 5/10/13
WEATHER: Overcast

DATUM:
COORDS: N: 499,767.4 E: 1,385,785.1
GS ELEVATION: 164.8 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	110	53.0 - 55.0 SAND; fine, poorly graded, subrounded; trace nonplastic fines; light brown; noncohesive; moist to wet; very dense.	SP		109.8	S11	DO	50/4"	N/A	0.3 / 2.0	Drilled w/o sampling. (53.5'-55')
60	105	58.0 - 60.0 SAND; fine, poorly graded, subrounded; trace nonplastic fines; light brown; noncohesive; moist to wet; very dense.	SP		104.8	S12	DO	50/3"	N/A	0.3 / 2.0	Drilled w/o sampling. (58.25'-60')
65	100	63.0 - 65.0 SAND; fine, poorly graded, subrounded; trace of nonplastic fines; light brown; noncohesive; moist to wet; very dense.	SP		99.8	S13	DO	50/4"	N/A	0.4 / 2.0	Drilled w/o sampling. (63.3'-65')
70	95	68.0 - 70.0 SAND; fine, poorly graded, subrounded; trace nonplastic fines; light brown; noncohesive; moist to wet; very dense.	SP		94.8	S14	DO	50/3"	N/A	0.3 / 2.0	Drilled w/o sampling. (68.25'-70')
75	90	73.0 - 75.0 SAND; fine to coarse, well-graded, subrounded; some fine to coarse, subangular gravel; light brown to orange-brown; noncohesive; wet; very dense.	SW		89.8	S15	DO	50/5"	N/A	0.5 / 2.0	Drilled w/o sampling. (73.4'-75')
80	85	78.0 - 80.0 SILTY CLAY; low to medium plasticity; trace fine sand, blocky, pockets of fine sand; dark red mottled light grey and white, slightly shiny; cohesive; w<PL; very stiff to hard.	CL		84.8	S16	DO	31 -50/5"	N/A	1.0 / 2.0	Drilled w/o sampling. (78.4'-80')
85	80	83.0 - 85.0 CLAY; high plasticity; trace nonplastic fines, pockets of fine sand; light grey mottled maroon and dark red, shiny; thinly laminated; cohesive; w~PL; stiff to very stiff.	CH		79.8	S17	DO	21 -34 -41 -45	75	1.7 / 2.0	
90	75	88.0 - 90.0 CLAY; high plasticity; trace nonplastic fines, pockets of fine sand; light grey mottled maroon and dark red, shiny; thinly laminated; cohesive; w~PL; stiff to very stiff.	CH		74.8	S18	DO	19 -21 -31 -41	52	2.0 / 2.0	
95	70										
100	65	98.0 - 100.0 SILTY CLAY; medium to high plasticity; trace of fine sand; mottled grey, maroon to dark red, slightly shiny; thinly laminated; cohesive; w~PL; stiff.	CL		64.8	S19	DO	14 -24 -34 -45	58	1.9 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE B-107

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 140.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/9/13
DATE COMPLETED: 5/10/13
WEATHER: Overcast

DATUM:
COORDS: N: 499,767.4 E: 1,385,785.1
GS ELEVATION: 164.8 ft
TOC ELEVATION: NA
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
105	60										
110	55	108.0 - 110.0 SILTY CLAY; medium to high plasticity; trace fine sand; reddish brown and light grey mottled, shiny; cohesive; w<PL; stiff to very stiff.	CL		54.8	S20	DO	19 -50/5"	N/A	1.0 / 2.0	Drilled w/o sampling. (108.9'-110')
115	50										
120	45	118.0 - 120.0 SILTY CLAY; medium to high plasticity; trace fine sand; reddish brown and light grey mottled, shiny; cohesive; w<PL; stiff to very stiff.	CL		44.8	S21	DO	21 -31 -50/5"	N/A	1.5 / 2.0	Drilled w/o sampling. (119.4'-120')
125	40										
130	35	128.0 - 130.0 SILTY CLAY; medium to high plasticity; trace of fine sand; light grey and dark red; thinly laminated; cohesive; w<PL; stiff to very stiff. Bottom 0.3 ft.: very soft.	CL		34.8	S22	DO	36 -46 -50/5"	N/A	2.0 / 2.0	Drilled w/o sampling. (129.4-130')
135	30										
140	25	138.0 - 140.0 SILTY CLAY; medium to high plasticity; dark and mottled light grey, shiny; cohesive; w<PL; stiff to very stiff.	CL		24.8	S23	DO	36 -46 -50/5"	N/A	1.6 / 2.0	Drilled w/o sampling. (139.4'-130')
		Boring completed at 140.0 ft									
145	20										
150	15										

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-6

SHEET 1 of 1

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 30.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 5/14/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 501,052.6 E: 1,388,345.3
GS ELEVATION: 81.5 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0	80										
5	75	3.0 - 5.0 GRAVELLY SAND; fine, poorly graded, subrounded; ~30% fine to coarse angular to subangular gravel; brown to dark brown; trace organics (plant matter); noncohesive; moist; compact.	SP		76.5	S1	DO	6 -4 -6 -3	10	0.8/2.0	
10	70	8.0 - 10.0 GRAVELLY SAND; fine, poorly graded, subrounded; ~40% fine to coarse subrounded gravel, trace nonplastic fines; brown; noncohesive; moist; compact.	SP		71.5	S2	DO	6 -8 -7 -10	15	0.5/2.0	
15	65	13.0 - 15.0 SAND; fine to medium, poorly graded, subrounded; some nonplastic fines, seams of soft light grey clay; light brown to orangeish brown; noncohesive; moist to wet; loose.	SP		66.5	S3	DO	4 -4 -3 -3	7	1.9/2.0	Spoon is wet.
20	60	18.0 - 20.0 SAND; fine to coarse, poorly graded, subrounded; some fine to coarse subrounded gravel, trace nonplastic fines, seams of soft light grey clay; light brown to orangeish brown; noncohesive; wet; compact.	SP		61.5	S4	DO	3 -5 -7 -8	12	1.5/2.0	End HSAs. Drilled w/ 3" mud rotary bit.
25	55	23.0 - 25.0 SAND; fine, poorly graded, subrounded; some nonplastic fines, trace coarse gravel >1" dia., seams of soft light grey clayey sand; light brown to orangeish brown; noncohesive; moist to wet; compact.	SP		56.5	S5	DO	3 -10 -13 -27	23	0.7/2.0	
30	50	28.0 - 30.0 SAND; fine to medium, poorly graded, subrounded; trace fine rounded gravel; light brown; noncohesive; wet.	SP		51.5	S6	DO	8 -20 -50/4"	N/A	1.3/2.0	SPT N value may have been affected by coarse gravel fall-in. Drilled w/o sampling. (29.3'-30')
35	45										
40	40										
45	35										
50											

Boring completed at 30.0 ft

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-11

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 220.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Hydraulic Hammer- 140 lb, 30 in. w/ 15 HSAs
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/19/13
WEATHER: Partly Cloudy

DATUM:
COORDS: N: 501,239.1 E: 1,385,779.8
GS ELEVATION: 143.5 ft
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0											
5	140	3.0 - 5.0 SILTY SAND; fine sand to 1.1 ft.; then SILTY SAND; fine to coarse, nonplastic; trace of subrounded to subangular coarse to fine gravel, 5-12% clay content; dark brown to light brown; trace of organics (roots); moist.	SM		138.5	S1	DO	2 -4 -8 -10	12	1.4/2.0	Installed 6" steel (SW) casing to approx. 9 ft. into silty clay (hydraulically pushed). Foaming of drill water from chlorine that was added to acquire drill water in mud tank. Switched to mud-rotary drilling using a 5-7/8" dia. bit (Oray bit).
10	135	8.0 - 10.0 SILTY SAND; trace nonplastic fines and subrounded coarse gravel, fine to medium sand, some thin clay seams (~5mm); brown to mottled light brown; moderate to very moist; compact.	SM		133.5	S2	DO	2 -1 -1 -2	2	0.8/2.0	
15	130	13.0 - 15.0 SANDY SILT to SILT; nonplastic; brown to tan brown; trace organics; very moist. After 14.8 ft: coarse, fine to coarse gravelly SILT, subrounded; quartz; moderate to very moist; compact.	ML		128.5	S3	DO	2 -3 -5 -9	8	1.1/2.0	
20	125	18.0 - 20.0 SAND; medium; gravelly sandy slough, occasional coarse subangular gravel, quartz derived gravel; tan to pale brown; very moist; loose.	SP		123.5	S4	DO	4 -5 -7 -9	12	0.6/2.0	
25	120	23.0 - 25.0 GRAVEL and SAND; fine to coarse, subrounded, loose; fine to coarse sand grains, trace of fines; tan brown; wet.	SP		118.5	S5	DO	3 -3 -5 -9	8	0.8/2.0	
30	115	28.0 - 30.0 CLAY; low to medium plasticity; tan brown silty sand (slough) and fine to coarse gravel; maroon red to grey to mottled red-brown; thinly laminated; slightly varved; moderate to very moist.	CL		113.5	S6	DO	2 -2 -3 -5	5	0.6/2.0	
35	110	33.0 - 35.0 CLAY; maroon-grey to pale purple-brown; thinly laminated; firm.	CL		108.5	S7	DO	4 -9 -10 -13	19	1.3/2.0	
40	105	38.0 - 40.0 CLAY; maroon-grey to pale purple-brown; thinly laminated; firm.	CL		103.5	S8	DO	3 -5 -8 -12	13	1.5/2.0	
45	100	43.0 - 45.0 CLAY; low to medium plasticity; maroon red grey; thinly laminated, varved; stiff.	CL		98.5	S9	DO	4 -6 -9 -12	15	1.2/2.0	
50	95	48.0 - 50.0 CLAY; low to medium plasticity; maroon red grey, mottled color; thinly laminated at top 0.2 ft., blocky structure; moist; stiff to very stiff.	CL		93.5	S10	DO	6 -12 -18 -27	30	2.0/2.0	Drilling getting harder, hard clay.

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-11

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 220.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Hydraulic Hammer- 140 lb, 30 in, 15 HSAs
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/19/13
WEATHER: Partly Cloudy

DATUM: NAD83
COORDS: N: 501,239.1 E: 1,385,779.8
GS ELEVATION: 143.5 ft
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	90	53.0 - 55.0 CLAY; trace silt; mottled pinkish grey to maroon red; slightly laminated; moist; stiff.	CL		88.5	S11	DO	6 -8 -12 -26	20	2.0/2.0	
60	85	58.0 - 60.0 CLAY; trace silt; mottled pinkish grey to maroon red; slightly laminated; moist; stiff.	CL		83.5	S12	DO	7 -10 -16 -18	26	2.0/2.0	Borehole taking drill water. Two-330 gal tanks already used up. Still taking drill water. Possible causes: Clay has formed a collar up to sand/clay interface at shallower depth and water is being forced into a shallower sand unit (20-30ft).
65	80	63.0 - 65.0 CLAY; trace silt; low to medium plasticity; mottled brown, grey and maroon to red and purple; moist; stiff.	CL		78.5	S13	DO	13 -17 -26 -21	43	2.0/2.0	
70	75	68.0 - 70.0 CLAY; high to medium plasticity; red to brown to grey to tan brown mottled; massive structure; moist; stiff.	CL		73.5	S14	DO	7 -16 -26 -34	42	2.0/2.0	
75	70	73.0 - 75.0 CLAY; high to medium plasticity; purple-grey, 0.2 ft of rust orange at top of interval; massive structure; moist; stiff to hard.	CL		68.5	S15	DO	6 -9 -14 -21	23	2.0/2.0	
80	65	78.0 - 80.0 CLAY; high plasticity; grey to purple to mottled brown; massive structure; stiff to hard.	CL		63.5	S16	DO	6 -11 -17 -19	28	2.0/2.0	
85	60	83.0 - 85.0 CLAY; high plasticity; trace silt, fine sand grains throughout; purple to gray to red brown mottled; moist; stiff to hard.	CL		58.5	S17	DO	8 -16 -22 -29	38	2.0/2.0	
90	55	88.0 - 90.0 CLAY; high plasticity; trace silt, fine sand grains throughout; occasional tan to brown silty clay pockets, especially near the bottom; moist.	CL		53.5	S18	DO	10 -20 -28 -36	48	2.0/2.0	
95	50	93.0 - 95.0 CLAYEY SILT to SILT; trace fine sand; pale grey; moderate to very moist; firm.	CL		48.5	S19	DO	31 -28 -29 -33	57	1.3/2.0	
100	45	98.0 - 100.0 SILTY CLAY to CLAY; maroon red to gray to light brown mottled; massive structure; moist; stiff.	CL		43.5	S20	DO	8 -18 -26 -23	44	2.0/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-11

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 220.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Hydraulic Hammer- 140 lb, 30 in. HSAs
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/19/13
WEATHER: Partly Cloudy

DATUM: NAD 83
COORDS: N: 501,239.1 E: 1,385,779.8
GS ELEVATION: 143.5 ft
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
105	40	103.0 - 105.0 CLAY to SILTY CLAY; high plasticity; occasional pockets of dark red, dense Clayey SILT; maroon red to grey, mottled; thinly laminated at top 0.2 ft.; dry to moist; stiff to hard.	CL		38.5	S21	DO	10 -15 -25 -32	40	2.0/2.0	
110	35	108.0 - 110.0 CLAY to SILTY CLAY; high plasticity; occasional pockets of dark red, dense Clayey SILT; maroon red to grey, mottled; thinly laminated at top 0.2 ft.; moist; stiff to hard.	CL		33.5	S22	DO	12 -16 -21 -28	37	2.0/2.0	
115	30	113.0 - 115.0 CLAYEY SILT; trace to some fine sand; grey maroon mottled; firm. Below 118.1 ft: CLAYEY SILT; nonplastic; trace of fine sand and some fines; pink to grey to marron red mottled; moderate to very moist.	CL		28.5	S23	DO	8 -16 -19 -23	35	2.0/2.0	
120	25	118.0 - 120.0 CLAYEY SILT; nonplastic; 20-30% fines, occassional dark brown clay silt pockets, trace fine sand; grey to red mottled brown; moist; tight to compact.	CL		23.5	S24	DO	10 -12 -25 -32	37	2.0/2.0	
125	20	123.0 - 125.0 CLAY; mottled purple to grey to old brown to pink; slightly laminated at top; massive structure; moist; stiff.	CL		18.5	S25	DO	12 -17 -26 -33	43	2.0/2.0	Color changes.
130	15	128.0 - 130.0 SILTY CLAY to CLAY; old brown to grey to red brown mottled; slightly laminated; moist; firm.	CL		13.5	S26	DO	8 -10 -20 -33	30	1.7/2.0	
135	10	133.0 - 135.0 CLAY; low to medium plasticity; trace silt; old brown to grey to reddish brown, slightly mottled towards the bottom; moist; stiff to hard.	CL		8.5	S27	DO	13 -19 -26 -34	45	2.0/2.0	
140	5	138.0 - 140.0 CLAY; low to medium plasticity; silty clay pockets; red brown to grey brown, occassional brown; moist; stiff to hard. (Collected geotech sample).	CL		3.5	S28	DO	9 -20 -31 -48	51	2.0/2.0	Hard drilling.
145	0	143.0 - 145.0 CLAY; medium to high plasticity; brown to dark brown, mottled grey to purple to brown at top 0.4 ft.; slightly laminated; moist; hard.	CL		-1.5	S29	DO	12 -23 -34 -43	57	1.9/2.0	
150	-5	148.0 - 150.0 CLAY; low to medium plasticity; brown to dark brown; moist; stiff to hard.	CL		-6.5	S30	DO	9 -18 -31 -42	49	2.0/2.0	
											When drilled to interval 156 ft., drilling was

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-11

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 220.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Hydraulic Hammer- 140 lb, 30 in, 15 HSAs
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/19/13
WEATHER: Partly Cloudy

DATUM: NAD83
COORDS: N: 501,239.1 E: 1,385,779.8
GS ELEVATION: 143.5 ft
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
155	-10	153.0 - 155.0 CLAY; low to medium plasticity; olive brown and grey mottled at bottom 0.7 ft.; thinly laminated.	CL		-11.5	S31	DO	15 -28 -42 -50/4.5"	N/A	2.0 / 2.0	less difficult and felt different. Lost approx. 20 -30 gals of drill water.
160	-15	158.0 - 160.0 CLAY; medium to high plasticity; trace medium sand, trace to some silt content; green to red mottled brown.	CL		-16.5	S32	DO	15 -25 -23 -50/6"	48	2.0 / 2.0	
165	-20	163.0 - 165.0 CLAY; occasional silt partings; red to brown to grey; blocky structure, slightly dessicated matrix; dry to moist; hard.	CL		-21.5	S33	DO	15 -27 -40 -50/5.5"	67	1.8 / 2.0	
170	-25	168.0 - 170.0 CLAY to SILTY CLAY; grey SILTY CLAY with trace fine sand, lustruous fine sand grains; brown to grey; slightly laminated, slightly varved; moist; hard.	CL		-26.5	S34	DO	12 -22 -36 -50/5.5"	58	2.0 / 2.0	
175	-30	173.0 - 175.0 CLAYEY SILT to SILTY CLAY; trace to some fine sand, blocky Clayey SILT; brown grey to brown; cohesive; moist; firm; softens towards the bottom.	CL		-31.5	S35	DO	8 -12 -19 -25	31	2.0 / 2.0	
180	-35	178.0 - 180.0 SILTY CLAY to occassional SILT; grey to dark grey; slightly varved; moderate to very moist. Below 179.5 ft: sandy SILT; very moist.	ML-SM		-36.5	S36	DO	10 -17 -23 -50/5.5"	40	2.0 / 2.0	Transition Zone.
185	-40	183.0 - 185.0 CLAYEY SANDY SILT; intermitten thin (<0.1 ft.) fine to medium silty sand seams (wet), low plasticity fines with inner fine to medium sand towards the bottom; grey to dark grey; dense.	CL-SM		-41.5	S37	DO	13 -17 -46 -50/3"	63	2.0 / 2.0	
190	-45	188.0 - 190.0 SILTY CLAY; slightly plastic; occassional thin (~5 mm) fine, light grey sand lenses and pockets; dark grey; moist to very moist; hard.	CL-ML		-46.5	S38	DO	20 -31 -50/5"	N/A	1.6 / 2.0	
195	-50	193.0 - 195.0 SILT-SILTY CLAY; nonplastic; trace of fine sand, hardpan silt at bottom; maroon to red to pinkish purple, olive mottled brown; dry to moist.	CL-ML		-51.5	S39	DO	42 -50/4"	N/A	0.9 / 2.0	~141 ft. MSL elevation @ PMW-11 (Phone GPS).
200	-55	198.0 - 200.0 CLAYEY SILT; trace fine sand; pinkish purple to grey to maroon red, dark to deep red to rust orange; varved; moist; dense.	CL-ML		-56.5	S40	DO	17 -50/4"	N/A	1.2 / 2.0	
	-60		SM			S41	DO	26 -50/4"	N/A	0.6	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-11

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 220.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Hydraulic Hammer- 140 lb, 30 in, 15 HSAs
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/19/13
WEATHER: Partly Cloudy

DATUM:
COORDS: N: 501,239.1 E: 1,385,779.8
GS ELEVATION: 143.5 ft
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
205		203.0 - 205.0 SILTY SAND; poorly graded; 5-12% fines, occasional thin clay lenses; pale grey-white; dilatently wet; compact. *(Continued)*	SM		-61.5	S41	DO	26 -50/4"	N/A	2.0	
	-65	208.0 - 210.0 SILTY SAND; poorly graded; coarsening with depth; occasional thin clay lenses; pale grey-white; compact.	SM		-66.5	S42	DO	37 -50/5"	N/A	0.7 / 2.0	Approx. 50 gals drill water lost during interval drilling.
210	-70	213.0 - 215.0 SAND; fine to medium; trace fines; brown.	SP		-71.5	S43	DO	50/5"	N/A	0.6 / 2.0	Drove spoon to ~10 in. to acquire enough sample.
215	-75	218.0 - 220.0 NO RECOVERY, white sand in shoe of spoon.			-76.5	S44	DO	50/5"	N/A	0.0 / 2.0	
220		Boring completed at 220.0 ft									
	-80										
225											
	-85										
230											
	-90										
235											
	-95										
240											
	-100										
245											
	-105										
250											
	-110										
255											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-12

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 240.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 5/3/13
WEATHER: Cloudy

DATUM:
COORDS: N: 499,635.2 E: 1,385,163.9
GS ELEVATION: 171.9 ft
TOC ELEVATION: NA
TEMPERATURE: 52 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0	170										
5		3.0 - 5.0 SILTY SAND; fine to medium grained; occasional white grey SILTY CLAY seams (~10-20 mm); tan to pale brown; moist; loose.	SM		166.9	S1	DO	1 -2 -4 -6	6	0.5 / 2.0	Poor recovery
	165										
10		8.0 - 10.0 CLAY; low plasticity; occasional white to grey SILTY CLAY stringers; dark red to maroon red and brown; blocky structure; w<PL; firm to stiff.	CL		161.9	S2	DO	3 -8 -7 -9	15	1.7 / 2.0	Approx. 30 gals of drill fluid lost.
	160										
15		13.0 - 15.0 CLAY; low plasticity; pockets and stringers of white to grey silty clay throughout; mottled color; thinly laminated; moist; firm.	CL		156.9	S3	DO	4 -6 -11 -12	17	1.7 / 2.0	
	155										
20		18.0 - 20.0 CLAY; low to medium plasticity; trace of silt near bottom; maroon red to brown to brown grey, becomes grey from 19.3-19.6 ft.; platy structure, thinly laminated; cohesive; moist, w<PL.	CL		151.9	S4	DO	5 -8 -12 -15	20	1.6 / 2.0	
	150										
25		23.0 - 25.0 CLAY; low plasticity; trace silt; olive green to pale grey to pale purple; blocky structure, slightly laminated; cohesive; moist, w<PL.	CL		146.9	S5	DO	4 -6 -10 -12	16	1.3 / 2.0	
	145										
30		28.0 - 30.0 CLAY; low plasticity; trace silt; olive brown to brown, lustrous; firm to stiff at bottom; moist, w<PL.	CL		141.9	S6	DO	6 -9 -12 -20	21	1.7 / 2.0	
	140										
35		33.0 - 34.6 CLAY; low plasticity; trace silt; 12-25% silt.	CL		137.3	S7	DO	8 -14 -23 -25	37	2.0 / 2.0	
		34.6 - 35.0 CLAYEY SILT; grey and tan; dark maroon red to pale brown; blocky structure; moist.	CL-MH								
	135										
40		38.0 - 38.4 CLAYEY SILT; trace very fine sand; pale grey; moist.	MH / MH		38.4 / 131.9	S8	DO	17 -25 -50/5.5"	N/A	1.9 / 2.0	
		38.4 - 40.0 SILTY CLAY; some very fine sand; purple to maroon red, grey and orange; highly varved, thinly bedded, blocky structure; cohesive; blocky.									
	130										
45		43.0 - 44.8 CLAYEY SILT to SILTY CLAY; intermittent fine to medium SILTY SAND seams, silt seams; white grey and maroon red; very moist; dense to firm.	CL		127.1	S9	DO	17 -28 -30 -31	58	2.0 / 2.0	
		44.8 - 45.0 SILTY CLAY; pale brown to pink brown; deformed at bottom.	CL-ML								
	125										
50		48.0 - 50.0 SANDY SILT; very fine; trace fines and occasional orange brown silt seams; white-grey; moist; soft, compact.	ML		121.9	S10	DO	37 -50/5"	N/A	1.0 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-12

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 240.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 5/3/13
WEATHER: Cloudy

DATUM:
COORDS: N: 499,635.2 E: 1,385,163.9
GS ELEVATION: 171.9 ft
TOC ELEVATION: NA
TEMPERATURE: 52 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	120	53.0 - 55.0 SILTY SAND; fine to very fine, nonplastic; 12% fines, very fine sand lenses at 53.6-54.2 ft; orange brown and grey; very moist; compact.	SM		116.9	S11	DO	36 -47 -50/5"	N/A	1.3 / 2.0	
60	115	58.0 - 60.0 SAND; nonplastic, fine to very fine; trace fines, some silt fines (12-15%); tan brown to light brown; very moist; compact.	SM		111.9	S12	DO	46 -50/3"	N/A	0.4 / 2.0	
65	110	63.0 - 65.0 SAND; fine to medium; some fines (5-12%); grey brown to tan brown; very moist.	SW		106.9	S13	DO	43 -50/4"	N/A	0.7 / 2.0	
70	105	68.0 - 70.0 SAND; fine to medium; some fines (5-12%); grey brown to tan brown; wet (water table).	SW		101.9	S14	DO	43 -50/4"	N/A	0.4 / 2.0	Poor recovery. Water table.
75	100	73.0 - 75.0 SILTY SAND; fine, nonplastic; some fines; grey to red to brown; moist.	SM		96.9	S15	DO	20 -17 -31 -50/5"	48	2.0 / 2.0	
80	95	78.0 - 80.0 CLAY; low plasticity; some CLAY SILT pockets; maroon red to brown to pale purple; slightly laminated, blocky structure; cohesive; w<PL; very stiff to hard. (Collected goetech sample).	CL		91.9	S16	DO	12 -31 -41 -47	72	2.0 / 2.0	
85	90	83.0 - 85.0 CLAY to SILTY CLAY; pockets of fine sand especially @ 84.1-84.7 ft.; grey with maroon red; cohesive; w<PL; stiff at top 0.7 ft. then hard down to the bottom.	CH		86.9	S17	DO	12 -18 -24 -27	42	2.0 / 2.0	
90	85	88.0 - 90.0 CLAY; high plasticity; trace fine sand, some silt; maroon red to grey brown mottled; blocky structure; w<PL.	CH		81.9	S18	DO	7 -16 -19 -24	35	2.0 / 2.0	
95	80	93.0 - 95.0 SILTY CLAY; some fine sand, occasional tan brown silt stringers, trace medium sand; maroon red to grey to brown mottling; blocky structure; cohesive; w<PL.	CL-ML		76.9	S19	DO	12 -18 -24 -34	42	2.0 / 2.0	
100	75	98.0 - 100.0 SILTY CLAY to CLAY; occasional tan brown silt pockets; maroon red to grey, pale purple and mottled; friable to blocky, slightly laminated at top 0.2 ft.; w<PL-w~PL.	CL-CH		71.9	S20	DO	10 -21 -23 -32	42	2.0 / 2.0	
	70										

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-12

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 240.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 5/3/13
WEATHER: Cloudy

DATUM:
COORDS: N: 499,635.2 E: 1,385,163.9
GS ELEVATION: 171.9 ft
TOC ELEVATION: NA
TEMPERATURE: 52 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
105	65	103.0 - 105.0 CLAY to SILTY CLAY; pale purple to grey mottled; slightly laminated and varved, blocky to slightly friable. Below 104.1 ft: w<PL-w~PL; stiff to very stiff.	CL-CH		66.9	S21	DO	11 -23 -28 -35	51	2.0/2.0	Shelby Tube (S-22) from 106 to 108 ft. bgs
110	60	108.0 - 110.0 CLAY to SILTY CLAY; medium plasticity; maroon red to grey mottled brown, lustrous; moderately cohesive; w<PL; stiff to very stiff. (Collected geotech sample).	CL-CH		61.9	S23	DO	11 -25 -31 -34	56	2.0/2.0	
115	55	113.0 - 115.0 CLAY; some grey silty clay stringers throughout; brown to olive brown; blocky structure, slightly laminated; cohesive; w<PL, moist; very stiff.	CH		56.9	S24	DO	11 -19 -28 -35	47	2.0/2.0	
120	50	118.0 - 120.0 SILTY CLAY to CLAY; brown to grey; very stiff to hard.	CL-CH		51.9	S25	DO	14 -22 -32 -38	54	2.0/2.0	Set sample interval to 10 ft. centers.
125	45										
130	40	130.0 - 132.0 CLAY; high plasticity; maroon grey mottled; thinly laminated; w<PL; hard to very hard.	CH		39.9	S26	DO	17 -24 -30 -33	54	2.0/2.0	SS extraction was difficult. Break down rods to pull up sample screen.
135	35										
140	30	138.0 - 140.0 CLAY to SILTY CLAY; pale purple to maroon red mottled to olive brown; blocky structure; cohesive; w<PL; stiff to hard.	CL-CH		31.9	S27	DO	8 -10 -11 -18	21	1.6/2.0	
145	25										
150	20	148.0 - 150.0 CLAY to SILTY CLAY; medium to high plasticity; pale purple to maroon red mottled to olive brown; w~PL.	CL-CH		21.9	S28	DO	19 -23 -32 -42	55	2.0/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-12

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 240.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 5/3/13
WEATHER: Cloudy

DATUM:
COORDS: N: 499,635.2 E: 1,385,163.9
GS ELEVATION: 171.9 ft
TOC ELEVATION: NA
TEMPERATURE: 52 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
155	15										
		158.0 - 160.0 CLAY to SILTY CLAY; trace fine sand; grey to brown; cohesive; hard.	CL-CH		11.9	S29	DO	13 -21 -32 -50/5.5"	53	2.0/2.0	
160	10										
		163.0 - 165.0 SILTY CLAY to CLAY; medium to high plasticity; grey to maroon, mottled at bottom 1 ft.; blocky structure; yellow stained; cohesive; w~PL; stiff to hard.	CL-CH		6.9	S30	DO	15 -23 -30 -45	53	2.0/2.0	
165	5										
		168.0 - 170.0 CLAY to SILT; trace to little bit of fine sand, pockets of fine sand; pale purple to maroon red to old green to maroon mottled red; blocky structure and slightly laminated near the top; cohesive; w<PL-w~PL.	CL-CH		1.9	S31	DO	15 -22 -31 -46	53	2.0/2.0	
170	0										
		173.0 - 175.0 SILTY CLAY to CLAY; medium to high plasticity; grey to brown red; blocky to friable; w<PL; stiff to hard.	CL-CH		-3.1	S32	DO	14 -21 -30 -41	51	2.0/2.0	
175	-5										
		178.0 - 180.0 SILTY CLAY to CLAY; medium to high plasticity; grey to maroon red mottled; blocky to friable; w<PL; hard.	CL-CH		-8.1	S33	DO	14 -20 -29 -40	49	2.0/2.0	
180	-10										
		183.0 - 185.0 SILTY CLAY to CLAY; medium to high plasticity; maroon red to olive brown; blocky to friable, slightly laminated, lustrous; w<PL; hard.	CL-CH		-13.1	S34	DO	13 -23 -35 -50/5.5"	58	2.0/2.0	Drillers note: hard drilling through interval (185 ft. to 188 ft.)
185	-15										
		188.0 - 190.0 SILTY CLAY to CLAY; medium to high plasticity; mottled grey to pale purple to maroon red to olive brown; friable, slightly laminated, lustrous; w~PL; hard.	CL-CH		-18.1	S35	DO	14 -23 -34 -39	57	2.0/2.0	Drillers note: quick drilling through interval (190 ft. to 193 ft.)
190	-20										
		193.0 - 195.0 SILTY CLAY to CLAY; medium to high plasticity; mottled grey to red brown; blocky, friable, thinly laminated, lustrous; w<PL; hard.	CL-CH		-23.1	S36	DO	15 -19 -38 -50/5"	57	2.0/2.0	
195	-25										
		198.0 - 200.0 CLAY to SILT; with some fine SAND and SANDY SILT; grey to green to red brown; very stiff.	CL-ML		-28.1	S37	DO	18 -20 -21 -28	41	2.0/2.0	Transition zone.
200	-30										
			CL-ML			S38	DO	8 -10 -12 -14	22	2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-12

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 240.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA
DRILL RIG: Simco 2800
DATE STARTED: 4/23/13
DATE COMPLETED: 5/3/13
WEATHER: Cloudy

DATUM:
COORDS: N: 499,635.2 E: 1,385,163.9
GS ELEVATION: 171.9 ft
TOC ELEVATION: NA
TEMPERATURE: 52 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
205	-35	203.0 - 205.0 SILTY CLAY to SANDY CLAY to SANDY CLAY; some SILT, some medium SAND; cohesive; brown to olive brown; w~PL to w>PL; blocky; firm to soft. *(Continued)*	CL-ML		-33.1	S38	DO	8 -10 -12 -14	22	2.0	
210	-40	208.0 - 210.0 CLAYEY SAND to SANDY CLAY to CLAYEY SAND; with fine SAND; cohesive; olive green to pale purple; w~PL to w>PL; very moist to wet.	SC-CL		-38.1	S39	DO	8 -12 -18 -24	30	0.8 / 2.0	
215	-45	213.0 - 215.0 CLAYEY SILT with fine SAND; very moist; soft.	CL		-43.1	S40	DO	11 -24 -33 -50/3"	57	1.8 / 2.0	Poor recovery.
220	-50	218.0 - 219.0 SILTY SAND; fine to medium; some low plasticity fines; cohesive to non-cohesive; grey.	SM		-47.1	S41	DO	36 -31 -36 -50/4.5"	67	2.0 / 2.0	Drillers note: starting to take water.
		219.0 - 220.0 SILTY CLAY; seams of fine SILTY SAND; cohesive; w~PL.	CL		219.0 -48.1						
225	-55	223.0 - 225.0 SILTY CLAY with fine SAND; silty SAND and layered CLAY seams; cohesive; dark grey; thinly stratified; w~PL; wet.	CL		-53.1	S42	DO	10 -50/5.5"	NA	1.0 / 2.0	
230	-60	228.0 - 230.0 SAND; fine to medium; trace fines; brown grey to grey; dense.	SP		-58.1	S43	DO	50/4.5"	NA	0.3 / 2.0	Drilled down to 240 ft. bgs for well installation.
235	-65	233.0 - 235.0 CLAYEY SAND; fine; some soft sand seams, firm clay partings, and dirty sand; dark grey to grey; cohesive; w~PL to w>PL.	SC		-63.1	S44	DO	18 -28 -50/5"	NA	1.7 / 2.0	
240	-70	238.0 - 238.3 CLAYEY SAND; fine; some soft sand seams, firm clay partings, and dirty sand; dark grey to grey; cohesive; w~PL to w>PL.	SC		238.3 -68.1	S45	DO	17 -37 -50/3"	NA	1.3 / 2.0	
		238.3 - 240.0 Weathered soft shale; with fine SAND; black to dark grey.									
		Boring completed at 240.0 ft									
245	-75										
250	-80										
255											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-13

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 270.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/6/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 499,205.1 E: 1,386,147.4
GS ELEVATION: 158.4 ft
TOC ELEVATION: NA
TEMPERATURE: 59 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0											
5	155	3.0 - 5.0 Topsoil to 3.2 ft.; dark brown; organics; moist. Below 3.2 ft: SAND; fine to medium, coarsening to bottom; 12-15% fines; orange brown and rust brown; noncohesive; moist; compact.	SM		153.4	S1	SS	7 -12 -15 -16	27	1.7 / 2.0	
10	150	8.0 - 10.0 As above to 8.5 ft; orange brown to tan brown to pale grey. Below 8.5 ft: Silty SAND to SAND; fine; some to trace of noncohesive silt, fine to medium sand, occasional loose CLAY silt seams; moist; compact.	SM		148.4	S2	SS	8 -8 -12 -11	20	1.7 / 2.0	
15	145	13.0 - 15.0 As above. SAND; fine to medium; 5-12% fines; pale brown to orange brown; layered, moist to very moist; loose.	SW-SP		143.4	S3	SS	5 -6 -5 -9	11	1.5 / 2.0	
20	140	18.0 - 20.0 SAND to SILTY SAND; fine; occasional hardpan silt seams; orange brown to pale brown to brown; layered; noncohesive; moist; loose to compact.	SM		138.4	S4	SS	7 -7 -9 -8	16	1.4 / 2.0	
25	135	23.0 - 25.0 To 23.6 ft: Sandy CLAY; fine; grey to pale brown; cohesive; very moist; soft. Below 23.6 ft: CLAY SILT; pale red grey; layered and friable; cohesive; w<PL; stiff.	SC-MH		133.4	S5	SS	8 -11 -17 -22	28	1.7 / 2.0	
30	130	28.0 - 30.0 CLAY SILT; 12-15% fine sand; pale grey; dilatent, blocky structure; cohesive; moist to wet; dense.	MH		128.4	S6	SS	9 -16 -19 -34	35	2.0 / 2.0	
35	125	33.0 - 35.0 As above to 34 ft. Below 34 ft.: SILTY CLAY; low plasticity; pale red grey; friable; moist.	MH		123.4	S7	SS	9 -12 -15 -26	27	2.0 / 2.0	
40	120	38.0 - 40.0 CLAY SILT to SILTY CLAY; occasional thin silt lenses, fine silty sand at bottom 0.2 ft.; maroon red to pale grey to pale mottled purple to tan brown; thinly laminated, layered; cohesive; very moist to wet, w>PL.	CL		118.4	S8	SS	10 -15 -16 -29	31	2.0 / 2.0	
45	115	43.0 - 45.0 Silty SAND to CLAYEY SILTY SAND, becoming CLAY SILT from 44 ft. downward; 12-15% fines; grey; trace of hard rust brown concrete; cohesive; w~PL; compact to dense.	SM		113.4	S9	SS	13 -14 -42 -42	N/A	2.0 / 2.0	
50	110	48.0 - 50.0 SILTY CLAY to 48.5 ft.; low plasticity; some fine sand; pale grey; cohesive; w>PL; stiff. Below 48.5 ft.: SILTY SAND; fine; some low plastic fines; cohesive; wet. (Water table @ approx. 48.5	CL		108.4	S10	SS	6 -13 -31 -33	44	2.0 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-13

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 270.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/6/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 499,205.1 E: 1,386,147.4
GS ELEVATION: 158.4 ft
TOC ELEVATION: NA
TEMPERATURE: 59 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
		ft.)									
55	105	53.0 - 55.0 SILTY SAND; fine; low plastic fines; pale grey to tan brown; layered; wet; dense.	SM		103.4	S11	SS	24 -47 -50/4	N/A	0.8 / 2.0	
60	100	58.0 - 60.0 SAND; fine to medium; trace of fines; grey brown to tan brown; noncohesive; moist; dense to stiff.	SW		98.4	S12	SS	33 -50/4	N/A	0.6 / 2.0	
65	95	63.0 - 65.0 SAND; fine to medium; moist to wet. As above.	SW		93.4	S13	SS	50 -50/3	N/A	0.7 / 2.0	
70	90	68.0 - 70.0 SAND; medium; trace of fine and coarse sand, 15-20% silt; brown to pale brown; wet to saturated; dense.	SP		88.4	S14	SS	21 -20 -31 -32	51	1.7 / 2.0	
75	85	73.0 - 75.0 SILTY CLAY to CLAY; 0.2 ft of silty fine sand seam near top (73.3-73.5 ft.); red brown to grey to maroon red and mottled grey; blocky and friable structure; possible deformed clay; w>PL; hard.	CL		83.4	S15	SS	14 -33 -38 -48	71	1.9 / 2.0	Transition zone. Have to retrieve more water due to the sand drilling.
80	80	78.0 - 80.0 CLAY; low to medium plasticity; grey maroon to mottled red, lustrous; blocky structure, waxy; cohesive; w>PL; stiff to hard.	CL		78.4	S16	SS	7 -18 -28 -38	16	2.0 / 2.0	
85	75	83.0 - 85.0 As above. CLAY; waxy; cohesive; w>PL; hard.	CH		73.4	S17	SS	14 -19 -25 -34	44	2.0 / 2.0	
90	70	88.0 - 90.0 CLAY to SILTY CLAY; low to medium plasticity; maroon red to mottled grey to 89 ft., then grey with slight pale red mottling; cohesive; w>PL; stiff to hard.	CL-CH		68.4	S18	SS	10 -19 -29 -37	48	2.0 / 2.0	
95	65	93.0 - 95.0 SILTY CLAY to CLAY; medium plasticity; trace of fine sand; maroon red to redish grey to mottled purple to brown; cohesive; w>PL; stiff.	CL-CH		63.4	S19	SS	9 -13 -18 -25	31	2.0 / 2.0	
100	60	98.0 - 100.0 As above. Medium to high plasticity; maroon to mottled grey; thinly laminated; stiff to hard.	CL-CH		58.4	S20	SS	9 -17 -22 -34	39	2.0 / 2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-13

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 270.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/6/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 499,205.1 E: 1,386,147.4
GS ELEVATION: 158.4 ft
TOC ELEVATION: NA
TEMPERATURE: 59 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
	55	103.0 - 105.0 As above. Blocky, becomes friable near bottom 0.9 ft.; cohesive; w>PL.	CL-CH		53.4	S21	SS	14 -21 -37 -50	58	2.0/2.0	
105						S22	SH	N/A -N/A -N/A -N/A	N/A	N/A/2.0	SHELBY TUBE collected. Drilled without sampling.
	50	108.0 - 110.0 SILTY CLAY to CLAY SILT, becomes CLAY SILT @ 109.4 ft.; brown to pale purple to grey brown; cohesive; w<PL to w~PL; stiff. Below 109.4 ft.: medium plasticity; trace of fine sand; grey brown; soft.	CL-ML		48.4	S23	SS	17 -16 -30 -34	46	2.0/2.0	
110											
	45	113.0 - 114.5 CLAY to SILTY CLAY; medium to high plasticity; some grey silt spots; brown red mottling; blocky structure, friable, slightly laminated near the top; cohesive; w~PL; stiff.	CH		43.9	S24	SS	17 -24 -32	56	1.7/2.0	Drove 1.5 ft interval since rods sank 0.5 ft.
115											
	40	118.0 - 120.0 CLAY; trace of fine sand with pockets of navy blue clay @ 119.2-119.4 ft.; grey pale purple to maroon red; blocky structure, slightly laminated, waxy; w>PL; stiff to hard.	CH		38.4	S25	SS	10 -16 -22 -26	38	2.0/2.0	
120											
	35										
125											
	30	128.0 - 130.0 CLAY TO SILTY CLAY; trace to some fine sand, silt towards bottom; maroon red brown to rust brown to mottled grey to pale purple; cohesive; w<PL; stiff to hard.	CL-ML		28.4	S26	SS	16 -24 -35 -44	59	2.0/2.0	
130											
	25										
135											
	20	138.0 - 140.0 SILTY CLAY; trace of fine sand; grey; massive structure; cohesive; w<PL.	ML		18.4	S27	SS	16 -30 -50/5	>50	1.4/2.0	
140											
	15										
145											
	10	148.0 - 150.0 CLAY; some nonplastic silt, trace of fine sand; maroon red to mottled grey to pale purple; cohesive; w<PL; hard.	CH		8.4	S28	SS	15 -22 -29 -37	51	N/A/2.0	
150											

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-13

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 270.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/6/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 499,205.1 E: 1,386,147.4
GS ELEVATION: 158.4 ft
TOC ELEVATION: NA
TEMPERATURE: 59 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
155	5										
	0	158.0 - 160.0 As above.	CH		-1.6	S29	SS	11 -19 -28 -36	47	2.0 / 2.0	Hard drilling interval.
160											
165	-5										
	-10	168.0 - 170.0 CLAY to SILTY CLAY; medium to high plasticity; maroon red to olive brown and mottled grey; blocky structure, waxy; cohesive; w<PL; very hard.	CH-ML		-11.6	S30	SS	20 -32 -50/5	>50	2.0 / 2.0	
170											
175	-15										
	-20	178.0 - 180.0 As above to 178.7 ft., then: CLAY SILT; medium plasticity; trace to some fine sand; pale purple to grey to dark green; friable; cohesive; friable; w<PL; stiff to hard.	CH-ML		-21.6	S31	SS	13 -22 -31 -38	53	1.8 / 2.0	
180											
185	-25										
	-30	188.0 - 190.0 SILTY CLAY and SILT; some fine sand, layered intermittent clay seams; pale red to brown to red brown to grey to old brown; slightly laminated, shiny; cohesive; w~PL; stiff to firm.	ML-SC		-31.6	S32	SS	12 -23 -34 -35	57	2.0 / 2.0	Transition zone.
190											
195	-35										
	-40	198.0 - 200.0 CLAYEY SILT to CLAYEY SAND; fine; fines with occasional firm clay lenses and seams; cohesive; w~PL, very moist.	MH-SC		-41.6	S33	SS	11 -14 -26 -39	40	2.0 / 2.0	
200											
	-45										

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-13

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 270.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/6/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 499,205.1 E: 1,386,147.4
GS ELEVATION: 158.4 ft
TOC ELEVATION: NA
TEMPERATURE: 59 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
205											
	-50	208.0 - 210.0 CLAYEY SILT to CLAYEY SAND; grey to dark grey; dry; soft to firm.	ML-SC		-51.6	S34	SS	14 -18 -24 -33	42	2.0/2.0	
210											
	-55										
215											
	-60	218.0 - 220.0 CLAYEY SAND to SILTY SAND; fine sand, stif clay; dark grey; cohesive; moist to very moist.	SC		-61.6	S35	SS	10 -17 -21 -23	38	2.0/2.0	Switched back to 5 ft samples.
220											
	-65	223.0 - 225.0 SILTY CLAY; occasional fine sand pockets, silt seams, @ 223.6 ft.: black shale-like seam (00.5 mm); dark grey; layered; cohesive; stiff.	CL		-66.6	S36	SS	17 -20 -24 -32	44	1.9/2.0	
225											
	-70	228.0 - 230.0 SILTY CLAY to CLAYEY SILT; trace of fine sand; dark grey; cohesive; w<PL to w~PL; stiff to hard.	CL		-71.6	S37	SS	13 -24 -32 -50/5	56	2.0/2.0	
230											
	-75	233.0 - 235.0 CLAY SAND; same SILTY CLAY as intermitten layered seams; dark grey; dilatent; moist to wet; firm to soft, compact.	SC		-76.6	S38	SS	33 -50/3	>50	0.6/2.0	Drilling hard @ 232 ft. for approx. 8 in. Already used up to 350 gals of drill water that morning.
235											
	-80	238.0 - 240.0 CLAYEY SILT, SILTY CLAY @ top 0.2 ft.; low plasticity; excess peat; hard maroon red to dark grey; massive structure; cohesive; w<PL.	ML		-81.6	S39	SS	43 -50/4	N/A	1.0/2.0	Hard drilling to rest of interval, used 80 gals of water.
240											
	-85	243.0 - 245.0 As above. SILTY CLAY to CLAY; hardpan silt; grey brown with maroon mottled red; in shape of spoon; stiff.	ML-CL		-86.6	S40	SS	32 -50/5	>50	1.0/2.0	
245											
	-90	248.0 - 250.0 CLAYEY SAND, dark red SILTY CLAY @ top 0.1 ft.; fine to medium; occasional CLAYEY SILT seams; grey to pale grey; blocky structure; cohesive; w~PL, very moist; dense to stiff.	SC		-91.6	S41	SS	WOR -16 -25 -50/4	41	1.6/2.0	
250											
	-95	253.0 - 255.0 SAND; fine; some silts and fines (12-15%); trace of medium sand; tan brown; very moist; dense.	SP		-96.6	S42	SS	50/3+50/4	>50	0.6/2.0	
255		Log continued on next page									

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-13

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 270.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/6/13
DATE COMPLETED: 5/14/13
WEATHER: Sunny

DATUM:
COORDS: N: 499,205.1 E: 1,386,147.4
GS ELEVATION: 158.4 ft
TOC ELEVATION: NA
TEMPERATURE: 59 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
255											
	-100	258.0 - 260.0 NO RECOVERY; fine to medium sand with brown wet residue.			-101.6	S43	SS	50/2	N/A	N/A / 2.0	
260											
	-105	263.0 - 265.0 SAND; medium grained, subrounded; 12-15% clay fines, trace of fine sand, occasional think soft clay lenses; pale grey to pale brown; noncohesive; very moist to wet; dense.	SP		-106.6	S44	SS	45 -50/3+100/4	>50	0.6 / 2.0	
265											
	-110	268.0 - 270.0 CLAYEY SAND; fine to medium grained, subrounded; trace of coarse, subangular to subrounded sand, frequent thin silty clay seams throughout (~5-10 mm); pale grey; cohesive to noncohesive; very moist to wet; dense to firm.	SC		-111.6	S45	SS	50/1		0.6 / 2.0	Drill rods @ ~250 ft. slipped down borehole and into unit approx. 12 in.
270		Boring completed at 270.0 ft									
	-115										
275											
	-120										
280											
	-125										
285											
	-130										
290											
	-135										
295											
	-140										
300											
	-145										
305											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-18

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 55- ATV
DATE STARTED: 5/20/13
DATE COMPLETED: 5/20/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,971.0 E: 1,387,520.4
GS ELEVATION: 73.6 ft
TOC ELEVATION: NA
TEMPERATURE: 65 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0											
5	70	3.0 - 5.0 SANDY LOAM to 1.0 ft., then CLAYEY SILT; fine graded; fine sand with fines; pale grey to brown and pale brown; some organic matter; very moist; soft to firm.	CL-ML		68.6	S1	SS	3 -6 -6 -9	12	1.4/2.0	No camera for first 3 intervals.
10	65	8.0 - 10.0 CLAYEY SAND; fine graded; trace subrounded coarse gravel; dark brown; cohesive; very moist to wet; soft.	SC		63.6	S2	SS	10 -10 -12 -8	22	1.2/2.0	Encountered gravel layer @ ~6 ft bgs.
15	60	13.0 - 15.0 Down to 13.9 ft.: SAND; medium to coarse, subrounded; intermitten CLAY seams (up to 0.2 ft thick); pale grey; wet; loose to firm. Below 13.9 ft.: CLAYEY SAND; fine to medium; trace orange brown soil; pale grey to tan and dark brown; wet; compact.	SP		58.6	S3	SS	4 -8 -12 -18	20	1.7/2.0	
20	55	18.0 - 20.0 SAND; fine to medium, uniformly graded; trace of fines occasional hardpan silt lenses; brown to tan brown, dark red to brown; wet; compact.	SP		53.6	S4	SS	15 -17 -19 -21	36	1.8/2.0	
25	50	23.0 - 25.0 SILTY CLAY; pale purple to dark mottled red to pale grey; slightly laminated @ bottom 0.2 ft; cohesive; w>PL.	CL		48.6	S5	SS	13 -28 -50/4	>50	1.2/2.0	
30	45	28.0 - 30.0 SILTY CLAY to CLAYEY SILT; low plasticity; trace fine sand; pale purple to pin to grey and maroon mottled red; cohesive; moist, w>PL; firm to stiff.	CL		43.6	S6	SS	14 -26 -36 -48	62	2.0/2.0	
35	40	33.0 - 35.0 SILTY CLAY to CLAYEY SILT; low plasticity; trace fine sand; brown to yellow brown to pale grey to marron mottled red; thinly laminated at top 0.4 ft.; friable; cohesive; moist, w>PL; firm to stiff.	CL-ML		38.6	S7	SS	20 -28 -32 -40	60	2.0/2.0	
40	35	38.0 - 40.0 SILTY CLAY to CLAYEY SILT; low to medium plasticity; pockets of grey CLAY SILT; brown to maroon red and grey; laminated at top 0.3 ft., friable; cohesive; w>PL; firm to stiff.	CL-ML		33.6	S8	SS	10 -18 -26 -34	44	2.0/2.0	
45	30	43.0 - 45.0 SILTY CLAY to CLAY; low to medium plasticity; trace of silt and grey silt stringers; red brown to brown to dark brown; massive structure, varved at top 0.3 ft.; cohesive; w>PL; stiff to hard.	CL-MH		28.6	S9	SS	11 -20 -28 -36	48	2.0/2.0	
50	25	48.0 - 50.0 CLAY to SILTY CLAY; low plasticity; dark grey; slightly friable; cohesive; w>PL; stiff to hard.	CL		23.6	S10	SS	12 -18 -28 -34	46	2.0/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE:

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-18

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 55- ATV
DATE STARTED: 5/20/13
DATE COMPLETED: 5/20/13
WEATHER: Overcast

DATUM:
COORDS: N: 501,971.0 E: 1,387,520.4
GS ELEVATION: 73.6 ft
TOC ELEVATION: NA
TEMPERATURE: 65 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	20										
60	15	58.0 - 60.0 CLAYEY SAND to SILTY SAND, SILTY CLAY at top 0.3 ft.; fine grained; intermitten firm clay seams throughout; dark brown to pale brown to pale grey, dark grey; cohesive to noncohesive; moist; very dense.	SC-SM		13.6	S11	SS	10 -19 -28 -50/4	47	1.9 / 2.0	Transition zone.
65	10	63.0 - 65.0 SILTY SAND to CLAYEY SILT; fine; pockets of SILTY fine SAND, intermitten SILTY CLAY seams, occasional wet sand seams (up to 0.1 ft thick); compact. SILTY CLAY: CLAYEY SILT stringers at bottom 0.3 ft.; pale grey to grey with red; cohesive; w>~PL; firm.	SM-MH		8.6	S12	SS	15 -26 -50/5	>50	1.7 / 2.0	
70	5	68.0 - 70.0 SILTY CLAYEY SAND; fine; pink brown to orange brown to maroon red and pink mottled grey; cohesive to noncohesive; w~PL. SAND: medium; occasional wet seams, trace of fine grey gravel, trace of clay at bottom of spoon (0.1 ft); maroon red fine sandy silt.	CL-ML		3.6	S13	SS	18 -36 -39 -50/4	75	1.9 / 2.0	
75	0	73.0 - 75.0 SAND; fine to medium; trace to some fines, occasional soft, pale grey SILTY CLAY pockets, sand; tan brown to brown, orange to brown; slightly shiny, layered; very moist; compact to dense.	SP		-1.4	S14	SS	44 -50/4	>50	0.7 / 2.0	
80	-5	78.0 - 80.0 SAND; fine to medium, poorly gaded; brown to pale grey with orange brown; layering at bottom half; moist to wet; dense.	SP		-6.4	S15	SS	50/4+50/3	N/A	0.6 / 2.0	
85	-10	83.0 - 85.0 SAND; medium, poorly graded, subrounded; trace fines, some fine sand; tan brown to brown; wet; dense.	SP		-11.4	S26	SS	50/6	N/A	0.5 / 2.0	
90	-15	Boring completed at 85.0 ft									
95	-20										
100	-25										

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE:

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-19

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 90.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/17/13
WEATHER: Overcast

DATUM:
COORDS: N: 502,391.0 E: 1,386,879.8
GS ELEVATION: 103.3 ft
TOC ELEVATION: NA
TEMPERATURE: 56 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0		0.0 - 2.0 CLAY; medium to high plasticity; reddish purple mottled white, shiny; trace organics; cohesive; w<PL; stiff.	CH		101.3	S1	DO	4 -8 -12 -17	20	1.2 / 2.0	
	100	3.0 - 5.0 CLAY; medium to high plasticity; red to maroon mottled grey, shiny; yellowish brown staining at ~3 to 4 ft bgs, cohesive; stiff.	CH		98.3	S2	DO	4 -13 -19 -20	32	1.0 / 2.0	
5											
	95	8.0 - 8.6 SILTY CLAY; low to medium plasticity; mottled red and white; thinly laminated; yellow staining; cohesive; w~PL; stiff.	CL CL CH		94.7 93.7	S3	DO	5 -10 -16 -17	26	1.6 / 2.0	
10		8.6 - 9.0 SILTY CLAY; low to medium plasticity; light grey; w<PL; stiff.									
	90	9.0 - 9.6 CLAY; red to maroon mottled white; thinly laminated; cohesive; stiff.	CH		89.7						
		13.0 - 13.6 CLAY; medium to high plasticity; purplish grey, shiny; cohesive; w~PL; stiff.	CH		13.6 88.3	S4	DO	6 -10 -15 -16	25	1.2 / 2.0	
15		13.6 - 15.0 CLAY; medium to high plasticity; trace gravel, lens of fine to medium yellowish brown sand; light grey mottled maroon; cohesive; stiff.									
	85	18.0 - 20.0 CLAY; medium to high plasticity; trace of coarse rounded gravel (~25 mm.); rust red; cohesive; w>PL; soft.	CH		83.3	S5	DO	5 -11 -12 -16	23	0.3 / 2.0	
20											
	80	23.0 - 25.0 CLAY; medium to high plasticity; rust red and grey; cohesive; w>PL; very soft.	CH		78.3	S6	DO	5 -11 -13 -15	24	0.7 / 2.0	
25											
	75	28.0 - 30.0 CLAY; medium to high plasticity; lenses of fine grey silty sand; greyish brown, shiny; some thin lamination; noncohesive to cohesive; moist; stiff.	CH		73.3	S7	DO	10 -12 -20 -30	32	1.9 / 2.0	
30											
	70	33.0 - 35.0 SILTY CLAY; low to medium plasticity; lens of fine grey sand; grey mottled maroon, slightly shiny; some thin laminations; noncohesive to cohesive; moist; stiff.	CL		68.3	S8	DO	8 -12 -18 -25	30	1.9 / 2.0	
35											
	65	38.0 - 40.0 SILTY CLAY; low to medium plasticity; trace fine sand; slightly fissured throughout; grey mottled maroon, slightly shiny; some thin laminations; noncohesive to cohesive; moist; stiff.	CL		63.3	S9	DO	10 -14 -20 -26	34	0.8 / 2.0	
40											
	60	43.0 - 45.0 CLAY; medium to high plasticity; grey mottled maroon, shiny; slightly fissured throughout; cohesive; stiff.	CH		58.3	S10	DO	10 -16 -22 -23	38	1.9 / 2.0	
45											
	55	48.0 - 50.0 SILTY CLAY; low to medium plasticity; some fine light grey sand; mottled light grey and maroon; cohesive; stiff.	CL		53.3	S11	DO	10 -13 -20 -23	33	1.9 / 2.0	
50											

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-19

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 90.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: Mud Rotary- 3 in.
DRILL RIG: Simco 2800
DATE STARTED: 4/16/13
DATE COMPLETED: 4/17/13
WEATHER: Overcast

DATUM:
COORDS: N: 502,391.0 E: 1,386,879.8
GS ELEVATION: 103.3 ft
TOC ELEVATION: NA
TEMPERATURE: 56 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
	50	53.0 - 55.0 SILTY CLAY; low to medium plasticity; mottled grey and dark red, dull; cohesive; stiff. 53.6-54.0 ft w>PL; soft.	CL		48.3	S12	DO	19 -20 -37 -40	57	0.9 / 2.0	
55	45	58.0 - 60.0 CLAY; medium to high plasticity; some silt; mottled grey and maroon, shiny; cohesive; w~PL; stiff.	CH		43.3	S13	DO	12 -14 -21 -22	35	0.7 / 2.0	
60		60.0 - 62.0 SILTY CLAY; low to medium plasticity; some fine sand; dark grey mottled brown; cohesive;, stiff.	CL		60.0 / 41.3	S14	DO	12 -14 -24 -28	38	2.0 / 2.0	
	40	62.0 - 64.0 SILTY CLAY; low plasticity; lenses of fine grey silty sand, pockets of fine grey sand; light grey, shiny; cohesive; stiff.	CL		62.0 / 39.3	S15	DO	15 -16 -24 -28	40	2.0 / 2.0	
65		64.0 - 66.0 SILTY SAND; nonplastic, fine; some plastic fines, lenses of fine grey sand; light grey, shiny; noncohesive to cohesive; trace black material-soft, shiny, possibly organic; moist.	SM		64.0 / 37.3	S16	DO	15 -18 -24 -45	42	1.9 / 2.0	
			SM		66.0 / 35.3	S17	DO	25 -39 -50/4	N/A	1.7 / 2.0	Drilled w/o sampling. (67.3'-68')
	35	66.0 - 68.0 SILTY SAND; fine, nonplastic; pockets of fine grey sand; light grey; noncohesive; moist; very dense.	CL		68.0 / 33.3	S18	DO	14 -23 -30 -45	53	1.8 / 2.0	
70		68.0 - 70.0 SILTY CLAY; low to medium plasticity; lenses of fine to medium sand; dark grey, slightly shiny; cohesive; stiff.	CL		70.0 / 31.3	S19	DO	23 -50/5	N/A	0.9 / 2.0	Drilled w/o sampling. (70.9'-72')
	30	70.0 - 72.0 SILTY CLAY; low to medium plasticity; pockets of fine grey sand, lens of fine to med reddish brown sand; dark grey; cohesive; very stiff.	CL		72.0 / 29.3	S20	DO	24 -35 -50/5	N/A	1.8 / 2.0	Drilled w/o sampling. (73.4'-74')
75		72.0 - 74.0 SILTY CLAY; low to medium plasticity; lenses of fine to medium light grey sand; light grey mottled rust red, slightly shiny; cohesive; stiff.	CL		74.0 / 27.3	S21	DO	27 -40 -50/5	N/A	0.9 / 2.0	Drilled w/o sampling. (75.4'-76')
			ML		76.0 / 25.3	S22	DO	16 -30 -50/5	N/A	0.9 / 2.0	Drilled w/o sampling. (77.4'-78')
	25	74.0 - 76.0 SILTY CLAY; low to medium plasticity; pockets of fine to medium light grey sand; light grey mottlled browish red, slightly shiny; cohesive; w~PL; stiff.	SM		78.0 / 23.3	S23	DO	22 -32 -37 -50/3	69	1.5 / 2.0	
80		76.0 - 78.0 CLAYEY SILT; low plasticity; light grey mottled brownish red; lens of fine to medium light grey sand; slightly fissured; cohesive; w<PL; stiff.									
	20	78.0 - 80.0 SILTY SAND; fine to medium, nonplastic; lenses of light grey mottled brownish red clayey silt; light grey; noncohesive; moist to wet; very dense.	SM		18.3	S24	DO	49 -37 -50/4	N/A	1.3 / 2.0	Drilled w/o sampling. (89.4'-85')
85		83.0 - 85.0 SILTY SAND; fine to medium, nonplastic; light grey; noncohesive; moist to wet; very dense.									
	15	88.0 - 90.0 SILTY SAND, transition into very soft CLAY; ~0.4 ft. of fine to medium sand, nonplastic; grey; moist; very dense. ~0.9 ft. of CLAY; high plasticity; grey and red; cohesive; w>PL; very soft.	SP		13.3	S25	DO	50/5	N/A	1.3 / 2.0	Drilled w/o sampling.
90		Boring completed at 90.0 ft									
	10										
95											
	5										
100											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Earth Matters Inc.
DRILLER: D. Taylor

GA INSPECTOR: KMC
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-23

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 230.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/29/13
DATE COMPLETED: 5/30/13
WEATHER: Partly Cloudy

DATUM:
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0		3.0 - 3.3 SANDY SILT; dark red brown; organics; moist; firm.	SM ML-CL		3.3	S1	SS	5 -8 -10 -16	18	1.3/2.0	
5		3.3 - 5.0 CLAYEY SILT, SILTY CLAY; clay seams; dark red brown; blocky; cohesive; w>PL; stiff.									
		8.0 - 10.0 CLAYEY SILT, SILTY CLAY; low plasticity; clay seams; trace fine gravel; dark red brown; blocky; cohesive; w>PL; stiff to hard.	ML-CL			S2	SS	9 -13 -19 -26	32	1.9/2.0	
10		13.0 - 15.0 CLAYEY SILT, SILTY CLAY; low plasticity; clay seams; trace fine gravel; marron red-grey-brown mottling; blocky; cohesive; w>PL; hard.	ML-CL			S3	SS	8 -14 -19 -27	33	1.9/2.0	
15		18.0 - 20.0 CLAYEY SILT, SILTY CLAY; low plasticity; clay seams; trace fine gravel; marron red-grey-brown mottling; friable, blocky; cohesive; w>PL; stiff.	ML-CL			S4	SS	7 -12 -14 -23	26	1.8/2.0	Clay possibly swelling in borehole.
20		23.0 - 25.0 CLAYEY SILT; trace fine to medium sand; maroon; friable, blocky structure; cohesive; w>PL.	MH			S5	SS	8 -13 -17 -23	30	2.0/2.0	Clay swelled enough to close borehole and refuse rods- used 15' of 4'1/4" HSAs to support hole and resumed drilling and sampling through augers from 0-15 ft bgs.
25		28.0 - 30.0 SILTY SAND; trace fines; clay seams; pale brown grey; cohesive; moist.	SM			S6	SS	19 -27 -25 -50/5"	52	1.9/2.0	
30		33.0 - 35.0 SILTY SAND; occasional pockets of fine sand, clay seams; pale brown grey; cohesive; moist.	SM			S7	SS	26 -40 -41 -50/4"	81	1.8/2.0	
35		38.0 - 40.0 SILTY SAND; fine, poorly graded; grey brown to tan brown; moist.	SM			S8	SS	22 -31 -50/5"	81	1.2/2.0	
40		43.0 - 45.0 SAND; fine to medium, poorly graded; trace silt; grey brown to tan brown; moist.	SP			S9	SS	34 -50/4.5"	N/A	0.9/2.0	
45		48.0 - 50.0 SAND; fine to medium; some fines; tan brown to brown; moist; dense.	SP			S10	SS	34 -50/6"	N/A	0.8/2.0	
50		Log continued on next page									

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY:
DATE:

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 8/28/13

RECORD OF BOREHOLE PMW-23

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 230.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/29/13
DATE COMPLETED: 5/30/13
WEATHER: Partly Cloudy

DATUM:
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55		53.0 - 55.0 SAND; fine to medium; trace fines; grey brown; moist; compact to dense.	SP			S11	SS	27 -50/5"	N/A	0.9/2.0	
60		58.0 - 60.0 SAND; fine to medium; trace pale green clay seams; brown to tan brown; moist to wet; dense.	SP			S12	SS	33 -50/5.5"	N/A	0.9/2.0	
65		63.0 - 65.0 SAND; fine to medium; occasional soft clay pale green; brown to tan brown; moist to fry; dense.	SP			S13	SS	27 -40 -50/4"	90	1.1/2.0	
70		68.0 - 70.0 SAND; fine to medium, poorly graded; some coarse sand; tan brown; moist to wet.	SP			S14	SS	39 -50/4"	N/A	0.7/2.0	
75		73.0 - 75.0 SAND; medium to coarse; trace fines, some dirty sand; tan brown; dilatent, subrounded; dense to compact.	SP			S15	SS	18 -21 -27 -50/5"	48	1.8/2.0	
80		78.0 - 80.0 SILTY SAND to SANDY CLAY; maroon red clay seams; maroon red to pale green; cohesive; w>PL; moist.	SM-SC			S16	SS	10 -13 -20 -28	33	2.0/2.0	
85		83.0 - 85.0 CLAYEY SAND; some silt pockets and seams, trace charcoal-like matter; cohesive to noncohesive; w>PL; moist.	SC			S17	SS	14 -24 -50/4"	74	1.7/2.0	
90		88.0 - 90.0 CLAYEY SILT to SILTY CLAY; trace fine sand; dark grey; cohesive; blocky, slightly friable; w>PL; stiff.	ML-CL			S18	SS	8 -13 -22 -30	35	1.9/2.0	
95		93.0 - 95.0 CLAYEY SILT to SILTY CLAY; dark grey; cohesive; w>PL; stiff.	ML-CL			S19	SS	10 -14 -24 -28	35	2.0/2.0	
100		98.0 - 100.0 SILTY CLAY to CLAYEY SILT; soft clay seams; low plasticity; dark grey; cohesive; blocky; stiff.	ML-CL			S20	SS	4 -9 -12 -21	21	2.0/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY:
DATE:

Golder Associates

RECORD OF BOREHOLE PMW-23

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 230.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/29/13
DATE COMPLETED: 5/30/13
WEATHER: Partly Cloudy

DATUM:
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
105		103.0 - 105.0 SILTY CLAY to CLAYEY SILT; soft clay seams; low plasticity; dark grey; cohesive; blocky; w>PL; moist; stiff.	ML-CL			S21	SS	5 -14 -19 -30	33	2.0/2.0	
110		108.0 - 110.0 SILTY CLAY to CLAYEY SILT; low plasticity; dark grey to brown; cohesive; massive structure.	ML-CL			S22	SS	9 -16 -26 -31	42	2.0/2.0	
115		113.0 - 115.0 SILTY CLAY to CLAYEY SILT; dark grey to brown; low plasticity; massive structure; cohesive; w>PL.	ML-CL			S23	SS	9 -15 -18 -25	33	2.0/2.0	
120		118.0 - 120.0 SILTY CLAY to CLAYEY SILT; some fine sand lenses, pockets of cemented sandy silt pockets and occasional black coal pockets; dark grey to brown; cohesive; w>PL.	ML-CL			S24	SS	9 -18 -26 -40	44	2.0/2.0	
125		123.0 - 125.0 CLAY; low to medium plasticity; maroon red to dark brown; cohesive; w>PL; hard.	CH			S25	SS	8 -10 -17 -23	27	2.0/2.0	
130		128.0 - 130.0 Shelby tube collected	ML			S26	SS	N/A		1.6/2.0	
140		138.0 - 140.0 CLAY; medium to high plasticity; pale purple to brown grey to maroon red mottled yellow btown; cohesive; blocky and friable; w>PL; very hard.	CH			S27	SS	16 -22 -30 -47	52	2.0/2.0	
150		148.0 - 150.0 CLAY; trace silt; tan brown grey to grey brown; cohesive; blocky and friable; w>PL; hard.	CH			S28	SS	13 -21 -28 -38	49	2.0/2.0	Drilled w/o sampling. (150'-158'). Drillers note materials feels like hard clay.

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY:
DATE:

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 8/28/13

RECORD OF BOREHOLE PMW-23

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 230.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/29/13
DATE COMPLETED: 5/30/13
WEATHER: Partly Cloudy

DATUM:
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
155											
		158.0 - 160.0 CLAY to SILTY CLAY; some fine sand and silt seams; dark grey; cohesive; w~PL; stiff.	CH-ML			S29	SS	11 -14 -19 -27	33	2.0/2.0	Drilled w/o sampling. (160'-168'). Drillers note coarse material.
160											
165											
		168.0 - 170.0 SILTY CLAY to SILTY SAND; some sandy silty seams, trace coarse gravel; dark grey; cohesive; w~PL; stiff.	ML-SM			S30	SS	11 -11 -19 -29	30	2.0/2.0	
170											
		173.0 - 175.0 SILTY CLAY to SILTY SAND; fine to medium sand seams, trace silt stone or mudstone fragments; dark grey; cohesive; w~PL; stiff.	ML-SM			S31	SS	14 -28 -42 -50/3.5"	70	2.0/2.0	Drilled w/o sampling. (175'-178'). Drillers note materials feel like sand.
175											
						S32	SS	13 -31 -25 -60/4"	56	1.9/2.0	
180											Drilled w/o sampling. (180'-183').
		183.0 - 185.0 SILTY CLAY and SAND; fine to medium; cohesive to non-cohesive; dark grey to grey; w~PL, wet.	CL-SP			S33	SS	13 -41 -27 -50/4"	68	2.0/2.0	
185											Drilled w/o sampling. (185'-188').
		188.0 - 190.0 SANDY CLAY; fine silty sand lenses throughout; cohesive; strongly cemented, irregular; w<PL to w~PL; stiff.	SC			S34	SS	9 -16 -20 -27	36	2.0/2.0	
190											Drilled w/o sampling. (190'-193').
		193.0 - 195.0 SILTY SAND to CLAY; fine to medium; some coarse sand; low plasticity; grey silty stringers; pale brown to brown; cohesive; blocky and friable; w<PL; very moist to wet; hard.	SM-CL			S35	SS	28 -29 -40 -50/4.5"	69	2.0/2.0	
195											Drilled w/o sampling. (195'-198'). Drillers note materials feel like hard clay.
		198.0 - 200.0 SILTY CLAY to CLAY; medium plasticity; occasional grey silty stringers and lenses; maroon red to red brown; blocky; hard.	CH-ML			S36	SS	18 -33 -44 -50/4.5"	77	2.0/2.0	
200											Drilled w/o sampling. (200'-208'). Drillers note materials feel like hard clay.

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY:
DATE:

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 8/28/13

RECORD OF BOREHOLE PMW-23

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 230.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 75
DATE STARTED: 5/29/13
DATE COMPLETED: 5/30/13
WEATHER: Partly Cloudy

DATUM:
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION: NA
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
205											
						S37	SS	31 -50/5"	N/A	0.9 / 2.0	Drilled w/o sampling. (210'-218'). Drillers note materials feel like hard clay.
210											
215											
		218.0 - 220.0 No Recovery.				S38	SS	50/5.5"	N/A	0.5 / 2.0	
220											Drilled w/o sampling. (220'-223'). Drillers note materials feel like sand.
		223.0 - 225.0 No Recovery.				S39	SS	50/5"	N/A	NR / 2.0	
225											Drilled w/o sampling. (225'-228'). Drillers note materials feel like sand.
		228.0 - 230.0 CLAY; some fine to coarse sand, trace silt; white.	CL			S40	SS	33 -32 -50/5"	82	1.4 / 2.0	
230		Boring completed at 230.0 ft									
235											
240											
245											
250											
255											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY:
DATE:

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 8/28/13

RECORD OF BOREHOLE PMW-28

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 80.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 55- ATV
DATE STARTED: 5/16/13
DATE COMPLETED: 5/18/13
WEATHER: Sunny

DATUM:
COORDS: N: 500,547.9 E: 1,388,117.0
GS ELEVATION: 139.2 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
0											
5	135	3.0 - 5.0 CLAYEY SILT; some fine sand; brown to olive brown; cohesive; moist; firm.	SC		134.2	S1	SS	6 -9 -11 -10	20	1.8/2.0	
10	130	8.0 - 10.0 SILTY GRAVEL with sand; fine to coarse, subrounded gravel, medium to coarse sand, trace fine subrounded sand; brown to tan brown; quartz gravel; moist; loose to compact.	GM		129.2	S2	SS	4 -5 -6 -8	11	1.3/2.0	
15	125	13.0 - 15.0 CLAYEY SILT to SILTY SAND; clay at seams and SILTY SAND seams, loose fine sand at bottom 0.1 ft.; pale grey; layered; cohesive to noncohesive; moist to wet; soft to firm.	MH-SM		124.2	S3	SS	2 -2 -3 -5	5	2.0/2.0	
20	120	18.0 - 20.0 SAND; poorly, uniformly graded, fine; trace fines; brown to tan brown; layered; moist to wet; loose.	SP		119.2	S4	SS	4 -3 -4 -7	7	1.9/2.0	At approx. 19 ft. bgs: wet. Install 6" steel temporary casing.
25	115	23.0 - 23.7 CLAYEY SILT; fine sand, occasional low plasticity clay pockets; pale grey; cohesive; very moist; compact.	SC / SM / SP		115.5 / 114.8 / 114.2	S5	SS	4 -6 -13 -25	19	1.9/2.0	
		23.7 - 24.4 CLAYEY SAND; occasional clay pockets; cohesive; moist; compact.									
		24.4 - 25.0 SAND; fine, poorly graded; trace fine; tan pale to pale brown; noncohesive; very moist; compact.									
30	110	28.0 - 30.0 SAND; trace of fines; brown to pale brown to tan brown; layered; moist, occasional thin wet zones; compact.	SP		109.2	S6	SS	15 -18 -21 -27	39	1.8/2.0	
35	105	33.0 - 35.0 SAND; fine to medium, poorly graded; trace of fines; tan brown to pale brown; moist to wet; dense.	SP		104.2	S7	SS	18 -30 -39 -50/4"	69	1.7/2.0	
40	100	38.0 - 40.0 SAND; fine to medium; poorly graded; trace fines; tan brown to pale brown; wet to moist; dense.	SP		99.2	S8	SS	21 -30 -41 -50/3"	N/A	1.5/2.0	
45	95	43.0 - 45.0 SAND; pale brown to tan brown; moist to wet.	SP		94.2	S9	SS	32 -50/5"	N/A	0.6/2.0	
50	90	48.0 - 50.0 SAND; medium, uniformly graded; some fine sand; pale brown to tan brown; wet; dense.	SP		89.2	S10	SS	50/5"	N/A	0.8/2.0	

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

RECORD OF BOREHOLE PMW-28

PROJECT: Chesapeake Terrace SFI
PROJECT NUMBER: 063-1431-003
DRILLED DEPTH: 80.0 ft
AZIMUTH: N/A
LOCATION: Odenton, MD

DRILL METHOD: HSA/Mud Rotary
DRILL RIG: CME 55- ATV
DATE STARTED: 5/16/13
DATE COMPLETED: 5/18/13
WEATHER: Sunny

DATUM:
COORDS: N: 500,547.9 E: 1,388,117.0
GS ELEVATION: 139.2 ft
TOC ELEVATION: NA
TEMPERATURE: 50 F

INCLINATION: -90
DEPTH W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in	N	REC / ATT	COMMENTS
55	85	53.0 - 55.0 SAND, becoming medium sand with 20-30% fines; fine to medium, subrounded; occasional soft grey clay pockets; wet; dense.	SP		84.2	S11	SS	43 -50/5"	>50	0.9 / 2.0	
60	80	58.0 - 60.0 SAND; uniformly graded; trace of fines, 0.1 ft. of SILTY CLAY with fine sand; very moist; dense, firm at top of interval.	SP		79.2	S12	SS	36 -50/3"	>50	0.7 / 2.0	
65	75	63.0 - 65.0 SAND; uniformly graded; 0.4 ft. of SILTY CLAY seam; pale grey, from 64.2-64.6 ft.: brown to pale brown; dilatent wet; compact.	SP		74.2	S13	SS	11 -24 -50/4"	>50	1.0 / 2.0	Comparable to boring log for MW-13.
70	70	68.0 - 70.0 SAND; poorly graded, fine to medium; trace fines; brown to tan brown; slightly stratified; wet; dense.	SP		69.2	S14	SS	9 -27 -33 -50/4"	60	1.3 / 2.0	
75	65	73.0 - 75.0 SAND; poorly graded, fine to medium; trace clay pockets, trace fines; brown to tan brown; "clean"; wet; dense.	SP		64.2	S15	SS	50/4.5"+100/2"	N/A	0.8 / 2.0	
80	60	78.0 - 80.0 SILTY CLAY to CLAYEY SILT; intermitten CLAYEY fine SAND seams (up to 0.2' thick); blocky structure; cohesive; moist thoughout, clay=w~PL; soft to stiff.	CL-MH		59.2	S16	SS	10 -16 -30 -50/5"	46	1.9 / 2.0	
	55	Boring completed at 80.0 ft									
85											
	50										
90											
	45										
95											
	40										
100											

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: FSD
DRILLER: J. Scribellito

GA INSPECTOR: RJM
CHECKED BY: VEF
DATE: 8/8/13

Golder Associates

AA GEOTECH LOG NO PID CHESAPEAKE SFI.GPJ GOLDER NJ-PA 05-24-06.GDT 9/27/13

MONITORING WELL INSTALLATION LOG

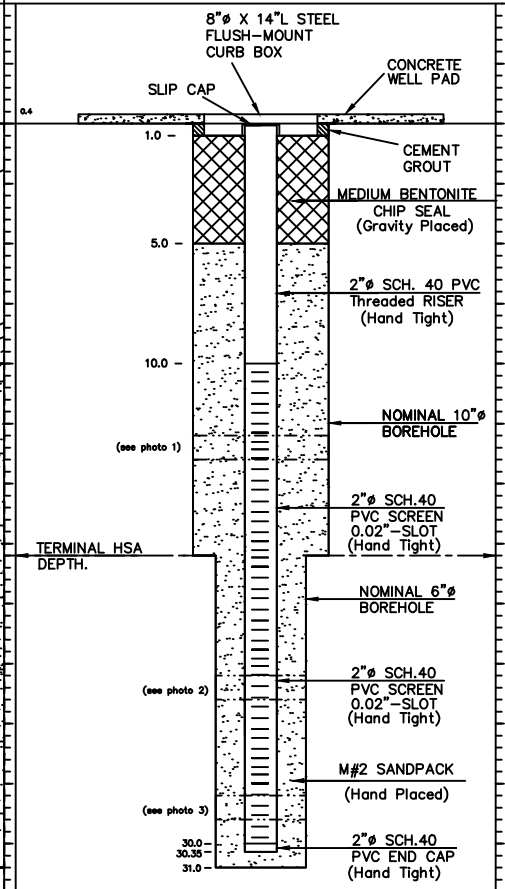
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-06	SHEET	1 of 2
GA INSP.	KMC	DRILLING METHOD	6 1/4" HSAs & 5 7/8" MUD ROTARY	GROUND ELEV.	~76-FT.	WATER DEPTH	14.59 FT. BTOR
WEATHER	SUNNY	DRILLING COMPANY	EARTH MATTERS INC.	COLLAR ELEV.	~75.5-FT.	DATE/TIME	0800 05/15/13
TEMP.	50° F	DRILL RIG	SIMCO 2800	DRILLER	D. TAYLOR	STARTED (TIME / DATE)	1045 05/14/13
						COMPLETED (TIME / DATE)	1315 05/14/13
LOCATION / COORDINATES	N, E	(EAST OF CELL 11)					

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 10 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	MEDIUM BENTONITE CHIPS-FOUR (4) BAGS
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	GRAVITY
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	20 BAGS
GROUT QUANTITY	N/A	CENTRALIZERS	NOT USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	MEDIUM BENTONITE CHIPS	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	GRAVITY

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~76.0	EXISTING GROUND SURFACE*
0.0	INTERPRETED SUB-SURFACE*
	Gravelly SAND
	(SP) Gravelly f-SAND, poorly graded, up to 40% fine to coarse gravel, some plastic fines, brown, non-cohesive, moist, compact.
5.0	
66.0	
10.0	SAND
	(SP) Fine to coarse SAND, poorly graded, some fine to coarse gravel, occasional seams of soft, sandy clay, light brown to orange brown, non-cohesive, moist to wet, compact.
15.0	
66.0	
18.0	
20.0	
25.0	
30.0	
45.0	
31.0	EOB @ 31.0 FT. bgs.

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 6¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 18.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING FROM 3-30 FT. bgs. USING 2⅞"DRAG BIT. REAMED OUT BOREHOLE USING 5⅞"DRAG BIT FROM 18.0-31.0 FT. bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. WELL MATERIALS PLACED IN BOREHOLE USING 20.0 FT. WELL SCREEN, FLAT-END THREADED END CAP, 10.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 30.35 FT. WELL MATERIALS PLACED TO 30.35 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK PLACED THROUGH AUGERS 31.0-5.0 FT. bgs. HSAs REMOVED AND BENTONITE CHIP SEAL PLACED 5.0-0.0 FT. bgs. TEMPORARY RISER STICKUP REMOVED ON 5/15/13 TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH- MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags.

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (05/14/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED: 05/15/13
DEVELOPMENT METHOD: SUPERTWISTER SUBMERSIBLE PUMP
VOLUME PURGED: 476 GALS.
FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

Golder Associates

G:\Projects\2018\20183854 - Chesapeake Terrace LF\Work Documents\Info from Golder\CAD\~Misc\Well Logs\CAD Files for Well Logs\Shallow Wells\PMW-06 well log.dwg

MONITORING WELL INSTALLATION LOG

JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-06	SHEET	2 of 2
GA INSP.	KMC	DRILLING METHOD	6 1/4" HSAs & 5 7/8" MUD ROTARY	GROUND ELEV.	~76-FT.	WATER DEPTH	14.59 FT. BTOR
WEATHER	SUNNY	DRILLING COMPANY	EARTH MATTERS INC.	COLLAR ELEV.	~75.5-FT.	DATE/TIME	0800 05/15/13
TEMP.	50° F	DRILL RIG	SIMCO 2800	DRILLER	D. TAYLOR	STARTED (TIME / DATE)	1045 05/14/13
						COMPLETED (TIME / DATE)	1315 05/14/13
LOCATION / COORDINATES	N, E	(EAST OF CELL 11)					

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 10 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	MEDIUM BENTONITE CHIPS-FOUR (4) BAGS
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	GRAVITY
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	20 BAGS
GROUT QUANTITY	N/A	CENTRALIZERS	NOT USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	MEDIUM BENTONITE CHIPS	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	GRAVITY

	INSTALLATION PHOTOS**	INSTALLATION NOTES
PHOTO 1 Photo of sample interval portion from screened section of PMW-6 (screen set from 10-30-ft. bgs).		**SEE PHOTO LOG IN REPORT FOR ADDITIONAL CONSTRUCTION PHOTOS
PHOTO 2 Photo of sample interval portion from screened section of PMW-6 (screen set from 10-30-ft. bgs).		
PHOTO 3 Photo of sample interval portion from screened section of PMW-6 (screen set from 10-30-ft. bgs).		

Golder Associates

MONITORING WELL INSTALLATION LOG

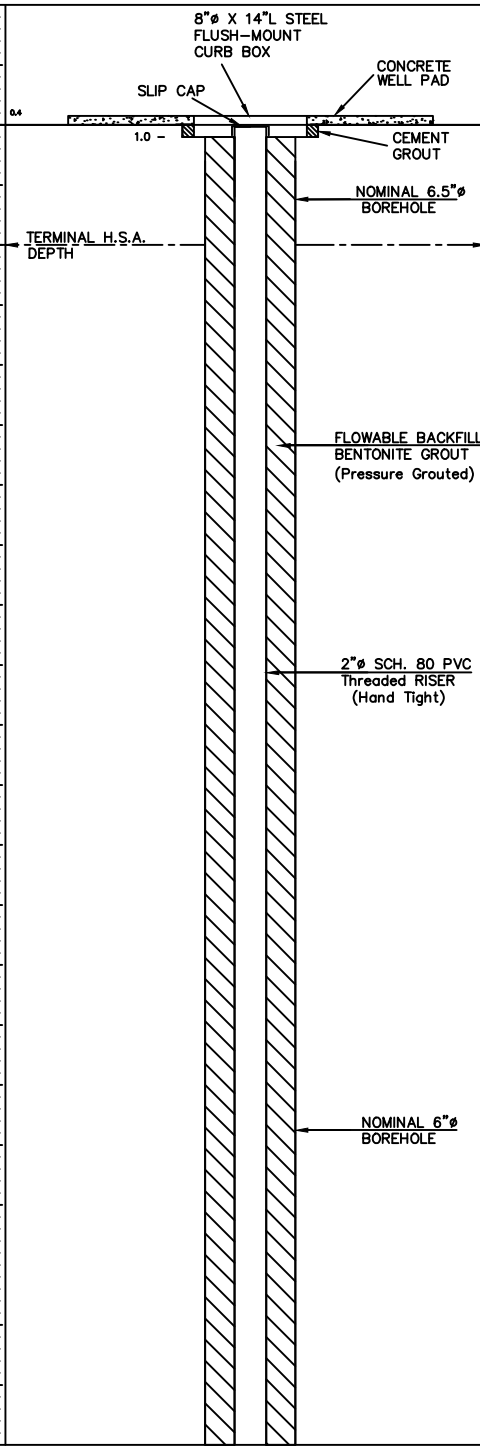
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-11	SHEET	1 of 2
GA INSP.	RJM	DRILLING METHOD	3 1/4"I.D. H.S.A's & 5 7/8" MUD ROTARY	GROUND ELEV.	~146 FT.	WATER DEPTH	82.56 FT.BTOR
WEATHER	SUNNY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~145.5 FT.	DATE/TIME	05/20/2013 0750
TEMP.	50° F	DRILL RIG	CME-75	DRILLER	J. SCRIBELLITO	STARTED	0900 04/22/13 (TIME / DATE)
						COMPLETED	1300 04/22/13 (TIME / DATE)
LOCATION / COORDINATES	N, E . (WEST OF CELL 10 AREA)						

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 200 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 80 PVC	SCREEN TYPE	SCHEDULE 80 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	8 BAGS
GROUT QUANTITY	~280-300 GALLONS	CENTRALIZERS	2-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	TREMIE-WASHED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~146.0	EXISTING GROUND SURFACE*
0.0	INTERPRETED SUB-SURFACE*
	SILTY SAND to SILT to SAND (SM-SW to ML) Silty f-m SAND, brown-tan br. to pale br., non-plastic, some plastic fines, occasional sub-rounded gravelly fines, trace organic material, non-cohesive, moist to wet, loose to CP.
10.0	
20.0	
118.0	
28.0	
30.0	CLAY TO SILTY CLAY (CH-CL) CLAY to SILTY CLAY, light grey & maroon-dk. maroon to red-purple, pale purple-white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand & silt lenses, trace silty sand lenses, occasionally fissured and blocky, cohesive, w<PL to w>PL, stiff to hard.
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	
110.0	

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 3¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 10.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING 3-5 FT AND 8-10 FT. AUGERS REMOVED. TEMPORARY 6" STEEL SURFACE CASING HYDRAULICALLY PUSHED TO 9 FT. bgs. RESUMED STANDARD SAMPLING USING 5⅞"DRAG BIT FROM 13.0-65.0 FT. bgs. DUE TO SIGNIFICANT DRILLING FLUID LOSS AT SHALLOW DEPTH IN BOREHOLE ON 04/16/13, ADDITIONAL TEMPORARY 6" STEEL SURFACE CASING ADVANCED TO 31.0 FT bgs. ON 04/17/13. RESUMED STANDARD SAMPLING FROM 68.0 FT bgs. ON 04/17/13. SAMPLED TO 220 FT bgs. ON 04/19/13. DRILLED BOREHOLE ON 04/22/13 TO 221 FT bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH TEMPORARY 6" SURFACE CASING. WELL MATERIALS PLACED IN BOREHOLE USING 20.0 FT. WELL SCREEN, FLAT-END THREADED END CAP, 205.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 225.75 FT. WELL MATERIALS PLACED TO 220.75 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (04/22/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED: 05/20/13

DEVELOPMENT METHOD: AIR LIFT

VOLUME PURGED: 780 GALS.

FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

MONITORING WELL INSTALLATION LOG

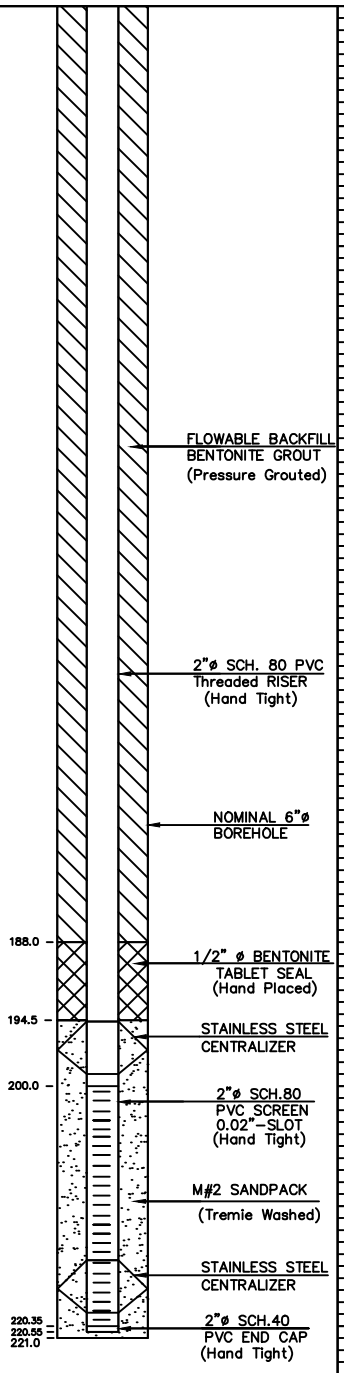
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-11	SHEET	2 of 2
GA INSP.	RJM	DRILLING METHOD	3 1/4" I.D. H.S.A's & 5 7/8" MUD ROTARY	GROUND ELEV.	~146 FT.	WATER DEPTH	82.56 FT.BTOR
WEATHER	SUNNY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~145.5 FT.	DATE/TIME	05/20/2013 0750
TEMP.	50° F	DRILL RIG	CME-75	DRILLER	J. SCRIBELLITO	STARTED (TIME / DATE)	0900 04/22/13
						COMPLETED (TIME / DATE)	1300 04/22/13

LOCATION / COORDINATES N, E . (WEST OF CELL 10 AREA)

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 200 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 80 PVC	SCREEN TYPE	SCHEDULE 80 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	8 BAGS
GROUT QUANTITY	~280-300 GALLONS	CENTRALIZERS	2-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	TREMIE-WASHED

Depth	Description
110.0	CLAY TO SILTY CLAY See Sheet 1 for Details
120.0	
130.0	
140.0	
150.0	
160.0	
170.0	
-32.0 / 178.0	
180.0	
190.0	SILTY CLAY to CLAYEY SILT
200.0	
-57.0 / 203.0	SILTY SAND to SAND
210.0	(SM-SP) Silty f-m SAND, pale grey & white, non-plastic, non-cohesive, trace low plasticity fines and occasional thin clay lenses, wet, dense.
220.0 -74.0	
221.0 -75.0	EOB @ 221.0 FT. bgs.



INSTALLATION NOTES

FT. STICKUP. M#2 SANDPACK TREMIE-WASHED 221.0-194.5 FT. bgs. 1/2" COATED BENTONITE TABLET SEAL PLACED BY HAND 194.5-188.0 FT. bgs. TABLETS ALLOWED TO HYDRATE 30 MINUTES. BENTONITE SLURRY TREMIED 188.0 FT. bgs. TO GROUND SURFACE WHILE REMOVING TEMPORARY 6" STEEL SURFACE CASING. GROUT LEVEL WAS MEASURED AT APPROX. 5.0 FT. bgs. ON 04/23/13 AFTER SETTLING, AND ADDITIONAL GROUT PLACED TO WITHIN 1-FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH-MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags.

Golder Associates

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD Files for Well Logs\Deep Wells\PMW-11 well log.dwg

MONITORING WELL INSTALLATION LOG

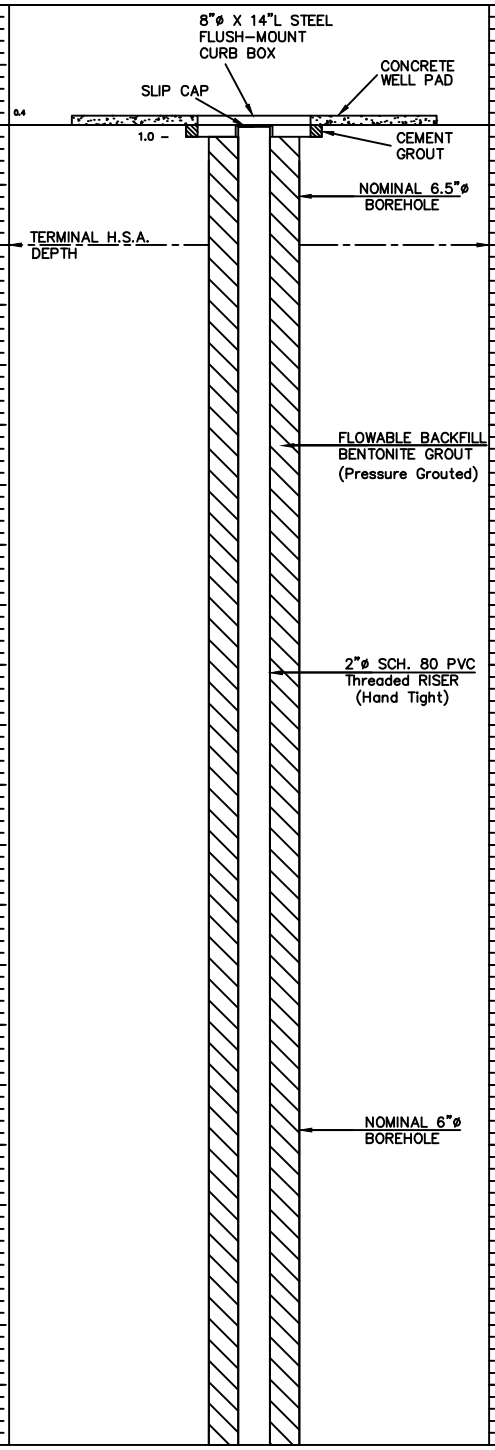
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-12	SHEET	1 of 2
GA INSP.	RJM	DRILLING METHOD	4 1/4"I.D. H.S.A's & 5 7/8" MUD ROTARY	GROUND ELEV.	~167 FT.	WATER DEPTH	111.56 FT.BTOR
WEATHER	SUNNY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~166.5 FT.	DATE/TIME	05/20/13 10:10
TEMP.	48-62° F	DRILL RIG	CME-75	DRILLER	J. SCRIBELLITO	STARTED	0800 05/03/13 (TIME / DATE)
						COMPLETED	1320 05/03/13 (TIME / DATE)
LOCATION / COORDINATES	N, E		(WEST OF CELL 5/8 INTERFCELL BERM AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 220 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 80 PVC	SCREEN TYPE	SCHEDULE 80 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	10 BAGS
GROUT QUANTITY	~320-340 GALLONS	CENTRALIZERS	2-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	TREMIE-WASHED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~167.0	EXISTING GROUND SURFACE*
	INTERPRETED SUB-SURFACE*
	SILTY SAND
159.0 / 8.0	(SM) Silty f-m SAND, tan br. to pale br., non-plastic, non-cohesive to cohesive, loose, trace plastic fines, occasional white-gray silty CLAY seams, moist to wet,
10.0	CLAY TO SILTY CLAY
20.0	(CH-CL) CLAY to SILTY CLAY, light grey & maroon-dk. maroon to red-purple, pale purple-white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand & silt lenses, trace silty sand lenses, occasionally fissured and blocky, cohesive, w<PL to w>PL, stiff to hard.
30.0	
40.0	
119.0 / 48.0	
50.0	SILTY SAND
60.0	(SM) SILTY fine-SAND, white-grey to to tan-br. to light br., non-cohesive to cohesive, some low plasticity fines, moist, compact to dense.
70.0	
91.0 / 76.0	
80.0	CLAY TO SILTY CLAY
90.0	(CH-CL) CLAY to SILTY CLAY, light grey & maroon-dk. maroon to red-purple, pale purple-white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand & silt lenses & seams, occasionally thinly laminated, occasionally fissured and blocky, cohesive, w<PL to w>PL, stiff to v. hard.
100.0	
110.0	

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 3¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 10.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING 3-5 FT AND 8-10 FT. AUGERS REMOVED. TEMPORARY 6" STEEL SURFACE CASING HYDRAULICALLY PUSHED TO 9 FT. bgs. RESUMED STANDARD SAMPLING USING 5⅞"DRAG BIT FROM 13.0-240.0 FT. bgs. DRILLED BOREHOLE ON 05/03/13 TO 241 FT bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH TEMPORARY 6" SURFACE CASING. WELL MATERIALS PLACED IN BOREHOLE USING 10.0 FT. SOLID RISER SUMP, FLAT-END THREADED END CAP, 20.0 FT. WELL SCREEN, 210.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 240.55 FT. WELL MATERIALS PLACED TO 240.55 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK TREMIE-WASHED 241.0-204.0 FT. bgs. 1/2" COATED BENTONITE TABLET SEAL PLACED BY HAND 204.0-192.0 FT. bgs. TABLETS ALLOWED TO HYDRATE 30 MINUTES. BENTONITE SLURRY TREMIED 192.0 FT. bgs. TO GROUND SURFACE WHILE...

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (05/15/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED: 05/20/13

DEVELOPMENT METHOD: AIR LIFT

VOLUME PURGED: 1435 GALS.

FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

Golder Associates

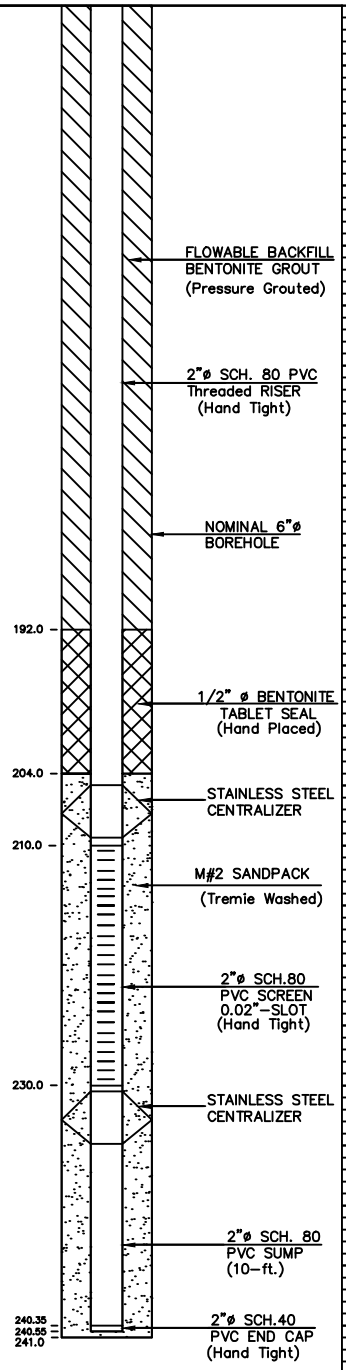
MONITORING WELL INSTALLATION LOG

JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-12	SHEET	2 of 2
GA INSP.	RJM	DRILLING METHOD	4 1/4" I.D. H.S.A's & 5 7/8" MUD ROTARY	GROUND ELEV.	~167 FT.	WATER DEPTH	111.56 FT.BTOR
WEATHER	SUNNY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~166.5 FT.	DATE/TIME	05/20/13 10:10
TEMP.	48-62° F	DRILL RIG	CME-75	DRILLER	J. SCRIBELLITO	STARTED (TIME / DATE)	0800 05/03/13
						COMPLETED (TIME / DATE)	1320 05/03/13
LOCATION / COORDINATES	N, E		(WEST OF CELL 5/8 INTERFCELL BERM AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 220 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS		
CASING TYPE	SCHEDULE 80 PVC	SCREEN TYPE	SCHEDULE 80 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING		
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	10 BAGS		
GROUT QUANTITY	~320-340 GALLONS	CENTRALIZERS	2-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND		
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	TREMIE-WASHED		

Depth	Description
110.0	CLAY TO SILTY CLAY See Sheet 1 for Details
120.0	
140.0	
160.0	
180.0	
190.0	
-33.0 / 200.0	CLAYEY SAND to SILTY SAND (SC-SM) Silty f-m SAND, pale grey-white to olive br.-br. to tan-br., non-plastic, non-cohesive to cohesive, some low plasticity fines and occasional thin, gray clay seams, moist to wet, dense to v. dense.
210.0	
220.0	
230.0	
210.0	WEATHERED BEDROCK Completely weathered SHALE, bl. to dk. gray, with occasional thin, dk. gray clay lenses and soft, f-sand seams, wet, dense.
-71.0 / 238.0	
240.0-73.0	
241.0-74.0	EOB @ 241.0 FT. bgs.



INSTALLATION NOTES

REMOVING TEMPORARY 6" STEEL SURFACE CASING. GROUT LEVEL WAS MEASURED AT APPROX. 5.0 FT. bgs. ON 05/06/13 AFTER SETTLING, AND ADDITIONAL GROUT PLACED TO WITHIN 1-FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH-MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags. AND SURFACE CASING LID REPLACED AND SECURED WITH GALVANIZED STEEL SCREWS.

Golder Associates

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD Files for Well Logs\Deep Wells\PMW-12 well log.dwg

MONITORING WELL INSTALLATION LOG

JOB NO. 063-1431-003 PROJECT NWM/CHESAPEAKE TERRACE SFI/MD WELL NO. PMW-13 SHEET 1 of 2

GA INSP. RJM DRILLING METHOD 3 1/4" I.D. H.S.A's & 5 7/8" MUD ROTARY GROUND ELEV. ~167 FT. WATER DEPTH 103.35 FT.BTOR

WEATHER P.CLOUDY DRILLING COMPANY FREE STATE DRILLING COLLAR ELEV. ~166.5 FT. DATE/TIME 05/21/13 0935

TEMP. 56-65° F DRILL RIG CME-75 DRILLER J. SCRIBELLITO STARTED 0800 05/15/13 (TIME / DATE) COMPLETED 1320 05/15/13 (TIME / DATE)

LOCATION / COORDINATES N, E (SOUTHWEST OF LEACHATE STORAGE FACILITY No. 2)

MATERIALS INVENTORY

WELL CASING 2.0 in. dia. 255 l.f. WELL SCREEN 2.0 in. dia. 20.0 l.f. BENTONITE SEAL 1/2" BENTONITE TABLETS

CASING TYPE SCHEDULE 80 PVC SCREEN TYPE SCHEDULE 80 PVC INSTALLATION METHOD GRAVITY THROUGH CASING

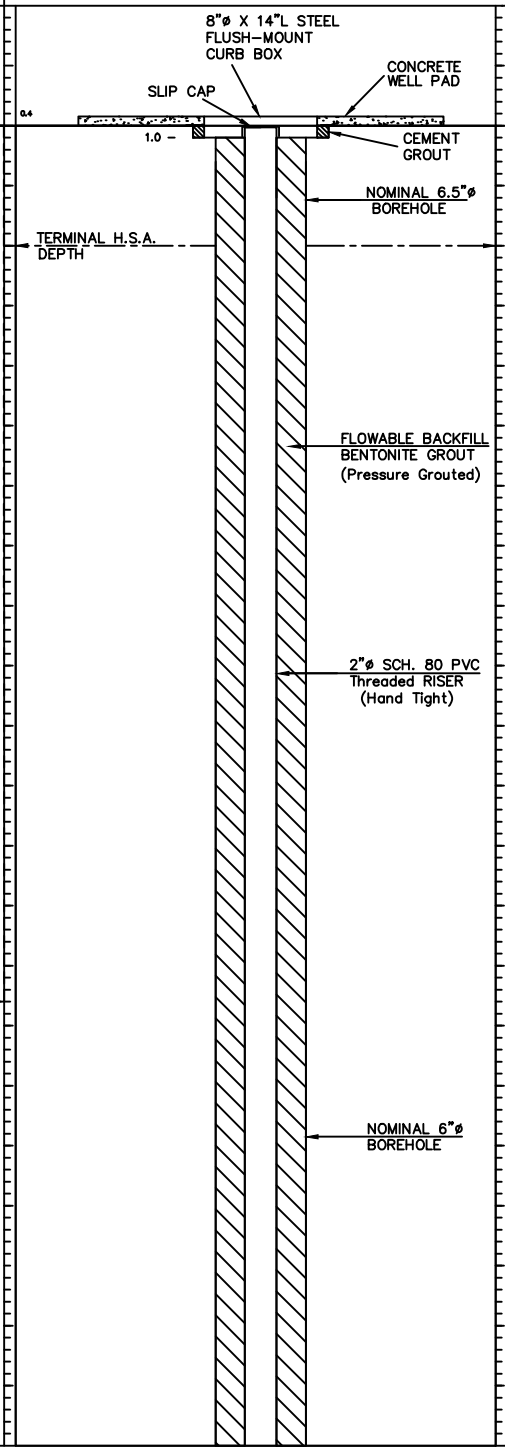
JOINT TYPE FLUSH THREADED SLOT SIZE 0.02"-SLOT FILTER PACK QTY. 13 BAGS

GROUT QUANTITY ~360-380 GALLONS CENTRALIZERS 2-STAINLESS STEEL USED FILTER PACK TYPE M#2-SIZE SAND

GROUT TYPE BENTONITE CLAY SLURRY DRILLING MUD TYPE WYO-BEN HIGH YIELD INSTALLATION METHOD TREMIE-WASHED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~167.0	EXISTING GROUND SURFACE*
	INTERPRETED SUB-SURFACE*
10.0	SILTY SAND
20.0	(SM) Silty f-m SAND, tan br. to pale br., non-plastic, non-cohesive to cohesive, loose, trace plastic fines, occasional white-gray silty CLAY seams, moist to wet,
30.0	
40.0	
50.0	
60.0	
70.0	
94.0	
73.0	
80.0	CLAY TO SILTY CLAY
	(CH-CL) CLAY to SILTY CLAY, light grey & maroon-dk. maroon to red-purple, pale purple-white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand & silt lenses, trace silty sand lenses, occasionally fissured and blocky, cohesive, w<PL to w>PL, stiff to hard.
90.0	
100.0	
110.0	

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 3¼" I.D. HOLLOW STEM AUGERS (HSAs) TO 10.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING 3-5 FT AND 8-10 FT. AUGERS REMOVED. TEMPORARY 6" STEEL SURFACE CASING HYDRAULICALLY PUSHED TO 9 FT. bgs. RESUMED STANDARD SAMPLING USING 5⅞" DRAG BIT FROM 13.0-240.0 FT. bgs. DRILLED BOREHOLE ON 05/03/13 TO 241 FT bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH TEMPORARY 6" SURFACE CASING. WELL MATERIALS PLACED IN BOREHOLE USING 10.0 FT. SOLID RISER SUMP, FLAT-END THREADED END CAP, 20.0 FT. WELL SCREEN, 210.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 240.55 FT. WELL MATERIALS PLACED TO 240.55 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK TREMIE-WASHED 241.0-204.0 FT. bgs. 1/2" COATED BENTONITE TABLET SEAL PLACED BY HAND 204.0-192.0 FT. bgs. TABLETS ALLOWED TO HYDRATE 30 MINUTES. BENTONITE SLURRY TREMIED 192.0 FT. bgs. TO GROUND SURFACE WHILE...

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (05/15/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED 05/21/13:

DEVELOPMENT METHOD: AIR LIFT

VOLUME PURGED: 1280 GALS.

FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

Golder Associates

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD Files for Well Logs\Deep Wells\PMW-13 well log_rev.dwg

MONITORING WELL INSTALLATION LOG

JOB NO. 063-1431-003 PROJECT NWM/CHESAPEAKE TERRACE SFI/MD WELL NO. PMW-13 SHEET 2 of 2

GA INSP. RJM DRILLING METHOD 3 1/4" I.D. H.S.A's & 5 7/8" MUD ROTARY GROUND ELEV. ~167 FT. WATER DEPTH 103.35 FT.BTOR

WEATHER P.CLOUDY DRILLING COMPANY FREE STATE DRILLING COLLAR ELEV. ~166.5 FT. DATE/TIME 05/21/13 0935

TEMP. 56-65° F DRILL RIG CME-75 DRILLER J. SCRIBELLITO STARTED 0800 05/15/13 (TIME / DATE) COMPLETED 1320 05/15/13 (TIME / DATE)

LOCATION / COORDINATES N, E (SOUTHWEST OF LEACHATE STORAGE FACILITY No. 2)

MATERIALS INVENTORY

WELL CASING 2.0 in. dia. 255 l.f. WELL SCREEN 2.0 in. dia. 20.0 l.f. BENTONITE SEAL 1/2" BENTONITE TABLETS

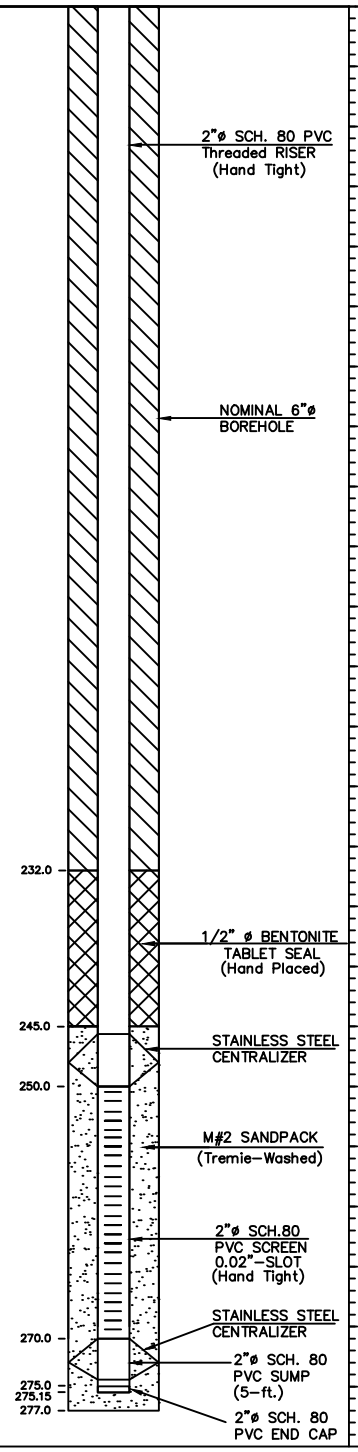
CASING TYPE SCHEDULE 80 PVC SCREEN TYPE SCHEDULE 80 PVC INSTALLATION METHOD GRAVITY THROUGH CASING

JOINT TYPE FLUSH THREADED SLOT SIZE 0.02"-SLOT FILTER PACK QTY. 13 BAGS

GROUT QUANTITY ~360-380 GALLONS CENTRALIZERS 2-STAINLESS STEEL USED FILTER PACK TYPE M#2-SIZE SAND

GROUT TYPE BENTONITE CLAY SLURRY DRILLING MUD TYPE WYO-BEN HIGH YIELD INSTALLATION METHOD TREMIE-WASHED

Depth	Description
110.0	CLAY to SILTY CLAY/ CLAYEY SILT See Sheet 1 for Details
120.0	
140.0	
160.0	
180.0	
200.0	
220.0	
230.0	
240.0	
-81.0 / 248.0	
250.0	SAND to CLAYEY SAND (SC-SM) Silty f-m SAND, pale grey-white to olive br.-br. to tan-br., non-plastic, non-cohesive to cohesive, some low plasticity fines and occasional thin, gray clay seams, moist to wet, dense to v. dense.
260.0	
270.0	
-110.0 / 277.0	EOB @ 277.0 FT. bgs.



INSTALLATION NOTES

REMOVING TEMPORARY 6" STEEL SURFACE CASING. GROUT LEVEL WAS MEASURED AT APPROX. 5.0 FT. bgs. ON 05/06/13 AFTER SETTLING, AND ADDITIONAL GROUT PLACED TO WITHIN 1-FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH-MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags.

Golder Associates

N:\Projects\2018\20183854 - Chesapeake Terrace LF\CAD Files for Well Logs\Deep Wells\PMW-13 well log_rev.dwg

MONITORING WELL INSTALLATION LOG

JOB NO. 063-1431-003 PROJECT NWM/CHESAPEAKE TERRACE SFI/MD WELL NO. PMW-18 SHEET 1 of 2

GA INSP. RJM DRILLING METHOD 3¼"I.D. H.S.A.'s & 5⅞" MUD ROTARY GROUND ELEV. ~74 FT. WATER DEPTH 12.21 FT.BTOR

WEATHER OVERCAST DRILLING COMPANY FREE STATE DRILLING COLLAR ELEV. ~73.5 FT. DATE/TIME 0715 05/22/13

TEMP. 71-79° F DRILL RIG CME-55 ATV DRILLER J. SCRIBELLITO STARTED 0830 05/21/13 (TIME / DATE) COMPLETED 1200 05/21/13 (TIME / DATE)

LOCATION / COORDINATES N, E (SOUTHEAST BASIN No. 1 AREA)

MATERIALS INVENTORY

WELL CASING 2.0 in. dia. 75 l.f. WELL SCREEN 2.0 in. dia. 10.0 l.f. BENTONITE SEAL 1/2" BENTONITE TABLETS

CASING TYPE SCHEDULE 40 PVC SCREEN TYPE SCHEDULE 40 PVC INSTALLATION METHOD GRAVITY THROUGH CASING

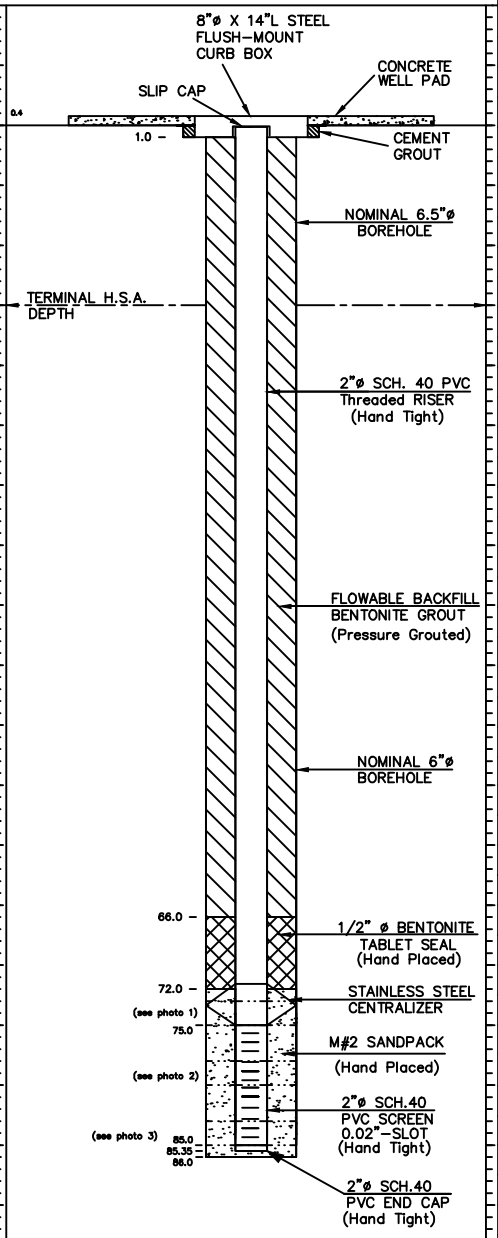
JOINT TYPE FLUSH THREADED SLOT SIZE 0.02"-SLOT FILTER PACK QTY. 5 BAGS

GROUT QUANTITY ~120 GALLONS CENTRALIZERS 1-STAINLESS STEEL USED FILTER PACK TYPE M#2-SIZE SAND

GROUT TYPE BENTONITE CLAY SLURRY DRILLING MUD TYPE WYO-BEN HIGH YIELD INSTALLATION METHOD GRAVITY THROUGH CASING

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~74.0	EXISTING GROUND SURFACE*
0.0	INTERPRETED SUB-SURFACE*
70.0 / 4.0	SANDY LOAM
10.0	Clayey SILT to Clayey SAND (ML-SC) Clayey SILT and f-m SAND, poorly graded, some c-gravel in seams, occasional soft clay seams, pale grey to dk. brown, cohesive, moist to wet, compact.
59.0 / 15.0	
54.0 / 20.0	Silty CLAY to Clayey SILT to CLAY (ML-CL) Silty CLAY to Clayey SILT, trace to some fine sand lenses, pale purple to red-purple & maroon red-grey mottled, low-medium plasticity, occasional silt stringers, occasionally friable, occasionally laminated and varved, non-cohesive to cohesive, w<PL to w~PL, firm to hard, grading to (CL) CLAY, dk. grey, low plasticity, cohesive, w<PL, stiff to hard.
30.0	
40.0	
50.0	
16.0	
58.0 / 60.0	Clayey SAND to Silty SAND (SC-SM) Silty f-m SAND, dk. grey-pale grey to orange-br. and pale grey mottled, intermittent firm dk. grey SLY CLAY seams, occasional red-br silt stringers, cohesive to non-cohesive, moist to wet, CP to dense.
6.0 / 68.0 / 70.0	
80.0	SAND (SM-SP) Silty f-m SAND grading to m-SAND, poorly graded, some to tr. fines, non-plastic, sl. stratified, tan br-br, non-cohesive, occasional silty clay pockets, moist to wet, dense to v. dense.
-12.0 / 86.0	EOB @ 86.0 FT. bgs.

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 3¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 15.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING 3-15 FT. bgs. ON 05/20/13. AUGERS REMOVED. TEMPORARY 6" STEEL SURFACE CASING HYDRAULICALLY PUSHED/HAMMERED TO 13.5 FT. bgs. RESUMED STANDARD SAMPLING USING 5⅞"DRAG BIT FROM 18.0-85.0 FT. bgs. DRILLED BOREHOLE TO 86 FT. bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH TEMPORARY 6" SURFACE CASING. WELL MATERIALS PLACED IN BOREHOLE USING 10.0 FT. WELL SCREEN, FLAT-END THREADED END CAP, 75.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 85.35 FT. WELL MATERIALS PLACED TO 85.0 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK GRAVITY FED 86.0-72.0 FT. bgs. 1/2" COATED BENTONITE TABLET SEAL PLACED BY HAND 72.0-66.0 FT. bgs. TABLETS ALLOWED TO HYDRATE 30 MINUTES. BENTONITE SLURRY TREMIED 66.0 FT. bgs. TO GROUND SURFACE WHILE REMOVING TEMPORARY 6" STEEL

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (05/21/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED: 5/22/13

DEVELOPMENT METHOD: AIR LIFT

VOLUME PURGED: 970-gals.

FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

Golder Associates

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MONITORING WELL INSTALLATION LOG

JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-18	SHEET	2 of 2
GA INSP.	RJM	DRILLING METHOD	3 1/4" I.D. H.S.A.'s & 5 7/8" MUD ROTARY	GROUND ELEV.	~74 FT.	WATER DEPTH	12.21 FT.BTOR
WEATHER	OVERCAST	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~73.5 FT.	DATE/TIME	0715 05/22/13
TEMP.	71-79° F	DRILL RIG	CME-55 ATV	DRILLER	J. SCRIBELLITO	STARTED	0830 05/21/13 (TIME / DATE)
						COMPLETED	1200 05/21/13
LOCATION / COORDINATES	N, E		(SOUTHEAST BASIN No. 1 AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 75 l.f.	WELL SCREEN	2.0 in. dia. 10.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	5 BAGS
GROUT QUANTITY	~120 GALLONS	CENTRALIZERS	1-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	GRAVITY THROUGH CASING

	INSTALLATION PHOTOS**	INSTALLATION NOTES
PHOTO 1 Photo of sample interval portion from screened section of PMW-18 (screen set from 75-85-ft. bgs).		SURFACE CASING. GROUT LEVEL WAS MEASURED AT APPROX. 5.0 FT. bgs. ON 05/22/13 AFTER SETTLING, AND ADDITIONAL GROUT PLACED TO WITHIN 1-FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH-MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags.
PHOTO 2 Photo of sample interval portion from screened section of PMW-18 (screen set from 75-85-ft. bgs).		**SEE PHOTO LOG IN REPORT FOR ADDITIONAL CONSTRUCTION PHOTOS
PHOTO 3 Photo of sample interval portion from screened section of PMW-18 (screen set from 75-85-ft. bgs).		

Golder Associates

MONITORING WELL INSTALLATION LOG

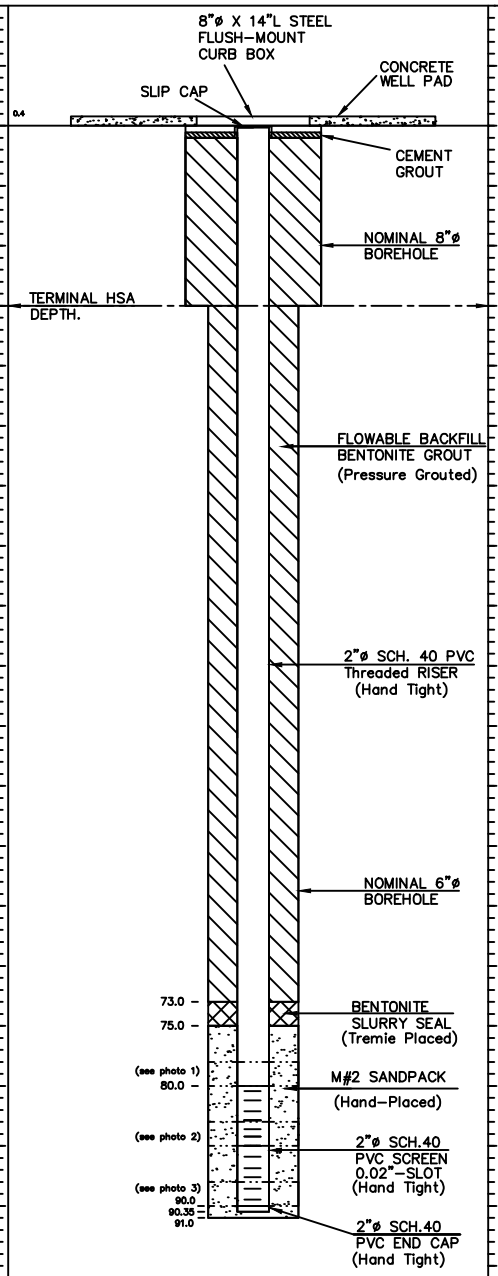
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-19	SHEET	1 of 2
GA INSP.	KMC	DRILLING METHOD	4 1/4" HSAs & 5 7/8" MUD ROTARY	GROUND ELEV.	~110-FT.	WATER DEPTH	40.57 FT. BTOR
WEATHER	SUNNY	DRILLING COMPANY	EARTH MATTERS INC.	COLLAR ELEV.	FT.	DATE/TIME	1440 05/15/13
TEMP.	70° F	DRILL RIG	SIMCO 2800	DRILLER	D. TAYLOR	STARTED	1530 04/17/13 (TIME / DATE)
						COMPLETED	0835 04/18/13 (TIME / DATE)
LOCATION / COORDINATES	N, E		(BASIN No. 1 AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 80 l.f.	WELL SCREEN	2.0 in. dia. 10.0 l.f.	BENTONITE SEAL	BENTONITE SLURRY
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	TREMIE
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	10 BAGS
GROUT QUANTITY	~70-80 GALLONS	CENTRALIZERS	NOT USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	USED	INSTALLATION METHOD	GRAVITY

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~110.0	EXISTING GROUND SURFACE*
0.0	INTERPRETED SUB-SURFACE*
	CLAY (CH-CL) CLAY to SILTY CLAY, light grey & maroon to red-purple white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand lenses, trace silty sand lenses, occasionally fissured, non-cohesive to cohesive, w<PL to w>PL, stiff to hard.
10.0	
95.0	
15.0	
20.0	
30.0	
	SILTY SAND (SM) Silty f-SAND, light grey, non-plastic, some plastic fines, occasional fine sand lenses & pockets, trace black organic material, non-cohesive to cohesive, moist, dense to v. dense.
40.0	
50.0	
	CLAY to SILTY CLAY (CH-CL) CLAY to SILTY CLAY, light grey & maroon to red-purple white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand lenses, trace silty sand lenses, occasionally fissured, non-cohesive to cohesive, w<PL to w>PL, stiff to hard.
60.0	
46.0	
64.0	
42.0	
68.0	
80.0	
27.0	
83.0	**SILTY SAND** (SM) Silty f-m SAND, light grey & mottled brown-red, non-plastic, non-cohesive to cohesive, moist to wet, v. dense, grading to (CH) CLAY, high plasticity, grey - red, cohesive, w>PL, v. soft.
19.0	
91.0	
100.0	
	EOB @ 91.0 FT. bgs.
110.0	

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 4¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 15.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING FROM 0-2 FT, 3-5 FT, 8-10 FT. AND 13-15 FT. bgs. RESUMED STANDARD SAMPLING USING 2⅞"DRAG BIT FROM 13.0-60.0 FT. bgs. GOLDER GEOLOGIST SHORTENED SAMPLE INTERVALS TO CONTINUOUS SAMPLING FROM 60-80 FT. bgs, THEN STANDARD SAMPLING FROM 80-90 FT. bgs. REAMED OUT BOREHOLE ON 04/18/13 USING 5⅞" DRAG BIT FROM 0.0-91.0 FT. bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. WELL MATERIALS PLACED IN BOREHOLE USING 10.0 FT. WELL SCREEN, FLAT-END THREADED END CAP, 85.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 95.75 FT. WELL MATERIALS PLACED TO 90.75 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK PLACED THROUGH AUGERS 91.0-75.0 FT. bgs. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH HSAs. BENTONITE SLURRY SEAL TREMIED 75.0-73.0 FT. bgs. BENTONITE GROUT TREMIED 73.0 TO TO GROUND SURFACE WHILE REMOVING HSAs. GROUT LEVEL WAS

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (04/17-04/18/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED: 05/15/13
DEVELOPMENT METHOD: SUPERTWISTER SUBMERSIBLE PUMP
VOLUME PURGED: 290 GALS.
FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

Golder Associates

MONITORING WELL INSTALLATION LOG

JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-19	SHEET	2 of 2
GA INSP.	KMC	DRILLING METHOD	4 1/4" HSAs & 5 7/8" MUD ROTARY	GROUND ELEV.	~110-FT.	WATER DEPTH	40.57 FT. BTOR
WEATHER	SUNNY	DRILLING COMPANY	EARTH MATTERS INC.	COLLAR ELEV.	FT.	DATE/TIME	1440 05/15/13
TEMP.	70° F	DRILL RIG	SIMCO 2800	DRILLER	D. TAYLOR	STARTED	1530 04/17/13 (TIME / DATE)
						COMPLETED	0835 04/18/13 (TIME / DATE)
LOCATION / COORDINATES	N, E		(BASIN No. 1 AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 80 l.f.	WELL SCREEN	2.0 in. dia. 10.0 l.f.	BENTONITE SEAL	BENTONITE SLURRY
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	TREMIE
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	10 BAGS
GROUT QUANTITY	~70-80 GALLONS	CENTRALIZERS	NOT USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	USED	INSTALLATION METHOD	GRAVITY

	INSTALLATION PHOTOS**	INSTALLATION NOTES
PHOTO 1 Photo of sample interval portion from screened section of PMW-19 (screen set from 80-90-ft. bgs).		MEASURED AT APPROX. 4.0 FT. bgs. ON 04/19/13 AFTER SETTLING, AND ADDITIONAL GROUT PLACED TO WITHIN 1-FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH-MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags. AND SURFACE CASING LID REPLACED AND SECURED WITH GALVANIZED STEEL SCREWS.
PHOTO 2 Photo of sample interval portion from screened section of PMW-19 (screen set from 80-90-ft. bgs).		**SEE PHOTO LOG IN REPORT FOR ADDITIONAL CONSTRUCTION PHOTOS
PHOTO 3 Photo of sample interval portion from screened section of PMW-19 (screen set from 80-90-ft. bgs).		

Golder Associates

MONITORING WELL INSTALLATION LOG

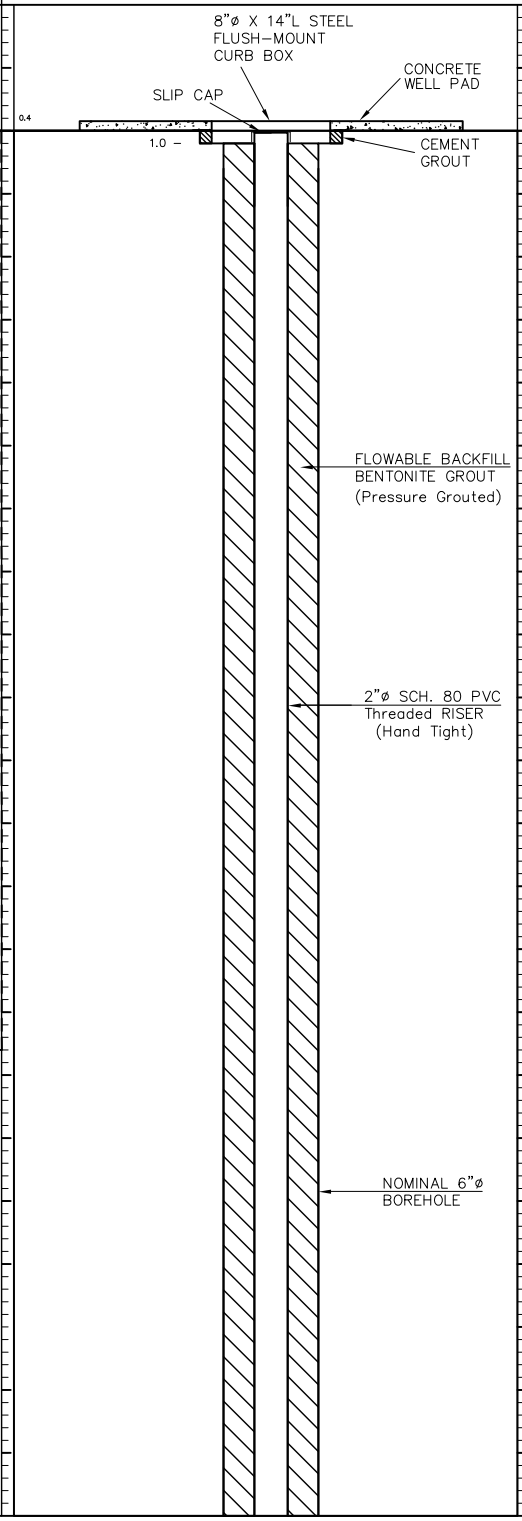
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-23	SHEET	1 of 2
GA INSP.	VF	DRILLING METHOD	3¼"I.D. H.S.A's & 5⅞"MUD ROTARY	GROUND ELEV.	~164 FT.	WATER DEPTH	FT.BTOR
WEATHER	P.CLOUDY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	FT.	DATE/TIME	
TEMP.	56-65° F	DRILL RIG	CME-75	DRILLER	J. SCRIBELLITO	STARTED (TIME / DATE)	0800 06/05/13
						COMPLETED (TIME / DATE)	1320 06/05/13
LOCATION / COORDINATES	N, E (SOUTHEAST OF CELL 7)						

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 208 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 80 PVC	SCREEN TYPE	SCHEDULE 80 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	10 BAGS
GROUT QUANTITY	~280-300 GALLONS	CENTRALIZERS	1-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	TREMIE-WASHED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~164.0	EXISTING GROUND SURFACE*
	INTERPRETED SUB-SURFACE*
10.0	SILTY SAND
20.0	(SM) Silty f-m SAND, tan br. to pale br., non-plastic, non-cohesive to cohesive, loose, trace plastic fines, occasional white-gray silty CLAY seams, moist to wet,
30.0	
40.0	
50.0	
60.0	
70.0	
94.0 / 73.0	
80.0	CLAY TO SILTY CLAY
90.0	(CH-CL) CLAY to SILTY CLAY, light grey & maroon-dk. maroon to red-purple, pale purple-white mottled to dark grey, low to high plasticity, trace gravel, trace to some fine sand & silt lenses, trace silty sand lenses, occasionally fissured and blocky, cohesive, w<PL to w>PL, stiff to hard.
100.0	
110.0	

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 3¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 10.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING 3-5 FT AND 8-10 FT. AUGERS REMOVED. TEMPORARY 6" STEEL SURFACE CASING HYDRAULICALLY PUSHED TO 9 FT. bgs. RESUMED STANDARD SAMPLING USING 5⅞"DRAG BIT FROM 13.0-240.0 FT. bgs. DRILLED BOREHOLE ON 06/4/13 TO 229 FT bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH TEMPORARY 6" SURFACE CASING. WELL MATERIALS PLACED IN BOREHOLE USING 10.0 FT. SOLID RISER SUMP, FLAT-END THREADED END CAP, 20.0 FT. WELL SCREEN, 208.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 228.55 FT. WELL MATERIALS PLACED TO 240.55 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK TREMIE-WASHED 229.0-203.0 FT. bgs. 1/2" COATED BENTONITE TABLET SEAL PLACED BY HAND 203.0-195.0 FT. bgs. TABLETS ALLOWED TO HYDRATE 30 MINUTES. BENTONITE SLURRY TREMIED 195.0 FT. bgs. TO GROUND SURFACE WHILE...

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (05/15/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED:

DEVELOPMENT METHOD: AIR LIFT/

VOLUME PURGED: GALS.

FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

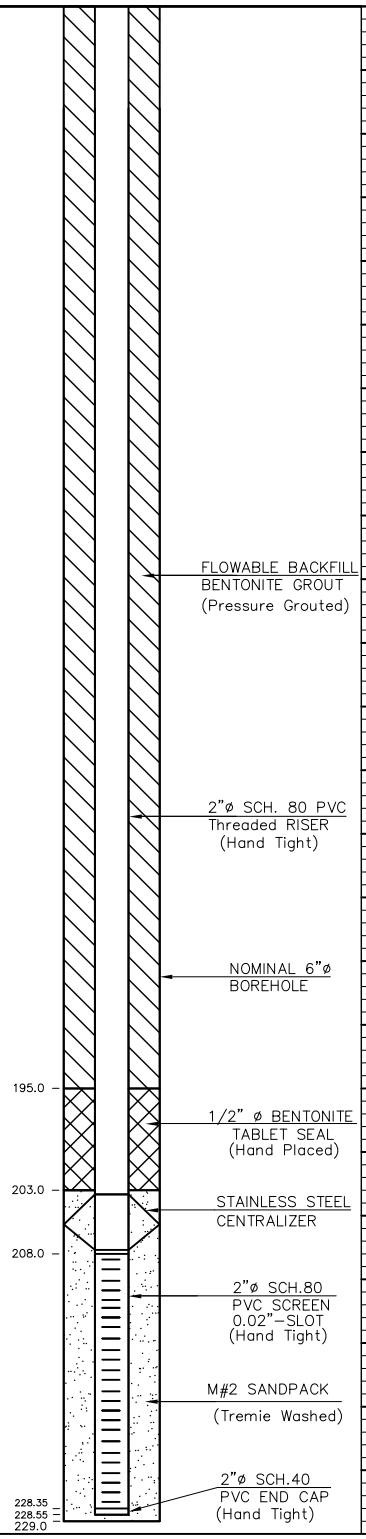
MONITORING WELL INSTALLATION LOG

JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-23	SHEET	2 of 2
GA INSP.	VF	DRILLING METHOD	3 1/4" I.D. H.S.A's & 5 7/8" MUD ROTARY	GROUND ELEV.	~164 FT.	WATER DEPTH	FT.BTOR
WEATHER	P.CLOUDY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	FT.	DATE/TIME	
	56-65° F	DRILL RIG	CME-75	DRILLER	J. SCRIBELLITO	STARTED (TIME / DATE)	0800 06/05/13
						COMPLETED (TIME / DATE)	1320 06/05/13
LOCATION / COORDINATES	N, E		(SOUTHEAST OF CELL 7)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 208 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS		
CASING TYPE	SCHEDULE 80 PVC	SCREEN TYPE	SCHEDULE 80 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING		
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	10 BAGS		
GROUT QUANTITY	~280-300 GALLONS	CENTRALIZERS	1-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND		
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	TREMIE-WASHED		

110.0	CLAY TO SILTY CLAY See Sheet 1 for Details		
120.0			
130.0			
140.0			
150.0			
160.0			
170.0			
-32.0 / 178.0			
180.0	SILTY CLAY to CLAYEY SILT		
190.0			
200.0			
-57.0 / 208.0			
210.0	SILTY SAND to SAND (SM-SP) Silty f-m SAND, pale grey & white, non-plastic, non-cohesive, trace low plasticity fines and occasional thin clay lenses, wet, dense.		
220.0			
229.0 **-75.0**			



INSTALLATION NOTES

REMOVING TEMPORARY 6" STEEL SURFACE CASING. GROUT LEVEL WAS MEASURED AT APPROX. 3.0 FT. bgs. ON 06/06/13 AFTER SETTLING, AND ADDITIONAL GROUT PLACED TO WITHIN 1-FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH-MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags.

EOB @ 229.0 FT. bgs.

MONITORING WELL INSTALLATION LOG

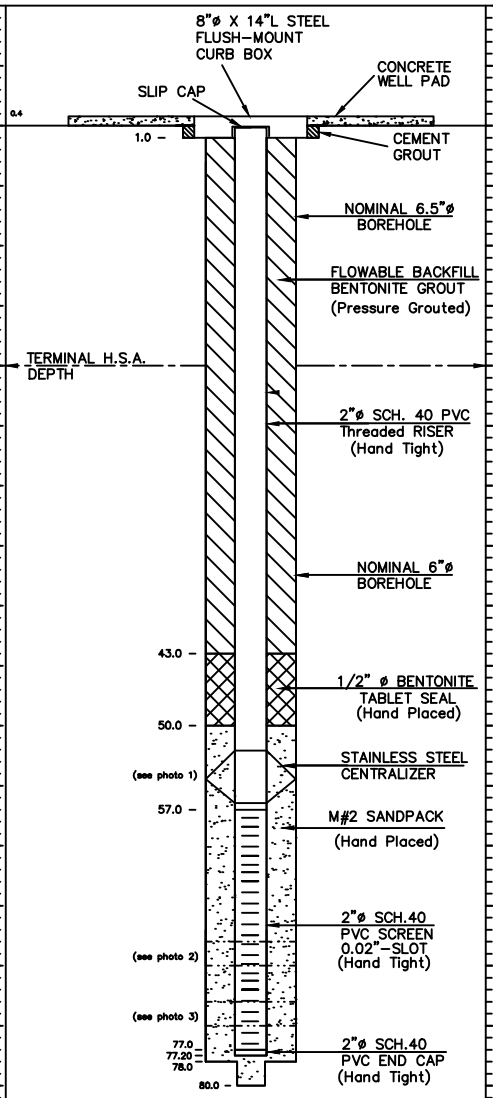
JOB NO.	063-1431-003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW-28	SHEET	1 of 2
GA INSP.	RJM	DRILLING METHOD	3¼"I.D. H.S.A's & 5⅞"MUD ROTARY	GROUND ELEV.	~142 FT.	WATER DEPTH	65.55 FT.BTOR
WEATHER	SUNNY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~141.5 FT.	DATE/TIME	05/22/13 1015
TEMP.	54-78° F	DRILL RIG	CME-55 ATV	DRILLER	J. SCRIBELLITO	STARTED	0950 05/17/13 (TIME / DATE)
						COMPLETED	1215 05/17/13 (TIME / DATE)
LOCATION / COORDINATES	N, E		(SW OF CELL 11 AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 57 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"-SLOT	FILTER PACK QTY.	11 BAGS
GROUT QUANTITY	~100-120 GALLONS	CENTRALIZERS	1-STAINLESS STEEL USED	FILTER PACK TYPE	M#2-SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO-BEN HIGH YIELD	INSTALLATION METHOD	GRAVITY THROUGH CASING

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
~142.0	EXISTING GROUND SURFACE*
0.0	INTERPRETED SUB-SURFACE*
	Clayey SILT to Silty Gravelly SAND to Silty SAND & SAND
10.0	(MH) CLAYEY SILT, some f-sand, brown to ol.br., cohesive, sl. plasticity, cohesive, w~PL, firm, then (GM) SILTY f-c subr. qtz. GRAVEL with m-c SAND, tr. f-sand, moist, loose to CP., then layered (ML-SM) CLAYEY SILT to SILTY f-SAND, occasional soft-firm pale grey clay seams,cohesive to non-coh., br., loose to CP, m-wet, grading to (SP) f-SAND,uniformly graded, tr.fines, slightly stratified br. to tan-br., loose, moist to wet (possibly perched water at ~19.0 FT. bgs).
20.0	
117.6	
24.4	
30.0	
40.0	
50.0	SAND
	(SP) Fine to coarse SAND, poorly graded, subrounded, some fine to coarse gravel, occasional seams and pockets of soft, light grey f-sandy clay decreasing with depth, some to trace fines, light brown to tan-br., non-cohesive, moist to wet, compact to dense.
60.0	
70.0	
62.0	
80.0	EOB @ 80.0 FT. bgs.

WELL SKETCH



INSTALLATION NOTES

AUGERED WITH 3¼"I.D. HOLLOW STEM AUGERS (HSAs) TO 20.0 FT. BELOW GROUND SURFACE (bgs) WITH STANDARD SAMPLING 3-20 FT. bgs. ON 05/16/13. AUGERS REMOVED. TEMPORARY 6" STEEL SURFACE CASING HYDRAULICALLY PUSHED/HAMMERED TO 18.5 FT. bgs. RESUMED STANDARD SAMPLING USING 5⅞"DRAG BIT FROM 23.0-55.0 FT. bgs. RESUMED STANDARD SAMPLING ON 05/17/13 FROM 55-80 FT. bgs. DRILLED BOREHOLE TO 78 FT. bgs. TO SET WELL. BOREHOLE FLUSHED WITH CLEAN WATER PRIOR TO REMOVING DRILL RODS & DRILL BIT. 1" DIAMETER SCH 40 PVC TREMIE PIPE INSERTED TO DEPTH THROUGH TEMPORARY 6" SURFACE CASING. WELL MATERIALS PLACED IN BOREHOLE USING 20.0 FT. WELL SCREEN, FLAT-END THREADED END CAP, 57.0 FT. OF RISER AND J-PLUG CAP FOR OVERALL LENGTH OF 77.20 FT. WELL MATERIALS PLACED TO 77.0 FT. bgs. AND SECURED AT DRILLING DECK WITH CHAIN BRACE WITH TEMPORARY 3.0 FT. STICKUP. M#2 SANDPACK GRAVITY FED 80.0-50.0 FT. bgs. 1/2" COATED BENTONITE TABLET SEAL PLACED BY HAND 50.0-43.0 FT. bgs. TABLETS ALLOWED TO HYDRATE 30 MINUTES. BENTONITE SLURRY TREMIED 43.0 FT.

SEE SHEET 2 FOR ADDITIONAL NOTES

*MEASUREMENTS REFERENCED FROM FIELD-MODIFIED GROUND SURFACE AS OF INSTALLATION DATE (05/17/13).

WELL DEVELOPMENT NOTES

DATE DEVELOPED:

DEVELOPMENT METHOD: SUBMERSIBLE PUMP

VOLUME PURGED:

FOR FURTHER DETAILS SEE ACCOMPANYING WELL DEVELOPMENT FIELD RECORD.

MONITORING WELL INSTALLATION LOG

JOB NO.	063–1431–003	PROJECT	NWM/CHESAPEAKE TERRACE SFI/MD	WELL NO.	PMW–28	SHEET	2 of 2
GA INSP.	RJM	DRILLING METHOD	3 1/4"I.D. H.S.A's & 5 7/8" MUD ROTARY	GROUND ELEV.	~142 FT.	WATER DEPTH	65.55 FT.BTOR
WEATHER	SUNNY	DRILLING COMPANY	FREE STATE DRILLING	COLLAR ELEV.	~141.5 FT.	DATE/TIME	05/22/13 1015
TEMP.	54–78° F	DRILL RIG	CME–55 ATV	DRILLER	J. SCRIBELLITO	STARTED	0950 05/17/13 (TIME / DATE)
						COMPLETED	1215 05/17/13 (TIME / DATE)
LOCATION / COORDINATES	N, E		(SW OF CELL 11 AREA)				

MATERIALS INVENTORY

WELL CASING	2.0 in. dia. 57 l.f.	WELL SCREEN	2.0 in. dia. 20.0 l.f.	BENTONITE SEAL	1/2" BENTONITE TABLETS
CASING TYPE	SCHEDULE 40 PVC	SCREEN TYPE	SCHEDULE 40 PVC	INSTALLATION METHOD	GRAVITY THROUGH CASING
JOINT TYPE	FLUSH THREADED	SLOT SIZE	0.02"–SLOT	FILTER PACK QTY.	11 BAGS
GROUT QUANTITY	~100 GALLONS	CENTRALIZERS	1–STAINLESS STEEL USED	FILTER PACK TYPE	M#2–SIZE SAND
GROUT TYPE	BENTONITE CLAY SLURRY	DRILLING MUD TYPE	WYO–BEN HIGH YIELD	INSTALLATION METHOD	GRAVITY THROUGH CASING

	INSTALLATION PHOTOS**	INSTALLATION NOTES
PHOTO 1 Well assembly materials including stainless steel centralizer at (shallow) permanent replacement monitoring well PMW–28.		bgs. TO GROUND SURFACE WHILE REMOVING TEMPORARY 6" STEEL SURFACE CASING. GROUT LEVEL WAS MEASURED AT APPROX. 6.0 FT. bgs. ON 05/21/13 AFTER SETTLING, AND BENTONITE CHIPS PLACED TO WITHIN 1–FT. OF GROUND SURFACE. TEMPORARY RISER STICKUP REMOVED TO APPROX. 0.5 FT bgs. CEMENT GROUT ADDED APPROX. 1.0 FT TO 0.5 FT bgs. WHILE PUSHING 8" DIAMETER, 14" LONG STEEL FLUSH–MOUNTED SURFACE CASING SET TO 4" ABOVE GROUND SURFACE (ags). 2 FT. X 2 FT. CONCRETE WELL PAD POURED AT GROUND SURFACE TO 4" ags. **SEE PHOTO LOG IN REPORT FOR ADDITIONAL CONSTRUCTION PHOTOS
PHOTO 2 Photo of sample interval portion from screened section of PMW–28 (screen set from 57–77–ft. bgs).		
PHOTO 3 Photo of sample interval portion from screened section of PMW–28 (screen set from 57–77–ft. bgs).		

Golder Associates

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX G

Geotechnical Laboratory Analysis

ADVANCED GeoServices
a Montrose Environmental Group company

Hardin-Kight –
Laboratory Analysis

HARDIN-KIGHT ASSOCIATES, INC.
CONSULTING ENGINEERS

November 9, 2002

MARK SCHULTZ ASSOCIATES
1202 West Street
Annapolis, Maryland 21401

Reference: Geotechnical Evaluation and Testing
Chesapeake Rubble Fill

Dear Mark,

In accordance with your request on October 31, 2002, I have reviewed MDE's August 5, 2002 letter and, in particular the Comments, 4a, 4b, and 4c.

Based on my experience as a geotechnical engineer, I can offer the following opinions.

1. With respect to the sentence in Comment 4a: ***"...there may also be the need for specific information on 'distinct strata' that underlie the site, in order to verify that the design of the landfill is and will remain stable after construction."***, I have reviewed the result of 33 Standard Penetration Test Borings and laboratory tests on samples of the clay which has "N" values in the range of 40 blow/foot. The test borings indicate that the clays below the cells have "N" values in excess of 100 blows/foot. It is my opinion that the geotechnical date collected to date are adequate to verify the design of the rubble fill and to verify that the rubble fill will remain stable after construction.

2. With respect to the sentence in Comment 4b: ***"Clays often exhibit greater porosity and plasticity than coarser sediments, and may subsequently be compressed to a greater extent than silts or sand when subjected to dewatering, vibration caused by traffic, and/or long term increase loading such would be expected under the proposed landfill area."*** This statement may apply to some clays, but none of these concerns are valid for clays with "N" values greater than 100 blows/foot. It is my opinion that the character of the clay as indicated by the existing Standard Penetration Test Borings is more than adequate to ***"insure that the liner and leachate collection system will not be subject to undue deflective stress, suffer damage, or exhibit a decrease in performance due to change in grade."*** To confirm that long term consolidation of the clays below the liner and the leachate collection system will be insignificant to the performance of the liner and the leachate collection system, you can obtain relatively undisturbed samples for one-dimensional consolidation testing. Some disturbance of the samples of the very hard clays below the liner and leachate collection system will be unavoidable, but the disturbance will

result in an estimated settlement greater than the actual settlement which will occur under the net long term load imposed by the landfill. Our evaluation of the existing subsurface data is that clay becomes stronger with depth below the existing surface and we anticipate that undisturbed sample will be obtained within 10 feet below the proposed bottom of the cells.

3. With respect to Comment 4c: *"The subsurface evaluation should provide sufficient information for a stability analysis to be performed on the proposed design, if one has not already been performed."* We recommend that the existing subsurface data be plotted to show the relationship between the subsurface data and the cells during construction and at completion. Based on these data stability analyses can be performed using conservative estimates of the soil characteristic based on the available data. Based on this initial evaluation, additional samples can be obtained, if necessary, to the confirm that the actual strength and compressibility characteristics of the undisturbed soils exceed the values used in the initial evaluation.

We have assumed that the civil engineering consultant can provide the sections which show the relationship between proposed Rubble Fill and the existing subsurface data. We propose to review the sections to determine where additional samples are required to allow us to predict the long term settlement of the clay below the liner and the leachate collection system and determine the most critical section for consideration of long term slope stability.

We have assumed that the contract for the collection of additional samples, if necessary, will be with the owner. We estimate that the cost of obtaining additional samples will be about $5000.00.

We estimate that the cost of additional laboratory testing, if necessary, will be about $5000.00.

We estimate that the cost of the geotechnical evaluation will be about $10,000.00.

We recommend that you budget $20,000 for the additional geotechnical evaluation which has been suggested by MDE's August 5, 2002 letter.

If you have any questions or if we can provide further assistance at this time, please call us.

Very truly yours,

HARDIN-KIGHT ASSOCIATES, INC.

Jack Hardin

Jack Hardin, PE

HARDIN-KIGHT ASSOCIATES, INC.
CONSULTING ENGINEERS

May 27, 2003 Our No.: 02231

Mark Schultz Associates, Inc.
1202 West Street
Annapolis, MD 21401

Reference: Geotechnical Testing and Evaluation
Chesapeake Rubble Landfill

Dear Mr. Schultz:

We have conducted laboratory tests on clay specimens for the Chesapeake Rubble Landfill as requested. Submitted herein are the results of the tests and our evaluation. This study was undertaken to predict the behavior of the clay at the bottom of the cell. The tests were conducted on hand carved soil samples obtained in the area of MW 28 at a depth of two feet. The test boring data reveals that the clays have a standard penetration test resistance (N) value of 30 to 40 blows per foot indicating a hard condition. This N value is less than the value for clays expected to be present at the proposed bottom of the cell according to the previous standard penetration test borings.

We conducted one dimensional consolidation test in accordance with ASTM D 2435 and unconfined compressive strength in accordance with ASTM D 2166. In addition, we conducted grain size distribution and index tests in accordance with the ASTM methods as indicated on the attached test results. In summary, the test results indicate that the soils encountered in the test pit are classified as CH in accordance with the Unified Soil Classification System (ASTM D 2487). The one dimensional consolidation test results indicate that the clays have an indicated pre-consolidation pressure of 5.4 tons per square foot. The initial void ratio and porosity are 0.499 and 0.333 respectively. The unconfined compressive strength was determined to be 10,594 pounds per square foot or 5.3 tons per square foot.

The sample tested in this study is a very hard clay. These soils will exhibit insignificant settlement when loaded to less than the 5.4 ton pre-consolidation pressure. The unconfined compressive strength indicates that the soils will support the anticipated loads with a factor of safety of at least two against bearing failure. For a 100 foot thickness of rubble, we estimate the loads to be roughly 4 tons per square foot.

According to the previous test boring data, most of the clays present on the site are harder than the clay represented by these tests. These test results indicate that the soils will be stable and are ideal for the proposed use. We expect the exposed materials at the bottom of the cell excavation to be superior based on the test boring data.

Attached are laboratory test results for your reference. If you have any questions concerning this matter, please call our office.

Very truly yours,

HARDIN KIGHT ASSOCIATES, INC.

Stephen E. Kight, P.E.

Jack Hardin, P.E.

SEK/JH/dlr

attachments

UNCONFINED COMPRESSION OF COHESIVE SOIL

Project: Chesapeake Rubble Fill
Job #: 02231
Lab #: 030081
Sample Location: On Site
Sample Description: Maroon & Gray Clay
Method: ASTM D2166

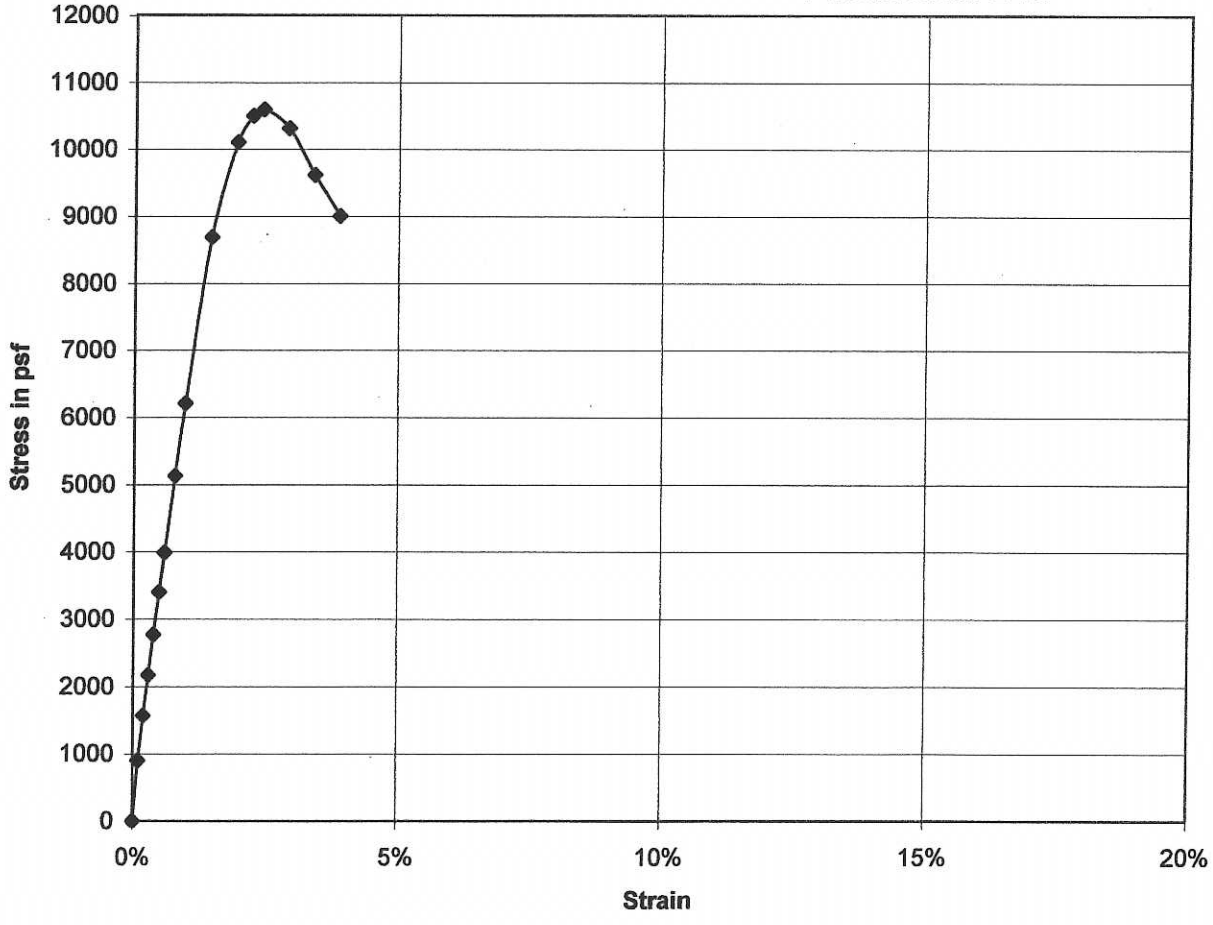
Date: 4/17/2003

Length:	5.140"	Initial Wet Wt.:	1138.47g	Initial Wet Unit Wt.:	132.4pcf
Diameter:	2.848"	Final Wet Wt.:	1136.48g	Final Wet Unit Wt.:	132.2pcf
Area:	6.371in^2	Dry Wt:	1083.46g	Dry Unit Wt.:	115.1pcf
Volume:	32.750in^3	Initial Moisture:	15.0%	L/D:	1.8

Load Rate: .045"/min

Stress-Strain Curve

Maximun Stress: 10594psf
Percent Strain: 2.4%



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7524 WB&A Road, Suite 100
Glen Burnie, Maryland 21061

Phone: 410 553-0802
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Email: HKAI@Erols.com

CONSOLIDATION

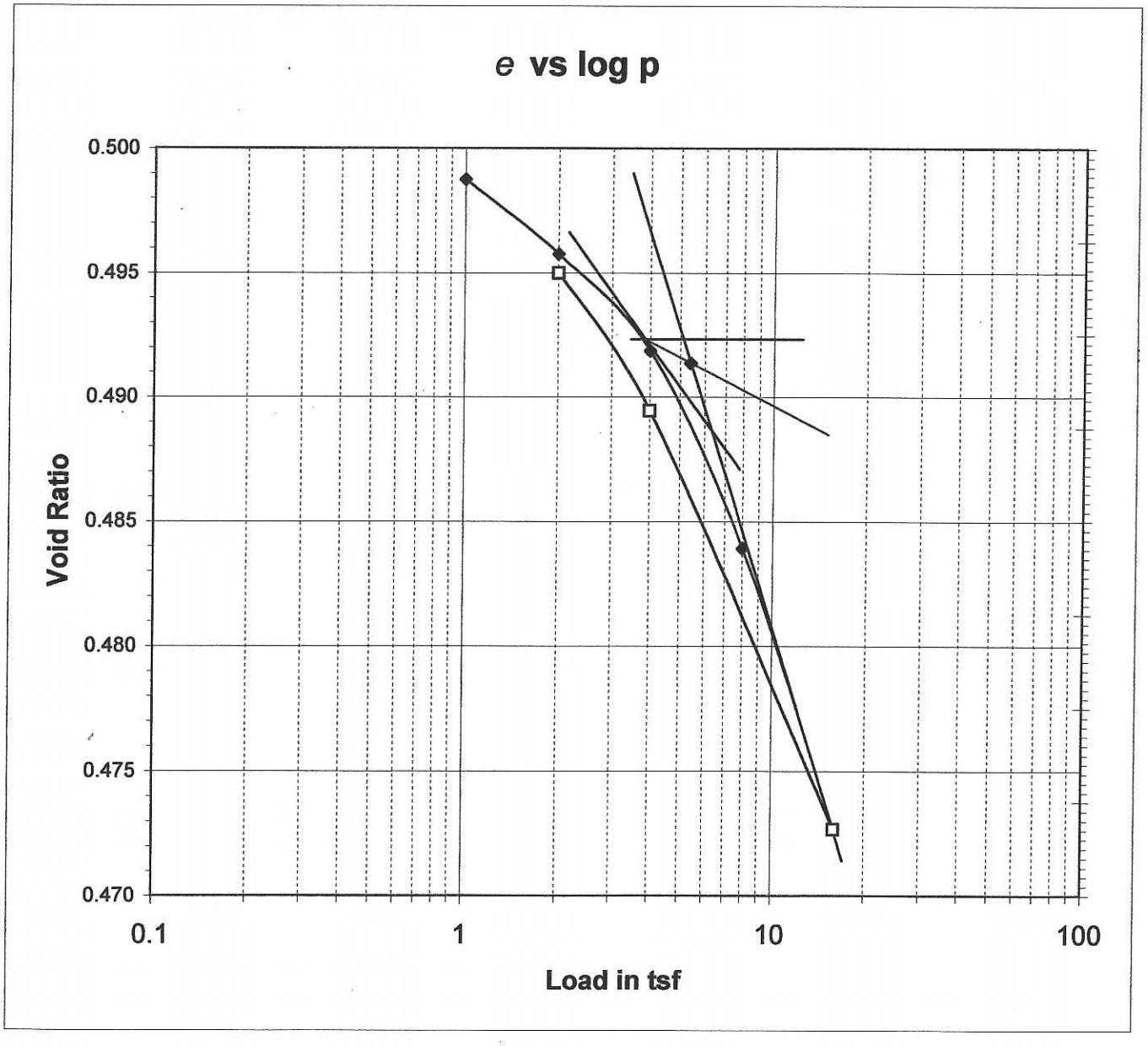
Project: Chesapeake Rubble Landfill
Job #: 02231
Lab #: 030081
Sample Location: On Site
Sample Description: Maroon & Gray Clay

Date: Apr-03

Specific Gravity: 2.8
Moisture Content: 17.3%
Sample Dia: 2.500"
Initial Sample Len: 1.000"

Unit Wt. Wet: 136.8 pcf
Unit Wt. Dry: 116.6 pcf
Initial Void Ratio: 0.499

Preconsolidation Pressure: 5.4 tsf



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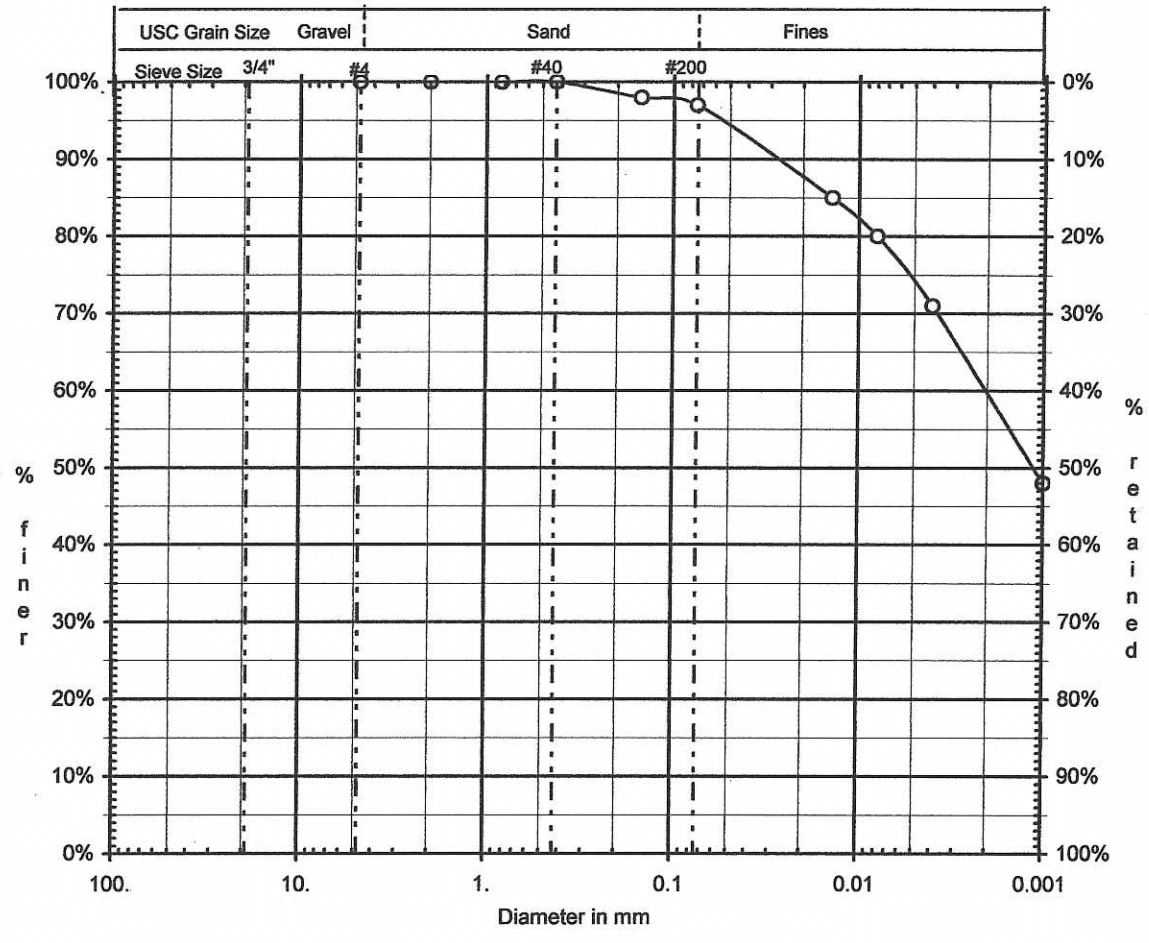
Grain Size Analysis

Project: Chesapeake Rubble Landfill
Job #: 02231

Date: 4/17/2003
Lab #: 030081

Identification: On Site

Description: Maroon & Gray Clay



Test Methods	Soil Properties		Classification
Moisture Content: ASTM D2216	Moisture Content	18.4%	USC: CH
Grain Size Analysis: ASTM D422	Liquid Limit:	66	
Liquid & Plastic Limits: ASTM D4318	Plastic Limit:	28	
	Plastic Index:	38	
	A Line:	34	

C:\~jobs\02\02231\[030081MAL.xls]

Checked By:

Tested By:

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Phone: 410 553-0802
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email: hkai@erols.com

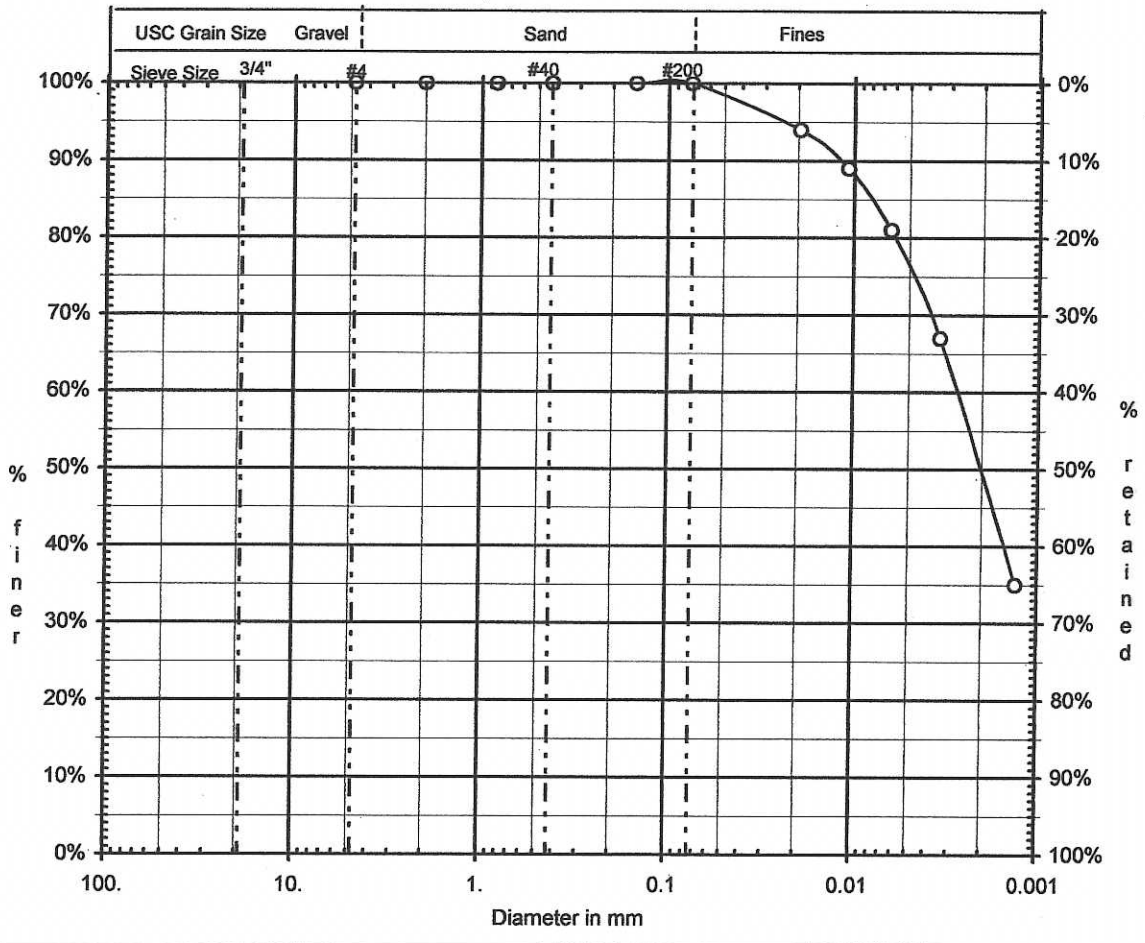
Grain Size Analysis

Project: Chesapeake Rubble Landfill
Job #: 02231

Date: 4/23/2003
Lab #: 030091

Identification: MW-23, S-13 & S-14

Description: Red brown & gray Clay



Test Methods	Soil Properties		Classification
Moisture Content: ASTM D2216	Moisture Content	24.2%	USC: CL
Grain Size Analysis: ASTM D422	Liquid Limit:	49	
Liquid & Plastic Limits: ASTM D4318	Plastic Limit:	27	
	Plastic Index:	22	
	A Line:	21	
	Checked By:		Tested By:

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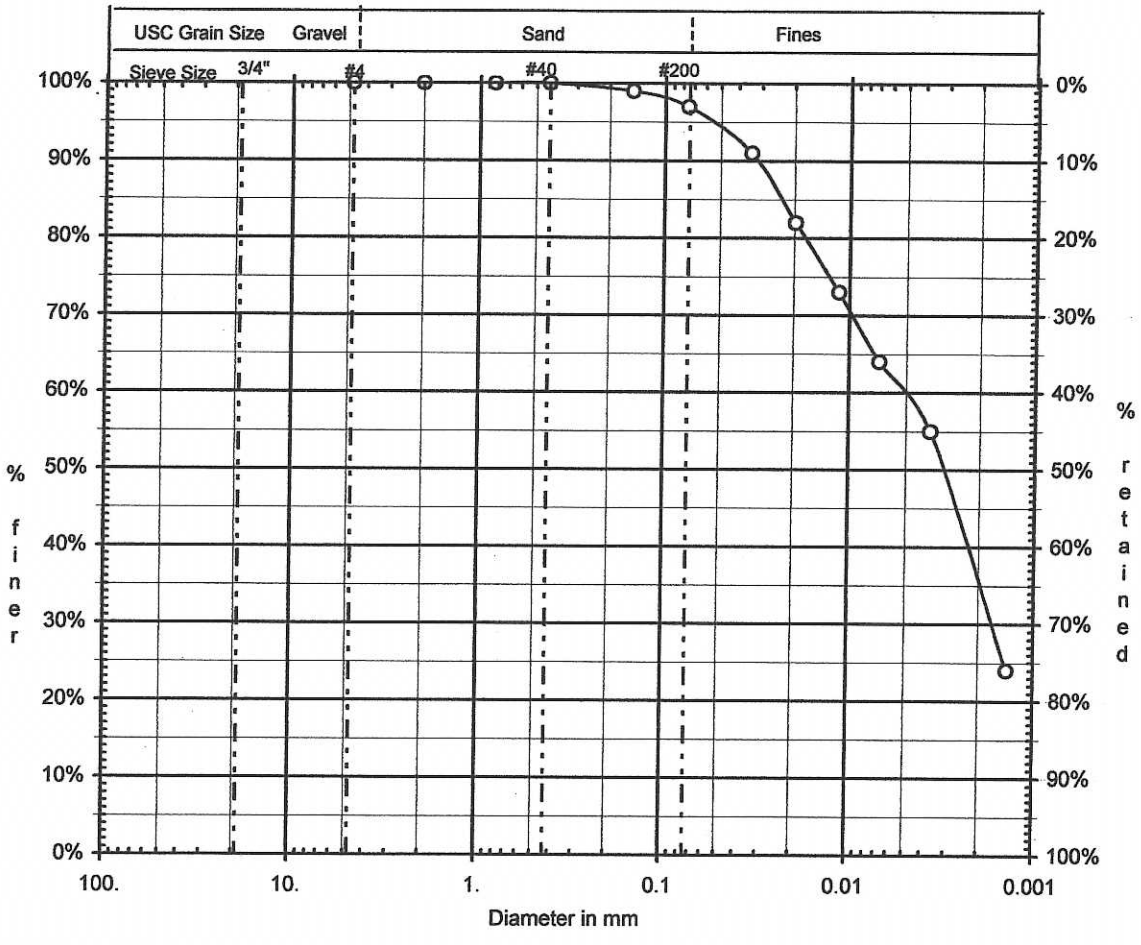
Grain Size Analysis

Project: Chesapeake Rubble Landfill
Job #: 02231

Date: 5/2/2003
Lab #: 030097

Identification: MW-23, S-8 & S-9

Description: Red & brown Clay



Test Methods	Soil Properties		Classification
Moisture Content: ASTM D2216	Moisture Content	20.0%	USC: CL
Grain Size Analysis: ASTM D422	Liquid Limit:	34	
Liquid & Plastic Limits: ASTM D4318	Plastic Limit:	23	
	Plastic Index:	11	
	A Line:	10	
	Checked By:		Tested By:

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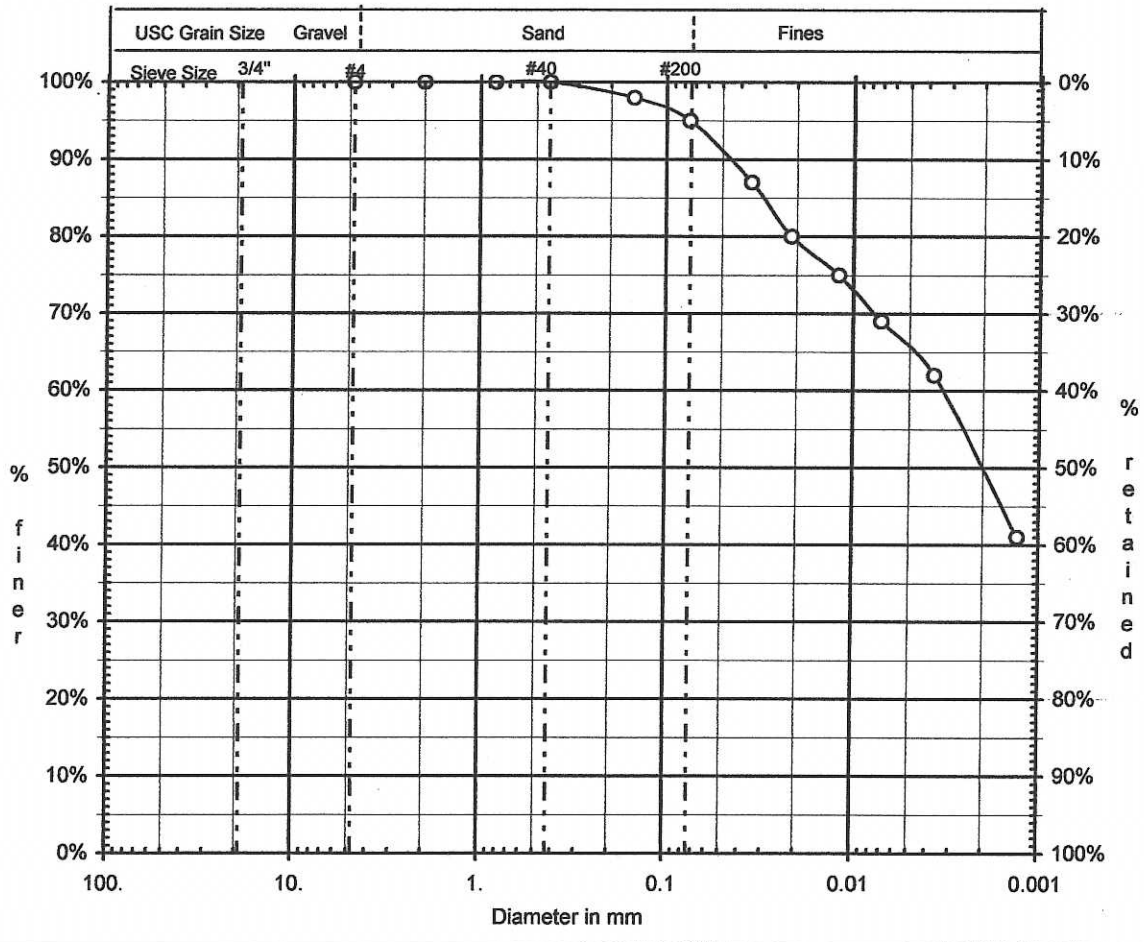
Grain Size Analysis

Project: Chesapeake Rubble Landfill
Job #: 02231

Date: 5/2/2003
Lab #: 030098

Identification: MW-23, 43-50'

Description: Red gray Clay



Test Methods	Soil Properties		Classification
Moisture Content: ASTM D2216	Moisture Content	20.0%	USC: CL
Grain Size Analysis: ASTM D422	Liquid Limit:	43	
Liquid & Plastic Limits: ASTM D4318	Plastic Limit:	20	
	Plastic Index:	23	
	A Line:	17	
	Checked By:		Tested By:

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Project: Chesapeake Rubble Landfill
Job #: 02231
Lab #: 030081
Location: On-Site
Description: Maroon & White Clay
Sample Type: Block Trimmed

Device Constants

	Burret	Pipet			
Vol:	50.0 cc	0.086	cc/Burret Unit	Panel:	2
Len:	53.3 cm	1.07	cm/Burret Unit	h_{wat}:	1.066 cm/cc
Area:	0.94 cm^2	0.0807	cm^2	in-out	0 Burret Units
				Offset	0.00 cm

Date: 4/21/2003

Sample Dimensions			Moisture Contents		
	Initial	Final		On site	Final
Length:	3.621 in				
Diameter:	2.845 in		Tare #:		
Wet Wt.:	808.61 g		Wet Wt.:	98.03 g	
Wet Unit Wt.:	133.8 pcf		Dry Wt.:	89.49 g	
Dry Unit Wt.:	108.9 pcf		Tare Wt.:	52.24 g	
Compaction:	#DIV/0!		Moisture:	22.9 %	

Date/Time	Pressure Cell	Pressure Head	Pressure tail	Head vol	Head b/p	Tail vol	Tail b/p	Temp	Volume In run	Volume In total	Volume Out Run	Volume Out Total	In/Out Ratio	Run Time sec	Head/Tail Differential psi	Head/Tail Differential cm	h	Hydraulic Gradiant	Temperature Ave.	Temperature Corr.	Hydraulic Conductivity (k_{20}) cm/sec	Steady State Average cm/sec
8:14	92.7	65.0	60.0	4.1	p	46.6	p	22.7									397.5					
10:08	92.7	65.0	60.0	4.5	p	46.1	p	22.8	0.0	0.0	0.0	0.0	0.80	6840	5.0	352.2	396.5	43	22.8	0.937	3.0E-09	
10:08	92.7	65.0	60.0	4.5	p	46.1	p	22.8									396.5					
11:47	92.7	65.0	60.0	4.8	p	45.6	p	22.9	0.0	0.1	0.0	0.1	0.60	5940	5.0	352.2	395.6	43	22.9	0.935	3.1E-09	
11:47	92.7	65.0	60.0	4.8	p	45.6	p	22.9									395.6					
15:50	92.7	65.0	60.0	5.6	p	44.2	p	23.2	0.1	0.1	0.1	0.2	0.57	14580	5.0	352.2	393.3	43	23.1	0.930	3.4E-09	
4/21/2003 15:50	92.7	65.0	60.0	5.6	p	44.2	p	23.2									393.3					
4/22/2003 8:07	92.7	65.0	60.0	9.3	p	39.8	p	23.0	0.3	0.4	0.4	0.6	0.84	58620	5.0	352.2	384.7	42	23.1	0.929	3.2E-09	
8:07	92.7	65.0	60.0	9.3	p	39.8	p	23.0									384.7					
14:15	92.7	65.0	60.0	10.4	p	38.1	p	23.3	0.1	0.5	0.1	0.7	0.65	22080	5.0	352.2	381.7	42	23.2	0.927	3.0E-09	
4/22/2003 14:15	92.7	65.0	60.0	10.4	p	38.1	p	23.3									381.7					
4/23/2003 8:03	92.7	65.0	60.0	14.0	p	33.5	p	23.2	0.3	0.9	0.4	1.1	0.78	64080	5.0	352.2	372.9	41	23.3	0.925	3.0E-09	
8:03	92.7	65.0	60.0	14.0	p	33.5	p	23.2									372.9					
15:30	92.7	65.0	60.0	16.2	p	31.4	p	23.1	0.2	1.0	0.2	1.3	1.05	26820	5.0	352.2	368.4	40	23.2	0.927	3.9E-09	
4/23/2003 15:30	92.7	65.0	60.0	16.2	p	31.4	p	23.1									368.4					
4/24/2003 7:56	92.7	65.0	60.0	21.3	p	25.5	p	23.0	0.4	1.5	0.5	1.8	0.86	59160	5.0	352.2	356.6	39	23.1	0.930	4.6E-09	
7:56	92.7	65.0	60.0	21.3	p	25.5	p	23.0									356.6					
16:47	92.7	65.0	60.0	23.8	p	22.5	p	23.0	0.2	1.7	0.3	2.1	0.83	31860	5.0	352.2	350.8	38	23.0	0.931	4.4E-09	4.0E-09
4/24/2003 16:47	92.7	65.0	60.0	23.8	p	22.5	p	23.0									350.8					
4/25/2003 7:53	92.7	65.0	60.0	28.0	p	17.6	p	23.0	0.4	2.1	0.4	2.5	0.86	54360	5.0	352.2	341.1	38	23.0	0.931	4.3E-09	4.3E-09
7:53	92.7	65.0	60.0	28.0	p	17.6	p	23.0									341.1					
15:31	92.7	65.0	60.0	30.1	p	15.1	p	23.0	0.2	2.2	0.2	2.7	0.84	27480	5.0	352.2	336.2	37	23.0	0.931	4.4E-09	4.4E-09
4/25/2003 15:31	92.7	65.0	62.0	1.8	b	45.6	b	23.0									258.0					
4/28/2003 8:18	92.7	65.0	62.0	2.8	b	44.5	b	22.7	1.0	3.2	1.1	3.8	0.91	233220	3.0	211.3	255.7	28	22.9	0.935	3.7E-09	4.2E-09

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ADVANCED GeoServices

a Montrose Environmental Group company

Golder Associates - Laboratory Analysis

Summary of Soil Samples for Laboratory Testing ***Chesapeake Terrace Supplemental Field Investigation***	
Sample	***Description***
PMW-28-A	Composite bagged material from S6 (28.0-30.0 ft), S8 (38.0-40.0 ft), and S14 (68-70.0 ft).
PMW-13-A	Bagged material from S4 (18.0-20.0 ft).
PMW-13-B	Bagged material from S14 (68.0-70.0 ft).
PMW-13-C	Composite bagged material from S16 (78.0-80.0 ft), and S18 (88.0-90.0 ft).
PMW-13-D	Composite bagged material from S20 (98.0-100.0 ft), and S21 (103.0-105.0 ft).
PMW-19-A	Composite bagged material from S21 (72.0-74.0 ft), S22 (74.0-76.0 ft), and S23 (76.0-78.0 ft).
PMW-19-B	Composite bagged material from S24 (83.0-85.0 ft), and S25 (88.0-90.0 ft).
B-105-A	Composite bagged material from S6(28.0-30.0 ft), and S7 (33.0-35.0 ft).
B-105-B	Composite bagged material from S11 (53.0-55.0 ft), and S12 (58.0-60.0 ft).
B-102-A	Bagged material from S14 (88.0-90.0 ft).
PMW-12-A	Bagged material from S10 (48.0-50.0 ft), and S11 (53.0-55.0 ft).
PMW-12-B	Composite bagged material from S28 (148.0-150.0 ft), S29 (158.0-160.0 ft), S30 (1653.0-165.0 ft), and S31 (168.0-170.0 ft).
PMW-12-C	Composite Bagged material from S41 (218.0-220.0), and S44 (233.0-235.0 ft).
PMW-23	Thin-walled tube sample (128.0-130.0 ft)

NWM/CHESAPEAKE TERRACE SFI/MD
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
PMW-12A	Bag	-	CL	17.1	25	17	8	-0.04	100.0	78.5	33.5	-	-	-	-	-	-	-
PMW-12B	Bag	-	CL	19.0	43	21	22	-0.11	100.0	95.1	72.0	-	-	-	-	-	-	-
PMW-12C	Bag	-	CL-ML	18.6	22	16	6	0.49	100.0	57.3	26.0	-	-	-	-	-	-	-
PMW-13A	Bag	-	(SM)	13.7	-	-	-	-	99.2	15.0	-	-	-	-	-	-	-	-
PMW-13B	Bag	-	(SP-SM)	19.1	-	-	-	-	100.0	9.9	-	-	-	-	-	-	-	-
PMW-13C	Bag	-	CL	15.7	37	18	19	-0.14	100.0	96.7	62.0	-	-	-	-	-	-	-
PMW-13D	Bag	-	CL	20.4	42	22	20	-0.06	100.0	97.0	58.5	-	-	-	-	-	-	-
PMW-19A	Bag	-	CL	16.0	27	16	11	-0.03	100.0	73.6	39.0	-	-	-	-	-	-	-
PMW-19B	Bag	-	(SC)	22.0	-	-	-	-	100.0	45.4	-	-	-	-	-	-	-	-
PMW-28A	Bag	-	(SM)	15.5	-	-	-	-	100.0	15.3	-	-	-	-	-	-	-	-
PMW-102A	Bag	-	CL	14.3	30	19	11	-0.46	100.0	79.4	39.0	-	-	-	-	-	-	-
PMW-105A	Bag	-	CH	24.7	61	25	36	-0.02	100.0	96.0	88.5	-	-	-	-	-	-	-
PMW-105B	Bag	-	CL	21.2	46	25	21	-0.16	100.0	98.1	60.5	-	-	-	-	-	-	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

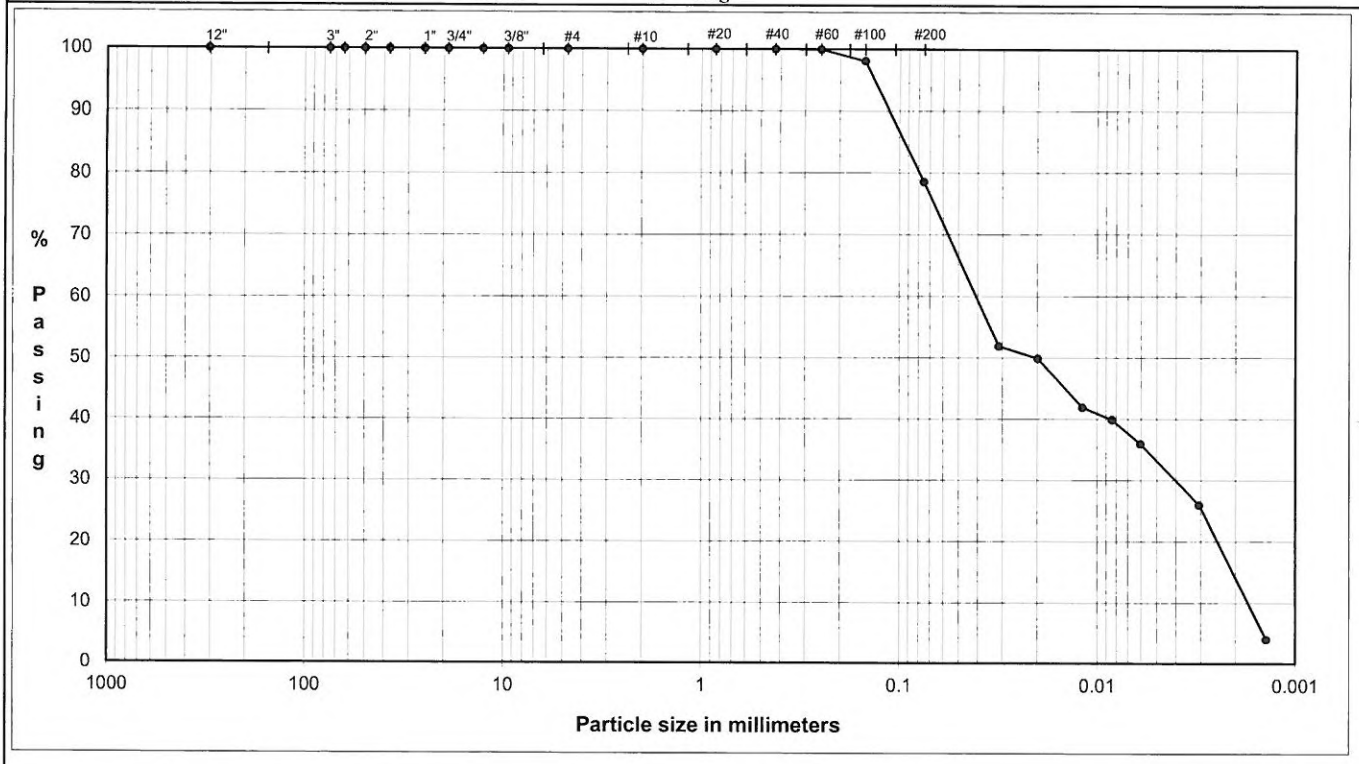
DECEMBER 2013

063-1431-003

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-12A** Depth: -
TYPE: **Bag**



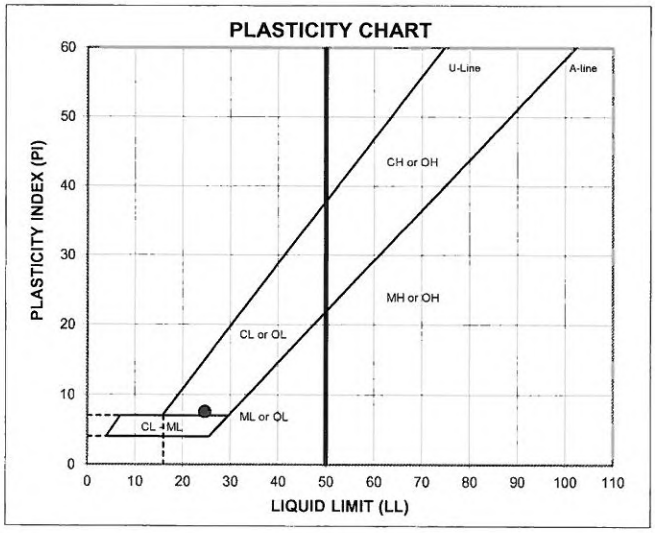
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**99.9**		
#100	0.15	**98.1**		
#200	0.075	**78.5**	Fine Sand	**21.5**

Hydrometer Analysis

(mm)	%Finer		
0.031	**51.9**		
0.020	**49.9**		
0.012	**41.9**	Fines	
0.0084	**39.9**	Silt or Clay	**78.5**
0.0060	**35.9**		
0.0031	**26.0**		
0.0014	**4.0**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
17.1	**25**	**17**	**8**	**-0.04**

LL (oven-dried)	
< 0.75 - ORGANIC (OL/OH)	

DESCRIPTION: sandy SILTY CLAY, fine sand; light gray.

USCS: CL

TECH	AM/TJ
DATE	12/18/13
CHECK	aem
REVIEW	DA
APPROVE	

Golder Associates Inc.

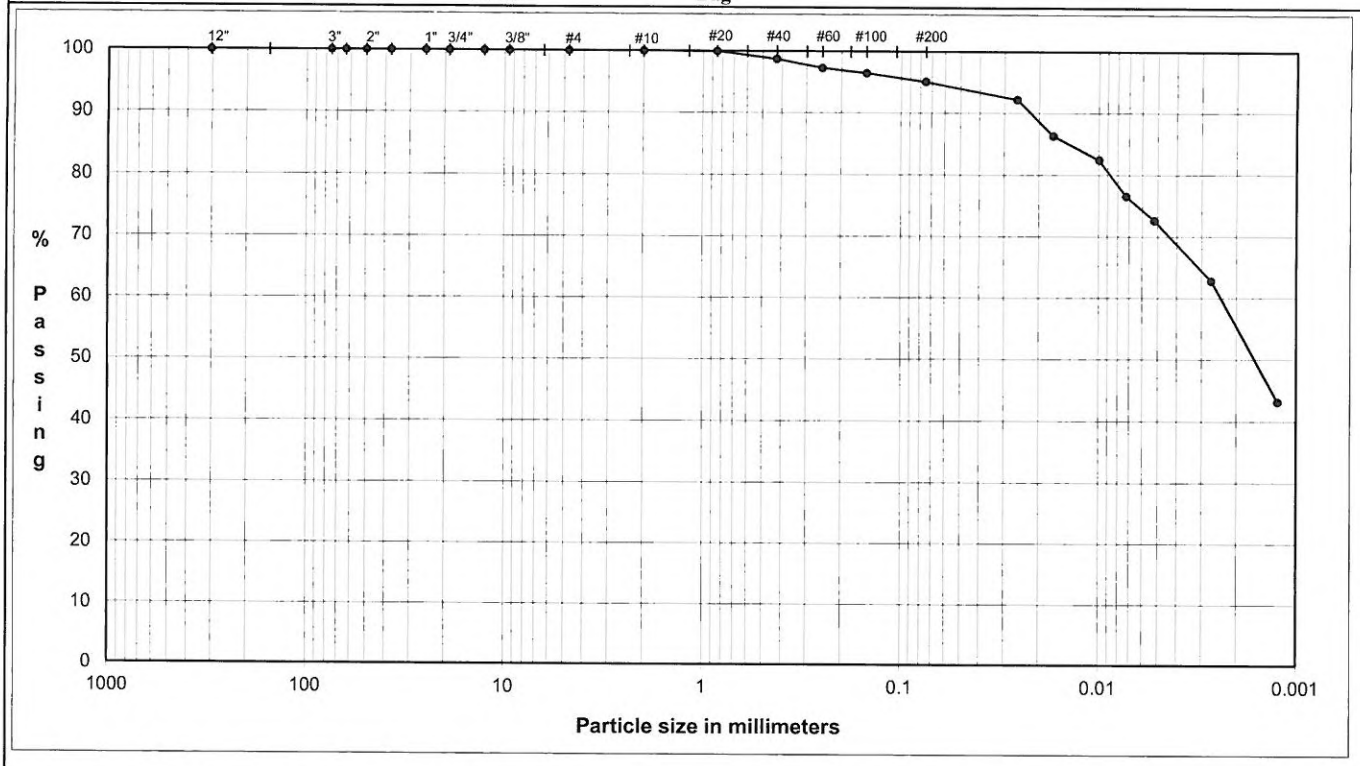
DECEMBER 2013

063-1431-003

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-12B** Depth: -
TYPE: **Bag**



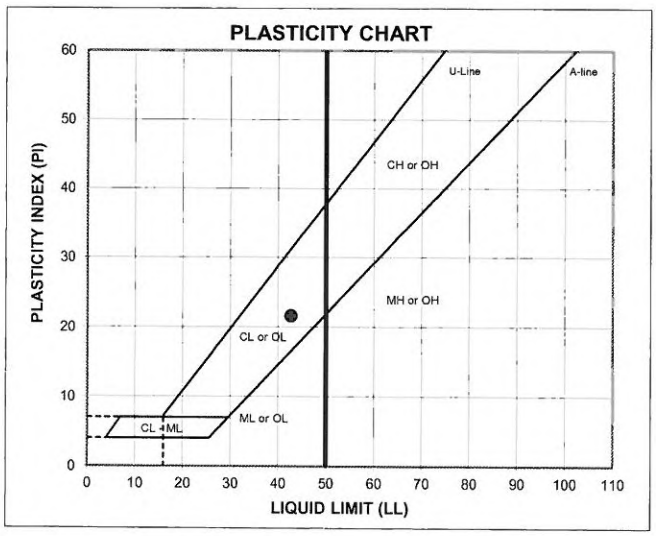
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**98.7**	Medium Sand	**1.3**
#60	0.25	**97.3**		
#100	0.15	**96.5**		
#200	0.075	**95.1**	Fine Sand	**3.6**

Hydrometer Analysis

(mm)	%Finer		
0.026	**92.2**		
0.017	**86.3**		
0.010	**82.4**	Fines	
0.0072	**76.5**	Silt or Clay	**95.1**
0.0052	**72.6**		
0.0027	**62.8**		
0.0012	**43.2**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
19.0	**43**	**21**	**22**	**-0.11**

LL (oven-dried)	
<0.75 - ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY, trace fine to medium sand; reddish yellow, reddish brown, and greenish gray.

USCS: CL

TECH	AM/TJ
DATE	12/18/13
CHECK	aem
REVIEW	JA
APPROVE	

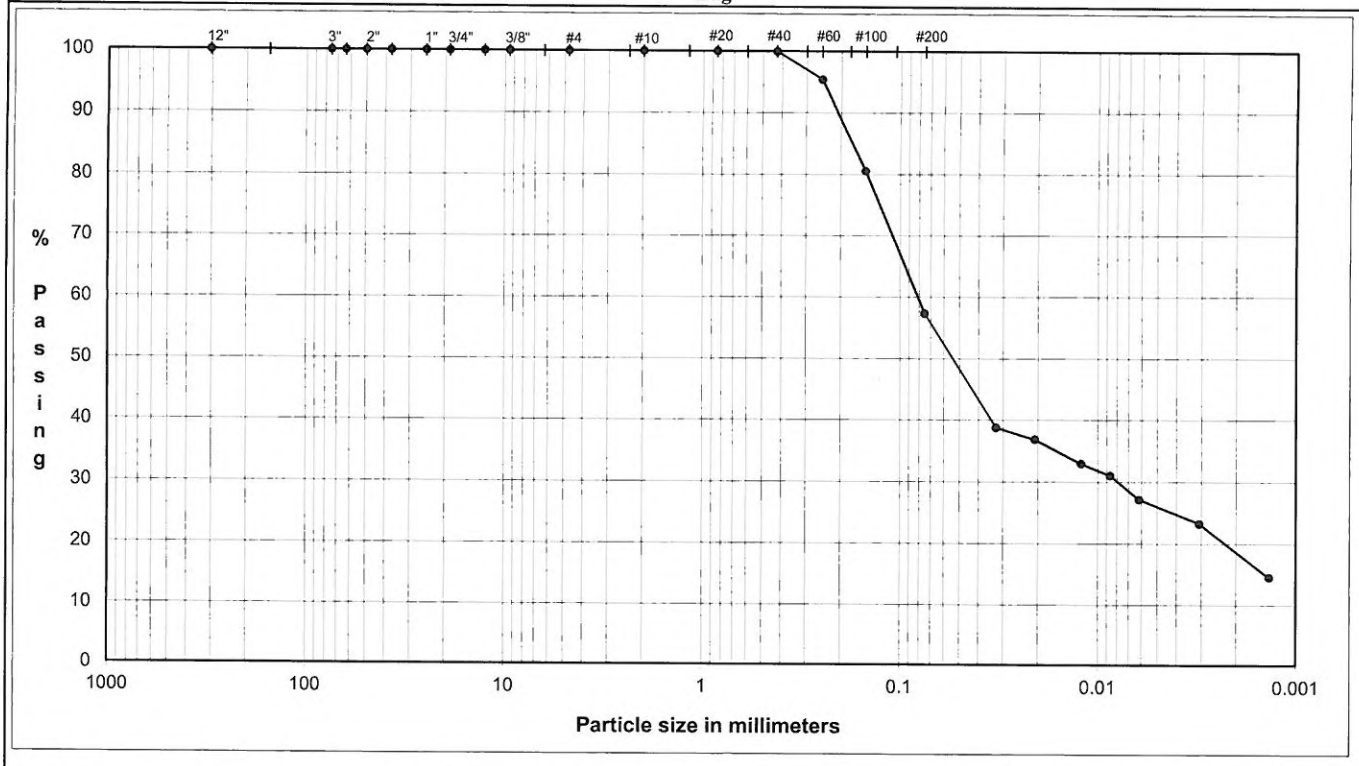
DECEMBER 2013

063-1431-003

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-12C** Depth: -
TYPE: **Bag**



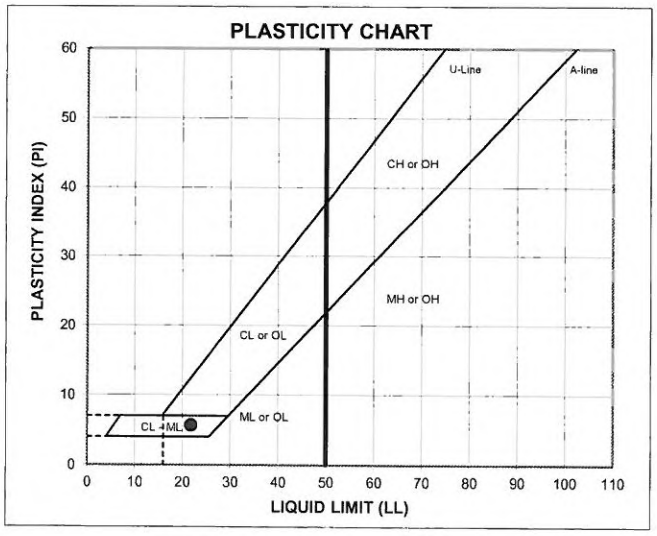
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**95.4**		
#100	0.15	**80.6**		
#200	0.075	**57.3**	Fine Sand	**42.6**

Hydrometer Analysis

(mm)	%Finer		
0.033	**38.8**		
0.021	**36.8**		
0.012	**33.0**	Fines	
0.0087	**31.0**	Silt or Clay	**57.3**
0.0062	**27.1**		
0.0031	**23.3**		
0.0014	**14.5**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
18.6	**22**	**16**	**6**	**0.49**

LL (oven-dried) / LL (oven-dried) / 0.75 = ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY to CLAYEY SILT and SAND, fine to medium; grayish brown.

USCS: CL-ML

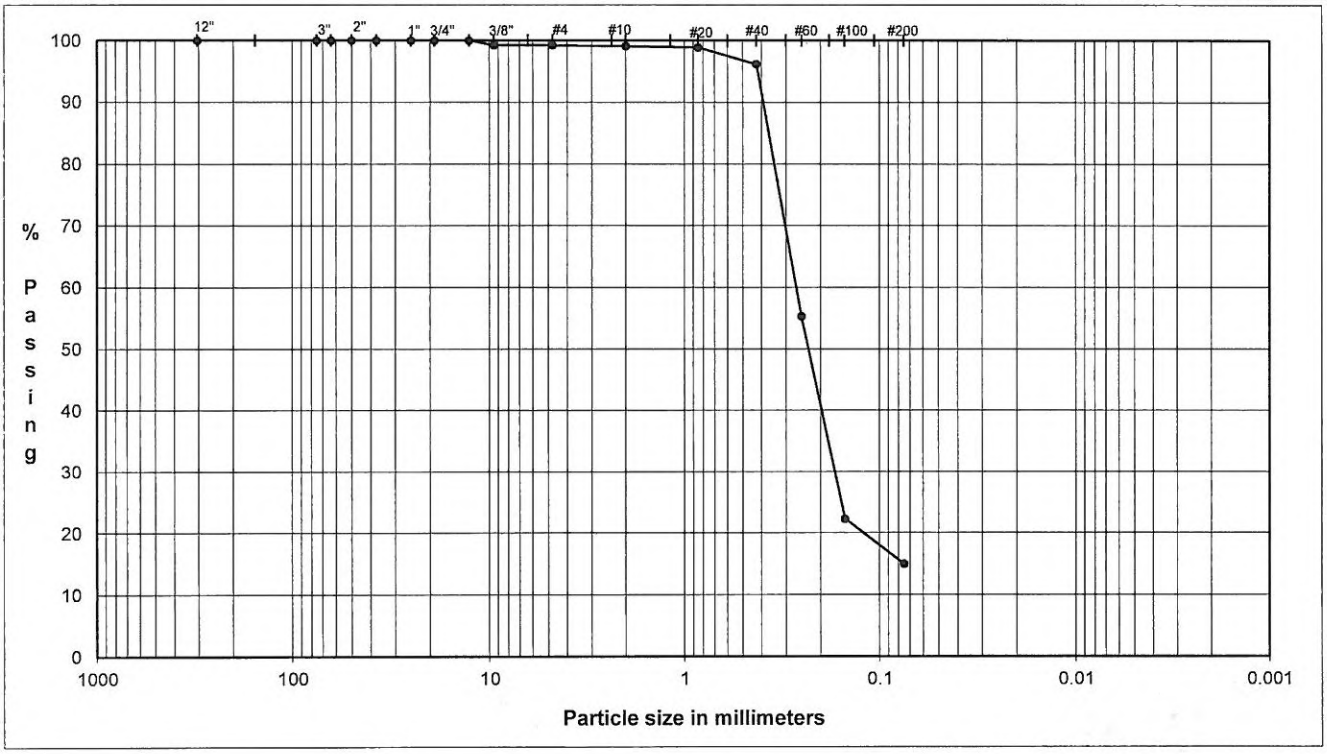
TECH	TJ
DATE	12/20/13
CHECK	alm
REVIEW	
APPROVE	

DECEMBER 2013 063-1431-003

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

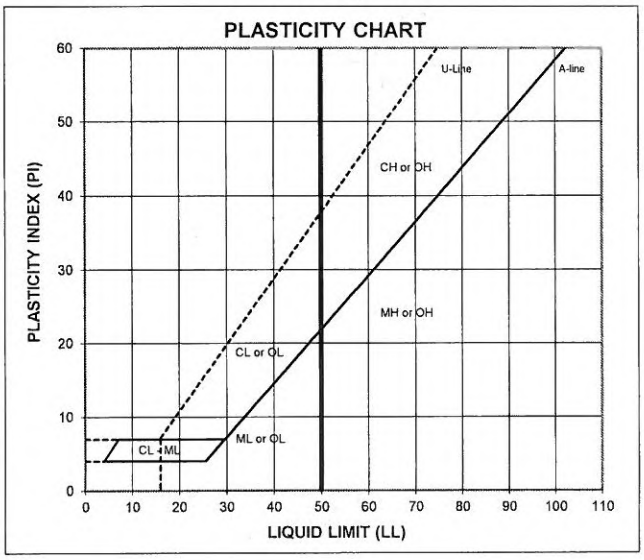
PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-13A** Depth: -
TYPE: **Bag**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**99.2**		
#4	4.8	**99.2**	Fine Gravel	**0.8**
#10	2.00	**99.1**	Coarse Sand	**0.2**
#20	0.85	**98.9**		
#40	0.43	**96.2**	Medium Sand	**2.9**
#60	0.25	**55.3**		
#100	0.15	**22.3**		
#200	0.075	**15.0**	Fine Sand	**81.2**
			Fines	**15.0**



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
13.7				

LL (oven-dried)
< 0.75 = ORGANIC (OL/OH)

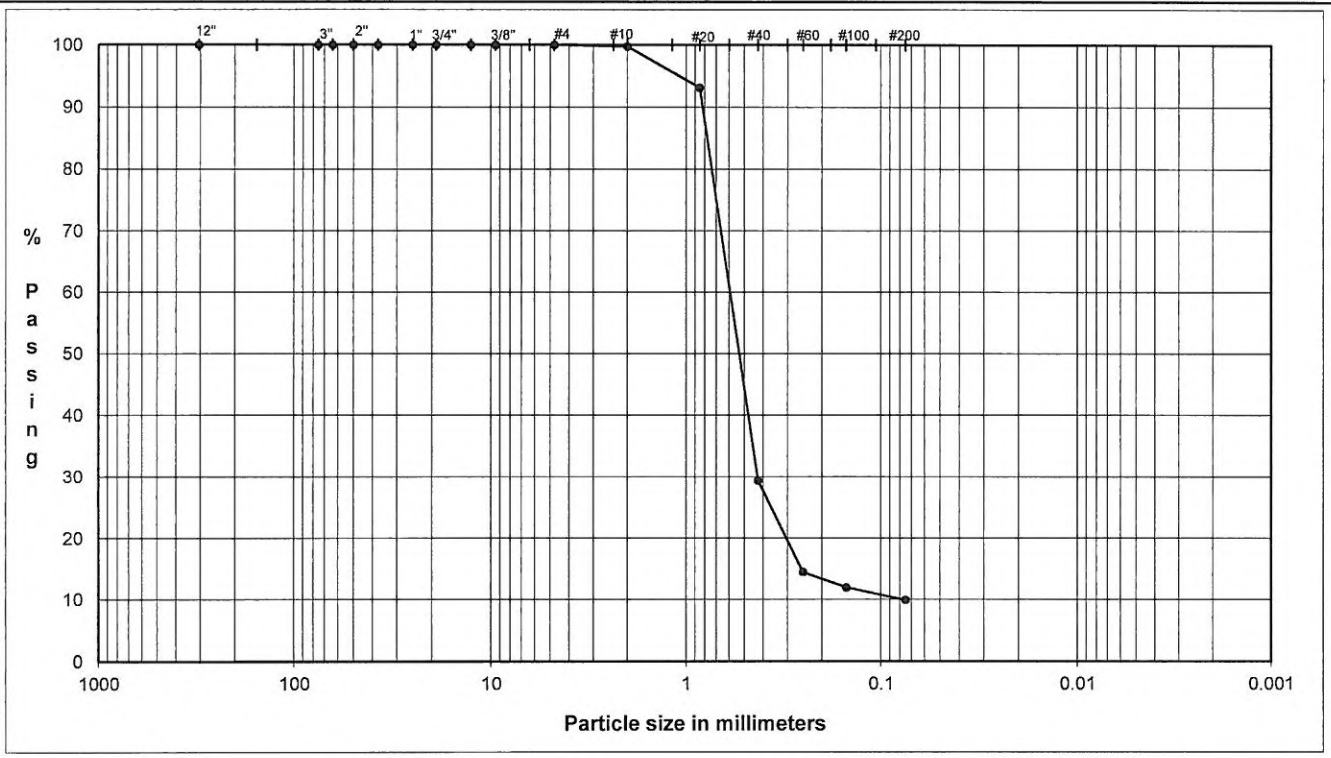
DESCRIPTION: SILTY SAND, fine to coarse, trace fine gravel; yellowish brown.
USCS: (SM)

TECH	TJ/AM
DATE	12/12/13
CHECK	gem
REVIEW	MWM
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

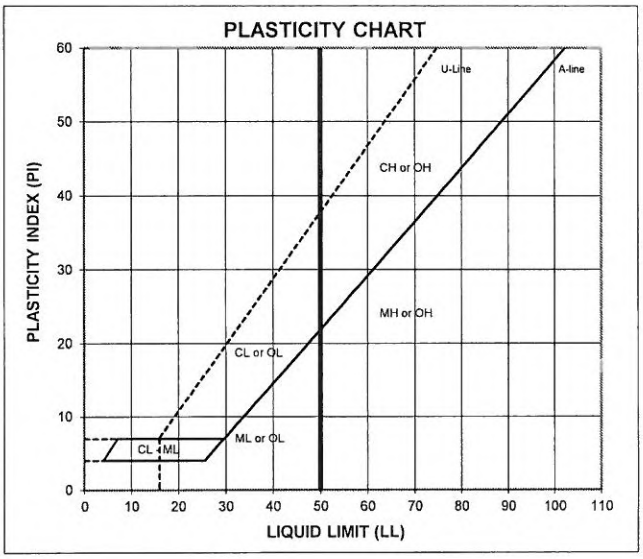
PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-13B** Depth: -
TYPE: **Bag**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.7**	Coarse Sand	**0.3**
#20	0.85	**93.2**		
#40	0.43	**29.4**	Medium Sand	**70.4**
#60	0.25	**14.5**		
#100	0.15	**12.0**		
#200	0.075	**9.9**	Fine Sand	**19.5**
			Fines	**9.9**



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
19.1				

LL (oven-dried)
0.75 = ORGANIC (OL/OH)

DESCRIPTION: SAND, fine to coarse, some fines; yellowish brown.

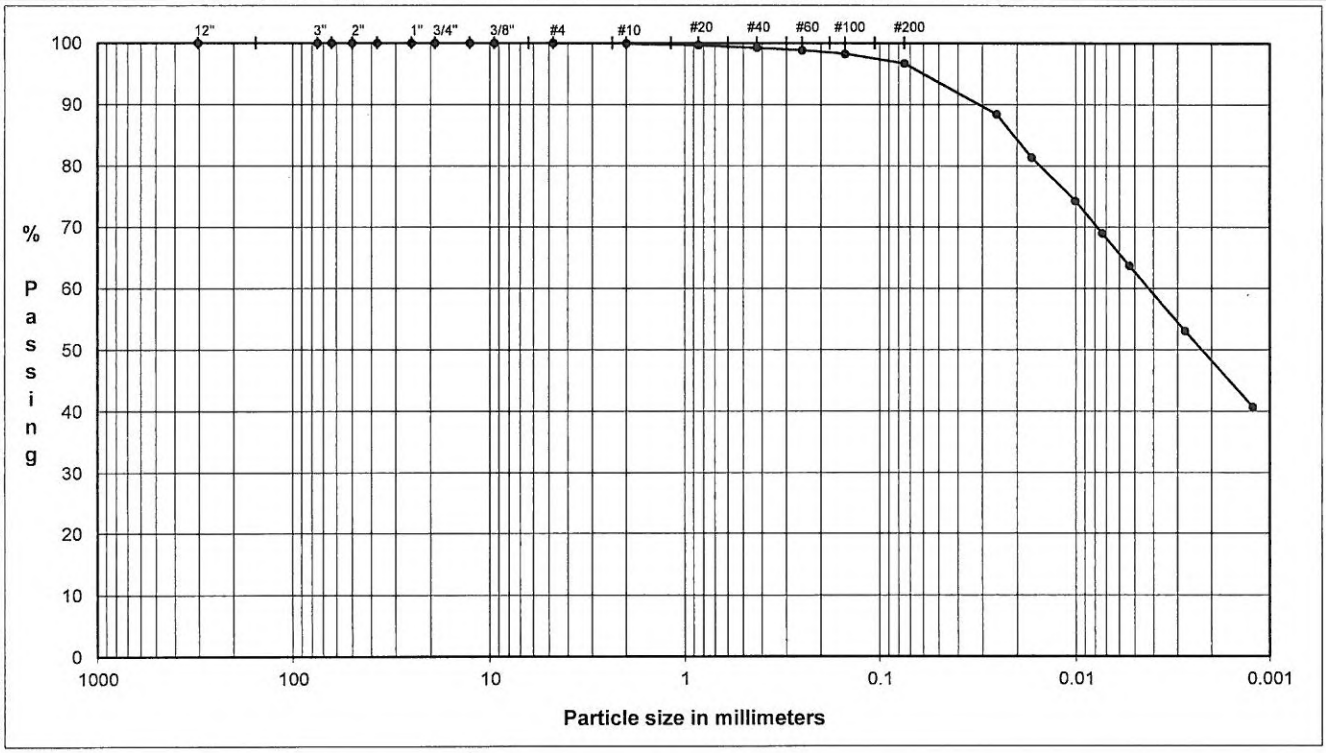
USCS: (SP-SM)

TECH	TJ/AM
DATE	12/12/13
CHECK	aem
REVIEW	TWM
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-13C** Depth: -
TYPE: **Bag**



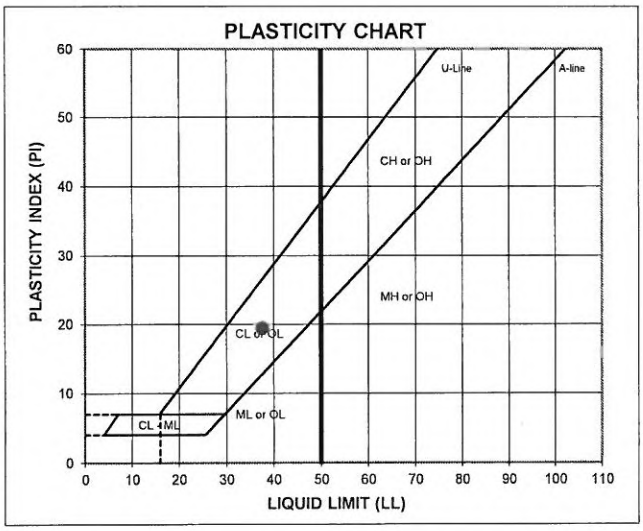
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.9**	Coarse Sand	**0.1**
#20	0.85	**99.7**		
#40	0.43	**99.3**	Medium Sand	**0.7**
#60	0.25	**98.9**		
#100	0.15	**98.3**		
#200	0.075	**96.7**	Fine Sand	**2.5**

Hydrometer Analysis

(mm)	%Finer		
0.025	**88.4**		
0.017	**81.4**		
0.010	**74.3**	Fines	
0.0074	**69.0**	Silt or Clay	**96.7**
0.0053	**63.7**		
0.0028	**53.1**		
0.0012	**40.7**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
15.7	**37**	**18**	**19**	**-0.14**

LL (oven-dried)	
< 0.75 = ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY, trace fine to coarse sand; reddish gray.

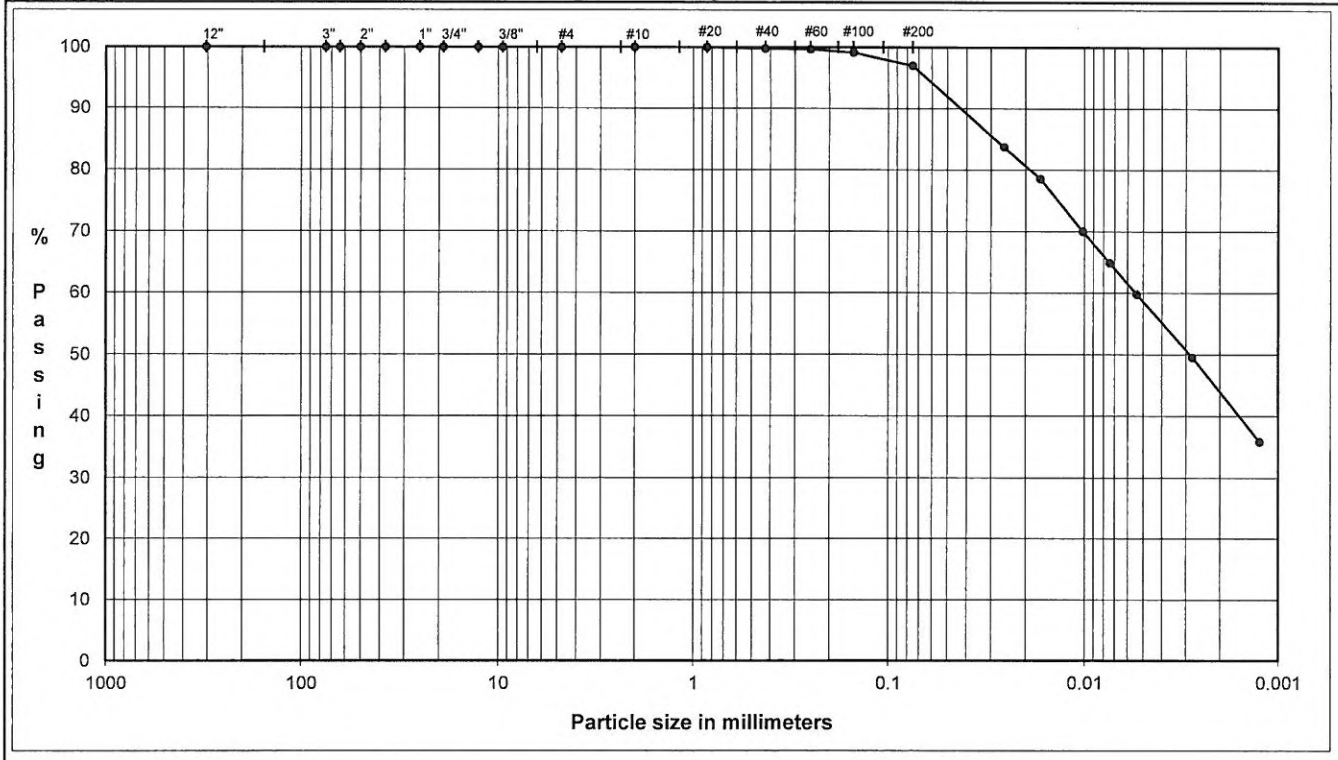
USCS: CL

TECH	TJ/AM/TW
DATE	12/12/13
CHECK	aem
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-13D** Depth: -
TYPE: **Bag**



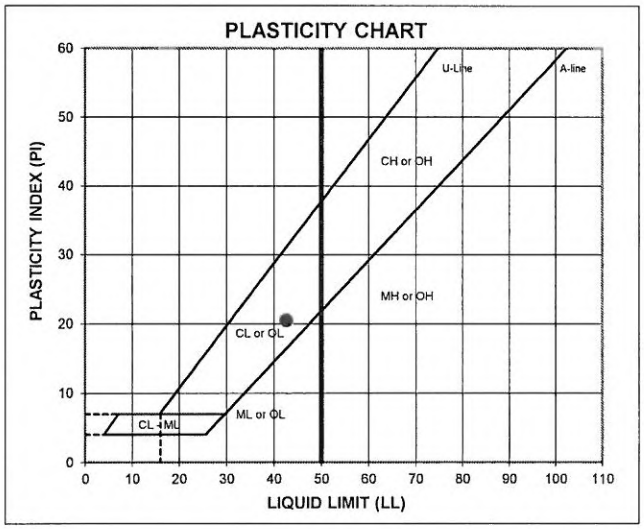
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	99.8	Medium Sand	0.2
#60	0.25	99.7		
#100	0.15	99.1		
#200	0.075	97.0	Fine Sand	2.7

Hydrometer Analysis

(mm)	%Finer		
0.026	83.7		
0.017	78.6		
0.010	70.0	Fines	
0.0074	64.9	Silt or Clay	97.0
0.0054	59.8		
0.0028	49.5		
0.0012	35.9		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
20.4	42	22	20	-0.06

LL (oven-dried)	
< 0.75 = ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY, trace fine to medium sand; reddish brown and yellow.

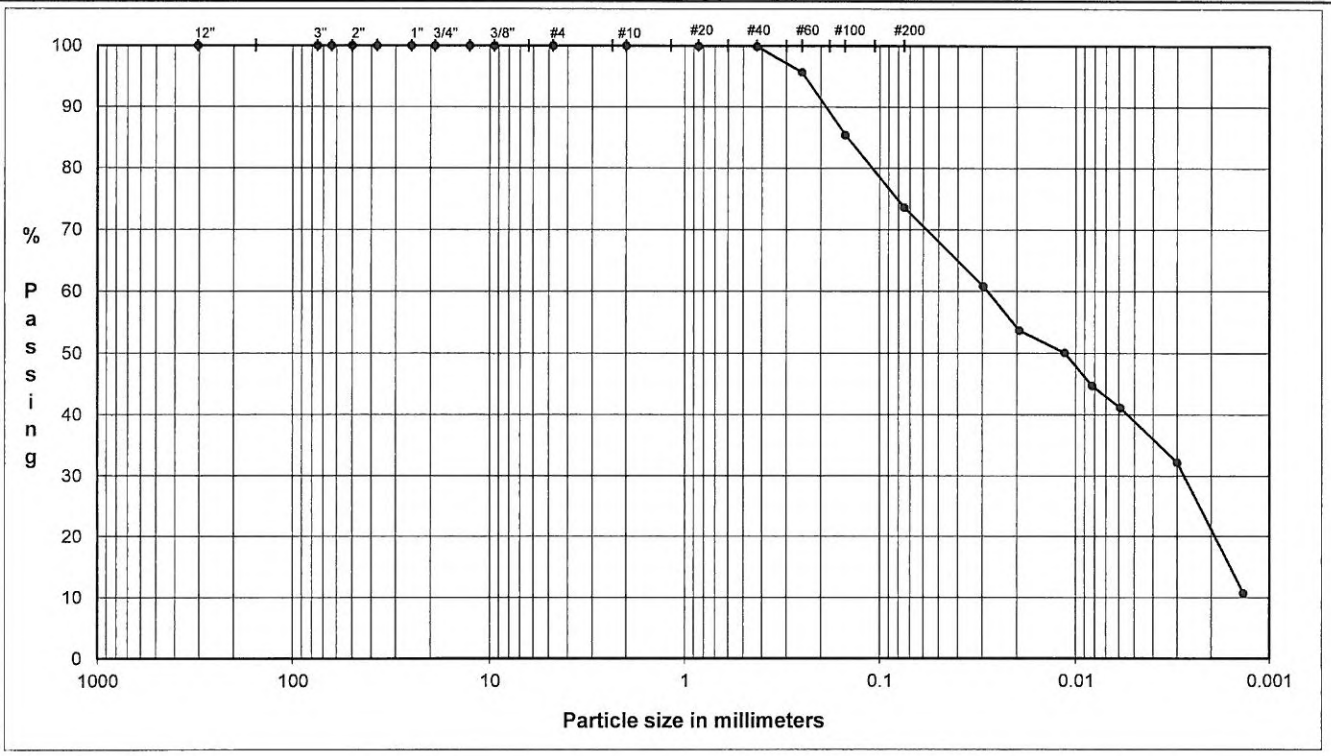
USCS: CL

TECH	TJ/AM/TW
DATE	12/12/13
CHECK	aem
REVIEW	PLW
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-19A** Depth: -
TYPE: **Bag**



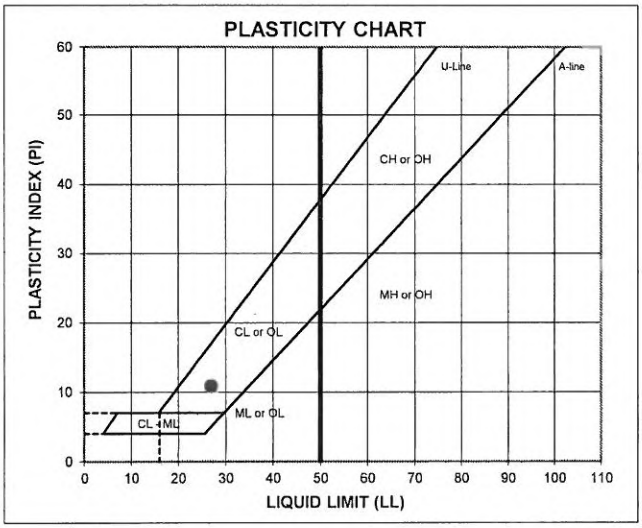
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**99.9**	Medium Sand	**0.1**
#60	0.25	**95.7**		
#100	0.15	**85.5**		
#200	0.075	**73.6**	Fine Sand	**26.3**

Hydrometer Analysis

(mm)	%Finer		
0.030	**60.8**		
0.019	**53.7**		
0.011	**50.1**	Fines	
0.0082	**44.7**	Silt or Clay	**73.6**
0.0059	**41.2**		
0.0030	**32.2**		
0.0014	**10.7**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
16.0	**27**	**16**	**11**	**-0.03**

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

DESCRIPTION: sandy SILTY CLAY, fine to medium; reddish brown.

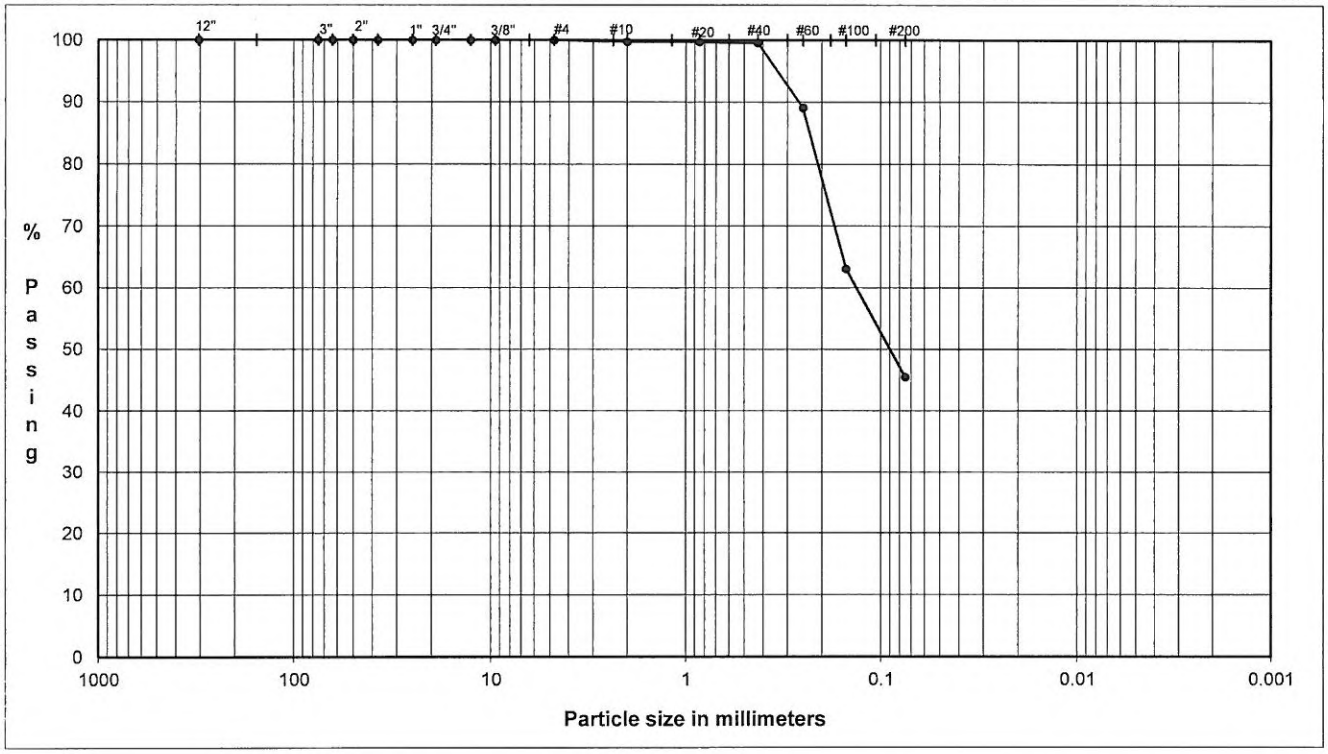
USCS: CL

TECH	TW/TJ/AM
DATE	12/12/13
CHECK	
REVIEW	
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

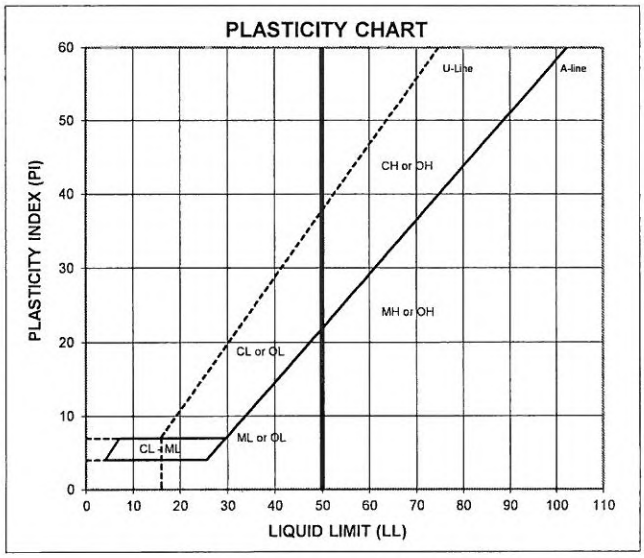
PROJECT NAME: NWM/CHESAPEAKE TERRACE SFI/MD
SAMPLE ID: PMW-19B Depth: -
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.7	Coarse Sand	0.3
#20	0.85	99.7		
#40	0.43	99.6	Medium Sand	0.2
#60	0.25	89.1		
#100	0.15	63.0		
#200	0.075	45.4	Fine Sand	54.1
			Fines	45.4



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.0				

DESCRIPTION: fine to coarse SAND and SILTY CLAY; light brown and red.

USCS: (SC)

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

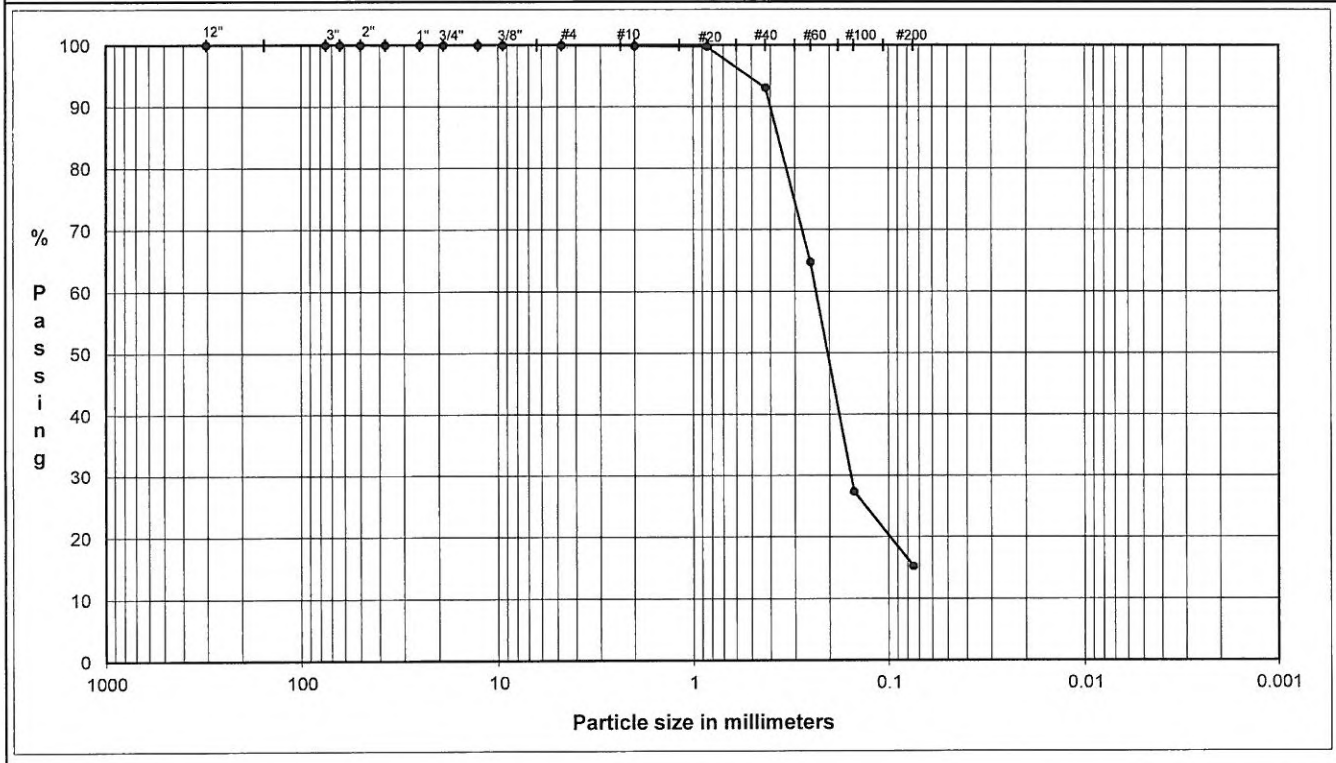
TECH	TJ/AM
DATE	12/12/13
CHECK	aem
REVIEW	[illegible]
APPROVE	

DECEMBER 2013 063-1431-003

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D6913, D4318

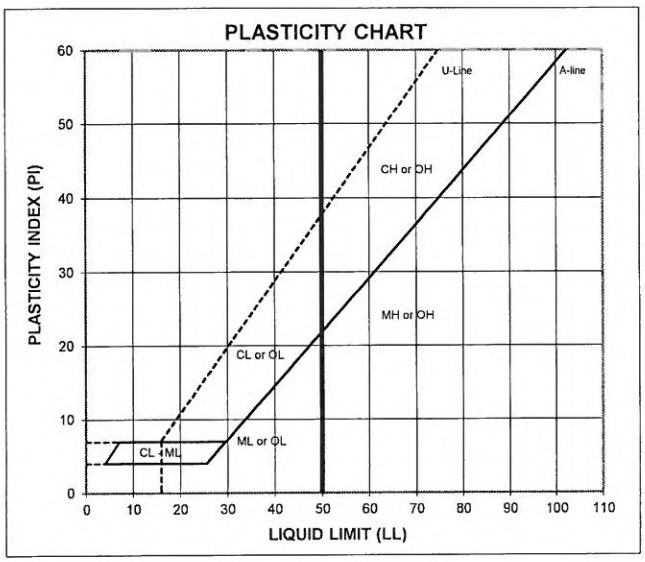
PROJECT NAME: NWM/CHESAPEAKE TERRACE SFI/MD
SAMPLE ID: PMW-28A Depth: -
TYPE: Bag



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.9	Coarse Sand	0.1
#20	0.85	99.8		
#40	0.43	93.1	Medium Sand	6.8
#60	0.25	64.8		
#100	0.15	27.4		
#200	0.075	15.3	Fine Sand	77.8
			Fines	15.3



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
15.5				

DESCRIPTION: SILTY SAND, fine to coarse; yellowish brown.

USCS: (SM)

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

TECH	TJ/AM
DATE	12/12/13
CHECK	aem
REVIEW	[illegible]
APPROVE	

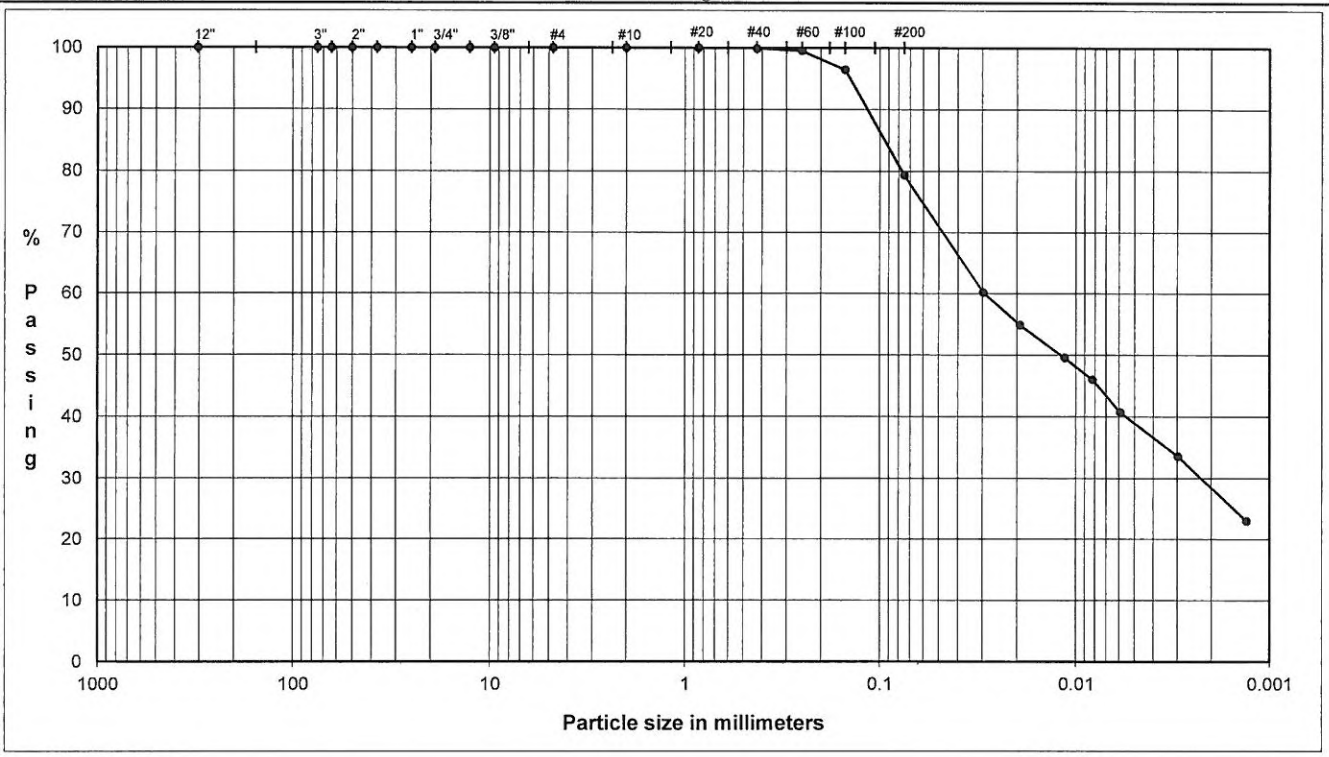
Golder Associates Inc.

DECEMBER 2013 063-1431-003

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-102A** Depth: -
TYPE: **Bag**



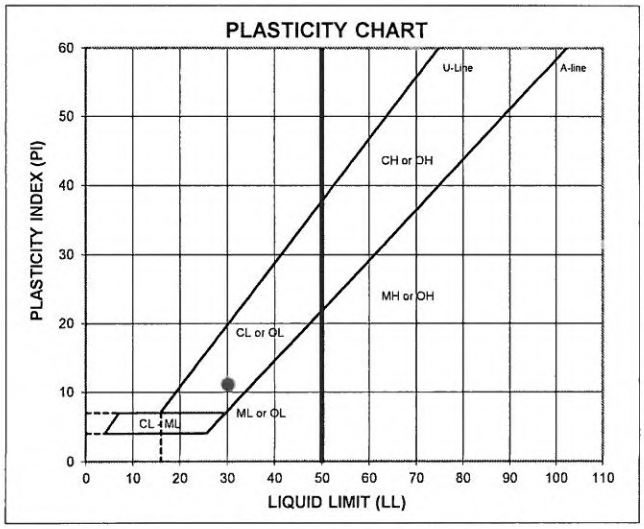
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	99.9	Medium Sand	0.1
#60	0.25	99.5		
#100	0.15	96.5		
#200	0.075	79.4	Fine Sand	20.5

Hydrometer Analysis

(mm)	%Finer		
0.030	60.2		
0.019	54.9		
0.011	49.6	Fines	
0.0082	46.0	Silt or Clay	79.4
0.0059	40.7		
0.0030	33.6		
0.0013	23.0		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
14.3	30	19	11	-0.46

LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

DESCRIPTION: sandy SILTY CLAY, fine to medium; gray.

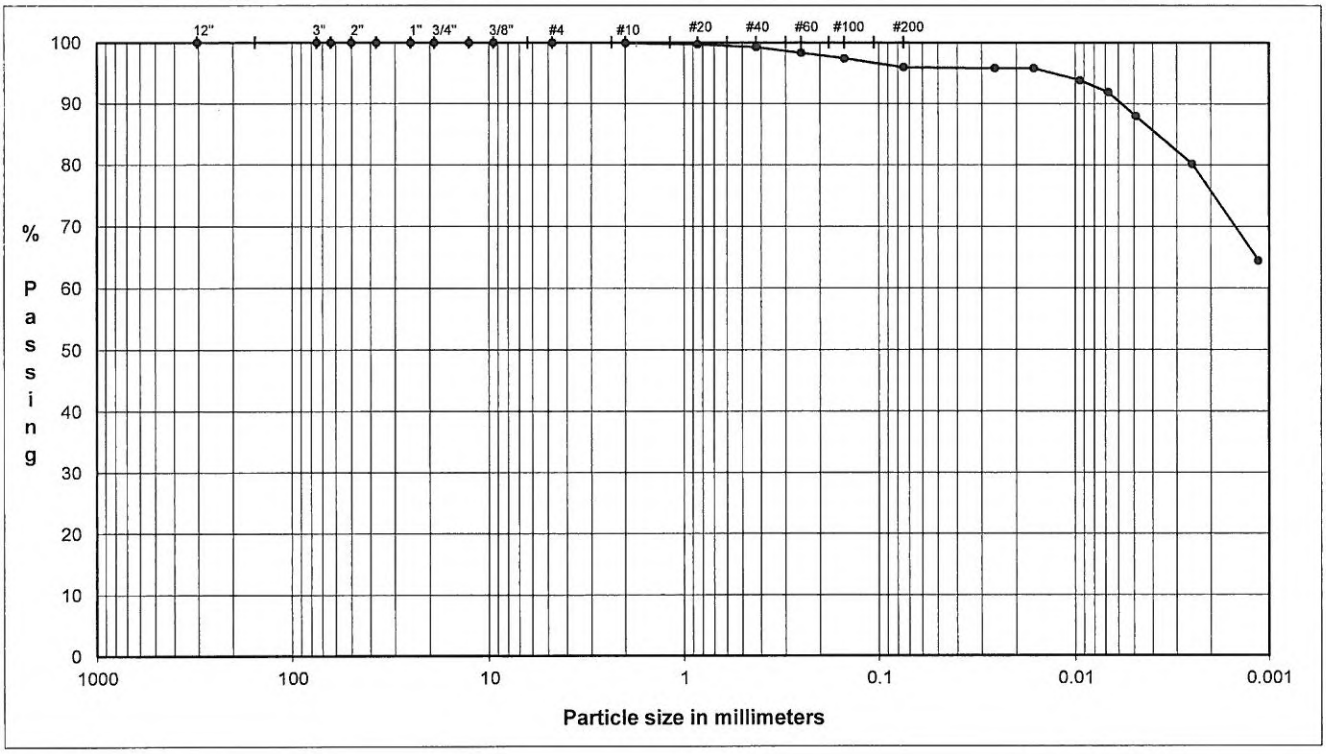
USCS: CL

TECH	TJ/AM/TW
DATE	12/12/13
CHECK	aem
REVIEW	[illegible]
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-105A** Depth: -
TYPE: **Bag**



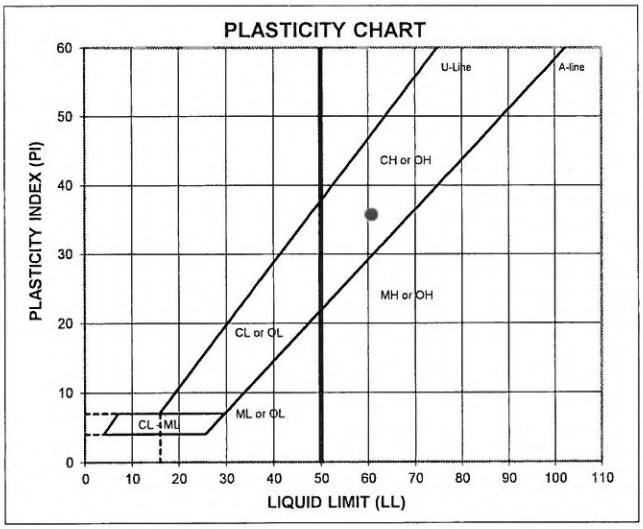
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.9**	Coarse Sand	**0.1**
#20	0.85	**99.7**		
#40	0.43	**99.3**	Medium Sand	**0.7**
#60	0.25	**98.3**		
#100	0.15	**97.4**		
#200	0.075	**96.0**	Fine Sand	**3.3**

Hydrometer Analysis

(mm)	%Finer		
0.026	**95.8**		
0.016	**95.8**		
0.009	**93.9**	Fines	
0.0068	**91.9**	Silt or Clay	**96.0**
0.0049	**88.0**		
0.0025	**80.2**		
0.0011	**64.5**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
24.7	**61**	**25**	**36**	**-0.02**

LL (oven-dried)	
< 0.75 = ORGANIC (OL/OH)	

DESCRIPTION: CLAY, trace fine to coarse sand; reddish brown.

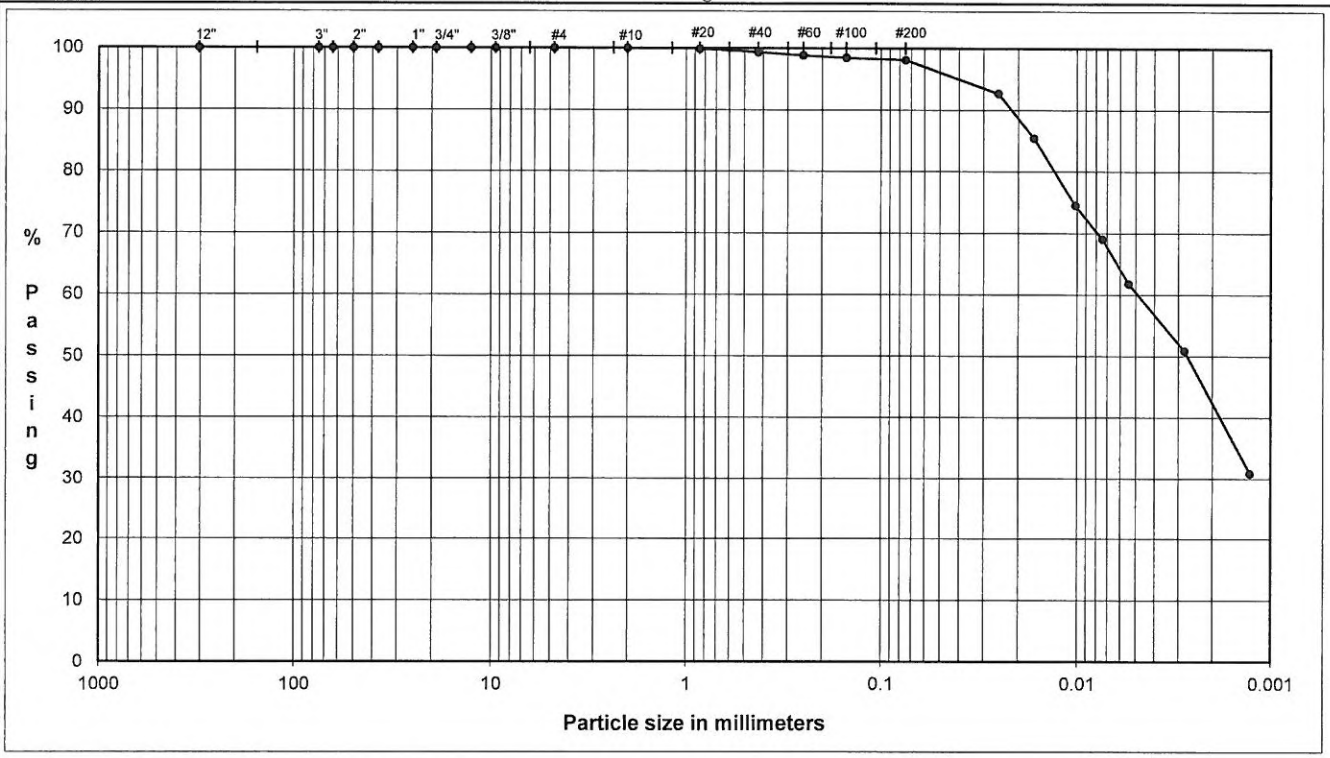
USCS: CH

TECH	TJ/AM?TW
DATE	12/12/13
CHECK	aem
REVIEW	[illegible]
APPROVE	

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **NWM/CHESAPEAKE TERRACE SFI/MD**
SAMPLE ID: **PMW-105B** Depth: -
TYPE: **Bag**



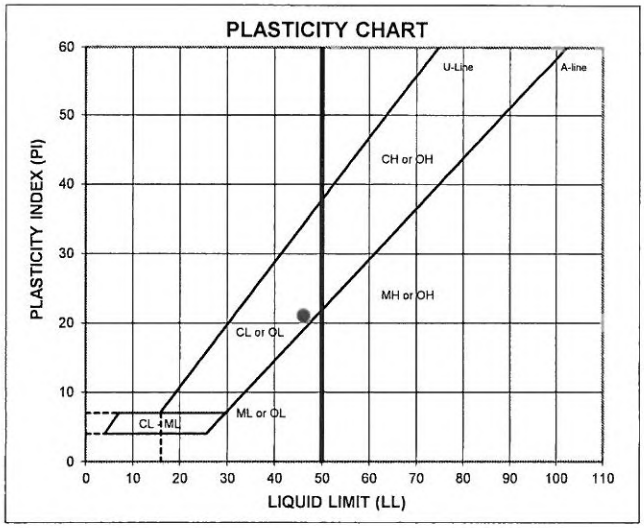
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.9		
#40	0.43	99.3	Medium Sand	0.7
#60	0.25	98.9		
#100	0.15	98.5		
#200	0.075	98.1	Fine Sand	1.2

Hydrometer Analysis

(mm)	%Finer		
0.025	92.7		
0.017	85.4		
0.010	74.5	Fines	
0.0074	69.1	Silt or Clay	98.1
0.0054	61.8		
0.0028	50.9		
0.0013	30.9		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.2	46	25	21	-0.16

LL (oven-dried)	
0.75 = ORGANIC (OL/OH)	

DESCRIPTION: SILTY CLAY, trace fine to medium; yellowish red.

USCS: CL

TECH	TJ/AM/TW
DATE	12/12/13
CHECK	aem
REVIEW	TWM
APPROVE	

NWM/CHESAPEAKE TERRACE SFI/MD
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
PMW-13	UD	105-107'	(CH)	28.9	-	-	-	-	-	-	-	-	-	2.80	28.9	96.4	-	C
PMW-23	UD	128-130'	(CH)	21.0	-	-	-	-	-	-	-	-	-	2.80	21.0	111.1	-	C

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

ONE-DIMENSIONAL CONSOLIDATION
ASTM D 2435 Method B

PROJECT NAME	NWM/CHESAPEAKE TERRACE SFI/MD
PROJECT NUMBER	063-1431-003
SAMPLE ID	PMW -13
SAMPLE DEPTH	105.0 - 107.0'
SAMPLE TYPE	UD

DESCRIPTION	CLAY; reddish brown and gray; soft (thumb will penetrate); moist.
CLASSIFICATION	(CH)
CONSOLIDOMETER #	2
ASTM D 2435 Method	B

LL	-
PL	-
PI	-
Gs	2.796

Sample Data	Trimmings	Before Test	After Test
Tare plus wet soil, g	137.62	195.63	191.23
Tare plus dry soil, g	118.99	168.68	168.68
Tare, g	52.22	74.73	74.73
Water, g	18.63	26.95	22.55
Dry soil, g	66.77	93.95	93.95
Water Content	27.9%	28.7%	24.0%

Diameter (in)	2.500
Height of sample (in)	0.750
Area of sample (in^2)	4.909
Volume of sample (in^3)	3.682
Water Content	28.7%
Sample Wt (wet, g)	120.9
Sample Wt (dry, g)	93.95
Water Wt (g)	26.95

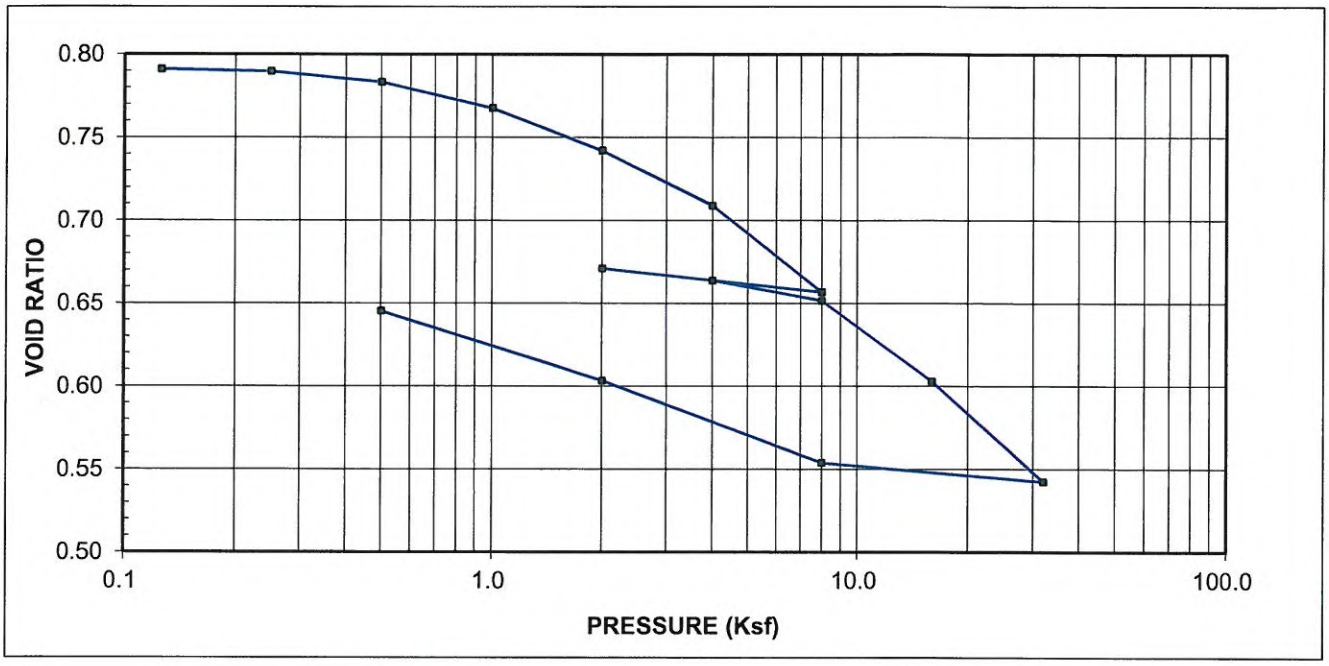
Sample Data	Initial	Final
Total Height (in)	0.750	0.688
Height of solids (in)	0.418	0.418
Height of voids (in)	0.332	0.270
Height of water (in)	0.335	0.280
Void ratio	0.795	0.645
Degree of saturation	100%	100%
Dry unit wt (pcf)	97.2	106.0
Wet unit wt (pcf)	125.1	131.5

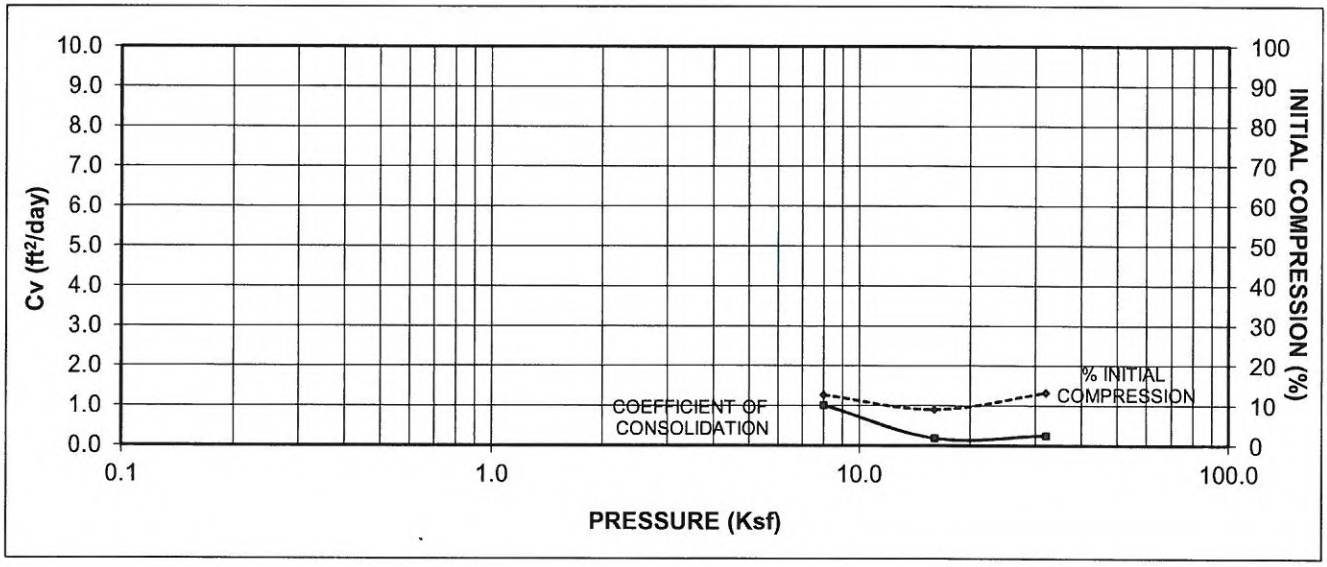
PRESSURE (ksf)	H100 DIAL READING	MACHINE / STONE CORR.	DIAL CHANGE (in)	FITTING TIME (sec) t90	SAMPLE HEIGHT (in)	HEIGHT OF VOIDS Hv	VOID RATIO e	CHANGE IN HEIGHT (accum)	STRAIN %	LENGTH OF DRAINAGE PATH (DOUBLE DRAINAGE) H (in)	H^2 (cm^2)	PERCENT INITIAL COMPRESSION	COEFFICIENT OF CONSOLIDATION (ft^2/day)
0.125	0.0000	0.0000	0.0000	0	0.750	0.3321	0.7947	0.0000	0.0	0.375	0.907		
0.126	0.0015	0.0000	0.0015	522	0.749	0.3306	0.7912	0.0015	0.2	0.375	0.906		
0.250	0.0020	0.0000	0.0020	614	0.748	0.3301	0.7898	0.0020	0.3	0.374	0.903		
0.500	0.0047	0.0000	0.0047	290	0.745	0.3274	0.7834	0.0047	0.6	0.373	0.899		
1.000	0.0113	0.0000	0.0113	614	0.739	0.3208	0.7677	0.0113	1.5	0.371	0.888		
2.000	0.0219	0.0000	0.0219	653	0.728	0.3102	0.7422	0.0219	2.9	0.367	0.868		
4.000	0.0358	0.0000	0.0358	406	0.714	0.2963	0.7090	0.0358	4.8	0.361	0.839	7.9	0.163
8.000	0.0576	0.0000	0.0576	540	0.692	0.2745	0.6568	0.0576	7.7	0.352	0.798	10.1	0.116
2.000	0.0517	0.0000	0.0517		0.698	0.2804	0.6711	0.0517	6.9	0.348	0.780		
4.000	0.0547	0.0000	0.0547	109	0.695	0.2774	0.6638	0.0547	7.3	0.348	0.783	17.4	0.565
8.000	0.0598	0.0000	0.0598	60	0.690	0.2723	0.6516	0.0598	8.0	0.346	0.774	12.7	1.017
16.000	0.0802	0.0000	0.0802	317	0.670	0.2519	0.6029	0.0802	10.7	0.340	0.746	9.0	0.185
32.000	0.1054	0.0000	0.1054	217	0.645	0.2267	0.5426	0.1054	14.0	0.329	0.697	13.2	0.254
8.000	0.1006	0.0000	0.1006		0.649	0.2315	0.5539	0.1006	13.4				
2.000	0.0800	0.0000	0.0800		0.670	0.2521	0.6034	0.0800	10.7				
0.500	0.0624	0.0000	0.0624		0.688	0.2697	0.6455	0.0624	8.3				

NOTES:
Loading sequence provided by client.
Sample was run inundated.
Sample was trimmed into consolidation ring
Time Deformation Method - Square root of time.

TECH	PWM
DATE	10/17/13
CHECK	
REVIEW	
APPROVE	

ONE - DIMENSIONAL CONSOLIDATION
ASTM D 2435 Method B





SAMPLE ID	PMW -13
SAMPLE TYPE	UD
SAMPLE DEPTH	105.0 - 107.0'

LL	-
PL	-
PI	-
Gs	2.80

	Initial	Final
Dry Unit Weight (pcf)	97.2	106.0
Wet Unit Weight (pcf)	125.1	131.5
Moisture Content	28.7%	24.0%
Void Ratio	0.795	0.645
Degree of Saturation	100%	100%

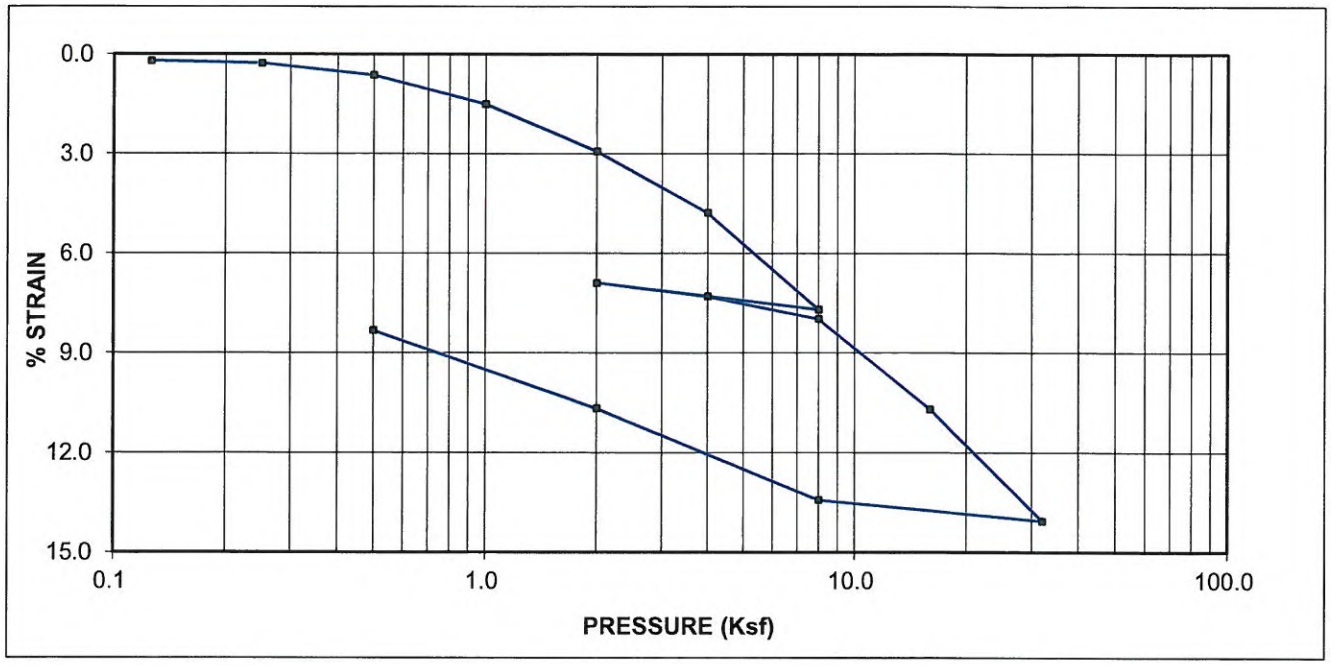
DESCRIPTION: CLAY; reddish brown and gray; soft (thumb will penetrate); moist.

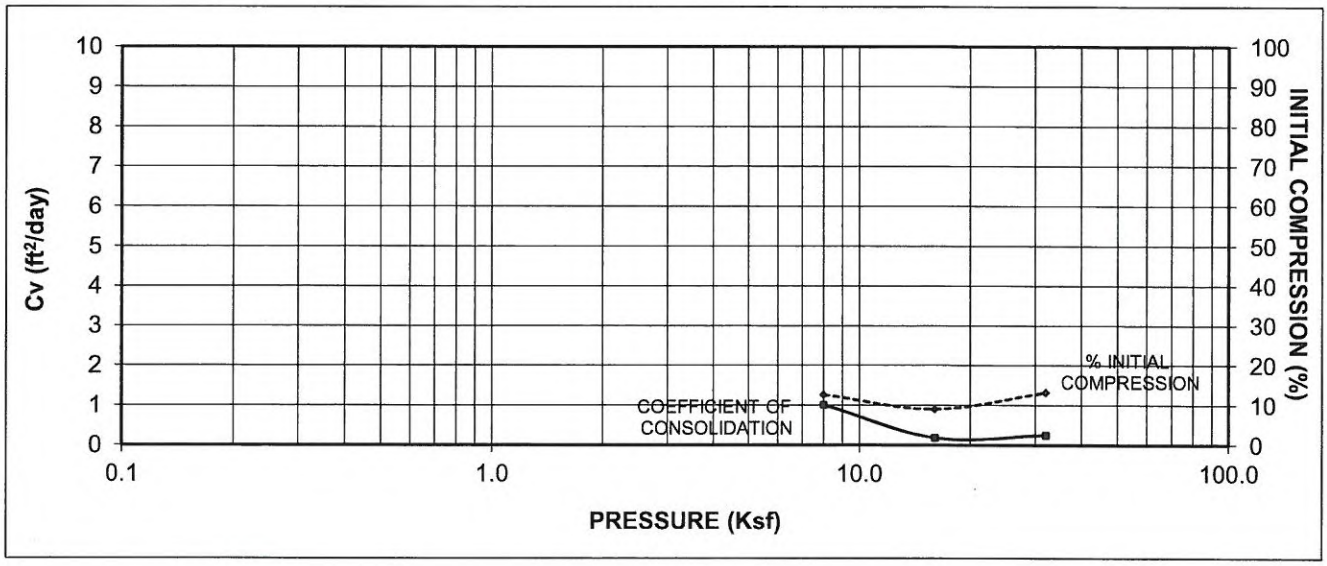
USCS: (CH)

NWM/CHESAPEAKE TERRACE SFI/MD
063-1431-003

TECH	PWM
DATE	10/17/13
CHECK	
REVIEW	
APPROVE	

ONE - DIMENSIONAL CONSOLIDATION
ASTM D 2435 Method B





SAMPLE ID	PMW -13
SAMPLE TYPE	UD
SAMPLE DEPTH	105.0 - 107.0'

LL	-
PL	-
PI	-
Gs	2.80

	Initial	Final
Dry Unit Weight (pcf)	97.2	106.0
Wet Unit Weight (pcf)	125.1	131.5
Moisture Content	28.7%	24.0%
Void Ratio	0.795	0.645
Degree of Saturation	100%	100%

DESCRIPTION: CLAY; reddish brown and gray; soft (thumb will penetrate); moist.

USCS: (CH)

NWM/CHESAPEAKE TERRACE SFI/MD
063-1431-003

TECH	PWM
DATE	10/17/13
CHECK	
REVIEW	
APPROVE	

ONE-DIMENSIONAL CONSOLIDATION
ASTM D 2435 Method B

PROJECT NAME	NWM/CHESAPEAKE TERRACE SFI/MD
PROJECT NUMBER	063-1431-003
SAMPLE ID	PMW - 23
SAMPLE DEPTH	128.0 - 130.0'
SAMPLE TYPE	UD

DESCRIPTION	CLAY; dark reddish brown and gray; Hard (can indent with thumb nail); dry to moist.
CLASSIFICATION	(CH)
CONSOLIDOMETER #	1
ASTM D 2435 Method	B

LL	-
PL	-
PI	-
Gs	2.803

Sample Data	Trimmings	Before Test	After Test
Tare plus wet soil, g	371.40	205.48	209.50
Tare plus dry soil, g	319.01	182.91	182.91
Tare, g	51.12	75.54	75.54
Water, g	52.39	22.57	26.59
Dry soil, g	267.89	107.37	107.37
Water Content	19.6%	21.0%	24.8%

Diameter (in)	2.500
Height of sample (in)	0.750
Area of sample (in^2)	4.909
Volume of sample (in^3)	3.682
Water Content	21.0%
Sample Wt (wet, g)	129.94
Sample Wt (dry, g)	107.37
Water Wt (g)	22.57

Sample Data	Initial	Final
Total Height (in)	0.750	0.750
Height of solids (in)	0.476	0.476
Height of voids (in)	0.274	0.274
Height of water (in)	0.281	0.331
Void ratio	0.574	0.574
Degree of saturation	100%	100%
Dry unit wt (pcf)	111.1	111.1
Wet unit wt (pcf)	134.5	138.6

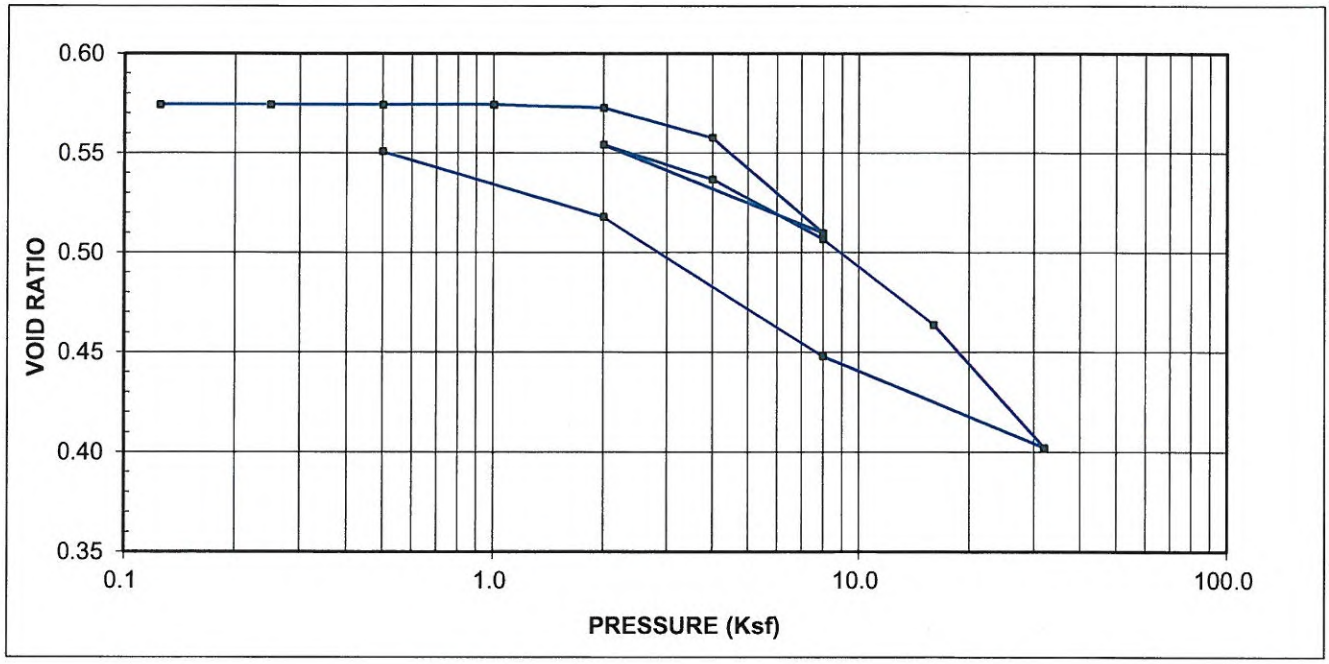
PRESSURE (ksf)	H100 DIAL READING	MACHINE / STONE CORR.	DIAL CHANGE (in)	FITTING TIME (sec) t90	SAMPLE HEIGHT (in)	HEIGHT OF VOIDS Hv	VOID RATIO e	CHANGE IN HEIGHT (accum)	STRAIN %	LENGTH OF DRAINAGE PATH (DOUBLE DRAINAGE) H (in)	H^2 (cm^2)	PERCENT INITIAL COMPRESSION	COEFFICIENT OF CONSOLIDATION (ft^2/day)
0.125	0.0000	0.0000	0.0000	0	0.750	0.2736	0.5743	0.0000	0.0	0.375	0.907		
0.125	0.0000	0.0000	0.0000	60	0.750	0.2736	0.5743	0.0000	0.0	0.375	0.907		
0.250	0.0000	0.0000	0.0000	60	0.750	0.2736	0.5743	0.0000	0.0	0.375	0.907		
0.500	0.0000	0.0000	0.0000	0	0.750	0.2736	0.5743	0.0000	0.0	0.375	0.907		
1.000	0.0000	0.0000	0.0000	0	0.750	0.2736	0.5743	0.0000	0.0	0.375	0.907		
2.000	0.0007	0.0000	0.0007	29	0.749	0.2729	0.5727	0.0007	0.1	0.375	0.906		
4.000	0.0079	0.0000	0.0079	194	0.742	0.2657	0.5577	0.0079	1.1	0.373	0.897	38.0	0.364
8.000	0.0307	0.0000	0.0307	1561	0.719	0.2429	0.5099	0.0307	4.1	0.365	0.861	23.1	0.044
2.000	0.0096	0.0000	0.0096		0.740	0.2640	0.5543	0.0096	1.3	0.365	0.859		
4.000	0.0178	0.0000	0.0178	2774	0.732	0.2558	0.5369	0.0178	2.4	0.368	0.874	11.6	0.025
8.000	0.0322	0.0000	0.0322	2053	0.718	0.2414	0.5068	0.0322	4.3	0.363	0.848	13.1	0.033
16.000	0.0527	0.0000	0.0527	1242	0.697	0.2209	0.4638	0.0527	7.0	0.354	0.808	13.6	0.051
32.000	0.0820	0.0000	0.0820	2306	0.668	0.1916	0.4022	0.0820	10.9	0.341	0.752	14.0	0.026
8.000	0.0602	0.0000	0.0602		0.690	0.2134	0.4480	0.0602	8.0				
2.000	0.0268	0.0000	0.0268		0.723	0.2468	0.5180	0.0268	3.6				
0.500	0.0112	0.0000	0.0112		0.739	0.2624	0.5509	0.0112	1.5				

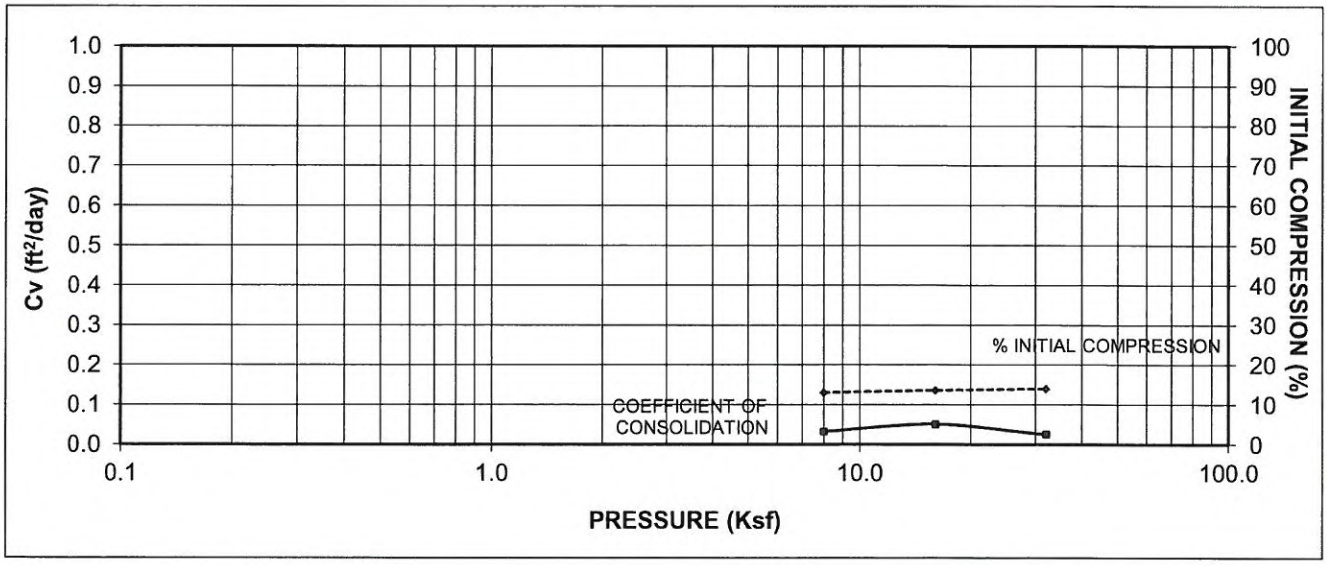
NOTES:
Loading sequence provided by client.
Sample required 4 ksf of pressure ot hold sample down.
Sample was run inundated.
Sample was trimmed into consolidation ring
Time Deformation Method - Square root of time.

TECH	PWM
DATE	10/17/13
CHECK	MWM
REVIEW	GE
APPROVE	

Golder Associates Inc.

ONE - DIMENSIONAL CONSOLIDATION
ASTM D 2435 Method B





SAMPLE ID	PMW - 23
SAMPLE TYPE	UD
SAMPLE DEPTH	128.0 - 130.0'

LL	-
PL	-
PI	-
Gs	2.80

	Initial	Final
Dry Unit Weight (pcf)	111.1	111.1
Wet Unit Weight (pcf)	134.5	138.6
Moisture Content	21.0%	24.8%
Void Ratio	0.574	0.574
Degree of Saturation	100%	100%

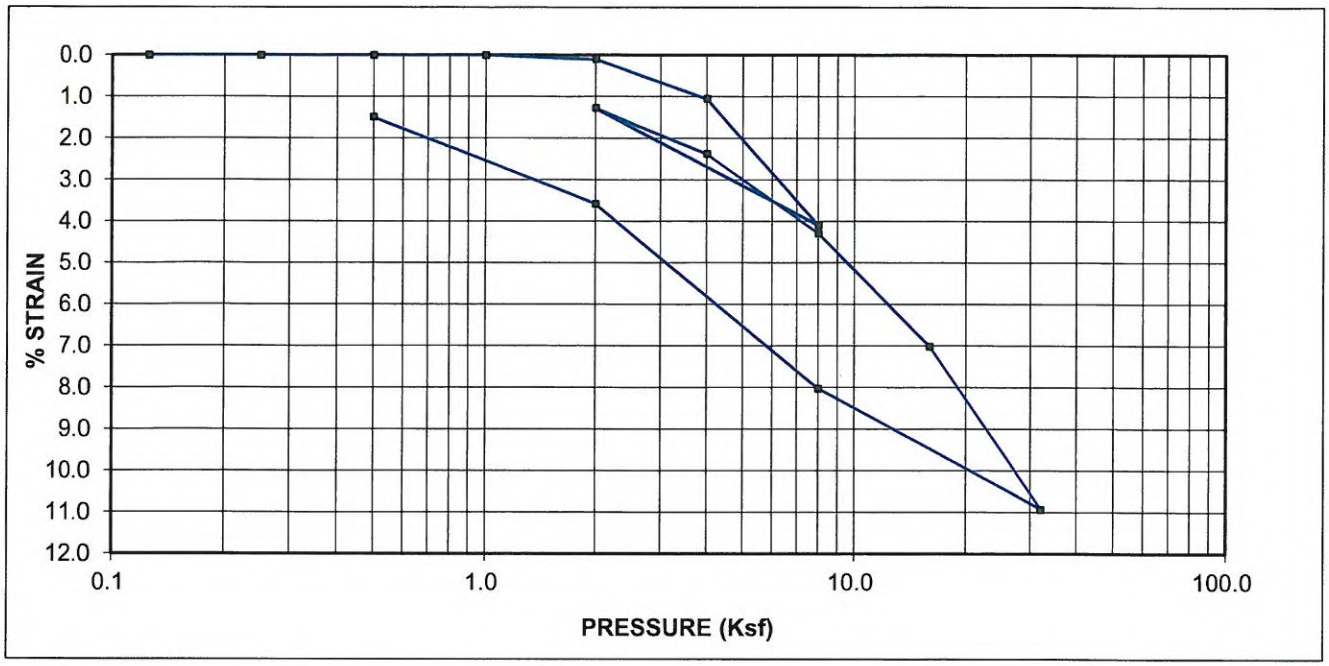
DESCRIPTION: CLAY; dark reddish brown and gray; Hard (can indent with thumb nail); dry to moist.

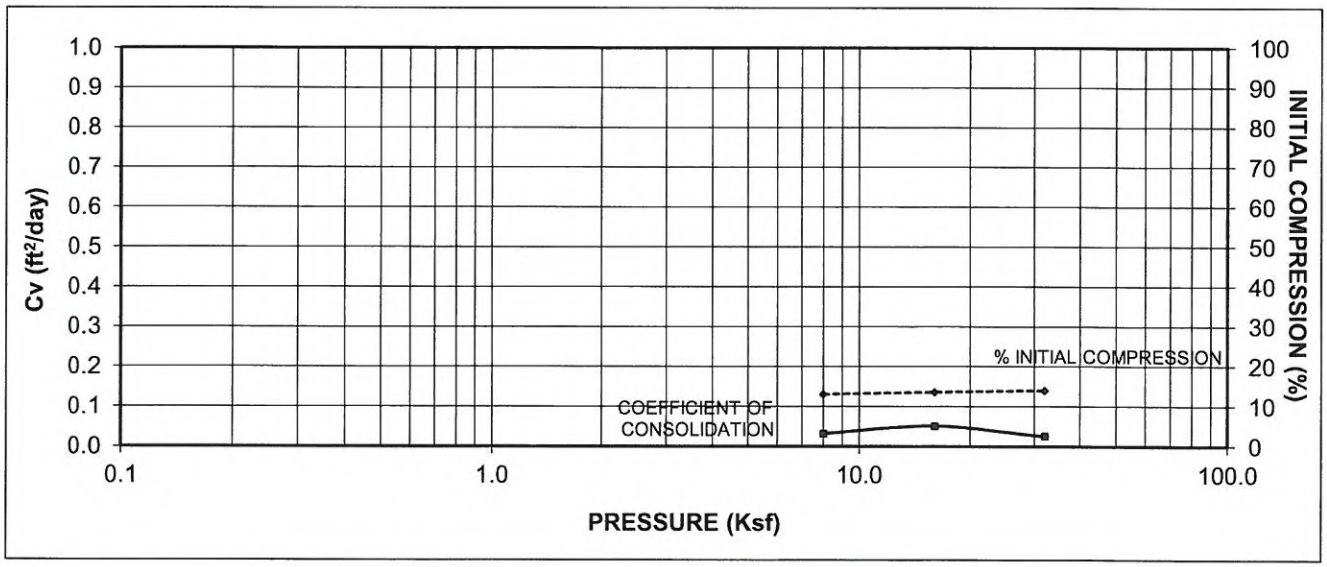
USCS: (CH)

NWM/CHESAPEAKE TERRACE SFI/MD
063-1431-003

TECH	PWM
DATE	10/17/13
CHECK	
REVIEW	
APPROVE	

ONE - DIMENSIONAL CONSOLIDATION
ASTM D 2435 Method B





SAMPLE ID	PMW - 23
SAMPLE TYPE	UD
SAMPLE DEPTH	128.0 - 130.0'

LL	-
PL	-
PI	-
Gs	2.80

	Initial	Final
Dry Unit Weight (pcf)	111.1	111.1
Wet Unit Weight (pcf)	134.5	138.6
Moisture Content	21.0%	24.8%
Void Ratio	0.574	0.574
Degree of Saturation	100%	100%

DESCRIPTION: CLAY; dark reddish brown and gray; Hard (can indent with thumb nail); dry to moist.

USCS: (CH)

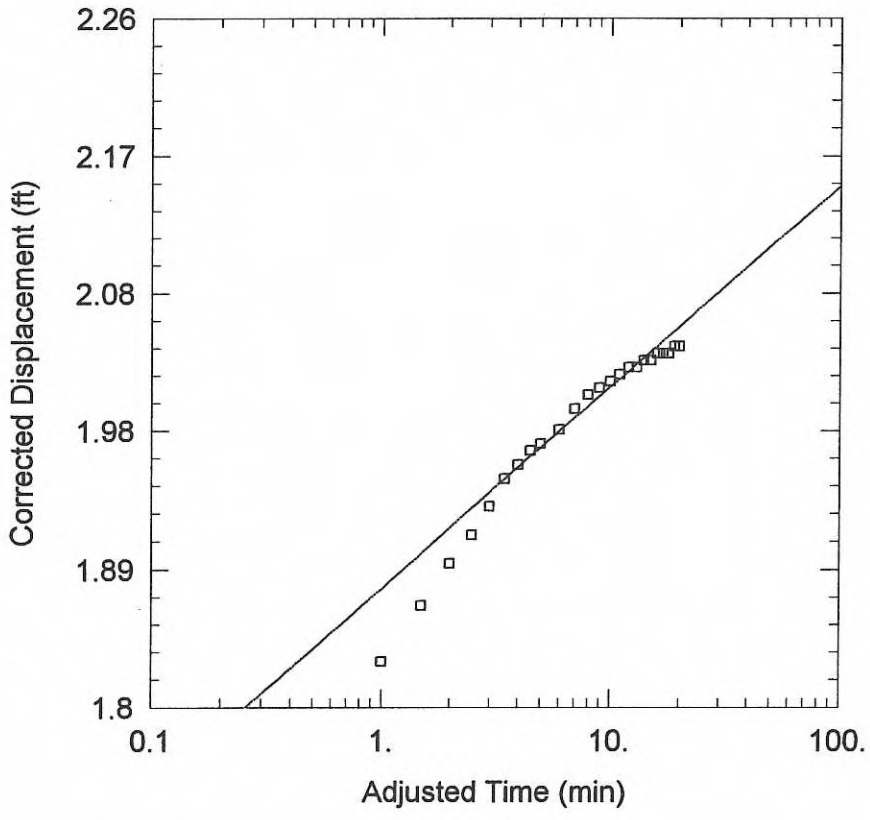
NWM/CHESAPEAKE TERRACE SFI/MD
063-1431-003

TECH	PWM
DATE	10/17/13
CHECK	KWM
REVIEW	TEY
APPROVE	

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX H

Pumping Test Data (2003)



REC IN MW-3 AFTER PUMPING AT 5.4 GPM FOR 30 MINUTES

Data Set: C:\...\MW-3 rec.aqt
Date: 11/28/03 Time: 14:28:51

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Location: Chesapeake Terrace
Test Well: MW-3
Obs. Well: MW-3
Test Date: 4-28-03

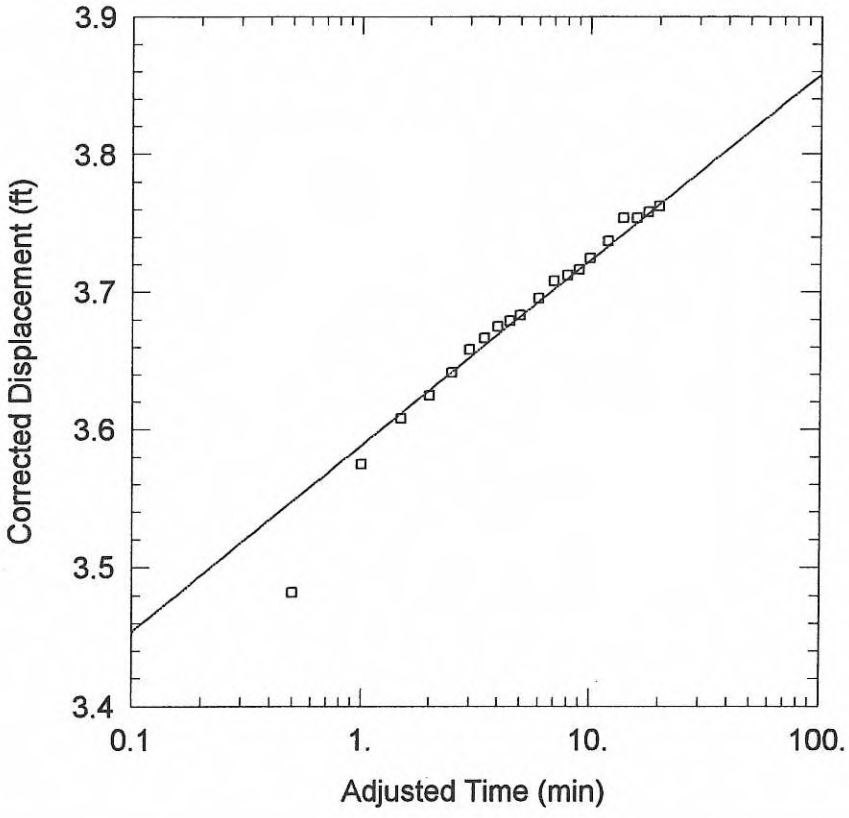
AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob
T = 0.9862 ft^2/min = 1,420 ft^2/day S = 3.394E-12

K = 47 ft^2/day



REC IN MW-4 AFTER PUMPING AT 5.4 GPM FOR 30 MINUTES

Data Set: C:\...\MW-4 rec.aqt
Date: 11/28/03 Time: 14:31:06

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Location: Chesapeake Terrace
Test Well: MW-4
Obs. Well: MW-4
Test Date: 4-28-03

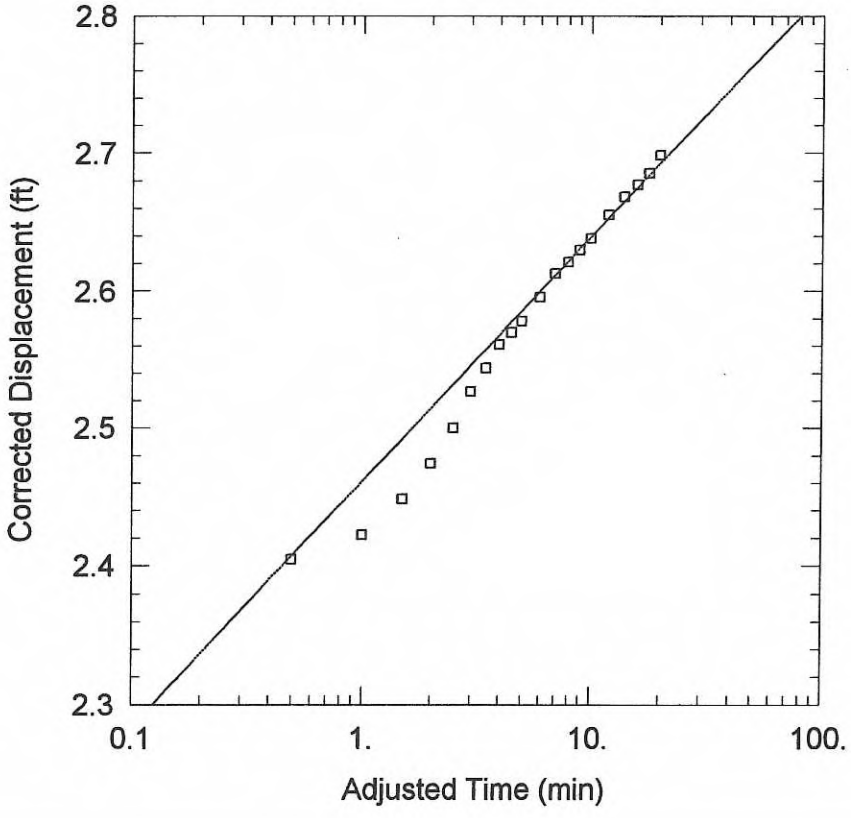
AQUIFER DATA

Saturated Thickness: 24. ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob
T = 0.9829 ft^2/min = 1,415 ft^2/day S = 7.539E-25

K = 60 ft/day



REC IN MW-5 AFTER PUMPING AT 5.6 GPM FOR 30 MINUTES

Data Set: C:\...\MW-5 rec.aqt
Date: 11/28/03 Time: 14:33:36

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Location: Chesapeake Terrace
Test Well: MW-5
Obs. Well: MW-5
Test Date: 4-28-03

AQUIFER DATA

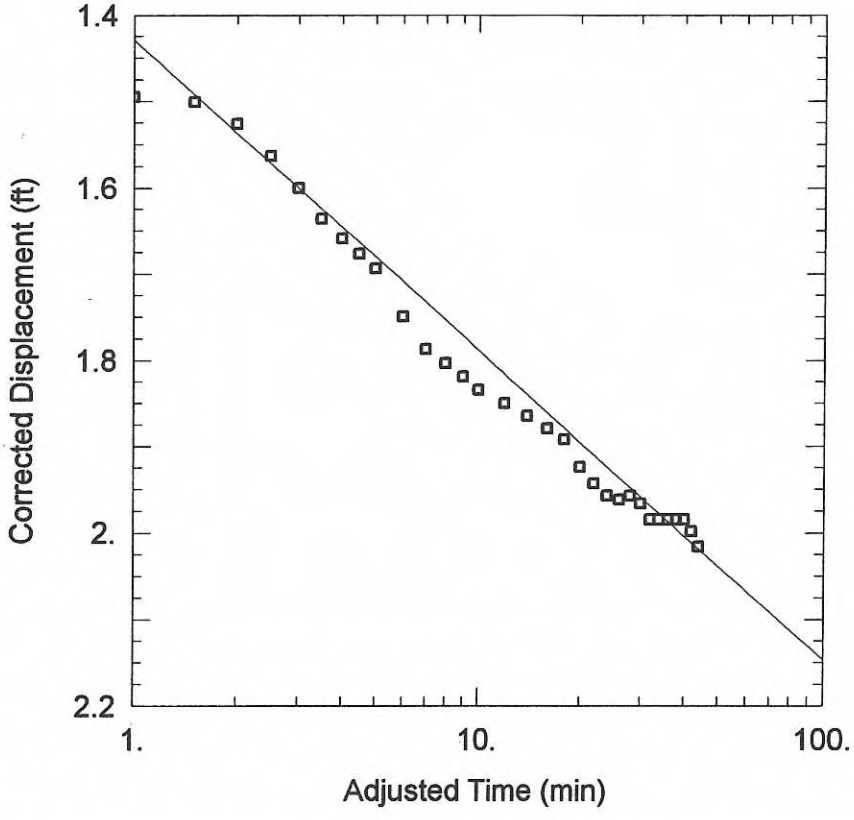
Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 0.771 ft^2/min = 1,110 ft^2/day S = 4.032E-12

K = 55 ft/day



DD IN MW-17 WHILE PUMPING AT 0.5 GPM FOR 44 MINUTES

Data Set: C:\...\MW-17 dd.aqt
Date: 12/07/03 Time: 09:40:45

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: National Waste Managers
Location: Chesapeake Terrace
Test Well: MW-17
Test Date: 4/17/03

AQUIFER DATA

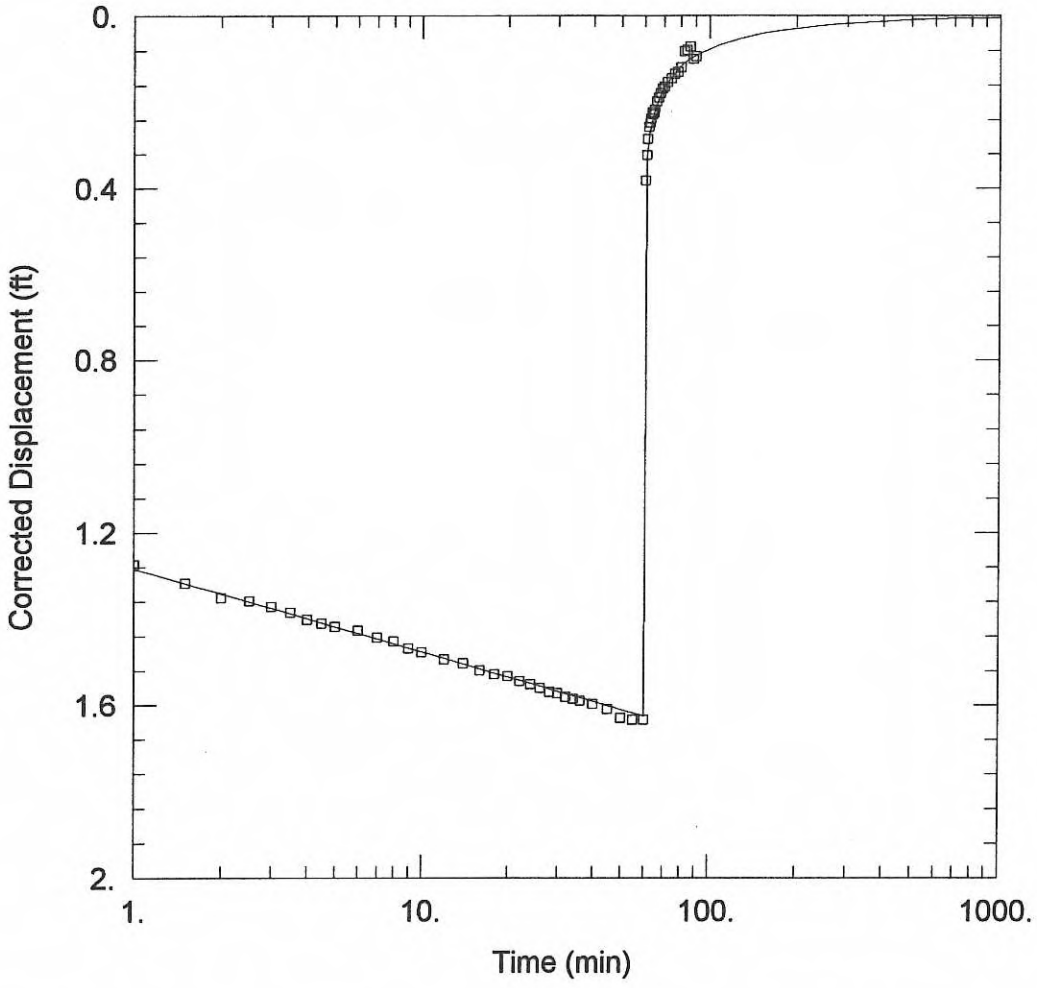
Saturated Thickness: 5. ft Anisotropy Ratio (Kz/Kr): 390.6

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 0.03417 ft^2/min K = 49 ft^2/day S = 0.001235

K = 10 ft/day



DD AND REC IN MW-18 WHILE PUMPING AT 5 GPM FOR 60 MINUTES

Data Set: C:\...\MW-18.aqt
Date: 06/04/03 Time: 18:25:46

PROJECT INFORMATION

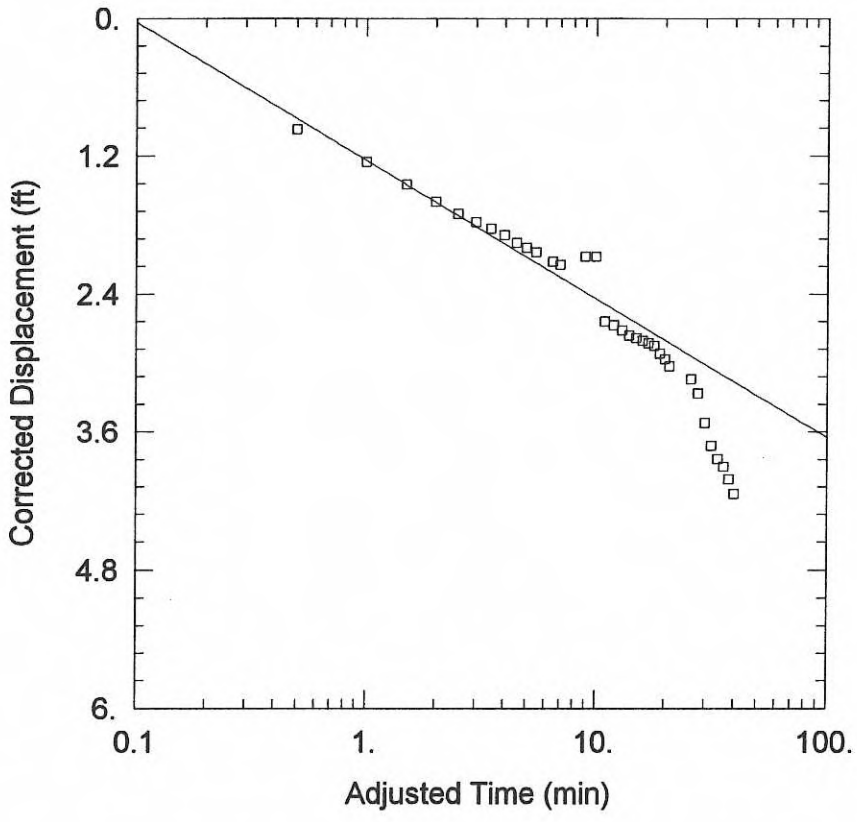
Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-18
Obs. Well: MW-18
Test Date: 4-17-03

SOLUTION

Aquifer Model: Unconfined Solution Method: Theis

T = 0.6382 ft^2/min = 920 ft^2/day S = 4.551E-05
Kz/Kr = 1. b = 9.8 ft

K = 95 ft/day



DD (EARLY) IN MW-19 WHILE PUMPING AT 3 GPM FOR 36 MINUTES

Data Set: C:\...\MW-19 early.aqt
Date: 12/07/03 Time: 09:42:16

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: National Waste Managers
Location: Chesapeake Terrace
Test Well: MW-19
Obs. Well: MW-19
Test Date: 4-15-03

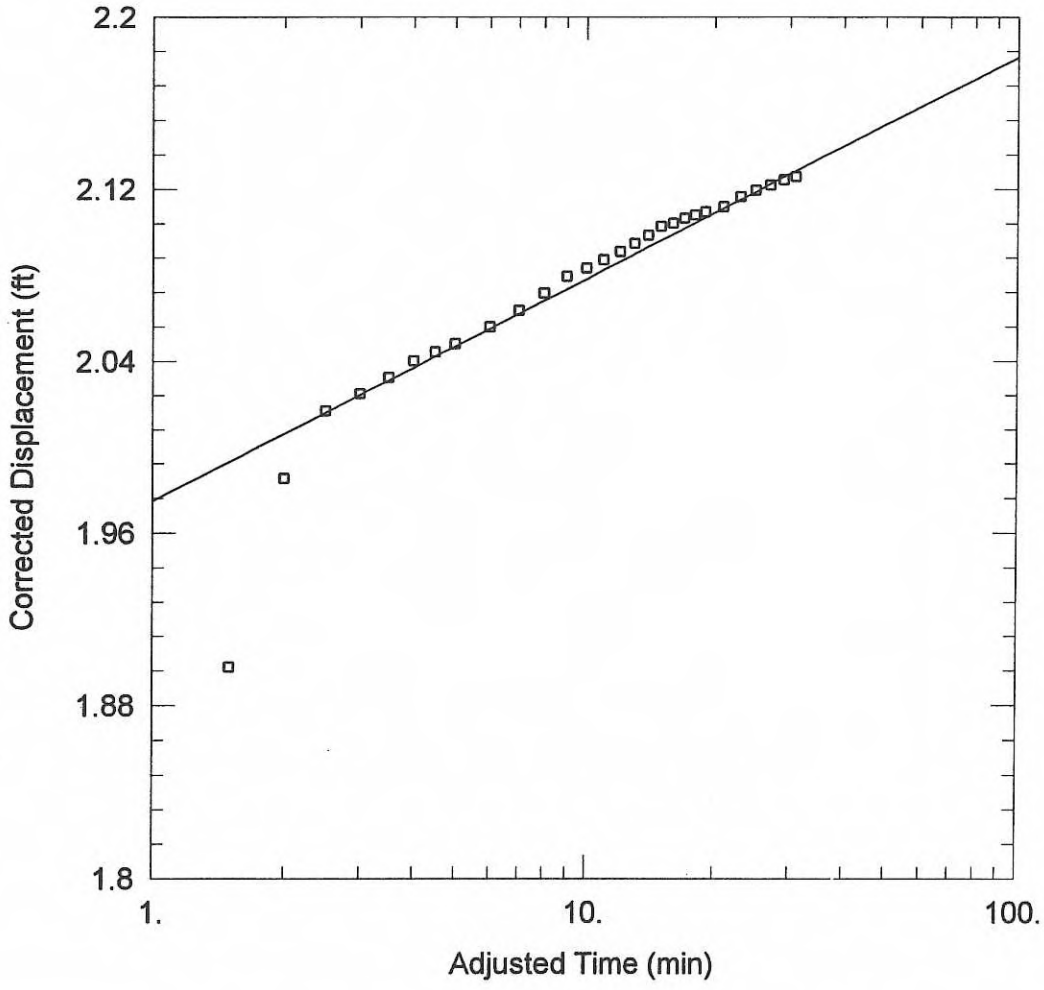
AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob
T = 0.06093 ft^2/min = 88 ft^2/day S = 1.995

K = 8.8 ft/day



REC IN MW-20 AFTER PUMPING AT 2.3 GPM FOR 60 MINUTES

Data Set: C:\...\MW-20 rec.aqt
Date: 06/05/03 Time: 15:21:52

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-20
Obs. Well: MW-20
Test Date: 4-15-03

AQUIFER DATA

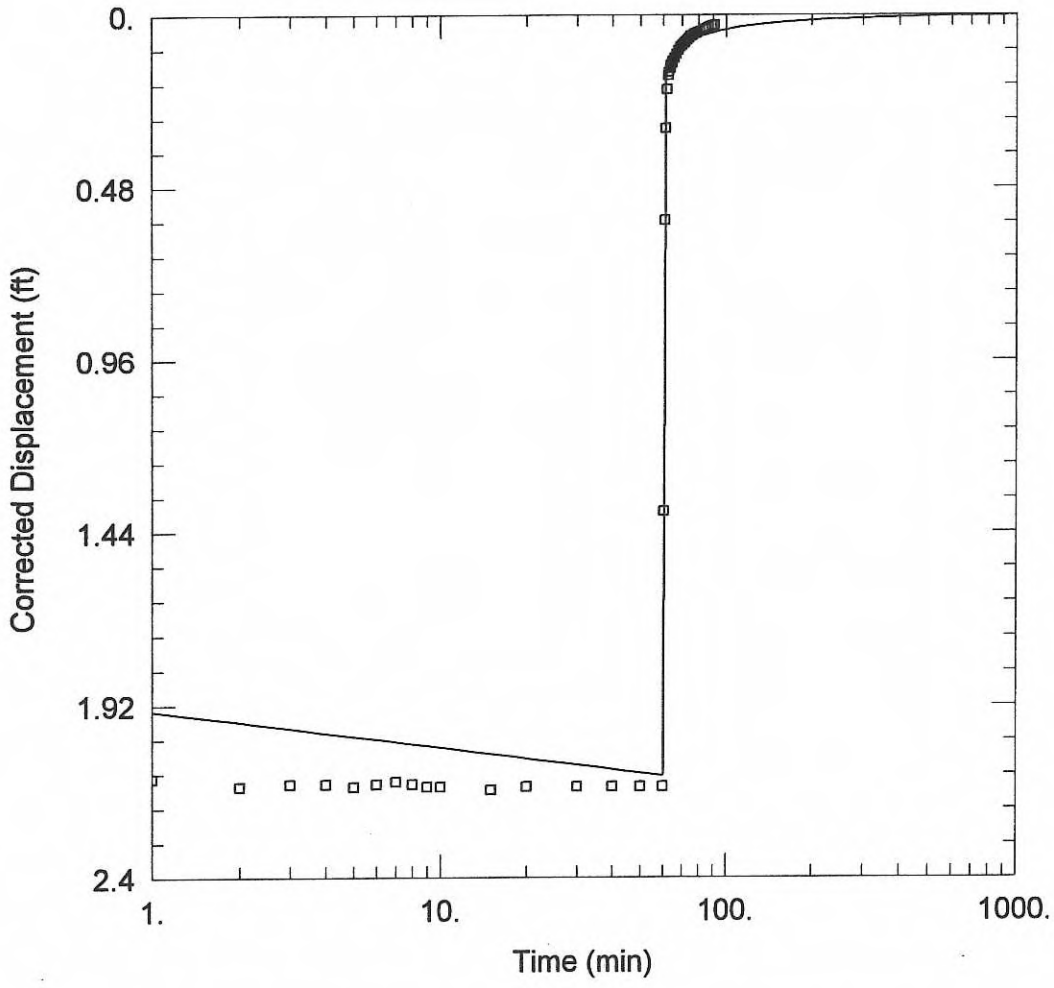
Saturated Thickness: 10.5 ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 0.5513 ft^2/min = 794 ft^2/day S = 1.319E-17

K = 75 ft/day



DD AND REC IN MW-20 WHEN PUMPING AT 2.3 GPM FOR 60 MINUTES

Data Set: C:\...\MW-20 dd-rec.aqt
Date: 06/05/03 Time: 15:24:37

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-20
Obs. Well: MW-20
Test Date: 4-15-03

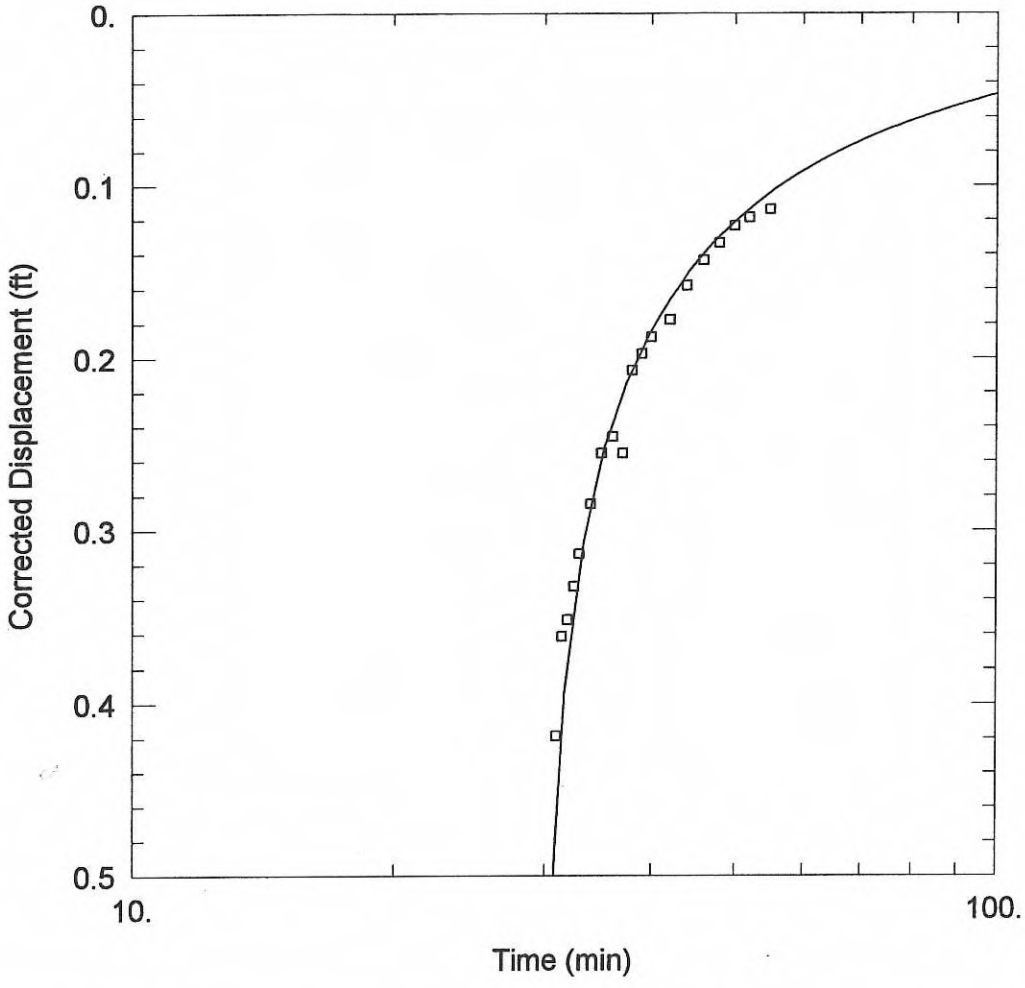
SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 0.5572 ft^2/min = 802 ft^2/day
Kz/Kr = 1.

S = 1.948E-17
b = 10.5 ft

K = 76 ft/day



DD AND REC IN MW-22 WHEN PUMPING AT 5 GPM FOR 30 MINUTES

Data Set: C:\...\MW-22 dd-rec.aqt
Date: 06/05/03 Time: 17:49:11

PROJECT INFORMATION

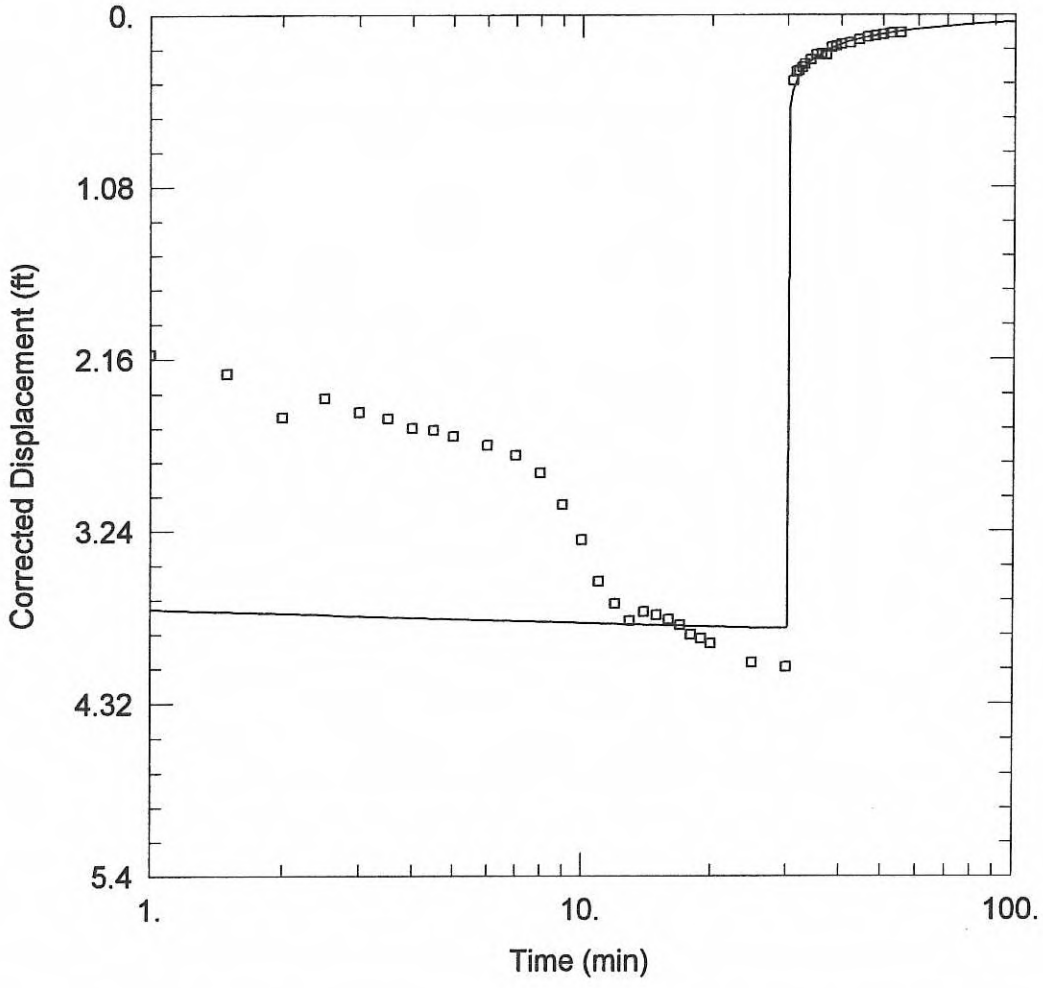
Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-22
Obs. Well: MW-22
Test Date: 4-21-03

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 0.4047 ft^2/min = 580 ft^2/day
S = 1.451E-17
Kz/Kr = 1.
b = 8.2 ft

K = 71 ft/day



DD AND REC IN MW-22 WHEN PUMPING AT 5 GPM FOR 30 MINUTES

Data Set: C:\...\MW-22 dd-rec.aqt
Date: 06/05/03 Time: 17:52:18

PROJECT INFORMATION

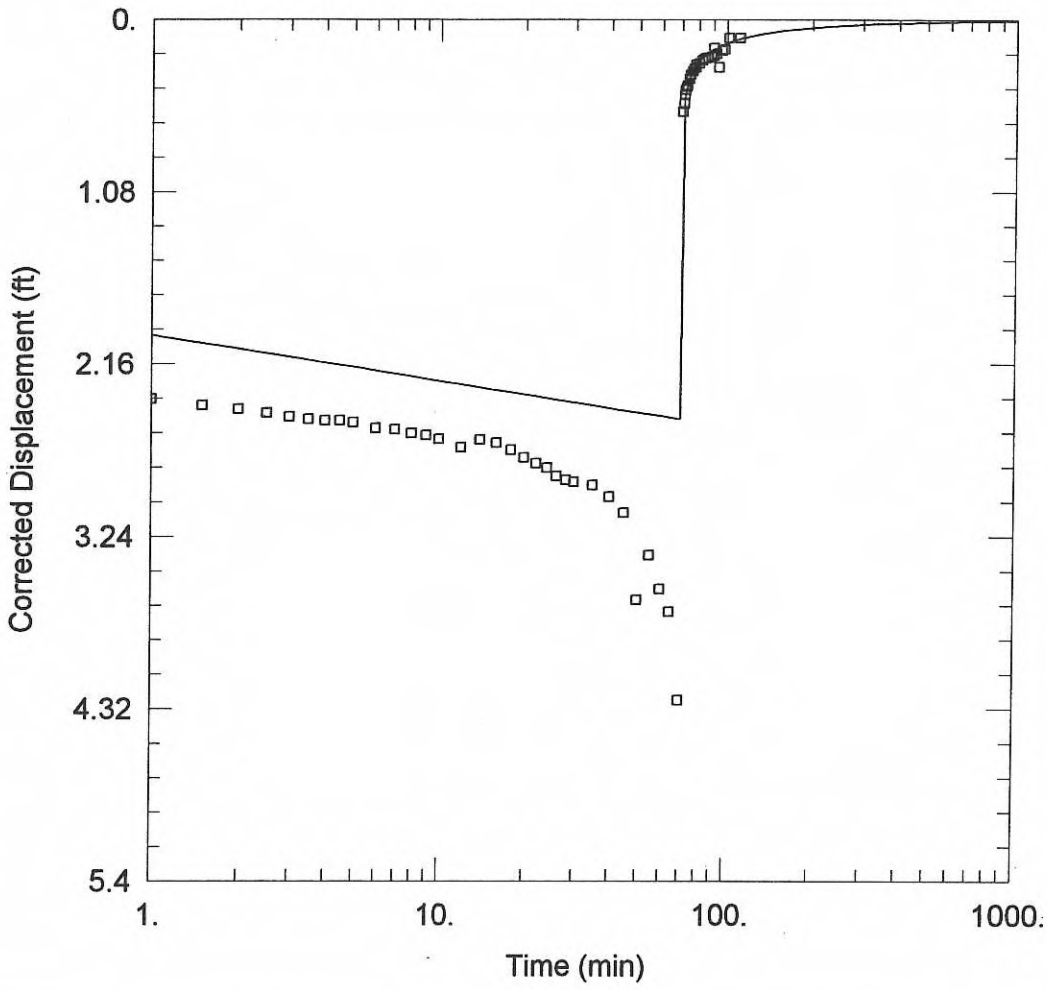
Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-22
Obs. Well: MW-22
Test Date: 4-21-03

SOLUTION

Aquifer Model: Unconfined Solution Method: Theis

T = 0.4047 ft^2/min = 580 ft^2/day S = 1.451E-17
Kz/Kr = 1. b = 8.2 ft

K = 71 ft/day



DD AND REC IN MW-24 WHEN PUMPING AT 4.2 GPM FOR 70 MINUTES

Data Set: C:\...\MW-24 dd-rec.aqt
Date: 06/06/03 Time: 09:39:09

PROJECT INFORMATION

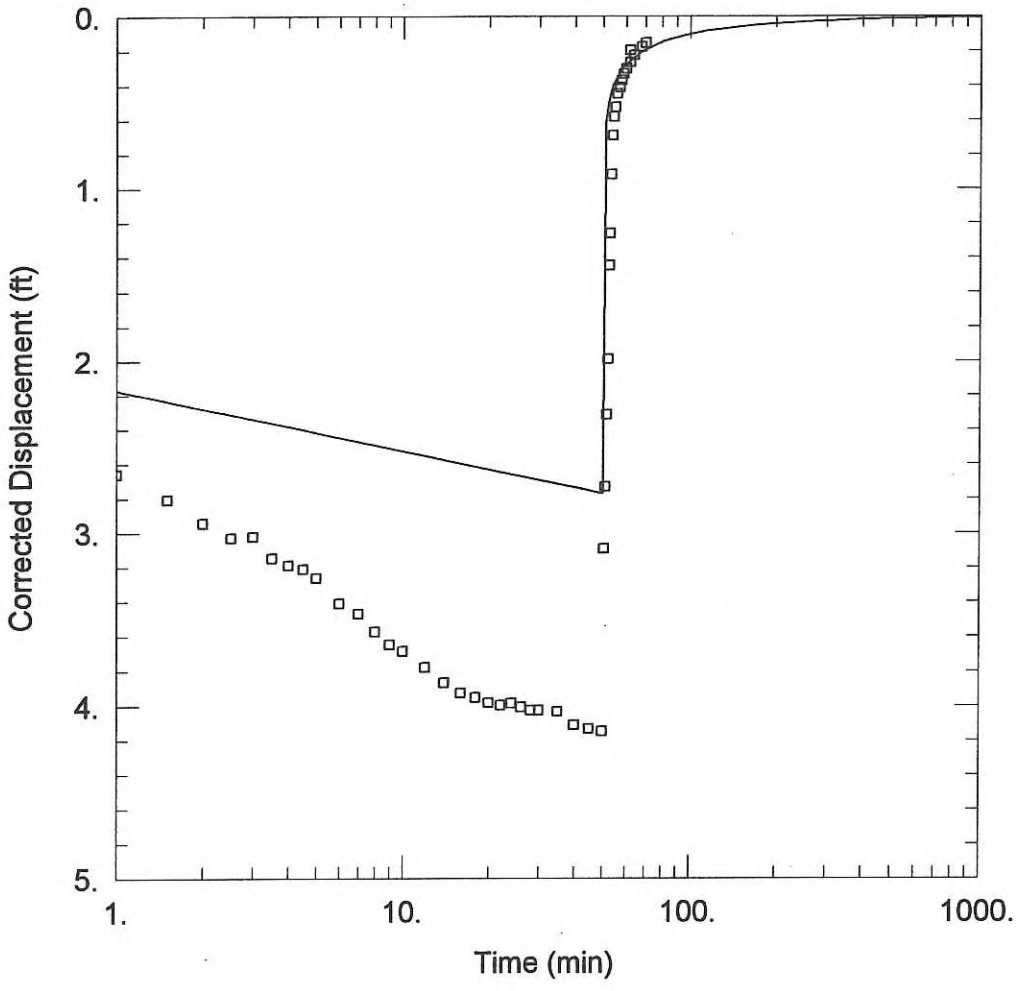
Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-24
Obs. Well: MW-24
Test Date: 4-21-03

SOLUTION

Aquifer Model: Unconfined Solution Method: Theis

T = 0.3607 ft^2/min = 520 ft^2/day S = 1.42E-05
Kz/Kr = 1. b = 14. ft

K = 37 ft/day



DD AND REC IN MW-25 WHEN PUMPING AT 1.5 GPM FOR 50 MINUTES

Data Set: C:\...\MW-25 rec.aqt
Date: 06/08/03 Time: 09:40:25

PROJECT INFORMATION

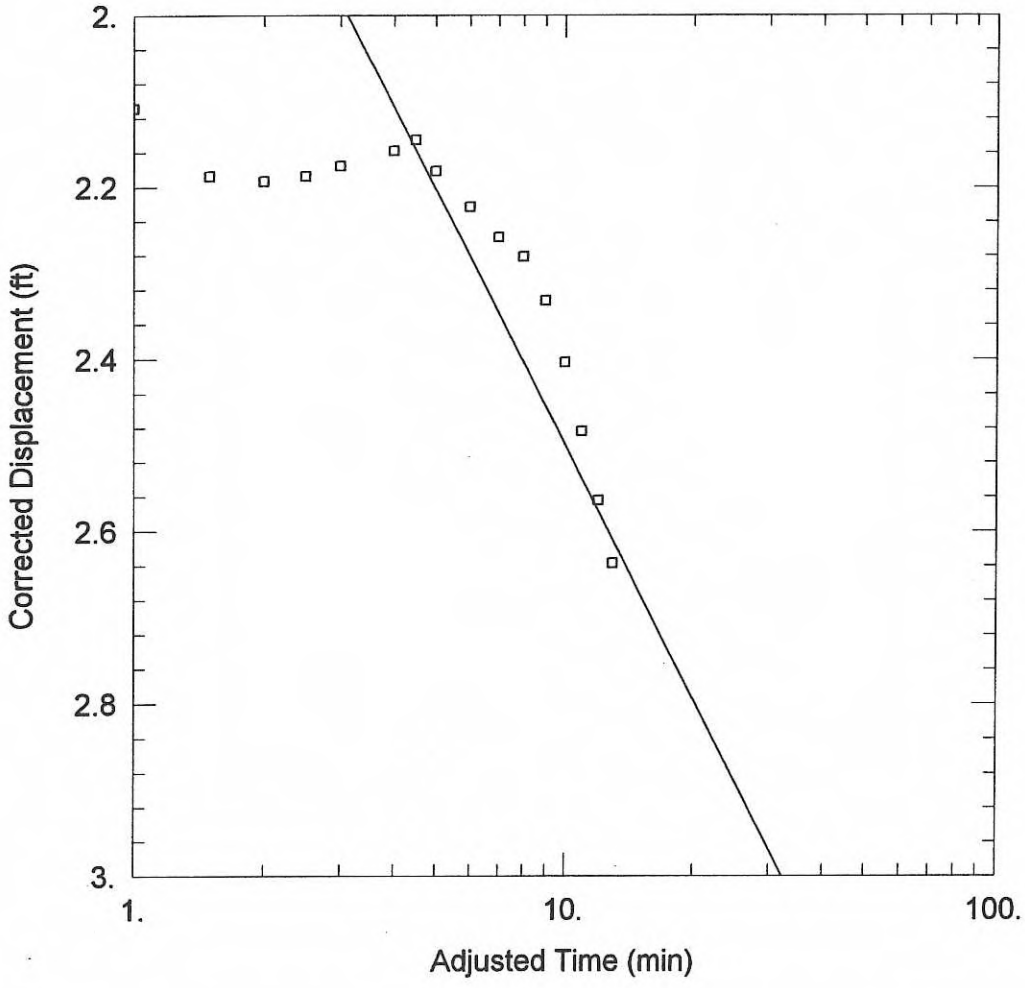
Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-25
Obs. Well: MW-25
Test Date: 4-25-03

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 0.1037 ft^2/min = 149 ft^2/day
S = 2.557E-05
Kz/Kr = 1.
b = 12. ft

K = 12.5 ft/day



DD MW-27 WHEN PUMPING AT 0.25 GPM FOR 13 MINUTES

Data Set: C:\...\MW-27.aqt
Date: 06/08/03 Time: 11:14:18

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-27
Obs. Well: MW-27
Test Date: 4-28-03

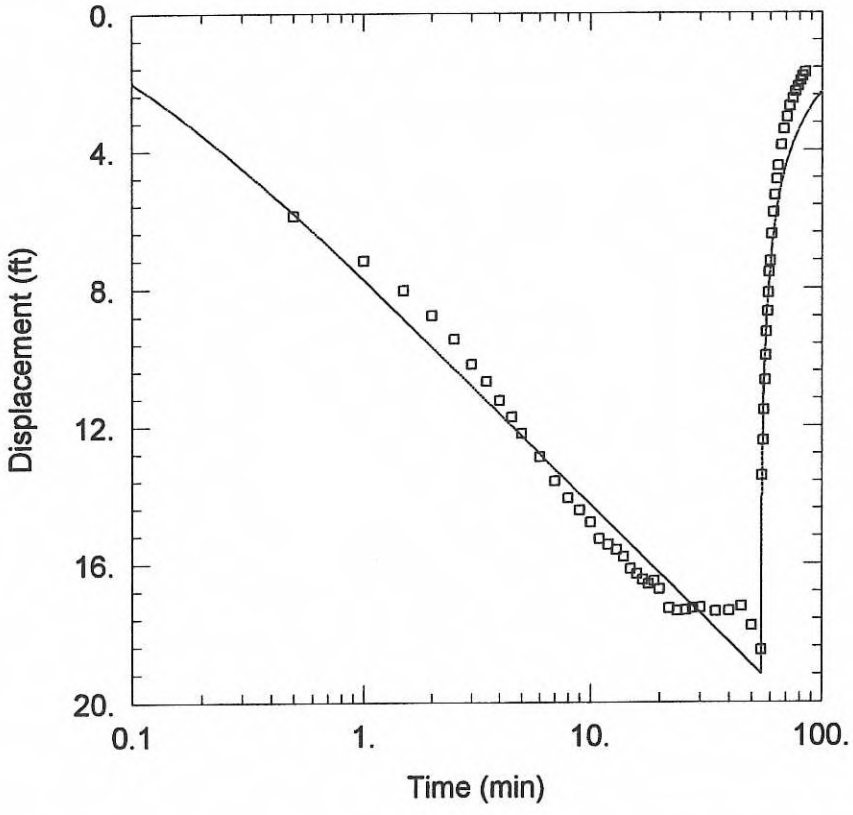
AQUIFER DATA

Saturated Thickness: 6.8 ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob
T = 0.006149 ft^2/min = 8.85 ft^2/day S = 0.06204

K = 1.3 ft/day



DD AND REC IN MW-28 WHEN PUMPING AT 0.5 GPM FOR 55 MINUTES

Data Set: C:\...\MW-28 dd-rec.aqt
Date: 12/01/03 Time: 09:18:26

PROJECT INFORMATION

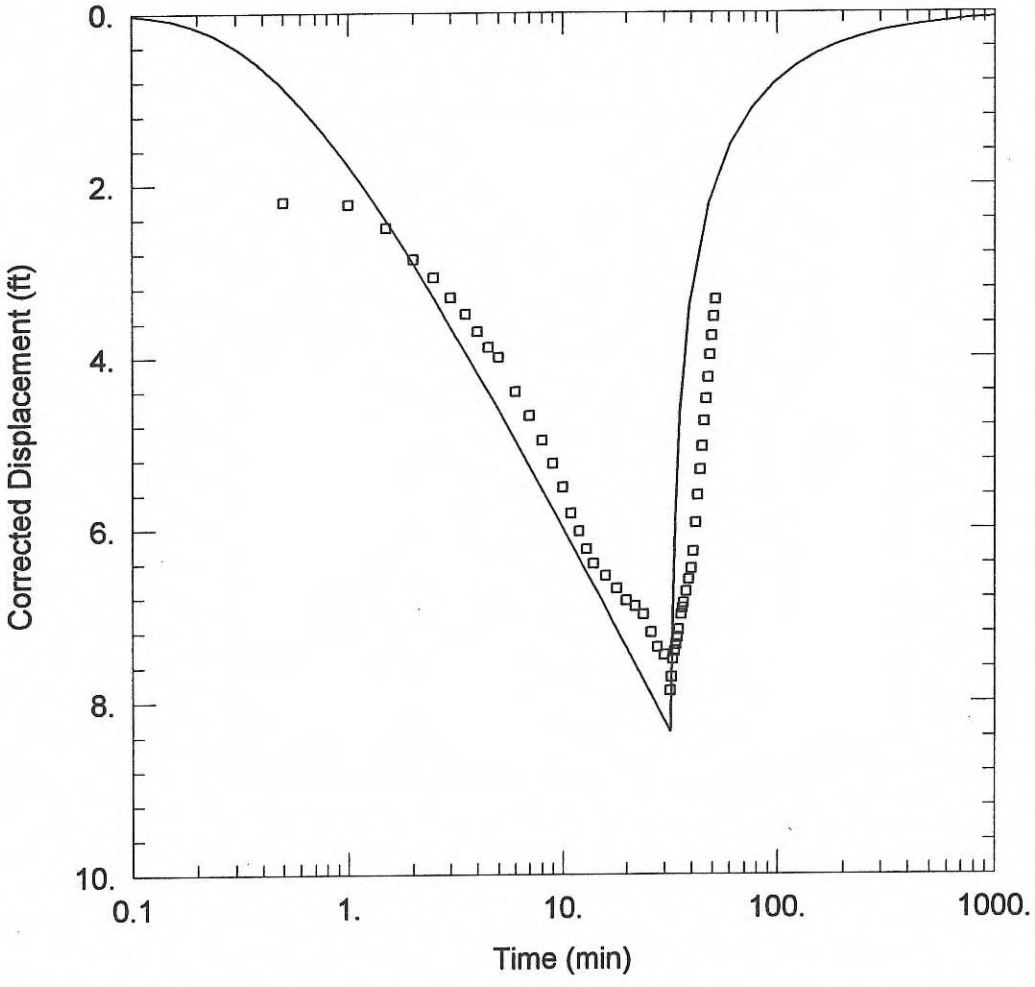
Company: Mark Schultz Associates
Client: Natl Waste Managers
Location: Chesapeake Terrace
Test Well: MW-28
Obs. Well: MW-28
Test Date: 4-25-03

SOLUTION

Aquifer Model: Confined Solution Method: Theis

T = 0.001845 ft^2/min = 2.7 ft^2/day S = 0.04638
Kz/Kr = 1. b = 10. ft

K = 0.27 ft/day



DD AND REC IN MW-29 WHEN PUMPING AT 0.25 GPM FOR 32 MINUTES

Date: 06/08/03 Time: 11:35:45

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-29
Obs. Well: MW-25
Test Date: 4-28-03

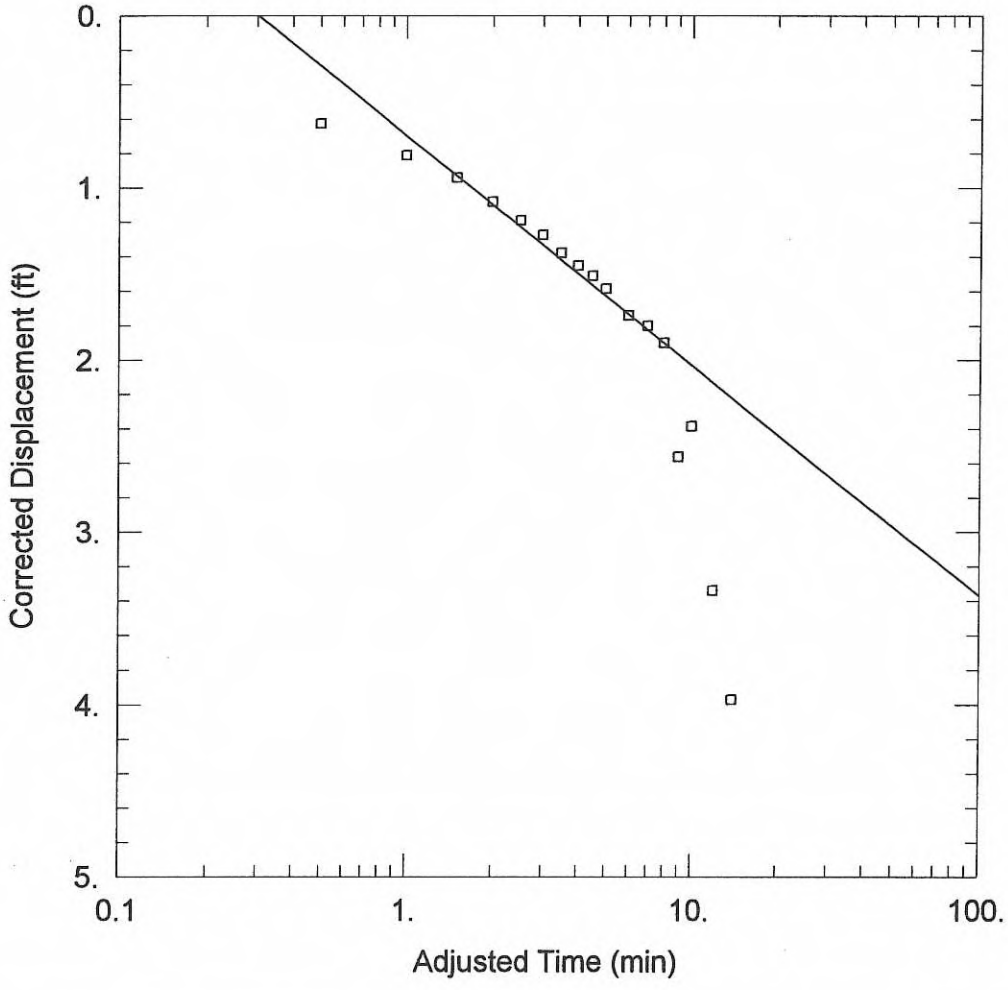
SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 0.001289 ft^2/min = 1.8 ft^2/day
Kz/Kr = 1.

S = 0.2557
b = 19. ft

K = 0.1 ft/day



DD IN MW-30 WHEN PUMPING AT 0.6 GPM FOR 14 MINUTES

Date: 06/09/03 Time: 08:11:29

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: Natl Waste Managers
Test Location: Chesapeake Terrace
Test Well: MW-30
Obs. Well: MW-30
Test Date: 4-28-03

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

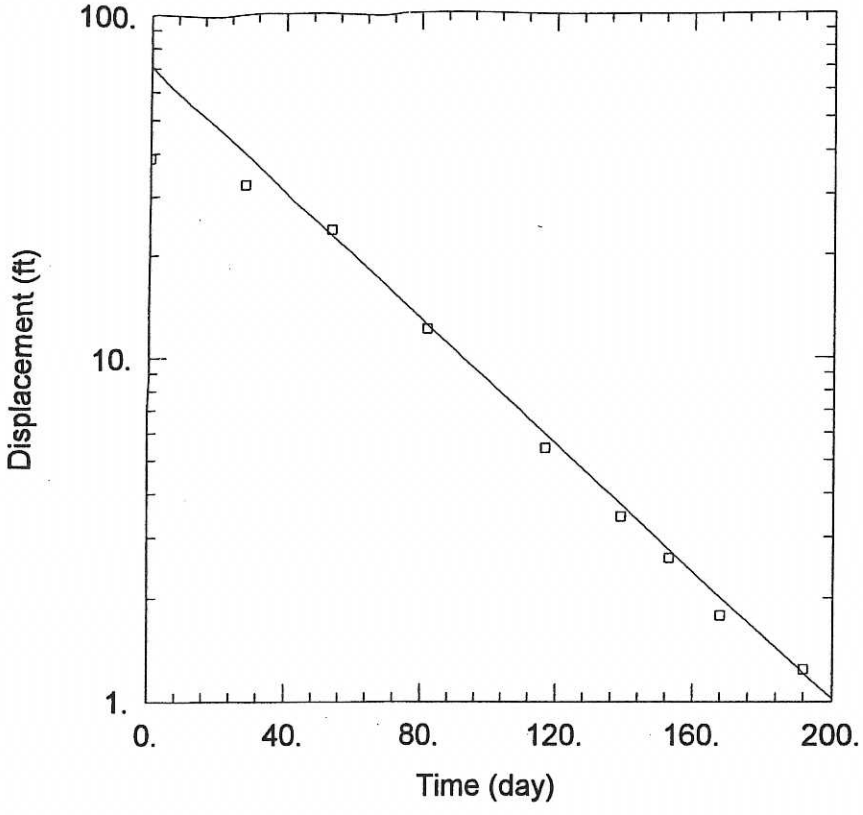
T = 0.01206 ft^2/min = 17.4 ft^2/day S = 1.275

K = 1.7 ft/day

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX I

Slug Test Data (2003)



SLUG TEST CONDUCTED ON MW-31 BEGINNING 4/30/03

Data Set: C:\...\MW-31.aqt
Date: 11/30/03 Time: 12:05:15

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: National Waste Managers
Location: Chesapeake Rubble Fill
Test Well: MW-31
Test Date: 5/03

AQUIFER DATA

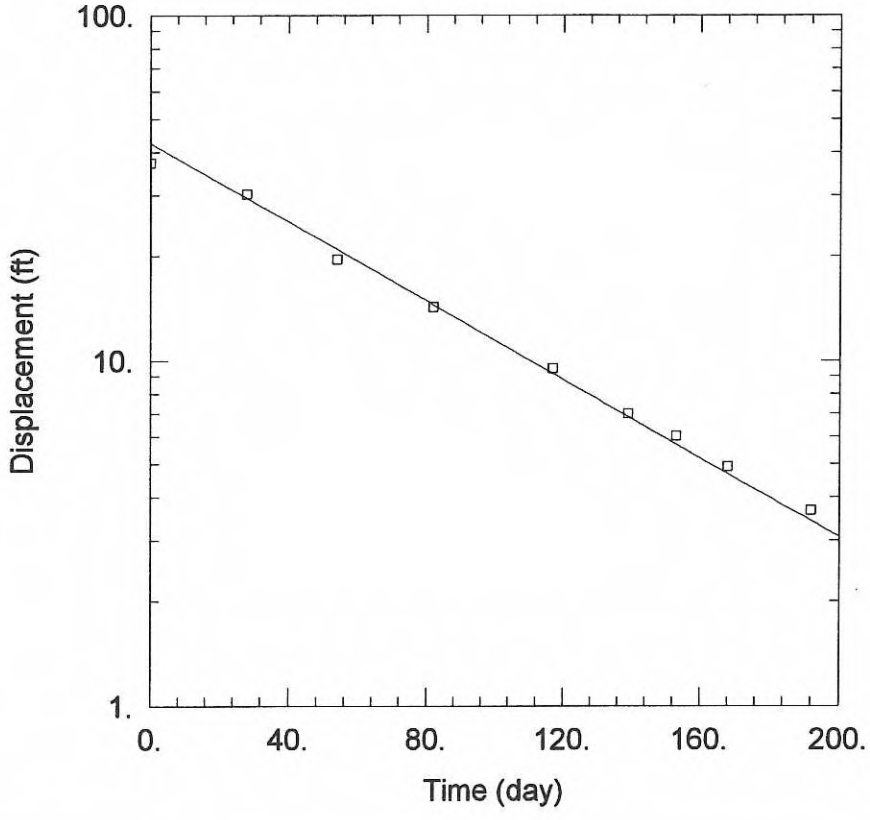
Saturated Thickness: 12. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-31)

Initial Displacement: 38.8 ft Static Water Column Height: 40. ft
Total Well Penetration Depth: 12. ft Screen Length: 12. ft
Casing Radius: 0.08 ft Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 2.581E-5 ft/day = 9.12 E-9 cm/sec y0 = 70.93 ft



SLUG TEST CONDUCTED ON WELL MW-26 BEGINNING 4/30/03

Data Set: C:\...\MW-26.aqt
Date: 11/30/03 Time: 12:00:14

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: National Waste Managers
Location: Chesapeake Rubble Fill
Test Well: MW-26
Test Date: 5/03

AQUIFER DATA

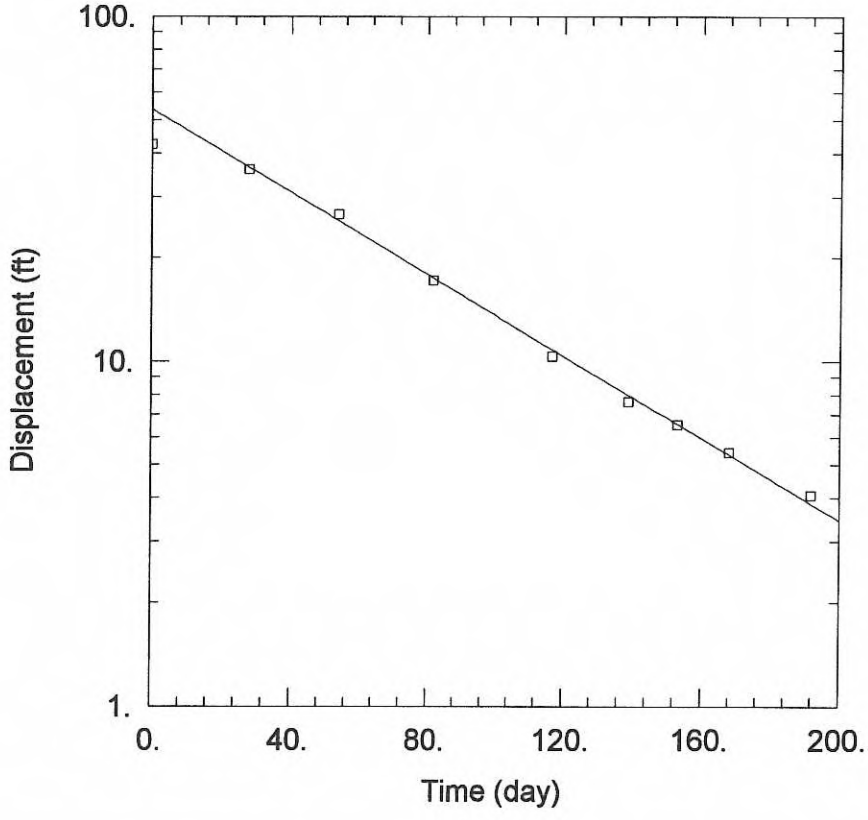
Saturated Thickness: 12. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-26)

Initial Displacement: 37.26 ft
Total Well Penetration Depth: 12. ft
Casing Radius: 0.08 ft
Static Water Column Height: 12. ft
Screen Length: 12. ft
Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 1.598E-5 ft/day = 5.64×10^{-9} cm/sec
y0 = 42.5 ft



SLUG TEST CONDUCTED ON WELL MW-23 BEGINNING 4/30/03

Data Set: C:\...\MW-23 R1 conf.aqt
Date: 11/30/03 Time: 11:48:47

PROJECT INFORMATION

Company: Mark Schultz Associates
Client: National Waste Managers
Location: Chesapeake Rubble Fill
Test Well: MW-23
Test Date: 5/03

AQUIFER DATA

Saturated Thickness: 12. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23)

Initial Displacement: 42.45 ft Static Water Column Height: 45. ft
Total Well Penetration Depth: 12. ft Screen Length: 12. ft
Casing Radius: 0.08 ft Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Hvorslev
K = 1.672E-5 ft/day = 5.90×10^{-9} cm/sec y0 = 53.69 ft

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX J

Not Used

APPENDIX K

NOAA Historical Rainfall Data

Baltimore MD Precipitation
*** PLEASE NOTE ***
Climate data on this page are PRELIMINARY (unofficial).
CERTIFIED (official) climate data are available from the
National Centers for Environmental Information (NCEI) - http://www.ncdc.noaa.gov/
*** PLEASE NOTE ***

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	WINTER	SPRING	SUMMER	AUTUMN	1ST HALF	2ND HALF
1871	1.55	1.38	3.03	1.90	2.03	2.82	6.15	3.41	2.22	3.11	3.24	1.90	32.74	M	6.96	12.38	8.57	12.71	20.03
1872	0.88	1.46	3.06	3.06	1.44	4.16	1.58	4.59	5.06	4.08	3.17	2.22	34.76	4.24	7.56	10.33	12.31	14.06	20.70
1873	4.27	4.74	3.02	2.77	6.31	0.94	2.90	9.49	3.70	6.21	4.05	0.97	49.37	11.23	12.10	13.33	13.96	22.05	27.32
1874	2.22	3.18	1.41	6.65	1.92	1.11	4.30	3.47	4.83	0.16	2.48	1.90	33.63	6.37	9.98	8.88	7.47	16.49	17.14
1875	2.51	2.91	4.72	4.27	1.49	2.85	4.78	8.67	3.62	1.44	4.86	3.14	45.26	7.32	10.48	16.30	9.92	18.75	26.51
1876	1.67	2.96	6.37	1.90	4.94	4.09	5.64	1.76	10.52	2.80	2.74	1.32	46.71	7.77	13.21	11.49	16.06	21.93	24.78
1877	3.80	1.87	3.60	3.30	2.23	3.53	4.25	0.64	5.27	5.22	6.85	2.23	42.79	6.99	9.13	8.42	17.34	18.33	24.46
1878	4.51	3.31	4.74	4.19	5.38	4.09	4.76	4.82	0.82	4.41	3.55	5.61	50.19	10.05	14.31	13.67	8.78	26.22	23.97
1879	2.59	1.55	1.65	3.69	2.74	3.92	3.16	6.71	2.72	0.75	1.30	5.23	36.01	9.75	8.08	13.79	4.77	16.14	19.87
1880	2.26	1.96	4.82	3.07	1.23	5.48	6.47	4.44	1.78	2.64	2.88	4.89	41.92	9.45	9.12	16.39	7.30	18.82	23.10
1881	4.84	5.68	7.59	2.00	2.30	7.81	1.40	2.15	2.98	4.06	2.41	5.90	49.12	15.41	11.89	11.36	9.45	30.22	18.90
1882	5.38	3.73	3.43	2.14	3.42	2.30	4.02	5.10	9.38	0.86	0.65	1.70	42.11	15.01	8.99	11.42	10.89	20.40	21.71
1883	3.16	4.69	3.68	3.20	1.22	8.08	3.10	2.72	3.49	2.83	1.37	2.98	40.52	9.55	8.10	13.90	7.69	24.03	16.49
1884	4.81	6.69	6.37	2.65	3.17	2.51	9.43	1.74	0.09	1.42	3.09	3.91	45.88	14.48	12.19	13.68	4.60	26.20	19.68
1885	3.07	4.40	1.60	1.37	4.50	6.31	2.67	7.78	1.30	6.51	4.04	2.49	46.04	11.38	7.47	16.76	11.85	21.25	24.79
1886	4.48	5.49	4.85	2.06	7.07	5.64	8.08	3.94	1.90	1.39	4.09	3.12	52.11	12.46	13.98	17.66	7.38	29.59	22.52
1887	2.57	4.69	3.49	2.44	2.57	4.44	8.32	4.15	2.80	1.06	2.02	5.04	43.59	10.38	8.50	16.91	5.88	20.20	23.39
1888	3.35	2.83	4.62	2.11	4.22	3.22	2.82	6.17	4.90	2.99	3.04	3.26	43.53	11.22	10.95	12.21	10.93	20.35	23.18
1889	4.22	2.53	5.71	8.70	6.82	6.17	11.03	1.40	4.59	4.12	6.45	0.61	62.35	10.01	21.23	18.60	15.16	34.15	28.20
1890	1.80	4.80	4.07	3.94	5.98	2.42	3.61	6.44	4.76	5.73	0.74	2.67	46.96	7.21	13.99	12.47	11.23	23.01	23.95
1891	4.89	5.52	7.94	2.48	3.11	5.45	7.79	4.24	5.46	2.76	1.33	3.24	54.21	13.08	13.53	17.48	9.55	29.39	24.82
1892	6.42	2.41	7.20	3.15	6.35	4.87	4.07	1.83	2.36	0.26	3.85	2.28	45.05	12.07	16.70	10.77	6.47	30.40	14.65
1893	1.78	4.43	1.38	3.52	3.78	2.26	1.88	1.81	1.80	3.44	3.78	2.29	32.15	8.49	8.68	5.95	9.02	17.15	15.00
1894	1.46	3.53	1.19	3.80	7.26	3.29	1.73	1.41	4.75	3.80	1.98	4.12	38.32	7.28	12.25	6.43	10.53	20.53	17.79
1895	4.67	0.83	2.94	7.42	3.04	2.83	3.40	2.43	6.01	2.20	1.86	2.84	40.47	9.62	13.40	8.66	10.07	21.73	18.74
1896	2.62	7.07	4.70	1.44	1.61	3.94	6.32	1.93	4.14	1.11	3.34	0.37	38.59	12.53	7.75	12.19	8.59	21.38	17.21

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YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	WINTER	SPRING	SUMMER	AUTUMN	1ST HALF	2ND HALF
1897	2.05	5.13	2.40	3.19	6.88	2.57	6.93	4.71	2.17	3.67	4.39	3.40	47.49	7.55	12.47	14.21	10.23	22.22	25.27
1898	2.99	1.32	2.58	1.84	3.86	1.06	3.51	6.09	1.56	3.97	4.34	3.34	36.46	7.71	8.28	10.66	9.87	13.65	22.81
1899	3.50	5.47	4.93	1.89	3.29	2.16	1.64	4.86	7.09	2.09	2.27	1.40	40.59	12.31	10.11	8.66	11.45	21.24	19.35
1900	2.11	4.65	3.17	2.06	1.00	4.34	1.51	2.91	4.26	1.68	1.81	2.07	31.57	8.16	6.23	8.76	7.75	17.33	14.24
1901	2.45	0.65	3.58	5.53	3.67	0.90	6.18	6.73	2.50	1.52	2.26	7.07	43.04	5.17	12.78	13.81	6.28	16.78	26.26
1902	3.05	4.68	3.41	2.90	1.62	4.30	2.45	4.31	7.19	6.85	3.71	5.66	50.13	14.80	7.93	11.06	17.75	19.96	30.17
1903	3.81	5.43	4.40	3.29	3.33	5.01	7.65	5.88	1.00	3.54	0.73	2.19	46.26	14.90	11.02	18.54	5.27	25.27	20.99
1904	2.86	1.50	2.88	2.37	1.84	3.27	4.58	1.95	5.90	3.73	1.87	3.34	36.09	6.55	7.09	9.80	11.50	14.72	21.37
1905	4.69	2.40	3.23	3.07	1.82	4.05	10.65	6.85	2.14	2.04	1.35	4.32	46.61	10.43	8.12	21.55	5.53	19.26	27.35
1906	3.22	2.21	4.63	3.31	2.73	5.10	7.96	5.80	0.32	5.74	1.74	4.06	46.82	9.75	10.67	18.86	7.80	21.20	25.62
1907	3.14	1.93	2.94	3.13	2.92	5.22	5.76	4.60	8.52	1.61	5.02	4.30	49.09	9.13	8.99	15.58	15.15	19.28	29.81
1908	3.49	4.71	2.50	1.09	4.04	1.08	4.34	5.17	2.59	2.59	0.77	3.04	35.41	12.50	7.63	10.59	5.95	16.91	18.50
1909	2.78	3.25	4.58	2.18	4.59	4.38	1.31	0.86	3.97	1.03	1.15	4.62	34.70	9.07	11.35	6.55	6.15	21.76	12.94
1910	4.68	2.28	0.46	7.76	2.95	5.30	0.95	1.37	2.13	2.71	1.93	2.45	34.97	11.58	11.17	7.62	6.77	23.43	11.54
1911	3.48	2.31	2.45	2.69	3.45	5.52	3.53	12.28	1.60	3.31	4.28	3.68	48.58	8.24	8.59	21.33	9.19	19.90	28.68
1912	2.63	2.75	6.64	1.94	3.30	3.09	5.96	3.25	8.75	0.72	1.93	4.17	45.13	9.06	11.88	12.30	11.40	20.35	24.78
1913	2.45	1.61	3.89	5.15	3.12	1.47	2.63	6.38	1.51	3.50	1.82	2.58	36.11	8.23	12.16	10.48	6.83	17.69	18.42
1914	5.66	2.89	1.80	4.55	1.17	1.64	2.55	6.74	1.64	1.24	2.18	4.34	36.40	11.13	7.52	10.93	5.06	17.71	18.69
1915	6.81	4.75	1.06	1.37	3.19	6.23	2.22	9.93	2.30	3.86	1.59	3.08	46.39	15.90	5.62	18.38	7.75	23.41	22.98
1916	1.51	3.21	3.61	3.68	3.49	5.33	5.04	0.83	1.82	1.61	1.97	3.94	36.04	7.80	10.78	11.20	5.40	20.83	15.21
1917	3.04	1.75	3.80	2.21	3.24	4.05	7.09	2.39	2.86	5.01	0.52	1.96	37.92	8.73	9.25	13.53	8.39	18.09	19.83
1918	5.00	1.04	4.17	6.79	3.17	1.75	2.28	3.35	3.01	0.76	1.50	4.72	37.54	8.00	14.13	7.38	5.27	21.92	15.62
1919	3.51	2.62	4.22	4.05	5.46	2.69	7.21	6.45	2.31	2.50	3.10	3.11	47.23	10.85	13.73	16.35	7.91	22.55	24.68
1920	1.87	3.41	2.56	4.84	2.30	8.25	4.94	9.47	3.08	0.17	3.96	3.58	48.43	8.39	9.70	22.66	7.21	23.23	25.20
1921	2.05	2.85	2.60	2.59	5.99	1.97	4.93	3.49	3.19	1.61	4.37	2.08	37.72	8.48	11.18	10.39	9.17	18.05	19.67
1922	4.88	2.94	4.83	0.88	4.00	4.45	7.28	1.11	2.69	5.58	0.44	3.43	42.51	9.90	9.71	12.84	8.71	21.98	20.53
1923	4.14	2.51	4.12	3.68	2.59	1.84	2.04	3.14	3.85	2.83	2.04	3.88	36.66	10.08	10.39	7.02	8.72	18.88	17.78
1924	4.33	4.14	6.66	5.89	5.80	5.54	1.99	5.22	5.75	0.05	1.37	2.30	49.04	12.35	18.35	12.75	7.17	32.36	16.68
1925	5.35	0.98	2.00	2.66	1.86	1.01	5.57	2.41	0.75	5.43	3.16	1.54	32.72	8.63	6.52	8.99	9.34	13.86	18.86
1926	3.10	4.27	2.19	1.46	2.60	2.46	5.74	5.58	4.19	4.24	6.46	2.89	45.18	8.91	6.25	13.78	14.89	16.08	29.10
1927	1.38	3.78	1.47	5.48	2.03	2.96	1.41	3.04	1.95	6.90	2.22	3.61	36.23	8.05	8.98	7.41	11.07	17.10	19.13
1928	2.76	2.89	3.12	6.26	3.09	4.43	3.54	9.70	4.35	0.26	1.78	1.22	43.40	9.26	12.47	17.67	6.39	22.55	20.85
1929	2.90	3.45	3.16	6.73	1.78	4.82	1.13	4.04	2.79	6.77	2.44	2.46	42.47	7.57	11.67	9.99	12.00	22.84	19.63

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YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	WINTER	SPRING	SUMMER	AUTUMN	1ST HALF	2ND HALF
1930	2.66	2.38	2.27	3.12	2.91	2.97	0.64	0.78	0.37	0.37	1.13	1.95	21.55	7.50	8.30	4.39	1.87	16.31	5.24
1931	1.89	1.41	4.62	2.77	5.80	1.89	6.04	7.98	2.05	1.79	1.13	2.20	39.57	5.25	13.19	15.91	4.97	18.38	21.19
1932	5.85	2.08	6.48	2.15	5.51	2.91	2.42	3.92	1.47	7.17	6.17	3.45	49.58	10.13	14.14	9.25	14.81	24.98	24.60
1933	3.37	2.95	4.60	7.58	5.17	3.09	3.90	13.83	3.28	1.76	0.96	2.47	52.96	9.77	17.35	20.82	6.00	26.76	26.20
1934	2.53	3.29	4.47	2.32	4.04	5.39	2.24	6.63	12.41	0.95	3.51	3.10	50.88	8.29	10.83	14.26	16.87	22.04	28.84
1935	4.79	2.74	2.82	5.12	4.51	5.01	4.55	3.97	7.59	2.63	5.63	2.16	51.52	10.63	12.45	13.53	15.85	24.99	26.53
1936	5.94	3.75	6.42	2.56	3.18	1.48	4.89	4.60	2.16	1.73	0.79	7.10	44.60	11.85	12.16	10.97	4.68	23.33	21.27
1937	6.74	3.52	1.93	7.92	3.27	3.53	3.81	5.06	1.10	7.75	5.21	0.95	50.79	17.36	13.12	12.40	14.06	26.91	23.88
1938	2.23	3.10	2.44	1.40	4.86	1.49	4.87	2.43	5.05	2.15	2.11	2.66	34.79	6.28	8.70	8.79	9.31	15.52	19.27
1939	3.77	6.52	3.75	5.92	1.47	3.86	2.41	3.52	3.08	4.01	0.76	1.87	40.94	12.95	11.14	9.79	7.85	25.29	15.65
1940	1.81	3.97	3.97	6.99	4.41	2.37	2.85	5.60	1.32	2.37	5.99	2.68	44.33	7.65	15.37	10.82	9.68	23.52	20.81
1941	3.29	1.07	2.20	3.29	3.61	7.77	5.61	1.60	0.50	0.99	1.32	3.48	34.73	7.04	9.10	14.98	2.81	21.23	13.50
1942	2.04	2.79	6.50	0.88	4.19	2.26	4.46	7.01	1.82	7.75	2.36	3.96	46.02	8.31	11.57	13.73	11.93	18.66	27.36
1943	3.53	2.08	4.38	2.56	4.76	1.29	4.95	0.86	1.84	6.29	2.77	1.44	36.75	9.57	11.70	7.10	10.90	18.60	18.15
1944	5.04	2.20	6.04	3.80	1.72	2.55	2.81	4.22	5.39	4.01	3.93	3.83	45.54	8.68	11.56	9.58	13.33	21.35	24.19
1945	3.75	3.44	1.41	3.55	3.50	2.65	9.68	2.48	5.06	1.18	3.92	5.99	46.61	11.02	8.46	14.81	10.16	18.30	28.31
1946	1.66	3.33	1.89	1.56	6.39	3.65	5.37	4.02	3.98	2.59	1.24	1.97	37.65	10.98	9.84	13.04	7.81	18.48	19.17
1947	3.89	1.87	1.54	5.56	3.95	7.48	4.92	3.74	3.54	1.20	6.92	1.63	46.24	7.73	11.05	16.14	11.66	24.29	21.95
1948	5.83	1.89	3.85	2.92	6.41	9.36	1.94	5.75	2.27	3.62	5.40	5.47	54.71	9.35	13.18	17.05	11.29	30.26	24.45
1949	6.13	3.41	2.74	2.44	5.90	1.19	3.24	2.82	2.33	4.11	1.13	2.25	37.69	15.01	11.08	7.25	7.57	21.81	15.88
1950	2.13	4.12	4.30	1.37	5.00	3.81	3.07	2.66	5.93	2.67	2.05	3.74	40.85	8.50	10.67	9.54	10.65	20.73	20.12
1951	2.88	3.36	3.70	3.69	3.92	8.80	1.84	0.77	4.13	2.02	6.20	4.49	45.80	9.98	11.31	11.41	12.35	26.35	19.45
1952	4.14	2.59	4.77	8.15	4.97	3.19	6.71	4.71	5.68	0.51	7.68	3.47	56.57	11.22	17.89	14.61	13.87	27.81	28.76
1953	4.56	2.74	6.80	4.43	6.37	2.90	4.94	4.26	4.05	2.83	1.32	3.05	48.25	10.77	17.60	12.10	8.20	27.80	20.45
1954	2.02	1.21	3.96	3.07	2.07	0.15	1.77	4.10	1.16	3.24	2.42	2.72	27.89	6.28	9.10	6.02	6.82	12.48	15.41
1955	0.29	2.68	3.34	2.34	2.34	6.73	0.30	18.35	0.56	5.66	1.35	0.20	44.14	5.69	8.02	25.38	7.57	17.72	26.42
1956	2.49	3.38	4.11	2.18	2.38	2.11	7.06	1.81	3.42	4.65	2.69	3.22	39.50	6.07	8.67	10.98	10.76	16.65	22.85
1957	2.28	2.61	2.27	2.46	0.55	4.08	1.25	2.44	5.63	2.21	2.87	5.30	33.95	8.11	5.28	7.77	10.71	14.25	19.70
1958	3.45	3.51	6.18	4.29	2.75	3.65	7.73	6.26	1.27	2.51	2.15	1.39	45.14	12.26	13.22	17.64	5.93	23.83	21.31
1959	2.39	1.82	2.72	3.44	2.82	3.68	6.00	4.39	0.82	4.16	2.12	3.57	37.93	5.60	8.98	14.07	7.10	16.87	21.06
1960	2.31	4.95	2.82	3.40	7.10	1.27	8.18	4.30	6.38	2.12	1.08	2.92	46.83	10.83	13.32	13.75	9.58	21.85	24.98
1961	2.91	4.63	3.87	4.45	2.72	5.19	4.57	4.31	1.57	3.70	1.98	2.85	42.75	10.46	11.04	14.07	7.25	23.77	18.98

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YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	WINTER	SPRING	SUMMER	AUTUMN	1ST HALF	2ND HALF
1962	2.02	4.41	4.85	4.25	2.43	3.16	2.09	2.26	2.39	2.96	6.50	2.92	40.24	9.28	11.53	7.51	11.85	21.12	19.12
1963	1.84	2.07	4.68	2.15	1.70	9.16	0.69	4.21	4.12	T	6.85	2.08	39.55	6.83	8.53	14.06	10.97	21.60	17.95
1964	5.27	4.36	2.98	4.37	0.43	2.40	2.66	1.96	2.61	1.19	2.51	3.94	34.68	11.71	7.78	7.02	6.31	19.81	14.87
1965	3.09	2.89	4.31	1.72	1.79	1.94	2.61	4.72	1.94	1.90	0.68	0.63	28.22	9.92	7.82	9.27	4.52	15.74	12.48
1966	4.15	4.24	0.93	4.39	4.53	1.18	1.48	1.87	8.50	4.80	2.78	3.53	42.38	9.02	9.85	4.53	16.08	19.42	22.96
1967	0.99	2.25	4.39	1.73	3.79	1.89	3.56	8.87	0.21	1.34	2.60	5.31	36.93	6.77	9.91	14.32	4.15	15.04	21.89
1968	3.42	0.72	4.41	1.61	5.41	3.35	2.75	4.16	4.39	3.13	3.85	2.60	39.80	9.45	11.43	10.26	11.37	18.92	20.88
1969	1.38	1.75	1.63	1.80	1.46	3.65	5.22	3.81	2.60	1.10	1.74	7.44	33.58	5.73	4.89	12.68	5.44	11.67	21.91
1970	0.94	3.34	3.07	4.53	1.69	4.10	4.32	1.33	0.46	3.04	5.11	3.50	35.43	11.72	9.29	9.75	8.61	17.67	17.76
1971	2.02	6.21	1.90	1.75	6.12	2.92	4.03	10.91	5.55	6.88	3.75	1.29	53.33	11.73	9.77	17.86	16.18	20.92	32.41
1972	2.82	6.01	2.38	5.30	4.11	9.95	2.81	2.22	1.15	3.51	7.05	5.02	52.33	10.12	11.79	14.98	11.71	30.57	21.76
1973	2.81	2.82	3.96	6.41	3.73	3.16	4.22	3.35	4.87	2.86	1.28	6.36	45.83	10.65	14.10	10.73	9.01	22.89	22.94
1974	2.92	0.94	4.12	2.59	3.58	2.84	0.85	5.85	5.45	1.53	1.39	5.70	37.76	10.22	10.29	9.54	8.37	16.99	20.77
1975	3.47	2.47	5.17	2.73	4.63	3.82	7.15	4.23	8.62	2.89	2.03	4.61	51.82	11.64	12.53	15.20	13.54	22.29	29.53
1976	4.10	2.16	2.23	1.27	5.03	2.49	5.56	2.98	6.93	8.09	0.56	2.04	43.44	10.87	8.53	11.03	15.58	17.28	26.16
1977	1.36	0.63	3.93	3.05	1.49	3.44	2.62	3.31	0.62	5.17	5.01	5.76	36.39	4.03	8.47	9.37	10.80	13.90	22.49
1978	7.34	0.56	4.74	1.26	5.49	2.81	6.83	3.39	1.03	0.71	2.70	4.63	41.49	13.66	11.49	13.03	4.44	22.20	19.29
1979	7.84	7.16	2.05	3.37	4.15	5.74	3.71	9.38	6.73	5.53	2.45	0.87	58.98	19.63	9.57	18.83	14.71	30.31	28.67
1980	2.58	1.06	5.46	4.24	3.58	3.04	3.25	4.00	1.00	3.08	2.72	0.70	34.71	4.51	13.28	10.29	6.80	19.96	14.75
1981	0.49	2.93	1.14	2.04	3.63	5.40	4.59	1.93	2.89	2.57	0.31	3.30	31.22	4.12	6.81	11.92	5.77	15.63	15.59
1982	3.37	4.04	3.03	3.61	1.85	5.70	2.16	0.95	3.63	2.31	3.13	2.39	36.17	10.71	8.49	8.81	9.07	21.60	14.57
1983	2.21	4.81	6.80	6.55	5.47	5.23	1.31	1.57	1.76	3.58	5.02	6.72	51.03	9.41	18.82	8.11	10.36	31.07	19.96
1984	1.96	3.90	5.79	2.95	4.29	1.65	3.27	4.11	2.38	1.94	3.01	1.71	36.96	12.58	13.03	9.03	7.33	20.54	16.42
1985	2.03	3.03	2.37	0.39	6.01	2.44	2.53	3.72	6.22	2.48	4.71	0.84	36.77	6.77	8.77	8.69	13.41	16.27	20.50
1986	2.16	3.78	0.96	2.64	0.37	1.46	4.12	4.26	0.58	1.86	5.96	5.52	33.67	6.78	3.97	9.84	8.40	11.37	22.30
1987	5.85	2.22	0.99	1.86	4.16	2.63	5.05	1.61	7.34	2.25	5.05	2.07	41.08	13.59	7.01	9.29	14.64	17.71	23.37
1988	3.24	3.25	2.35	2.44	4.37	0.84	3.78	2.64	2.05	1.59	4.78	0.97	32.30	8.56	9.16	7.26	8.42	16.49	15.81
1989	3.07	3.36	4.24	3.16	8.71	5.98	7.35	3.38	3.64	4.90	1.97	2.12	51.88	7.40	16.11	16.71	10.51	28.52	23.36
1990	3.71	1.48	2.54	4.23	4.92	2.55	5.68	6.17	1.07	2.57	2.10	4.86	41.88	7.31	11.69	14.40	5.74	19.43	22.45
1991	3.54	0.73	5.65	1.68	1.16	1.08	1.76	2.54	3.05	3.20	1.69	4.08	30.16	9.13	8.49	5.38	7.94	13.84	16.32
1992	1.27	2.49	4.58	1.76	2.92	1.89	5.07	2.19	5.96	2.73	3.44	4.63	38.93	7.84	9.26	9.15	12.13	14.91	24.02
1993	2.73	2.84	8.12	3.68	3.66	2.56	1.71	2.55	4.09	3.02	3.09	4.45	42.50	10.20	15.46	6.82	10.20	23.59	18.91
1994	4.59	4.07	8.64	2.53	3.02	2.84	4.54	3.44	3.93	1.82	1.95	1.95	43.32	13.11	14.19	10.82	7.70	25.69	17.63

Last updated 4/5/2020

Baltimore MD Precipitation

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	WINTER	SPRING	SUMMER	AUTUMN	1ST HALF	2ND HALF	
1995	2.87	1.88	2.12	1.92	3.40	1.80	3.65	2.98	3.29	6.24	4.12	2.66	36.93	6.70	7.44	8.43	13.65	13.99	22.94	
1996	6.80	2.36	3.57	3.76	5.68	4.08	7.38	4.17	5.65	4.32	3.77	6.77	58.31	11.82	13.01	15.63	13.74	26.25	32.06	
1997	2.83	2.23	5.67	2.40	3.03	3.74	1.49	4.21	1.47	3.43	5.79	2.05	38.34	11.83	11.10	9.44	10.69	19.90	18.44	
1998	5.65	6.40	5.56	3.02	3.46	3.22	1.42	0.91	1.27	1.06	1.13	1.27	34.37	14.10	12.04	5.55	3.46	27.31	7.06	
1999	4.70	2.65	3.46	2.27	1.73	2.04	2.06	6.14	11.50	2.48	1.95	2.96	43.94	8.62	7.46	10.24	15.93	16.85	27.09	
2000	3.64	2.01	4.35	5.06	2.82	5.54	5.64	3.18	5.55	0.08	1.73	2.31	41.91	8.61	12.23	14.36	7.36	23.42	18.49	
2001	2.68	2.35	4.76	1.32	5.34	3.58	3.85	5.74	1.43	0.78	1.01	1.73	34.57	7.34	11.42	13.17	3.22	20.03	14.54	
2002	2.19	0.36	3.75	4.08	2.99	2.39	2.26	3.66	3.17	6.01	3.78	4.96	39.60	4.28	10.82	8.31	12.96	15.76	23.84	
2003	2.59	6.70	4.17	2.40	6.81	6.96	5.56	4.61	7.47	5.82	4.86	4.71	62.66	14.25	13.38	17.13	18.15	29.63	33.03	
2004	1.26	2.40	2.73	5.33	5.05	4.17	8.69	2.71	3.94	1.44	5.02	2.93	45.67	8.37	13.11	15.57	10.40	20.94	24.73	
2005	3.75	1.66	5.13	3.81	2.64	3.74	8.77	3.71	0.67	9.23	2.12	3.90	49.13	8.34	11.58	16.22	12.02	20.73	28.40	
2006	3.48	2.64	0.18	3.27	1.60	7.32	1.86	1.45	7.56	5.75	6.25	1.88	43.24	10.02	5.05	10.63	19.56	18.49	24.75	
2007	2.48	2.04	4.17	5.00	0.94	2.20	3.31	3.08	0.35	5.85	1.52	4.03	34.97	6.40	10.11	8.59	7.72	16.83	18.14	
2008	1.47	3.80	2.37	4.62	7.77	3.70	5.47	1.48	7.22	1.27	2.61	3.19	44.97	9.30	14.76	10.65	11.10	23.73	21.24	
2009	2.73	0.26	2.07	5.80	8.42	5.52	3.29	4.76	3.48	6.24	4.94	8.06	55.57	6.18	16.29	13.57	14.66	24.80	30.77	
2010	2.24	4.15	5.53	2.20	3.49	1.55	4.36	4.74	8.26	2.95	2.04	1.96	43.47	14.45	11.22	10.65	13.25	19.16	24.31	
2011	2.66	2.69	4.99	3.52	2.42	3.51	2.77	10.38	13.32	3.31	2.45	4.50	56.52	7.31	10.93	16.66	19.08	19.79	36.73	
2012	2.54	2.42	1.76	1.99	1.99	2.68	3.27	5.82	2.21	8.92	0.71	3.11	37.42	9.46	5.74	11.77	11.84	13.38	24.04	
2013	3.64	1.95	2.64	2.20	3.43	7.81	2.77	1.13	1.65	7.62	2.82	5.27	42.93	8.70	8.27	11.71	12.09	21.67	21.26	
2014	2.71	4.58	4.38	8.60	3.35	3.95	2.80	7.90	3.21	4.16	3.36	3.58	52.58	12.56	16.33	14.65	10.73	27.57	25.01	
2015	3.89	2.24	4.67	4.30	2.10	13.09	3.49	2.46	3.25	3.40	2.42	5.85	51.16	9.71	11.07	19.04	9.07	30.29	20.87	
2016	3.50	5.70	2.10	1.31	5.24	3.20	6.09	3.96	4.36	0.78	1.51	2.77	40.52	15.05	8.65	13.25	6.65	21.05	19.47	
2017	2.69	1.46	3.82	3.52	5.64	1.40	7.11	4.60	1.95	2.99	2.15	0.95	38.28	4.15	12.98	13.11	7.09	18.53	19.75	
2018	1.00	5.30	2.25	3.20	8.17	4.77	16.73	3.84	9.19	2.69	8.14	6.54	71.82	9.07	13.62	25.34	20.02	24.69	47.13	
2019	3.15	3.64	4.14	1.46	5.51	2.95	3.85	2.39	0.16	6.21	1.10	3.57	38.13	7.74	11.11	9.19	7.47	20.85	17.28	
2020	3.11	2.98	3.05										9.14	12.63	3.05	0.00	0.00	9.14	0.00	
NORM	3.05	2.90	3.90	3.19	3.99	3.46	4.07	3.29	4.03	3.33	3.30	3.37	41.88	9.32	11.08	10.82	10.66	20.49	21.39	1981-2010
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	WINTER	SPRING	SUMMER	AUTUMN	1ST HALF	2ND HALF	

Last updated 4/5/2020

APPENDIX L

Ecological Correspondence

McCARTHY & ASSOCIATES, INC.

REGULATORY and ENVIRONMENTAL
CONSULTANTS

August 20, 2002

Certified Mail Number: 7002 0860 0006 3071 0721

Ms. Katharine McCarthy
Maryland Department of Natural Resources
Wildlife and Heritage Division
Room E-1
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

Re: Chesapeake Terrace Rubble Landfill

Dear Ms. McCarthy:

I have received Mr. Ed Dexter's correspondence, dated August 5, 2002, to Mr. Warren Halle concerning the above referenced project. In his letter, he has included correspondence from Department of Natural Resources, Environmental Review Section, dated April 5, 2002, relating to this project. The letter from Environmental Review addresses several items relating to the construction of the proposed facility. These include the following:

1. Threatened and endangered species.
2. Non-Tidal Wetlands of Special State concern adjacent to the rubble landfill.
3. Forest Interior Dwelling Bird Best Management Practices.
4. Anadromous Fish usage of the Little Patuxent River and associated time-of-year restriction.
5. Potential impacts to the state-endangered glassy darter.

I would like an opportunity to present a copy of the proposed rubble landfill plan to your office and to the Environmental Review Unit and discuss this project as it relates to the above referenced five items. Furthermore, at this meeting I will provide you with a copy of the federal and state wetland authorizations that are currently in place for this project.

14458 Old Mill Road #201
Upper Marlboro, Maryland 20772

At your earliest convenience, would you please schedule a meeting at your office with the appropriate representatives from the Environmental Review Unit so we may discuss this project in detail. Please call me to schedule this meeting. Your attention to this matter is sincerely appreciated.

Very truly yours,

Milton L. McCarthy

cc: Mr. Steve Fleischman (Halle Enterprises, Inc.)
Mr. Andy Chisholm (J.A. Chisholm, P.E., LLC)

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

C. Ronald Franks
Secretary

W. P. Jensen
Deputy Secretary

Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

October 21, 2003

Mr. Milton McCarthy
McCarthy & Associates, Inc.
14458 Old Mill Road #201
Upper Marlboro, MD 20772

RE: Chesapeake Terrace Rubble Landfill

Dear Mr. McCarthy:

In response to your request, I have contacted Mr. Ed Dexter of the Maryland Department of the Environment (MDE) Solid Waste Program regarding the status of this project and the protection of rare species. Mr. Dexter indicated that this project is in Phase 2 of the application process, which involves geologic and hydrologic study. We concluded that protection measures for rare species habitats should be addressed in the next phase, that of engineering design. In preparation for the next phase, the Natural Heritage Program recommends that either habitat assessments or species surveys be conducted for the following rare plant species currently known to occur in the vicinity of the project: State endangered Velvety sedge (*Carex vestita*), State threatened Featherbells (*Stenanthium gramineum*), and the State endangered extirpated Water-plantain spearwort (*Ranunculus ambigens;* though this species has not been seen in the vicinity since 1974, to our knowledge no effort has been made to relocate it due to the potential for unexploded ordinance at the historical site, and it is believed to persist in wetlands along the Patuxent River). Our guidelines for rare plant surveys should be followed and results of the surveys or habitat assessments should be submitted to the Natural Heritage Program and the Solid Waste Program.

In addition to working with the Solid Waste Program to prevent impacts to any rare plant habitat identified on or adjacent to the site, the Natural Heritage Program will coordinate with the Solid Waste Program to protect the state endangered fish, Glassy darter (*Etheostoma vitreum*) which inhabits the Little Patuxent River below the Rte 198 crossing. As noted in previous correspondence, the major concerns regarding protection of this rare fish are avoidance of sedimentation and maintenance of water quality in the Little Patuxent River and its tributaries in this vicinity.

I also contacted Mr. Ed Larrimore of the MDE Mining Program concerning the proposed surface mine adjacent to the Patuxent Community Ponds nontidal wetland of special state concern as part of the Chesapeake Rubble Fill Addition (referred to as the Plummer Property in correspondence we have received). He indicated that this

application was closed. If the applicant reactivates this application, then surveys or habitat assessments for the species noted would also be requested for this project site. The Natural Heritage Program would pursue protection measures for any rare species habitat identified on site and for the adjacent plant community within the nontidal wetland of special state concern through our review of the Mining Program permit application.

If you have any questions concerning these comments, please feel free to call me.

Sincerely,

Katharine McCarthy
Natural Heritage Program

Cc: Ed Dexter
Ed Larrimore

Ed Dexter
Review + KR → file

RECEIVED
APR 11 2002
SOLID WASTE PROGRAM

Parris N. Glendening
Governor

Kathleen Kennedy-Townsend
Lt. Governor

Maryland Department of Natural Resources
ENVIRONMENTAL REVIEW
Tawes State Office Building
Annapolis, Maryland 21401

J. Charles Fox
Secretary

Karen M. White
Deputy Secretary

April 5, 2002

Mr. Richard W. Collins, Director
Waste Management Administration
Maryland Department of the Environment
2500 Broening Highway
Baltimore MD 21224

RECEIVED
APR 11 2002
WASTE MANAGEMENT ADMINISTRATION

Dear Mr. Collins:

This letter is in response to your letter of request for information on the natural resources known to exist, or are likely to exist, in the vicinity of the proposed Chesapeake Terrace Rubble Landfill in Odenton, Anne Arundel County. Thank you for the opportunity to review and comment on this project.

Our Wildlife and Heritage Service's Natural Heritage database indicates that there are records for the following species of concern known to occur within the vicinity of the proposed rubble landfill:

Scientific Name	Common Name	State Status
Etheostoma vitreum	Glassy Darter	Endangered
Carex vestita	Velvety Sedge	Endangered
Stenanthium gramineum	Featherbells	Threatened
Oldenlandia uniflora	Clustered Bluets	No longer tracked

There are also 1960's records for state endangered Hoary Frostweed (*Helianthemum bicknellii*) and for Smith's Clubrush (*Scirpus smithii*), a state endangered extirpated species, known to have occurred within the vicinity of the area delineated on your map. These species could potentially occur on the project site itself, especially in areas of appropriate habitat.

There is also a wetland within the vicinity of the proposed rubble landfill that is designated in State regulations as a Nontidal Wetland of Special State Concern (NTWSSC), and is regulated by the Maryland Department of the Environment. This wetland and the adjacent 100 foot upland buffer is regulated as a NTWSSC.

Finally, the forested area on the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of this habitat is strongly encouraged by the Department of Natural Resources. The following guidelines are routinely provided to planners and developers:

1. Concentrate development to nonforested areas.

2. If forest loss or disturbance is absolutely unavoidable, concentrate or restrict development to the perimeter of the forest (i.e., within 300 feet of the existing forest edge), particularly in narrow peninsulas of upland forest less than 300 feet wide.

3. Limit forest removal to the "footprint" of houses and to that which is absolutely necessary for the placement of roads and driveways.

4. Wherever possible, minimize the number and length of driveways and roads.

5. Roads and driveways should be as narrow and short as possible, preferably less than 25 feet and 15 feet, respectively.

6. Maintain forest canopy closure over roads and driveways.

7. Maintain forest habitat up to the edges of roads and driveways; do not create or maintain mowed grassy berms.

8. Maintain or create wildlife corridors (for details, see Critical Area Commission's Guidance Paper on Wildlife Corridors).

9. Do not remove or disturb forest habitat during May-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.

10. Afforestation efforts should target (1) riparian or streamside areas that lack woody vegetation, (2) forested riparian areas less than 300 feet, and (3) gaps or peninsulas of nonforested habitat within or adjacent to existing FIDS habitat.

For further technical assistance regarding conservation and protection of the above indicated species, please contact Katharine McCarthy of our Wildlife and Heritage Service at 410-260-8569.

The Forest Conservation Act requires that before the issuance of a grading or sediment control permit, the applicant shall have an approved Forest Conservation Plan and Forest Stand Delineation (Nat. Res. Art. 5-1601-5-1613, Annotated Code of Maryland). The Forest Service recommends that

a forest conservation plan be submitted with the applicant's preliminary site plan for review to either the local jurisdiction, if a local program is in effect, or the State Forest Conservation Program, Forest Service, E-1, Tawes State Office Building, Annapolis, Maryland 21401 (410-260-8511).

From the information sent for review, it appears that the proposed work could impact drainages to the Little Patuxent River. All tributaries within the project area are classified as Use I streams (Water Contact Recreation and Protection of Aquatic Life). Generally, no instream work is permitted in Use I streams during the period of March 1 through June 15, inclusive, during any year.

Our Fisheries Service has documented the spawning activities of white perch (*Morone americana*) and herring (*Alosa sp.*) in the Little Patuxent River near the project site. Additionally, Table B1-4 (attached) lists other fish species documented by our Maryland Biological Stream Survey Program within the Patuxent Basin. Many of these species could be found near the project site.

It should be noted that the glassy darter (*Etheostoma vitreum*), a listed species by our Wildlife and Heritage Service, has been documented as a resident species in the Little Patuxent River and is relatively common immediately below the Fort Meade Dam at MD Route 198. Because this species is known to occur in only two small, unconnected locations in Maryland, its populations are not well suited to withstanding impacts to their habitat or recolonizing disturbed areas in the manner of some of the more common fish species. Even very infrequent and accidental impacts to the stream could be responsible for significant damage to the glassy darter population in Maryland. Stream habitat protection measures for this project should therefore focus on minimization of sedimentation and water quality impacts to the Little Patuxent River and tributaries.

For more information on the current status of the glassy darter in Maryland and the habitat requirements of this species, please contact our Wildlife and Heritage Service at 410-260-8569.

Thank you again for the opportunity to provide comments on the proposed Chesapeake Terrace Rubble Landfill. If you have any questions concerning these comments, please contact Larry Hughes of my staff at 410-260-8335.

Sincerely,

Ray C. Dintaman, Jr.

Ray C. Dintaman, Jr., Director
Environmental Review Unit

RCR:rcd
Attachment

Table B1-4. Fish species found in 1994 MBSS project sampling vs supplemental sampling, Patuxent Basin

Fish Species	MBSS Study	Supplemental Sampling
AMERICAN BROOK LAMPREY	X	
AMERICAN EEL	X	X
BANDED KILLIFISH	X	X
BANDED SUNFISH	X	
BLACKNOSE DACE	X	X
BLUEGILL	X	X
BLUESPOTTED SUNFISH	X	X
BROWN BULLHEAD	X	X
BROWN TROUT		X
CENTRAL STONEROLLER		X
CHAIN PICKEREL	X	
CHANNEL CATFISH		X
COMMON SHINER		X
CREEK CHUB	X	X
CREEK CHUBSUCKER	X	X
CUTLIPS MINNOW	X	X
EASTERN MUDMINNOW	X	X
FALLFISH	X	X
FATHEAD MINNOW		X
GIZZARD SHAD		X
GLASSY DARTER	X	
GOLDEN SHINER	X	X
GREEN SUNFISH		X
LAMPREY	X	X
LARGEMOUTH BASS	X	X
LEAST BROOK LAMPREY		X
LEPOMIS	X	
LEPOMIS HYBRID		X
LONGNOSE DACE		X
MARGINED MADTOM	X	X
MOSQUITOFISH	X	X
MUMMICHOG		X
NORTHERN HOGSUCKER		X
PIRATE PERCH	X	X
POTOMAC SCULPIN		X
PUMPKINSEED	X	X
RAINBOW TROUT		X
REDBREAST SUNFISH	X	X

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

C. Ronald Franks
Secretary

W. P. Jensen
Deputy Secretary

Maryland Department of Natural Resources

Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

October 21, 2003

Mr. Milton McCarthy
McCarthy & Associates, Inc.
14458 Old Mill Road #201
Upper Marlboro, MD 20772

RE: Chesapeake Terrace Rubble Landfill

Dear Mr. McCarthy:

In response to your request, I have contacted Mr. Ed Dexter of the Maryland Department of the Environment (MDE) Solid Waste Program regarding the status of this project and the protection of rare species. Mr. Dexter indicated that this project is in Phase 2 of the application process, which involves geologic and hydrologic study. We concluded that protection measures for rare species habitats should be addressed in the next phase, that of engineering design. In preparation for the next phase, the Natural Heritage Program recommends that either habitat assessments or species surveys be conducted for the following rare plant species currently known to occur in the vicinity of the project: State endangered Velvety sedge (*Carex vestita*), State threatened Featherbells (*Stenanthium gramineum*), and the State endangered extirpated Water-plantain spearwort (*Ranunculus ambigens;* though this species has not been seen in the vicinity since 1974, to our knowledge no effort has been made to relocate it due to the potential for unexploded ordinance at the historical site, and it is believed to persist in wetlands along the Patuxent River). Our guidelines for rare plant surveys should be followed and results of the surveys or habitat assessments should be submitted to the Natural Heritage Program and the Solid Waste Program.

In addition to working with the Solid Waste Program to prevent impacts to any rare plant habitat identified on or adjacent to the site, the Natural Heritage Program will coordinate with the Solid Waste Program to protect the state endangered fish, Glassy darter (*Etheostoma vitreum*) which inhabits the Little Patuxent River below the Rte 198 crossing. As noted in previous correspondence, the major concerns regarding protection of this rare fish are avoidance of sedimentation and maintenance of water quality in the Little Patuxent River and its tributaries in this vicinity.

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application was closed. If the applicant reactivates this application, then surveys or habitat assessments for the species noted would also be requested for this project site. The Natural Heritage Program would pursue protection measures for any rare species habitat identified on site and for the adjacent plant community within the nontidal wetland of special state concern through our review of the Mining Program permit application.

If you have any questions concerning these comments, please feel free to call me.

Sincerely,

Katharine McCarthy
Natural Heritage Program

Cc: Ed Dexter
Ed Larrimore

McCARTHY & ASSOCIATES, INC.

REGULATORY and ENVIRONMENTAL
CONSULTANTS

fyi + file

February 20, 2004

Certified Mail Number 7002 2030 0001 9858 7828

Mr. Kassa Kebede
Project Manager
Maryland Department of the Environment
Solid Waste Management Administration
Montgomery Park Business Center, #430
1800 Washington Boulevard
Baltimore, Maryland 21230

RECEIVED
FEB 23 2004
SOLID WASTE PROGRAM

Re: Chesapeake Terrace Rubble Fill

Dear Mr. Kebede:

I am writing as a follow-up to our conversation yesterday, concerning the Chesapeake Terrace Rubble Landfill, located in Odenton, Maryland. Our conversation focused around two primary issues; wetlands and threatened and endangered species.

As I indicated to you on the phone, both the federal 404 Clean Water Act permit and the state 401 Water Quality Certificate (WQC) are in place for this project. The Corps' authorization, dated February 26, 2001, expires on December 31, 2006. A copy of this authorization is enclosed. The WCQ, issued by Maryland Department of the Environment (MDE), was re-issued by MDE several years ago. Certification Number 91-WQ-0516 also has an expiration date of December 31, 2006.

You should be aware that there is no non-tidal wetland permit from MDE for this project. This is due to the fact that it is grand-fathered from non-tidal wetland review since the project was authorized originally by the Corps of Engineers and MDE and meets the exemption criteria of the State Non-Tidal Wetland Protection Act.

In regard to threatened and endangered species that could potentially be located in the project vicinity, we have requested a meeting with Ms. Katharine McCarthy, of Maryland Department of Natural Resources, Natural Heritage Program. Based on her October 21, 2003 correspondence to me, which references discussions with Mr. Ed Dexter, of your office, she indicates that the appropriate time to address threatened and endangered species issues would be during the Phase 3 engineering planning for this project.

14458 Old Mill Road #201
Upper Marlboro, Maryland 20772

301-627-7505 • Fax: 301-627-5571

Since the Phase 3 engineering will be initiated in the near future, I have requested a meeting with Ms. McCarthy to discuss these issues and items raised in her letter of October 21, 2003. Once this meeting occurs, you will be notified by either Ms. McCarthy or myself of the outcome as it relates to this particular project. A copy of her letter, dated October 21, 2003, to me is enclosed.

If you have any questions concerning either the federal or state wetland authorizations for this project, or have other concerns relating to threatened and/or endangered species, please contact me at your earliest convenience.

Very truly yours,

Milton L. McCarthy

Milton L. McCarthy

enclosure(s)

cc:
Ms. Katharine McCarthy (DNR-Natural Heritage Program)
Mr. Steve Fleischman (Halle Enterprises, Inc.)
Mr. Andy Chisholm (J.A. Chisholm, P.E., LLC)
Mr. Mark Schultz (Mark Schultz & Associates, Inc.)

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT
WATER MANAGEMENT ADMINISTRATON

WATER QUALITY CERTIFICATION

CERTIFICATION NUMBER: 91-WQ-0516 (Re-Issuance)

CORPS OF ENGINEERS NUMBER: 199101204

ISSUED TO: National Waste Managers
C/o Mr. Warren Halle
2900 Linden Lane, Suite 6
Silver Spring, Maryland 20910

Description of Certified Project: Construction of a rubble landfill known as Chesapeake Terrace. The project will result in permanent loss of approximately 3.66 acres of nontidal wetlands. The project is located on the south side of Patuxent Road, approximately 2.5 miles west of Md. 3, near Woodwardville, Anne Arundel County. The wetlands to be impacted are associated with drainage to Patuxent River.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 through 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the U.S. Army Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the project described above will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The certification holder shall comply with the conditions listed below.

GENERAL CONDITIONS

1. The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify the Water Management Administration (WMA) Compliance Program ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

2. The proposed project shall be constructed in accordance with the plan and its revisions.

3. All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

4. This certification is valid only for use by the certification holder. Certification may be transferred only with prior written approval of WMA. The new owner/operator shall request, in writing, transfer of this water quality certification to his/her name. In the event of transfer, transferee agrees to comply with all terms and conditions of this certification.

5. The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

SPECIAL CONDITIONS

6. The disturbance of the bottom of the water and sediment transport into adjacent State waters shall be minimized. The applicant shall obtain and certify compliance with a grading and sediment control plan which has been approved by the:

X (a) Anne Arundel Soil Conservation District or;

_ (b) Erosion and Sediment Control Representative, Division of Environmental Services, Bureau of Highways, Department of Public Works of the City of Baltimore or;

_ (c) The Department of the Environment, Water Management Administration or;

_ (d) Montgomery County Department of Environmental Protection.

The approved plan shall be available at the project site during all phases of construction.

7. X Work in waters shall be done only in the period **June 16 through February 28** inclusive, of any year.

8. X Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated, and maintained in accordance with the applicable approving authority.

9. _ Stormwater Management Plan: The certification holder shall provide to the Administration for review and approval a stormwater management plan including cross sections, and other applicable drawings which incorporates effective pollutant removal strategies in uplands to treat the required volume of runoff from impervious surfaces prior to the release of stormwater into state waters, tidal wetlands, or nontidal wetlands. There shall be no discharge of untreated stormwater to State waters and tidal and nontidal wetlands. The plan shall be provided by __ and shall be implemented by _____.

10. X Nontidal Wetland/Waters Mitigation Requirement: The certification holder shall mitigate for nontidal wetlands losses as required by the U.S. Army Corps of Engineers Permit.

11. _ The certification holder shall provide a stream restoration plan for review and approval by ___. The approved plan shall be implemented by _____.

12. __ At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

13. X Stormwater Discharges: Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity of no greater than four feet per second for the two year storm in order to prevent erosion in the receiving water or wetland.

14. _ Future Stormwater Discharges: Future stormwater discharges to authorized pond(s) are prohibited unless the required volume of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

15. __ Stormwater Detention Ponds: Authorized stormwater detention or extended detention ponds shall have a maximum detention time of ___ for temporarily impounded stormwater volumes in excess of any permanent pool elevations or pond bottom.

16. _ Integrated Pest Management: An Integrated Pest Management Plan for any proposed golf course shall be developed in accordance with the University of Maryland, Department of Entomology.

17. X Stormwater Drainage Facilities: Stormwater management and drainage facilities shall be maintained in accordance with the requirements of the applicable approving authority.

18. __ Use of Stormwater Management Facility: Stormwater management facility may not be used until all stabilization is completed and all temporary sediment control devices have been removed.

19. __ Maintenance of Stormwater Management Facility: If maintenance of a stormwater management facility is the responsibility of a homeowner's association, maintenance shall be conducted according to County specifications.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the certification holder in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED

for Amanda Sigillito, Chief
Nontidal Wetlands and Waterways Division

December 31, 2006
Expiration Date

Cc: U.S. Army Corps of Engineers (Janet Vine)
WMA Compliance Program w/file
McCarthy & Associates, Inc. (Milton McCarthy)

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

C. Ronald Franks
Secretary

W. P. Jensen
Deputy Secretary

Maryland Department of Natural Resources

Tawes State Office Building
580 Taylor Avenue
Annapolis, Maryland 21401

October 21, 2003

Mr. Milton McCarthy
McCarthy & Associates, Inc.
14458 Old Mill Road #201
Upper Marlboro, MD 20772

RE: Chesapeake Terrace Rubble Landfill

Dear Mr. McCarthy:

In response to your request, I have contacted Mr. Ed Dexter of the Maryland Department of the Environment (MDE) Solid Waste Program regarding the status of this project and the protection of rare species. Mr. Dexter indicated that this project is in Phase 2 of the application process, which involves geologic and hydrologic study. We concluded that protection measures for rare species habitats should be addressed in the next phase, that of engineering design. In preparation for the next phase, the Natural Heritage Program recommends that either habitat assessments or species surveys be conducted for the following rare plant species currently known to occur in the vicinity of the project: State endangered Velvety sedge (*Carex vestita*), State threatened Featherbells (*Stenanthium gramineum*), and the State endangered extirpated Water-plantain spearwort (*Ranunculus ambigens;* though this species has not been seen in the vicinity since 1974, to our knowledge no effort has been made to relocate it due to the potential for unexploded ordinance at the historical site, and it is believed to persist in wetlands along the Patuxent River). Our guidelines for rare plant surveys should be followed and results of the surveys or habitat assessments should be submitted to the Natural Heritage Program and the Solid Waste Program.

In addition to working with the Solid Waste Program to prevent impacts to any rare plant habitat identified on or adjacent to the site, the Natural Heritage Program will coordinate with the Solid Waste Program to protect the state endangered fish, Glassy darter (*Etheostoma vitreum*) which inhabits the Little Patuxent River below the Rte 198 crossing. As noted in previous correspondence, the major concerns regarding protection of this rare fish are avoidance of sedimentation and maintenance of water quality in the Little Patuxent River and its tributaries in this vicinity.

I also contacted Mr. Ed Larrimore of the MDE Mining Program concerning the proposed surface mine adjacent to the Patuxent Community Ponds nontidal wetland of special state concern as part of the Chesapeake Rubble Fill Addition (referred to as the Plummer Property in correspondence we have received). He indicated that this

application was closed. If the applicant reactivates this application, then surveys or habitat assessments for the species noted would also be requested for this project site. The Natural Heritage Program would pursue protection measures for any rare species habitat identified on site and for the adjacent plant community within the nontidal wetland of special state concern through our review of the Mining Program permit application.

If you have any questions concerning these comments, please feel free to call me.

Sincerely,

Katharine McCarthy
Natural Heritage Program

Cc: Ed Dexter
Ed Larrimore

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Robert L. Ehrlich, Jr., *Governor*
Michael S. Steele, *Lt. Governor*
C. Ronald Franks, *Secretary*

October 21, 2004

Mr. Kassa Kebede
Solid Waste Program
Waste Management Administration
1800 Washington Blvd., Suite 605
Baltimore, MD 21230-1719

RE: Chesapeake Terrace Rubble Fill, Anne Arundel County

Dear Mr. Kebede:

In response to my requests, consultants for the applicants have provided further data regarding the potential impacts of the rubble fill on the hydrology of the Patuxent Ponds wetland of special state concern and on rare species know to occur in the vicinity of the proposed rubble fill.

Mr. Mark Schultz, a hydrologist with Mark Schultz Associates, provided a preliminary assessment of the potential hydrologic impacts. Staff of Maryland Geological Survey reviewed his report and concur that his finding of minimal impact is reasonable. Therefore, the Wildlife and Heritage Program will voice no further concern regarding the potential hydrologic impacts of the project to the adjacent wetland of special state concern.

Mr. Brent Steury conducted a survey for rare plant species within the footprint of the proposed rubble fill and found no rare species. While we had originally requested that the survey include adjacent land outside the limit of disturbance, we accept the findings of this survey because the hydrologic assessment indicates minimal impact to the adjacent areas. The Wildlife and Heritage Program has no further concern regarding the potential impacts of this project to rare species.

In order to conserve habitat quality for the state threatened fish, Glassy darter (*Etheostoma vitreum*), in the adjacent Little Patuxent River, please provide special attention to erosion control and to the maintenance of water quality in the Little Patuxent River and its tributaries. As a condition for authorization, please require assurances that sediment and erosion control measures will be strictly enforced and rigorously maintained.

RECEIVED
OCT 26 2004
SOLID WASTE PROGRAM

Thank you for consulting our program in your review of this application. If you have any questions regarding these comments, please feel free to call me (410/260-8569).

Sincerely,

Katharine McCarthy
Natural Heritage Program

Cc: Mark Schultz
Milt McCarthy

GROUNDWATER CONSULTANTS
MARK SCHULTZ ASSOCIATES
1202 WEST STREET • ANNAPOLIS, MARYLAND 21401
410-263-8538 • FAX 410-626-6194
E-mail: msahydro@cs.com

August 26, 2004

Ms. Katherine McCarthy
Maryland Department of Natural Resources
Wildlife & Heritage Services
Tawes State Office Building, E-1
580 Taylor Avenue
Annapolis, Maryland 21401

Re: Chesapeake Terrace Rubble Landfill

Dear Ms. McCarthy:

This letter is a follow up to our meeting on July 22, 2004 and our reconnaissance of Patuxent Ponds Park on July 23, specifically, this letter addresses your request that we evaluate whether the proposed landfill might influence water levels in the two ponds in the park.

Location of Ponds

Patuxent Ponds Park is located on the south side of Patuxent Road west of Bragers Road. The park is located in the floodplain of the Little Patuxent River, which is located north of Patuxent Road.

The location of the ponds relative to the proposed perimeter of the landfill is shown on the topographic map on Figure 1. The figure also shows the perimeter of the drainage area for the ponds and the adjacent wetlands. As described below, the ponds and wetlands appear to be hydraulically connected.

The northernmost of the two ponds is hereafter referred to as the North Pond and the southernmost as the South Pond (see Figure 2).

Pond History from Aerial Photo Review

We reviewed historic air photos of the site on file with the Anne Arundel County Department of Planning Zoning. A description of the features shown on relevant air photos is as follows:

1952 The ponds do not yet exist. This photo shows the area of the Patuxent Ponds Park to be wooded. The area east of the ponds is submerged wetlands as it is today. Further to the east (before Bragers Road) the photo shows a gravel mining operation that has created two ponds that are still in existence today. Patuxent Road is in the same location as today. The wetlands to the north, east, and south of the ponds appear to be undisturbed.

RECEIVED
SOLID WASTE PROGRAM

1962 The two ponds in Patuxent Ponds Park are shown in their present locations; however, the two ponds are not connected as they are today. A surface water inlet/outlet in the southwest corner of the South Pond is clearly visible. The area immediately west of the North Pond is cleared and probably mined. The wetlands to the east and south of the ponds are undisturbed.

1970 The ponds are connected by the current narrow channel, that is, they are in their present configuration. The inlet in the southwest corner is still visible (see Figure 6).

1990 This infrared air photo illustrates the geometry of the wetlands adjacent to the east and south sides of the ponds (see Figure 7). Patuxent Road is shown to cut across the wetland feature located east of the ponds.

Groundwater Flow Model

As I described at our meeting on July 22, 2004, a computer groundwater flow model (MODFLOW) was generated for the western portion of the landfill where a perched aquifer will be removed prior to landfilling. The model indicates that removal of the perched aquifer and construction of the western half of the landfill will have a negligible impact on groundwater levels in the Patuxent Pond area.

A MODFLOW model was not generated for the eastern portion of the landfill because the perched water table is absent in this area. Under its eastern lobe, the base of the landfill will be maintained above the highest water table elevation. This will allow the unimpeded flow of groundwater, thus minimizing the impact on water table elevations. The landfill occupies only 5 percent of the 300-acre drainage area for the Patuxent Ponds and the surrounding wetlands (see Figure 1).

Hydrologic Features Observed During Inspection of Ponds

On July 24, 2004 we conducted an initial inspection of the ponds and observed the following hydrologic features:

- The south and east sides of the ponds are surrounded by a berm. The top of the berm is 2 to 3 feet higher than the water surface in the ponds.
- The ponds are connected by a channel that equalizes the water level elevations in the ponds.
- Submerged wetlands are located south and east of the ponds. These wetlands contain hardwood trees up to ≈8-inches in diameter. The historic air photos indicate that these wetlands have not been disturbed since 1952, if ever.
- The area west of the North Pond is relatively flat with Virginia pine up to 6-inches in diameter. The historic air photos indicate that this area was mined around 1960 at the same time the ponds were excavated.
- Submerged wetlands are located on the north side of Patuxent Road. The historic air photos indicate that these wetlands have not been disturbed since at least 1952.
- No culvert was observed under Patuxent Road.

Staff Gages and Pond Profiles

On August 6, 2004 we installed six (6) staff gages in the pond and adjacent wetlands in order to determine surface water elevations. The staff gages were surveyed to the nearest 0.01 foot msl. A description of the staff gage locations are as follows (also see Figure 2):

SG-1 In the north end of the wetland that borders the east side of the ponds.
SG-2 In the North Pond.
SG-3 In the wetland on the north side of Patuxent Road.
SG-4 In the South Pond.
SG-5 100 feet west of the South Pond in a 15'x30' excavation into gravel in which there is standing water.
SG-6 In the south end of the wetland that borders the east side of the ponds.

Pond Depths

We measured water depths in the ponds across five traverses (A-A', B-B', C-C', D-D', and E-E') in order to determine the pond bottom profile. The locations of the traverses are shown on Figure 2. Profiles showing water levels and the bottom of the ponds are shown on Figures 3, 4, and 5.

On August 10, 2004 the North Pond had a maximum depth of 5.5 feet and an average depth of 4.5 feet. The larger South Pond had a maximum depth of 7.5 feet and average depth of 5 feet. The ponds have steep banks both above and below the water line; therefore, the water level fluctuations that do occur have minimal impact on the size of the surface area of the ponds.

Water Level Elevations in Ponds and Adjacent Wetlands

Water level elevations measured in the ponds and wetlands in August 2004 are summarized as follows:

Staff Gage #	Location	Water Level Elevation (ft msl)			
		8/6/04	8/10/04	8/20/04	Average
SG-1	N End of Wetland	65.44	65.37	65.42	65.41
SG-2	North Pond	65.74	65.63	65.63	65.67
SG-3	N Side Paxuxent Rd	65.32	65.22	65.24	65.26
SG-4	South Pond	65.70	65.60	65.60	65.63
SG-5	Excavation W of Ponds	65.89	65.37	65.43	65.56
SG-6	S End of Wetland	66.02	65.90	65.96	65.96

Water level elevations in the wetland east of the ponds indicate that the direction of surface water flow is to the north toward the Little Patuxent River. The average water level elevation at

the southernmost staff gage (SG-6) was 65.96 ft msl, which was 0.55 feet higher than the 65.41 ft msl recorded at northernmost staff gage (SG-1).

The average water level elevation in the North and South Ponds was 65.65 ft msl which is mid-way between the water level elevations at the north and south ends of the adjacent wetlands (65.41 and 65.96 ft msl at SG-1 and SG-6). The essentially same water level elevation in the ponds and wetland implies a hydraulic connection between these water bodies. The ponds appear to "short-circuit" the tortuous surface-water flow path around trees and vegetation in the wetland.

The water level elevation in the 15'x30' excavation west of the South Pond (at SG-5) is of interest because this location is between the ponds and the proposed landfill. The water level elevation at SG-5 was higher than in the ponds on 8/6/04 and lower on 8/10 and 8/20/04. This indicates limited hydraulic connection between the ponds and the surface water/very shallow groundwater to the west. On 8/10 and 8/20/04 relative water level elevations in the pond and SG-5 actually implied a gradient from east to west, that is, from the ponds toward the proposed landfill.

Water level elevations at the staff gage located on the north side of Patuxent Road (at SG-3) were lower than in the ponds and adjacent wetland which is consistent with a gradient toward the north and the Little Patuxent River.

Inlet/Outlet in Southwest Corner of South Pond

Early aerial photos indicate a straight channel entering at the southwest corner of the South Pond. This channel is now overgrown with vegetation and is poorly defined. There is a low point in the berm at the location where the channel entered the pond. This point was surveyed and found to have an elevation of 66.96 ft msl. This is 1 foot higher than the elevation of the water surface in the wetlands at the nearest staff gage (SG-6) in August 2004. When water levels in the wetland are above 66.96 ft msl (e.g. during periods of high water in the spring) surface water will flow directly into the ponds at this point.

Conclusions

We conclude that the proposed landfill will not influence water levels in the ponds for the following reasons:

- Groundwater flow modeling of the western portion of the landfill indicates that landfill construction in this area will have negligible impact on groundwater levels in the Patuxent Pond area.

- Under the eastern portion of the landfill, the base of the landfill will be maintained above the highest water table elevation. This will allow the unimpeded flow of groundwater, thus minimizing any impact on water table elevations. The eastern portion of the landfill occupies only 5 percent of the 300-acre drainage area for the ponds and the adjacent wetlands.

- The ponds appear to be a localized hydrologic feature. They were created about 50 years ago when a steep-walled excavation was dug approximately 5 feet below the surface water/very shallow groundwater surface.

- The water level in the ponds is a reflection of the water level in the adjacent extensive wetlands located south and east of the ponds and not the water table aquifer under the proposed landfill.

After you have reviewed this letter, if you have any questions, please do not hesitate to call.

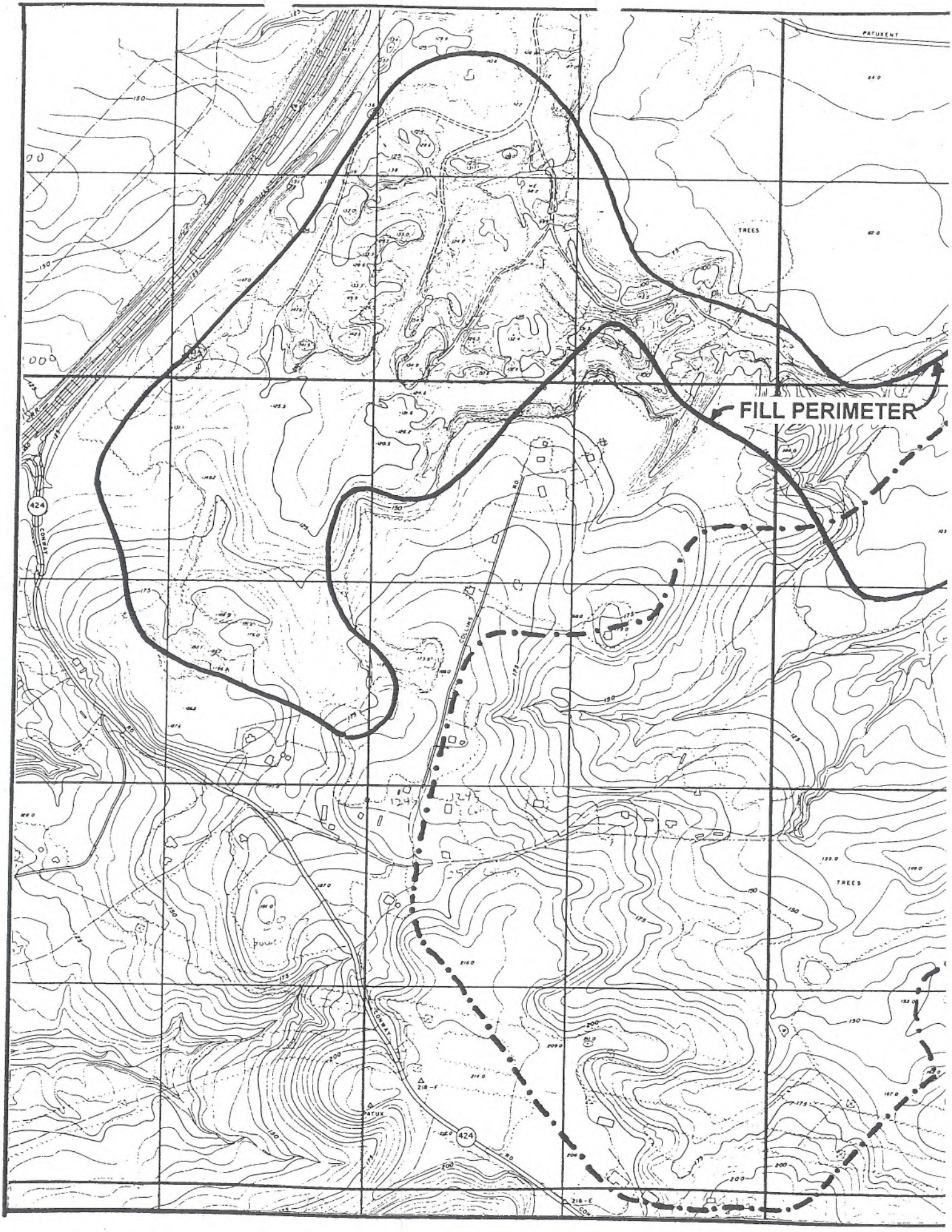
Sincerely,

Mark Schultz

Mark Schultz, PG

cc: Mr. Milton McCarthy (McCarthy & Associates, Inc.)
Mr. Stephen Fleischman (National Waste Managers, Inc.)

Enclosures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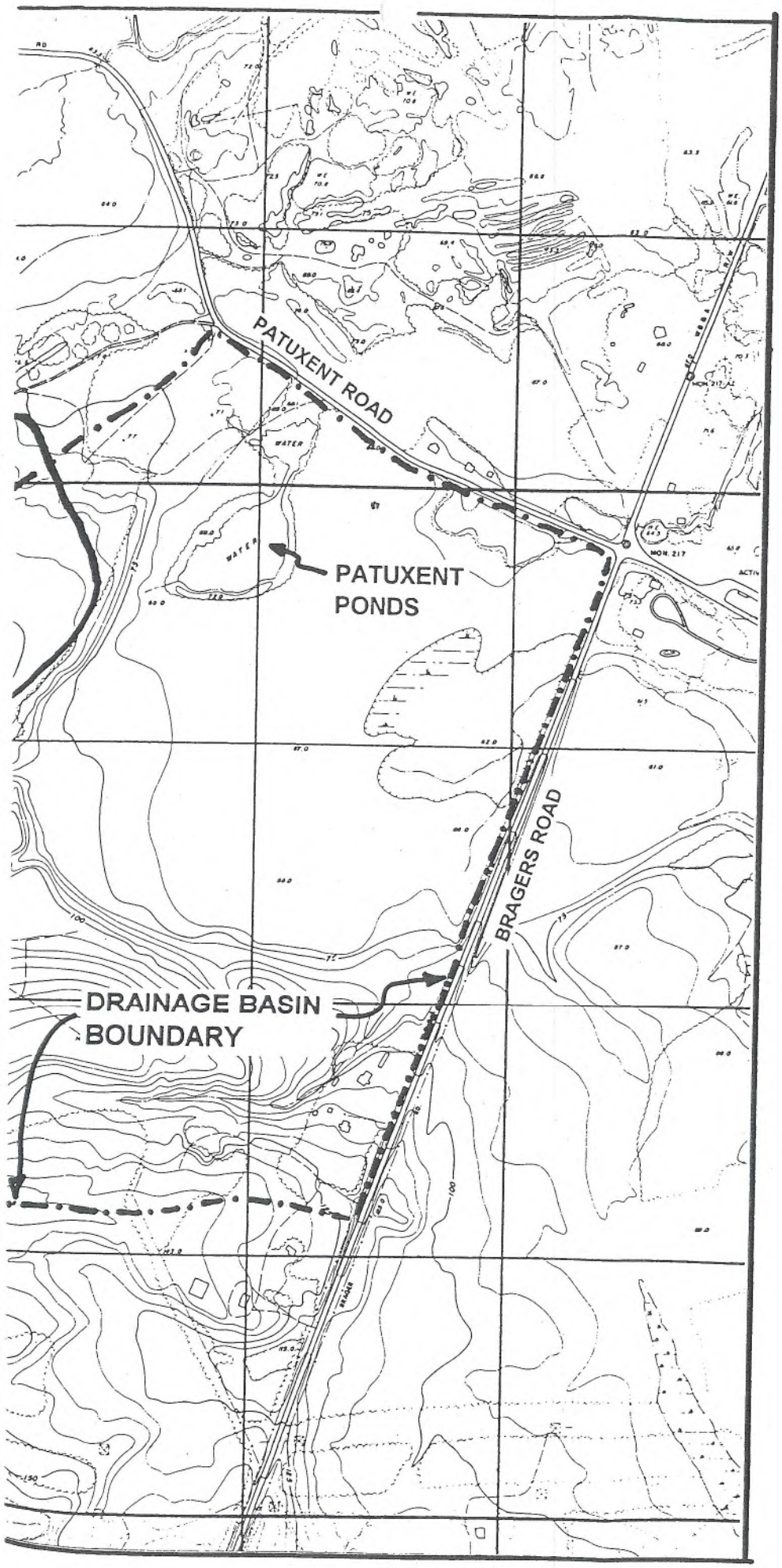
TREES
TREES
424
CONWAY
COLLINS RD
CONWAY
PATUX
424
218-F
218-E



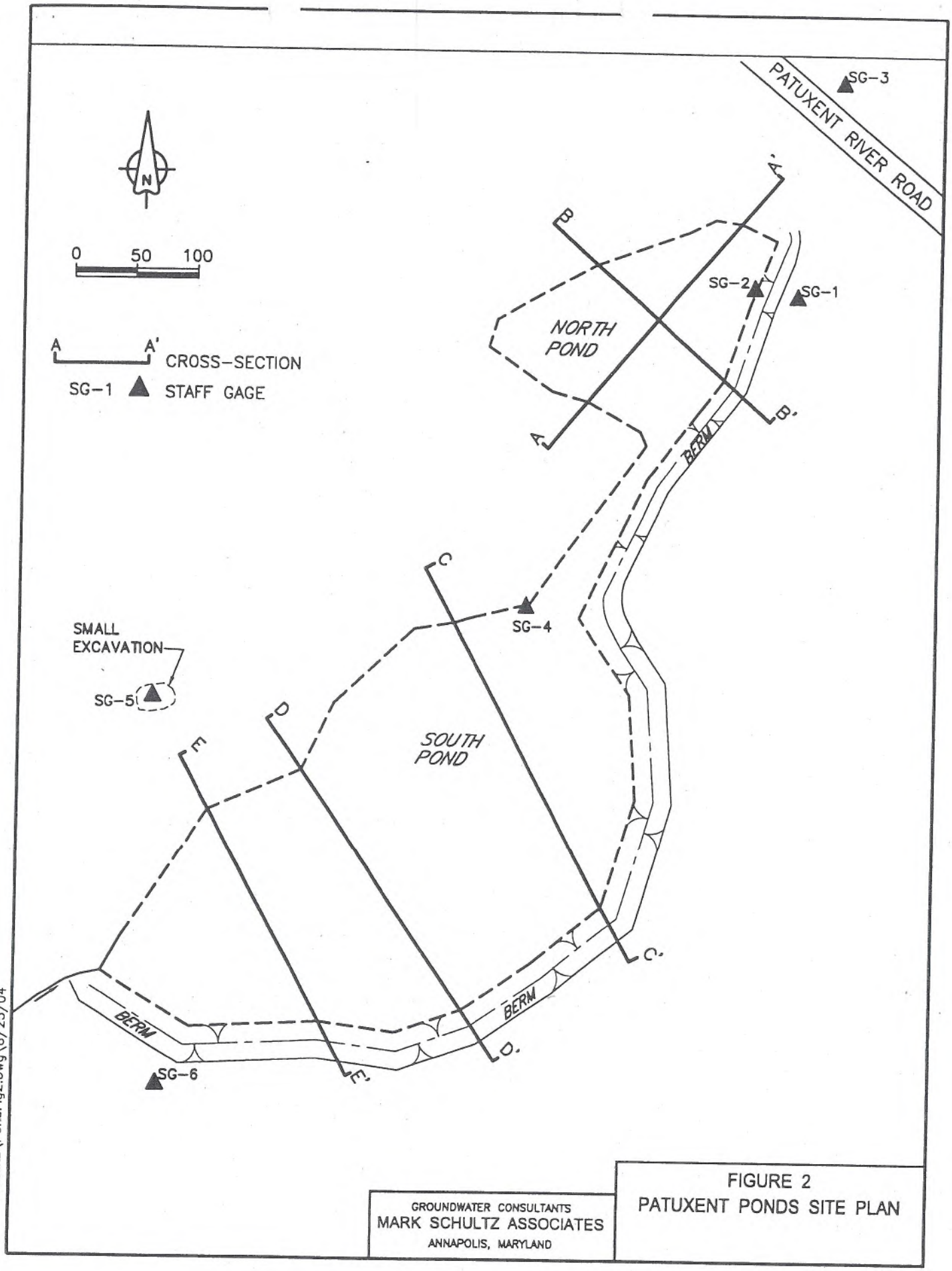
N

SCALE: 1" = 600'

FIGURE 1

VICINITY MAP FOR PATUXENT PONDS

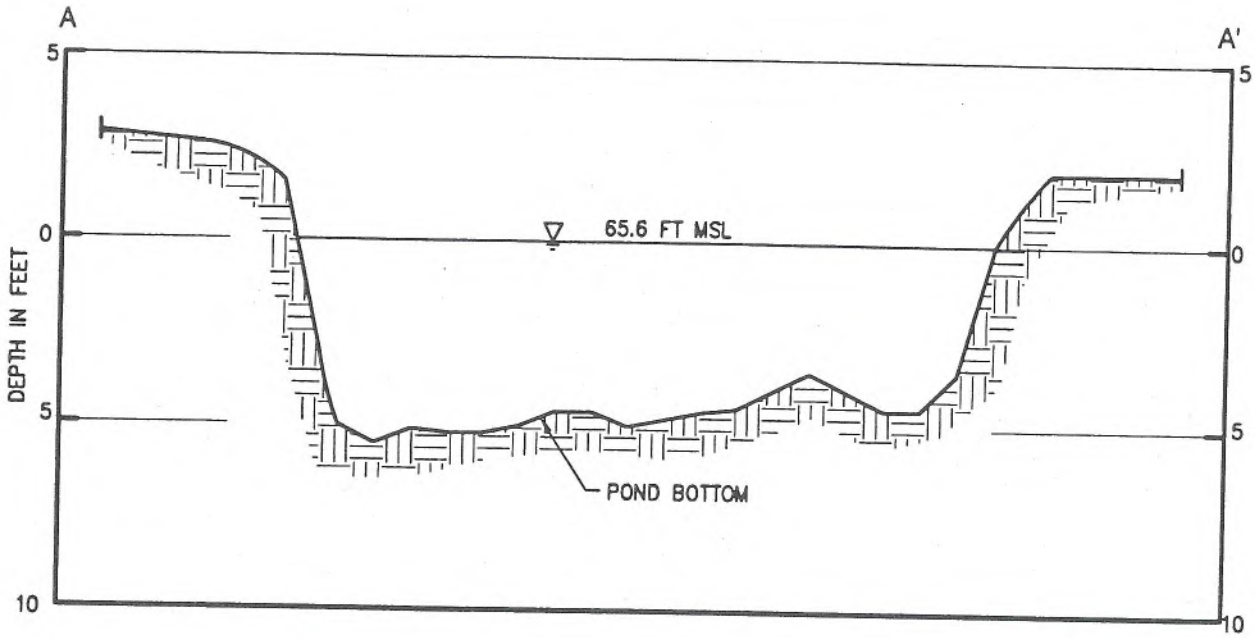
Mark Schultz Associates
August 2004



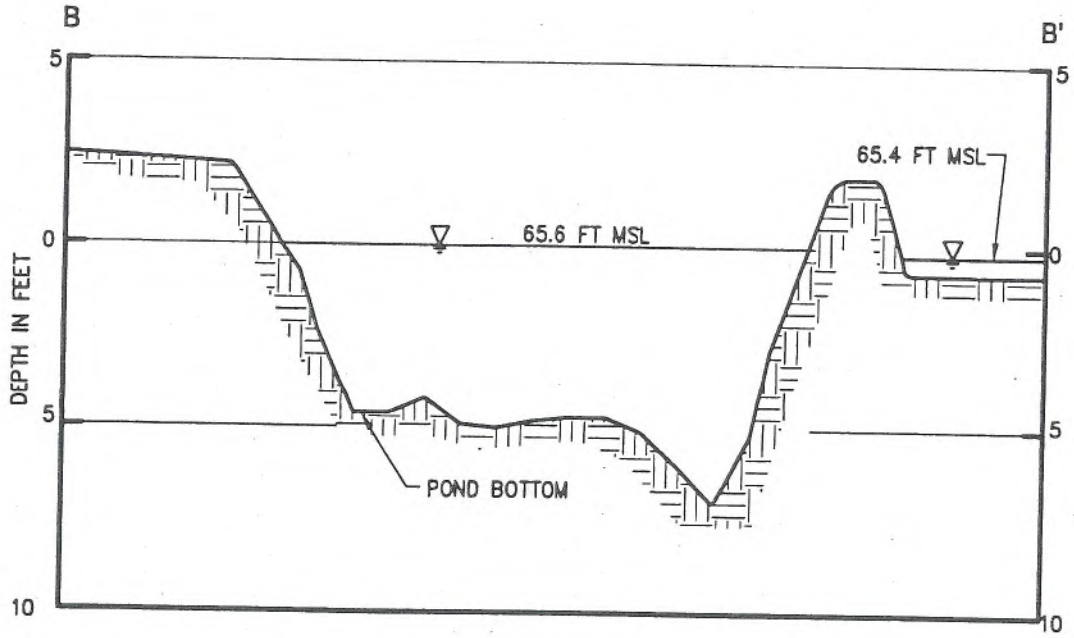
Schultz\PondFig2.Dwg\8/25/04

GROUNDWATER CONSULTANTS
MARK SCHULTZ ASSOCIATES
ANNAPOLIS, MARYLAND

FIGURE 2
PATUXENT PONDS SITE PLAN



CROSS-SECTION A - A'



CROSS-SECTION B - B'

5
0
50
SCALE IN FEET

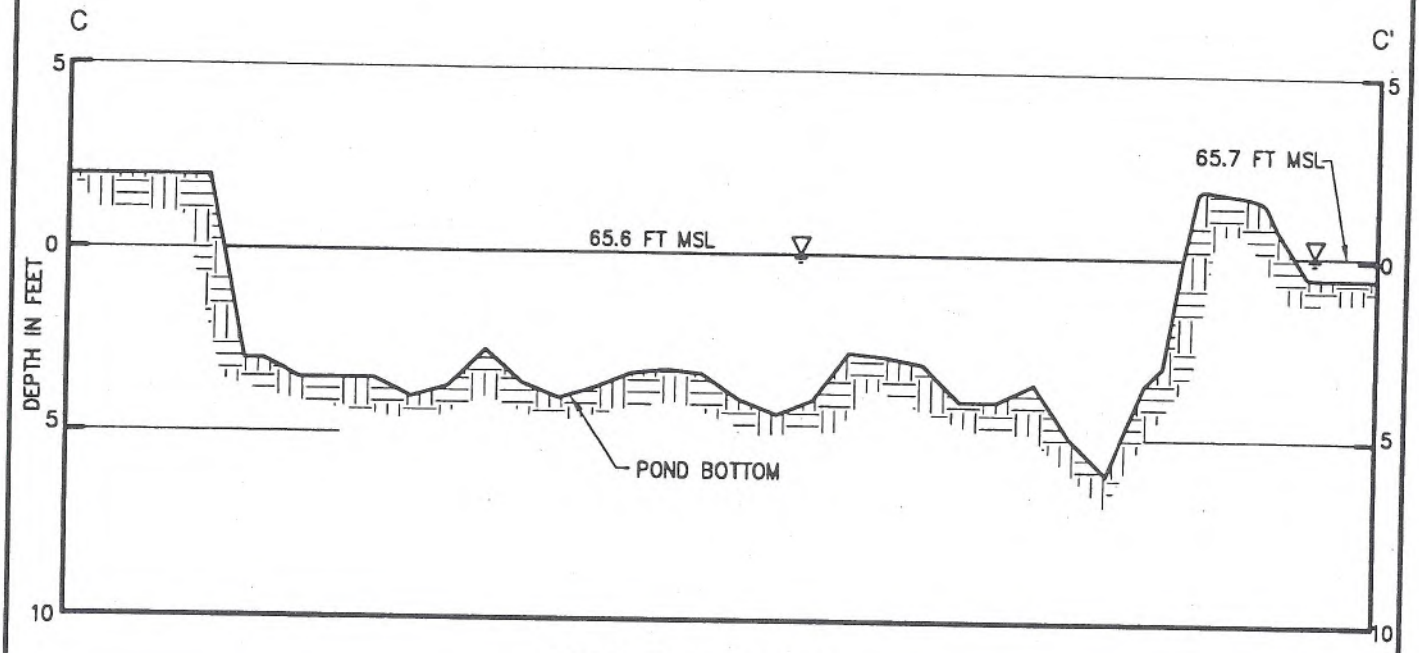
WATER SURFACE

HORIZ. 1"=50'
VERT. 1"=5'

GROUNDWATER CONSULTANTS
MARK SCHULTZ ASSOCIATES
ANNAPOLIS, MARYLAND

FIGURE 3
CROSS-SECTIONS A - A' & B-B'
WITH WATER LEVELS ON 8-20-04

Schultz\PondProfs.Dwg\8/20/04



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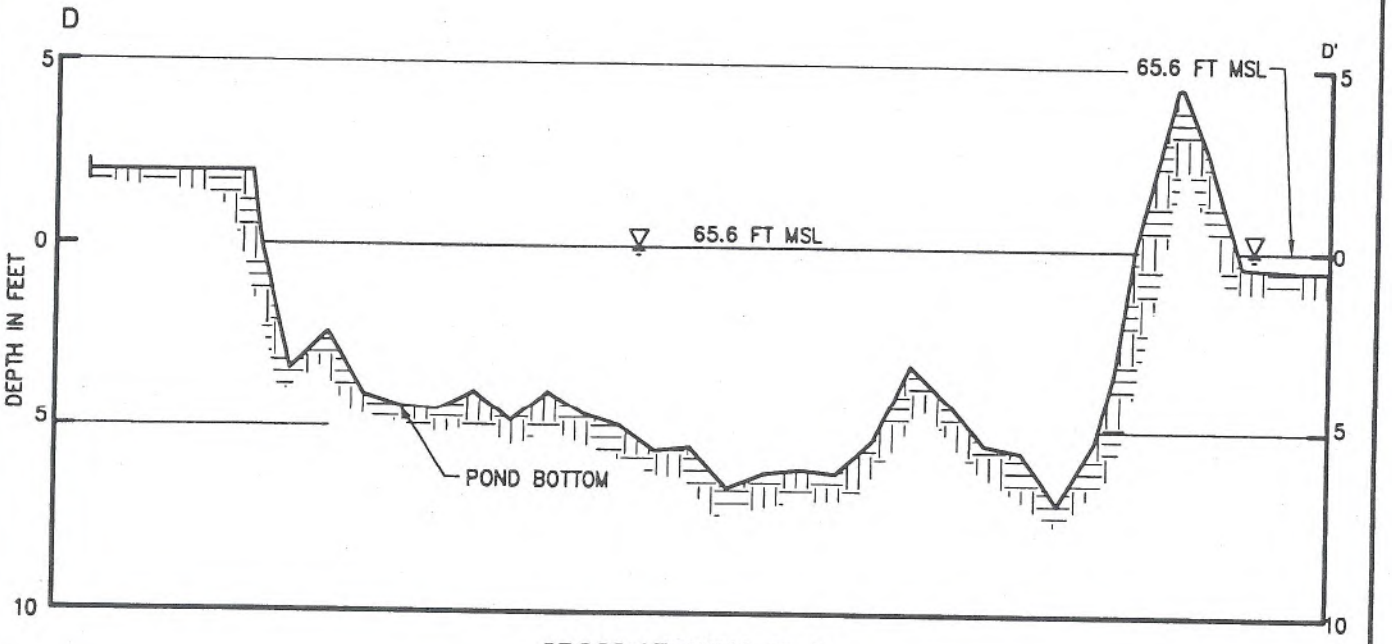


CROSS-SECTION D - D'

5
0
50
SCALE IN FEET

WATER SURFACE

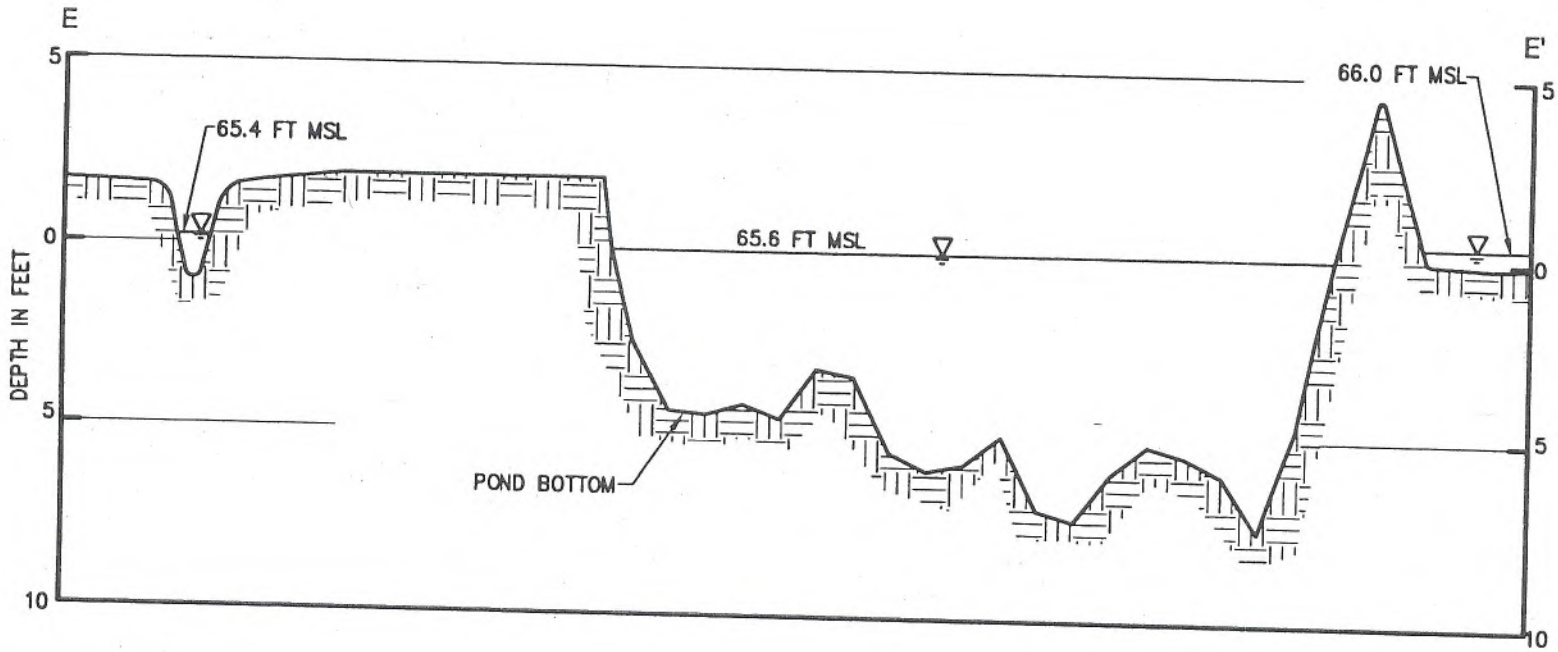
HORIZ. 1"=50'
VERT. 1"=5'

GROUNDWATER CONSULTANTS
MARK SCHULTZ ASSOCIATES
ANNAPOLIS, MARYLAND

FIGURE 4
CROSS-SECTIONS C - C' & D - D'
WITH WATER LEVELS ON 8-20-04

Schultz\PondProfs.Dwg\8/25/04

Schultz\PondProfs.Dwg\8/25/04



5
0
50
SCALE IN FEET

WATER SURFACE
HORIZ. 1"=50'
VERT. 1"=5'

GROUNDWATER CONSULTANTS
MARK SCHULTZ ASSOCIATES
ANNAPOLIS, MARYLAND

FIGURE 5
CROSS-SECTION E - E'
WITH WATER LEVELS ON 8-20-04

Figure 6

Aerial Photo Taken in 1970
at Scale of 1"=1000'

Figure 7

Aerial Photo Taken in 1990
at Scale of 1"=600'

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX M

Wetlands Permit Info

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

April 26, 2019

Mr. Stephen N. Fleischman
The Halle Companies
2900 Linden Lane
Suite 300
Silver Spring, Maryland 20190

Re: Chesapeake Terrace Rubble Landfill
Water Quality Certification No. 91-WQ-0516
AI No. 63592

Dear Mr. Fleischman:

The purpose of this letter is to confirm that the Water Quality Certification No. 91-WQ-0516, originally issued for the U.S. Army Corps of Engineers' Chesapeake Terrace Rubble Landfill Permit (No. CENAB-OP-RMN 1991-01204-M18), remains in effect until the December 31, 2023 expiration date of the federal permit. Should you have any questions, please feel free to contact me at 410-537-3766 or at amanda.sigillito@maryland.gov .

Sincerely,

Amanda Sigillito

Amanda Sigillito, Chief
Nontidal Wetlands Division

C: Richard Kibby (Maryland Section Northern, Regulatory Functions Branch, Baltimore District Army Corps of Engineers, 2 Hopkins Plaza, Baltimore, MD 21201)

Milton L. McCarthy (Bay Environmental, Inc., 2661 Riva Road, Bldg. 800, Suite A, Annapolis, MD 21401)

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
ATTN: REGULATORY BRANCH
2 HOPKINS PLAZA
BALTIMORE, MD 21201

January 3, 2019

Operations Division

National Waste Manager, Inc.
Attn: Mr. Warren E. Halle
2900 Linden Lane, Suite #6
Silver Spring, Maryland 20910

Dear Mr. Halle:

This is in reference to your request for an extension of time to the Department of the Army Permit, **CENAB-OP-RMN (CHESAPEAKE TERRACE RUBBLE LANDFILL) 1991-01204-M18**. The property is located adjacent to the Little Patuxent River on Patuxent Road, Odenton, Anne Arundel County, Maryland.

As there have been no significant changes in the attendant circumstances since authorization was granted, the District has determined that it is not contrary to the public interest to grant an extension of time. Accordingly, the time limit for completing the work authorized ends on December 31, 2023. Please note, no additional extensions for the proposed work will be granted by this office.

All conditions of the original permit remain in effect. You may proceed with the construction indicated therein, provided you have obtained all other required state and/or local authorizations.

If you have any questions concerning this matter, please call Mr. Richard Kibby of this office at (410)962-0694.

By Authority of the Secretary of the Army:

Issued for and in Behalf of

John T. Litz, PMP
Colonel, U.S. Army
Commander and District Engineer

DAVIA.JOSEPH.P.1229279170

Digitally signed by DAVIA.JOSEPH.P.1229279170
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAVIA.JOSEPH.P.1229279170
Date: 2019.01.03 11:23:08 -05'00'

Joseph P. DaVia
Chief, Maryland Section Northern

Enclosure

Cc: (via e-mail) Mr. Milt McCarthy, Bay Environmental, Inc. <info@bayenvinc.com>

To identify how we can better serve you, we need your help. Please take the time to fill out our new customer service survey at: http://www.nab.usace.army.mil/Wetlands%20Permits/survey.htm

CHESAPEAKE TERRACE
WETLAND DELINEATION REPORT

Prepared for:

National Waste Managers, Inc.

Prepared by:

EA Mid-Atlantic Regional Operations
EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

RECEIVED
DEC 26 1990

December 1990

EA Project 11767.01

CHESAPEAKE TERRACE
WETLAND DELINEATION REPORT

Prepared for:

National Waste Managers, Inc.

Prepared by:

EA Mid-Atlantic Regional Operations
EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

December 1990

EA Project 11767.01

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3	Soils on Chesapeake Terrace project site.

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Number	Title
1	Soil types of the Chesapeake Terrace project site.
2	Vegetation identified at the Chesapeake Terrace property.

1. INTRODUCTION

EA Engineering, Science, and Technology was retained by National Waste Managers, Inc. to conduct a wetlands delineation and characterization at the Chesapeake Terrace site in Anne Arundel County, Maryland. The project area is in the Coastal Plain geologic province. The project site consists of an approximately 460-acre tract located south of Patuxent Road, east of the Amtrak railroad tracks, north of Conway Road and Lucinda Avenue and west of the Patuxent River Park (Figure 1).

The proposed project consists of the conversion of approximately 215 of those 460 acres into a rubble fill. Regulations regarding rubble fill operations, and restrictions associated with the 100-year floodplain of the Little Patuxent River were used to define the study area (Figure 2). In other words, that portion of the project site that could be utilized for rubble fill operations if appropriately permitted determined the boundaries of the study area.

The study site consists of approximately 215 acres of land, some of which had previously been subject to surface mining and various levels of reclamation efforts. The mined areas varied considerably in vegetative cover, topography, and soil characteristics. Some areas were vegetated primarily with pines growing on steeply sloped and severely eroded sand and gravel mounds, and other previously mined areas were primarily unvegetated, flat, or gently sloping with clay and sand substrates. Other areas of the study site that do not display characteristics of mining activities were vegetated primarily by upland hardwood species on steep and gentle slopes having sandy and silty loam soils.

The following report describes the methodology used in determining the presence and extent of wetlands on the study site, a findings section which more closely details the soils, hydrology and vegetation of the wetlands identified, a summary section, and references. Army Corps of Engineers (ACOE) datasheets are appended.

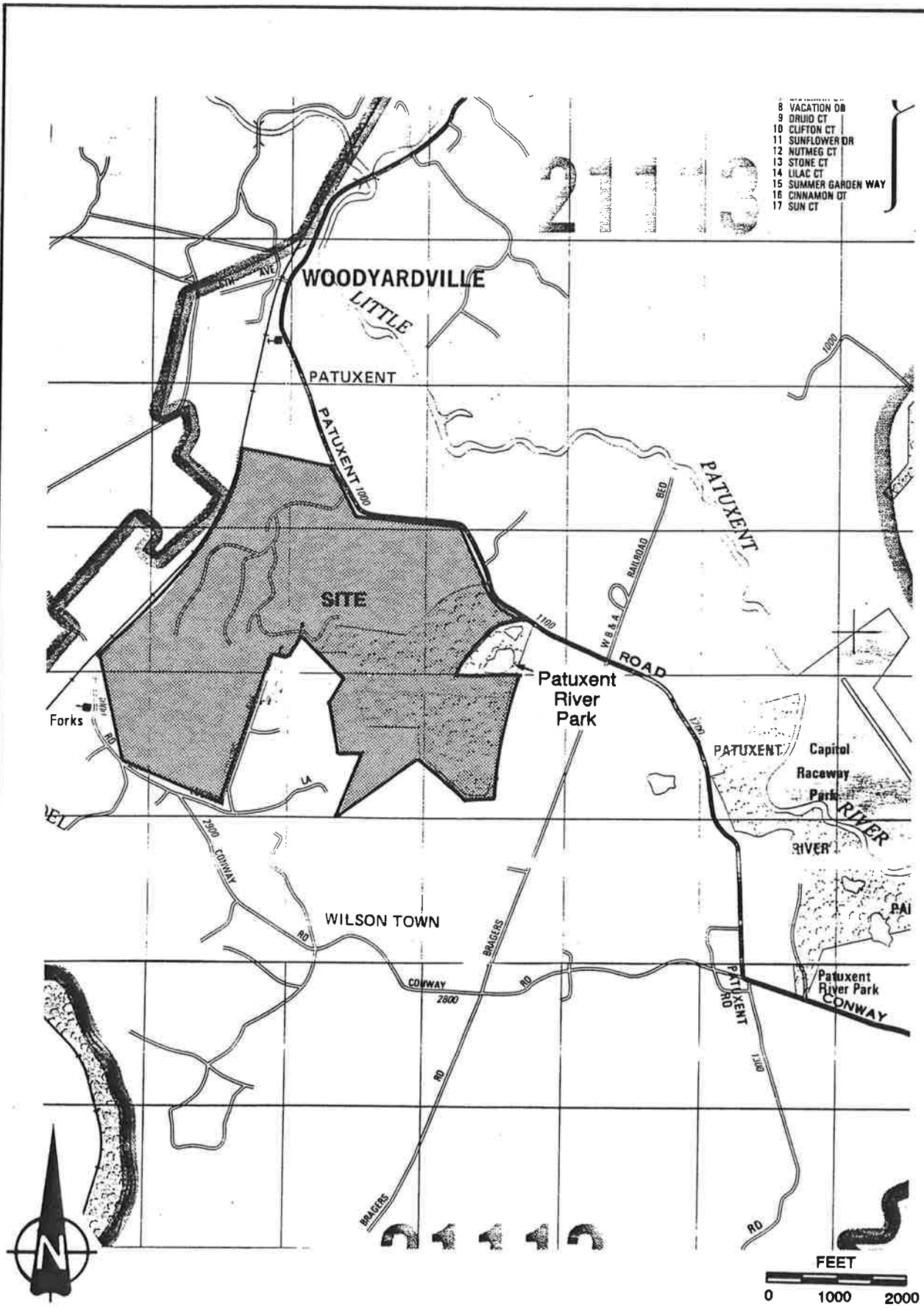

Figure 1. Vicinity map. (Source: ADC map of Anne Arundel County, p.12)

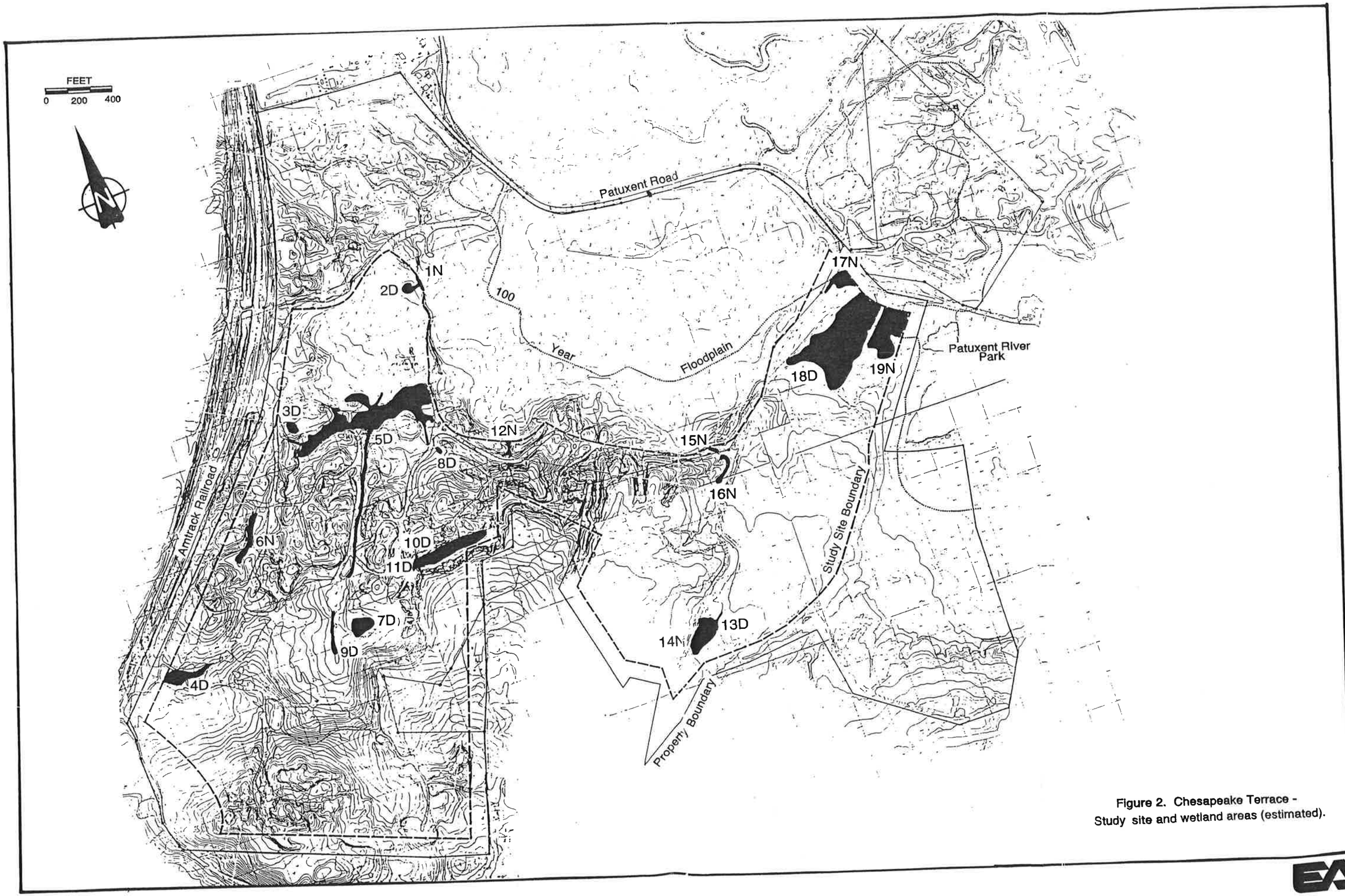

Figure 2. Chesapeake Terrace - Study site and wetland areas (estimated).

2. METHODS

Wetlands are characterized and delineated according to the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (January 1989), on the basis of three main factors: hydrology, soils, and vegetation. The hydrology factor describes the duration and timing of surface inundation and the fluctuations in ground water. Hydrology is determined by reviewing topographic maps, soil surveys, and field indicators such as mud marks on trees, drift lines and stained leaves.

Hydric soils are the second indicator used to characterize wetlands. These are poorly drained soils which have held water long enough for chemical reactions to take place changing the color of the soil. Soil saturation leads to gleying and mottling, which are the field characteristics examined to determine whether a soil exhibits wetland conditions. Soil colors (hue, value, and chroma) are compared to the Munsell soil color chart, and soils with a chroma of 2 or less (e.g., 10YR 5/2), are considered to exhibit field characteristics of a hydric soil. The color and texture of the soil are used to determine how well it drains and whether it could support wetland vegetation. The Anne Arundel County Soil Survey provides an indication of where hydric soils may be located in the soil type map. Each soil type has been given a capability unit. Capability units are designations made by the Soil Conservation Service which describe limitations for cultivation and are also useful in locating potential wetland areas. Capability classes are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations. Capability subclasses are designated by small letters: e--for erosion, s--for stony, and w--for water in or on the soil which interferes with plant growth or cultivation. Soils with capability units of IIw may or may not have wetlands. Soils with capability units of IIIw generally support some wetlands. Wet capability units greater than IIIw nearly always support wetlands.

Finally, the vegetation of wetlands under natural conditions is composed of species adapted to wet soils and/or periodic flooding. Species which are commonly found in wetlands have been categorized by the U.S. Fish and Wildlife Service in the *National List of Plant Species That Occur in Wetlands: Northeast* (Reed 1988). Each plant listed is categorized by a regional indicator or "hydrophytic status" which describes the occurrence percentage of a given species in wetlands throughout its range.

There are four indicators:

OBL (Obligate Wetland) = greater than 99 percent of these plants are found in wetlands

FACW (Facultative Wetland) = 67-99 percent of these plants are found in wetlands

FAC (Facultative) = 34-66 percent of these plants are found in wetlands

FACU (Facultative Upland) = 1-33 percent of these plants are found in wetlands

Hydrophytes have been defined as species with indicators of OBL, FACW, and FAC for purposes of Army Corps of Engineers permitting. Wetlands are characterized by a predominance (>50 percent cover) of hydrophytic species.

Because the study site had been significantly altered during the surface mining operation, particular emphasis was placed on the Disturbed Area Delineation (pp. 50-55) section of the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands.* Disturbed areas include situations where one or more of the three wetland field indicators are absent due to past or recent change. In order to facilitate identification, delineation, and description of the wetlands on the study site, EA biologists labeled wetlands and potential wetlands as one of three types: (1) non-disturbed, (2) disturbed, and (3) problem or questionable areas. The label "non-disturbed wetland" was used to identify those wetland areas that appeared to be unaltered by previous site activities. These areas

generally exhibited all three wetland field indicators. The label "disturbed wetland" was used to identify those areas that historically may have been wetlands but due to past activities one or more of the three wetland field indicators have been obliterated. The classification as "disturbed wetland" was also applied to areas which may not have historically been wetlands but, due to recent or past activities, now display one or more wetland characteristics. The label "problem or questionable areas" was used to indicate areas that were not flagged as wetlands but displayed one of the three wetland field characteristics. These "problem areas" typically displayed the hydrologic characteristic expected in wetlands. However, there was generally little to no vegetation in these areas and the soils were generally tightly packed clays which produced surface runoff and little infiltration.

3. FINDINGS

The wetlands in the study site were delineated and characterized by EA biologists on 4 through 7 and 11 through 13 December 1990. At the time of delineation, each wetland was categorized as non-disturbed or disturbed while problem/questionable areas were noted on a field copy of the site map.

Non-disturbed wetlands included eight areas: 1N, 6N, 12N, 14N, 15N, 16N, 17N, and 19N. Disturbed wetlands included eleven areas: 2D, 3D, 4D, 5D, 7D, 8D, 9D, 10D, 11D, 13D, and 18D. Problem/questionable areas were not assigned area numbers as they were not considered jurisdictional wetlands. Figure 2 shows the distribution of the wetlands on the study site. Appendix A includes copies of the Army Corps of Engineers' data sheets for wetlands used to characterize and delineate wetlands on the study site. The following findings section will detail each wetland field indicator as displayed by these three categories.

3.1 SOILS

The soils on the Chesapeake Terrace site have been significantly disturbed due to prior excavation of sand and gravel. The types of disturbances included: excavation and removal, excavation and grading, and stock piling. These past activities and the erosive effects of nature (wind, rain) have caused significant erosion and consequent deposition of the soils, sands, and gravels onsite. As a result, site topography displayed much more relief than is typically found in the Coastal Plain.

Prior to excavation, the soils of the site were a combination of Sassafras fine sandy loams, Loamy and clayey land, Woodstown loams, and Bibb silt loams (Figure 3). Sassafras fine sandy loam appears to be the most common soil type onsite. Characteristics of these soils in the study area are presented in Table 1.

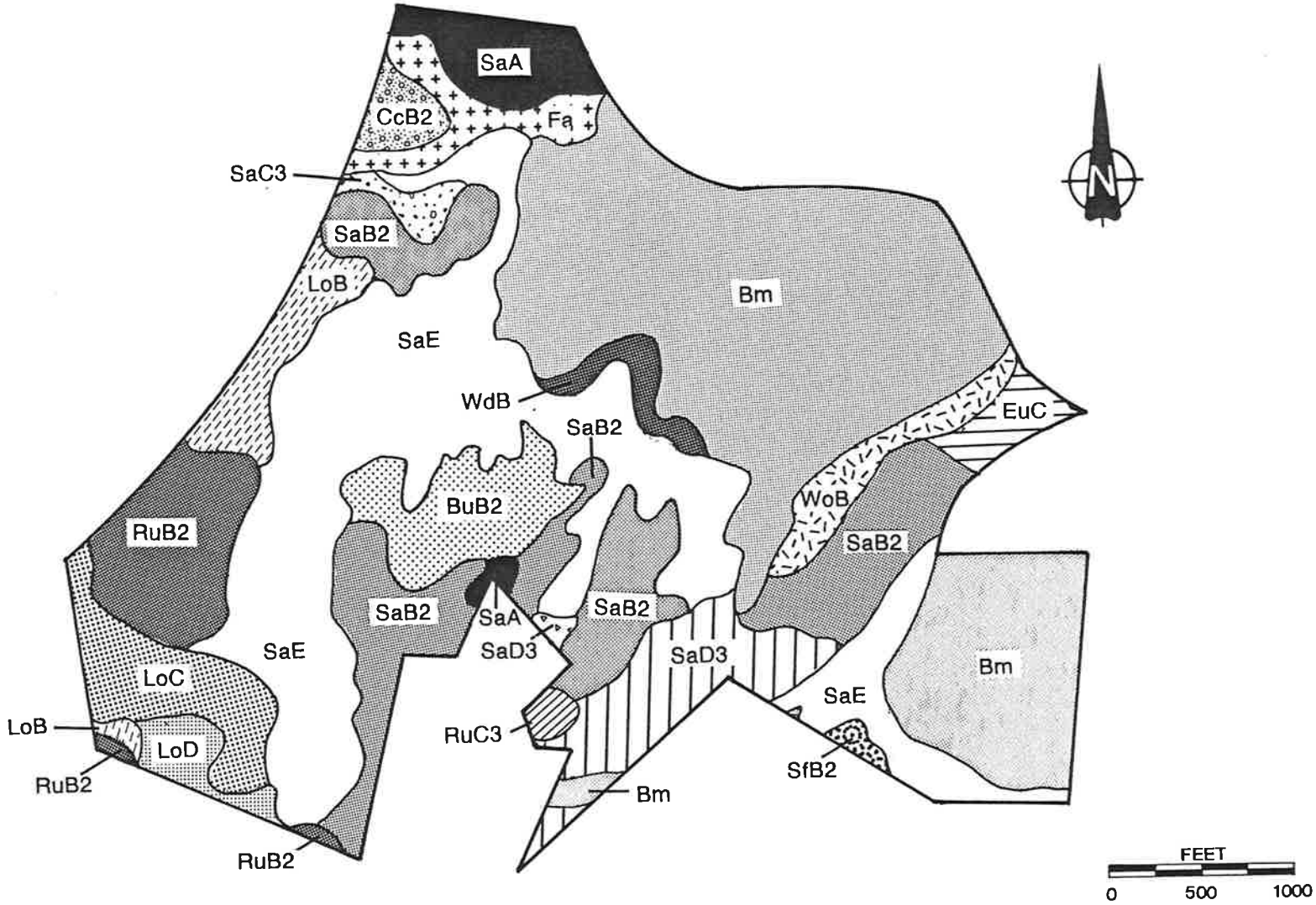

Figure 3. Soils on Chesapeake Terrace project site - soil symbols defined in Table 1.
(Source: Anne Arundel County Soil Survey, 1973)

TABLE 1 SOIL TYPES OF THE CHESAPEAKE TERRACE PROJECT SITE FROM THE ANNE ARUNDEL COUNTY SOIL SURVEY, 1973

Symbol	Soil Type	Slope	Capability Unit
Bm	Bibb silt loam	2-5%	IIIw-7
BuB2	Butlertown silt loam	2-5%	IIe-16
CcB2	Christiana silt loam	2-5%	IIe-42
EuC	Evesboro-Urban land complex	0-15%	--
Fa	Fallsington sandy loam		IIIw-6
LoB	Loamy and clayey land	0-5%	IIIe-3
LoC	Loamy and clayey land	5-10%	IVe-2
LoD	Loamy and clayey land	10-40%	VIe-2
RuB2	Rumford loamy sand	2-5%	IIs-4
SaA	Sassafras fine sandy loam	0-2%	I-5
SaB2	Sassafras fine sandy loam	2-5%	IIe-5
SaC3	Sassafras fine sandy loam	5-10%	IVe-5
SaD3	Sassafras fine sandy loam	10-15%	VIe-2
SaE	Sassafras fine sandy loam	15-40%	VIe-2
SfB2	Sassafras loam	2-5%	IIe-36
WdB	Woodstown sandy loam	2-5%	IIe-36
WoB	Woodstown loam	2-5%	IIe-16

Typically, most of these soils, with the exception of loamy and clayey land, have moderate to rapid infiltration rates. Loamy and clayey land is generally categorized as having a slow to moderate infiltration rate.

3.1.1 Non-Disturbed

Soils in the "non-disturbed" wetland areas were mapped (Anne Arundel County Soil Survey 1973) as Sassafras fine sandy loam with slopes ranging from 0 to 40 percent, Bibb silt loam with 2 to 5 percent slopes, Woodstown loam with 2 to 5 percent slopes, and Evesboro-Urban land complex with 0 to 15 percent slopes. Overall soil matrix colors in the non-disturbed wetland areas ranged from 10YR 3/2 to 10YR 7/1. Mottling in the soil was present at all non-disturbed wetland areas except 12N and 17N. The mottle colors ranged from 10YR 4/6 to 10YR 6/6. Significant gleying of the soils was also present in all non-disturbed wetland areas. In addition, most of the soils in the non-disturbed wetland areas displayed oxidized root rhizospheres. Soils in the uplands adjacent to the non-disturbed wetland areas were generally bright, sandy loams with an overall soil matrix color of 10YR 5/6.

3.1.2 Disturbed

Soils in the "disturbed" wetland areas were mapped as Bibb silt loam with 2 to 5 percent slopes, Sassafras sandy loams with 0 to 40 percent slopes, Rumford loamy sand with 2 to 5 percent slopes, and Butlertown silt loams with 2 to 5 percent slopes. In general, the areas identified as "disturbed" wetlands have undergone significant excavation of materials and/or filling and grading associated with reclamation efforts. Soils in these areas varied from tightly packed silty clays to sands underlain by clay. Due to the nature of soils in these disturbed areas, the determination of a wetland-upland interface line was based most often on the vegetative and hydrologic field indicators. It should be noted,

however, that overall soil matrix colors in the "disturbed" wetland areas ranged from what is typically considered bright upland at 10YR 6/6 to very definitely hydric at 5YR 5/1 and 10YR 4/2.

3.1.3 Problem/Question Areas

Soils in the "problem or questionable areas" were very similar to those of the disturbed areas. In some cases excavation and filling have left exposed clay or sand. Some of the exposed clay areas had surface waters traversing them in patterns determined primarily by the erosivity of the remaining substrate (i.e., no final grading or reclamation after cessation of mining activities).

3.2 HYDROLOGY

Hydrology on the study site had been significantly altered during past surface mining activities. Intermittent and perennial streambeds appeared to have been excavated to mine the underlying gravels and, in some cases, filled with sand and other soil materials or dammed to create ponds.

3.2.1 Non-Disturbed

Hydrology in the wetland areas categorized as "non-disturbed" ranged from surface water runoff and collection to intermittent streams and collection ponds. Some of the hydrologic indicators found include leaf staining, mud marks, debris dams, soil saturation, and standing water.

3.2.2 Disturbed

Hydrology in the wetland areas categorized as "disturbed" consisted primarily of surface water runoff channels and small ponds or puddles. Additional hydrologic indicators present in these "disturbed" areas included saturated soils, standing

water, and leaf staining. Some of the small ponded areas and puddles appeared to be caused by water collection in slowly permeable material crossed by heavy machinery (track ruts).

3.2.3 Problem/Questionable Areas

Hydrology was generally the most evident wetland characteristic in areas categorized as problematic or questionable. This wetland characteristic and evidence of channel erosion were identified in the largest open unvegetated area of the study site. However, due to a substantial rain event during the beginning of the field investigation, the sources of these hydrologic indicators were undetermined.

3.3 VEGETATION

Nineteen wetlands were delineated during the field survey. Eleven of these areas were described as disturbed, severely modified, or created by human activity. The remaining eight wetlands were in a relatively natural and more mature condition. Evidence of disturbance or modification to wetlands included abnormal clay substrates exposed from sand and gravel mining, road fills across wetlands, ditches, dikes, erosion channels, and sediment control ponds. Disturbed wetlands were generally in an early successional state of herbaceous species shrub/scrub, or young tree growth. Vegetation identified in the wetlands is listed by wetland in the ACOE Routine Wetland Determination Data Forms in Appendix A, and is also listed collectively in Table 2, including species identified in adjacent uplands.

Wooded wetlands included floodplain swamps, steeply sloped swales, and isolated bermed depressions. These wetlands were generally dominated by river birch and/or sweetgum. Other canopy species included red maple, sycamore, cottonwood, tulip poplar, beech, pin oak, white oak, willow oak, loblolly pine, and occasionally Virginia pine. Understory species included birch, ironwood, black

TABLE 2 VEGETATION IDENTIFIED AT THE CHESAPEAKE TERRACE PROPERTY, DECEMBER 1990

Scientific Name	Common Name	Hydrophytic Status[a]
TREES		
Acer rubrum	Red maple	FAC
Ailanthus altissima	Tree-of-heaven	FACU
Ablizzia julibrissan	Mimosa	UP*
Betula nigra	River birch	FACW
Caprinus caroliniana	Ironwood	FAC
Carya glabra	Pignut hickory	FACU
Fagus grandifolia	Beech	FACU
Ilex opaca	American holly	FACU
Juniperus virginiana	Eastern red cedar	FACU
Liquidambar styraciflua	Sweetgum	FAC
Liriodendron tulipfera	Tulip tree	FACU
Magnolia virginiana	Sweetbay magnolia	FACW
Pinus taeda	Loblolly pine	FAC
Pinus virginiana	Virginia pine	UP*
Platanus occidentalis	American sycamore	FACW
Populus deltoides	Eastern cottonwood	FAC
Prunus serotina	Black cherry	FACU
Quercus alba	White oak	FACU
Quercus falcata	Southern red oak	FACU
Quercus palustris	Pin oak	FACW
Quercus phellos	Willow oak	FAC
Quercus prinus	Chestnut oak	UP*
Quercus rubra	Northern red oak	FACU
Robinia pseudoacacia	Black locust	FACU
Salix caroliniana	Coastal plain willow	OBL
Salix nigra	Black willow	FACW

(a) Hydrophytic status follows Reed, P.B. Jr. (1988) The U.S. Fish and Wildlife National List of Plant Species that Occur in Wetlands unless indicated otherwise. Abbreviations:
OBL = Obligate (found in wetlands in more than 99% of all findings)
FACW = Faculative wetland (66-99%)
FAC = Faculative (33-66%)
FACU = Faculative upland (1-33%)
UP = Upland (<1%)

Note: *Hydrophytic status not reported; status presented is based on professional judgement and is supported by appropriate literature.

TABLE 2 (Cont.)

SHRUBS		
Alnus serrulata	Alder	OBL
Aralia spinosa	Hercules club	FAC
Aronia arbutifolia	Red chokeberry	FACW
Clethra alnifolia	Pepperbush	FAC
Euonymus americanus	Strawberry bush	FAC
Kalmia latifolia	Mountain laurel	FACU
Leucothoe racemosa	Fetter-bush	FACW
Pyrus coronaria	Crab apple	UP*
Rhus typhina	Staghorn sumac	UP*
Rosa multiflora	Multiflora rose	FACU
Rubus hispidus	Bristly blackberry	FACW
Rubus occidentalis	Black raspberry	UP*
Sambucus canadensis	American elder	FACW
Vaccinium corymbosum	Highbush blueberry	FACW
Vaccinium macrocarpon	Large cranberry	OBL
Vaccinium vacillans	Low blueberry	UP*
Viburnum dentatum	Arrow-wood	FAC
VINES		
Campsis radicans	Trumpet vine	FAC
Lonicera japonica	Japanese honeysuckle	FAC
Mitchella repens	Partridge-berry	FACU
Rhus radicans	Poison ivy	FAC
Smilax rotundifolia	Greenbrier	FAC
Vitis rotundifolia	Muscadine grape	FAC
FERNS AND FERN ALLIES		
Asplenium platyneuron	Ebony splennwort	FACU
Athyrium filix-femina	Lady fern	FAC
Athyrium thelypteroides	Silvery spleenwort	FAC
Botrychium dissectum	Cutleaf grapefern	FAC
Dryopteris spinulosa	Spinulose woodfern	FAC
Lycopodium fabelliforme	Ground cedar	FACU
Lycopodium obscurum	Tree clubmoss	FACU
Onoclea sensibilis	Sensitive fern	FACW
Osmunda cinnamomea	Cinnamon fern	FACW
Polystichum acrostichoides	Christmas fern	FACU
Pteridium aquilinum	Bracken fern	FACU
Sphagnum spp.	Peat moss	OBL

TABLE 2 (Cont.)

GRASSES, SEDGES, AND RUSHES

Agrostis perennans	Perennial Bentgrass	FACU
Andropogon virginicus	Broomsedge	FACU
Aristida oligantha	Prairie three-awn	UP*
Bromus japonicus	Japanese chess	FACU
Carex lurida	Lurid sedge	OBL
Carex crinita	Fringed sedge	OBL
Carex intumescens	Bladder sedge	FACW
Chasmanthium laxum	Slender spikegrass	FAC
Dactylis glomerata	Orchard grass	FACU
Dichanthelium clandestinum	Deer tongue witchgrass	FAC
Echinochloa crusgalli	Barnyard grass	FACU
Eleocharis obtusa	Blunt spikerush	OBL
Eleocharis tuberculosa	Long-tubercle spikerush	OBL
Elymus virginicus	Virginia wild-rye	FACW
Festuca pratensis	Meadow fescue	FACU
Fimbristylis autumnalis	Fimbristylis	FACW
Glyceria striata	Fowl mannagrass	OBL
Juncus effusus	Soft rush	FACW
Juncus tenuis	Slender rush	FAC
Juncus debilis		
Juncus scirpoides		
Leersia oryzoides	Rice cutgrass	OBL
Panicum virgatum	Switch grass	FAC
Phleum pratense	Timothy	FACU
Phragmites australis	Common reed	FACW
Scirpus cyperinus	Wool-grass	FACW
Scirpus purshianus	Alkali bulrush	OBL
Setaria glauca	Yellow bristle grass	FAC
Setaria italica	Foxtail	FACU
Sorghastrum nutans	Indian grass	UP*
Tridens flavus	Purple-top	FACU
Zizania aquatica	Annual wild rice	OBL

TABLE 2 (Cont.)

HERBS

Achillia millefolium	Yarrow	FACU
Allium vineale	Field garlic	FACU
Apocynum cannabinum	Indian hemp	FACU
Arctium minus	Burdock	UP*
Arisaema triphyllum	Jack-in-the-pulpit	FACW
Asclepias syriaca	Pink milkweed	UP*
Bidens polylepsis	Devil's-beggarticks	FACW
Cirsium vulgare	Thistle	FACU
Daucus carota	Queen Anne's Lace	UP*
Duchesnea indica	Indian mock-strawberry	FACU
Eupatorium fistulosus	Hollow joe-pye weed	FACW
Geum laciniatum	Rough avens	FAC
Hypericum mutilum	Dwarf St. Johns wort	FAC
Impatiens capensis	Spotted touch-me-not	FACW
Ludwigia alternifolia	Bushy seedbox	FACW
Lycopus americanus	American bugleweed	OBL
Oenothera biennis	Evening primrose	FACU
Phytolacca americana	Pokeweed	FACU
Plantago lanceolata	English plantain	UP*
Plantago rugelii	Black-seed plantain	FACU
Polygonum arifolium	Arrow-leaf tear thumb	OBL
Polygonum perfoliatum	Asian tearthumb	FAC
Potentilla simplex	Oldfield cinquefoil	FACU
Prunella vulgaris	Heal-all	FACU
Pycnanthemum flexuosum	Narrow-leaf mountain mint	FACW
Rumex crispus	Curly dock	FACU
Solanum carolinense	Horse nettle	UP*
Solidago spp.	Goldenrods	UNK
Spiranthes sp.	Ladies tresses	UNK
Taraxacum officionale	Dandelion	FACU
Typha latifolia	Broad-leaf cattail	OBL
Vernonia noveboracensis	New York ironweed	FACW
Xanthium strumarium	Rough cocklebur	FAC
Xyris caroliniana	Yellow-eyed grass	FACW

willow, sweetgum, maple, sweetbay, holly, and hercules club. Shrubs were dominated by arrow-wood and also included clethra, swamp dewberry, black raspberry, multiflora rose, highbush blueberry, elderberry, alder, strawberry bush, and chokeberry. Vines were often dense and were dominated by greenbrier and/or Japanese honeysuckle and also included muscadine grape, poison ivy, and partridge berry. Ground cover was often dominated by Japanese honeysuckle. Other herbaceous species included woolgrass, soft rush, fowl manna-grass, sphagnum moss, ferns, and ground pine.

Unforested wetlands were disturbed areas which included shrub-scrub, emergent and open water areas. Woolgrass and soft rush were the most common species found in these areas. Woody species included young birches, willows, maples, sweetgums, and sycamores. Shrub species included blackberry, sumac, elderberry, multiflora rose, alder, and highbush blueberry. Vines included trumpet vine, Japanese honeysuckle, and poison ivy. Herbaceous species were varied and numerous and included path rush, perennial bent grass, deer-tongue witchgrass, spike rush, switch grass, common reed, rice cutgrass, various sedges, field garlic, dwarf St. John's wort, seedbox, bugleweed, cattails, asters, goldenrods, beggars'-ticks, and Joe-pye weed.

The largest wetland system, located along the southern side of the largest mine area (5D), was a forested swamp and pond system modified by roads, ditches, and dikes. This wetland included several unique wetland associations, including a patch of cranberry, a man-made pond (with old beaver sign) dominated by rice cutgrass, and an approximately 800-ft-long roadside ditch dominated by woolgrass.

Another large wetland system was located along Patuxent Road (Route 170) and included three wooded floodplain wetlands (17N, 18D, and 19N) separated by roads and berms of old roads. These wetlands were codominated by loblolly pine and sweetgum and also included Virginia pine, river birch, red maple, willow oak, pin oak, cottonwood, holly, sycamore, and white oak. Shrubs and vines

included highbush blueberry, arrow-wood, clethra, elderberry, greenbrier, Japanese honeysuckle, poison ivy, and grape. Ground cover was dominated by soft rush and also included Japanese honeysuckle, seedbox, various sedges and rushes, sphagnum moss, spikegrass, bugleweed, deer-tongue witchgrass, goldenrod, and swamp dewberry. A similar floodplain wetland (1N) occurred along the northern edge of the largest open mine area. This wetland contained similar species, but with limited pine cover.

Five steeply sloped non-disturbed wooded swales (6N, 12N, 14N, 15N, 16N) were identified. These were dominated by sweetgum and/or river birch with limited understory, shrub layer, and ground cover. Other tree species included ironwood, cottonwood, holly, maple, and beech. Shrub, vine, and herbaceous species were similar to other wooded wetland areas described above, but were limited probably due to high energy storm events. Similar less steeply sloped, disturbed areas (4D, 7D, 8D) were dominated by younger birches and pine with marsh emergents as ground cover. Wetland area 4D, located in the western corner of the site, was dominated by birch and was associated with a ponded wetland at a road crossing. Species associated with the pond included woolgrass, cattails, soft rush, beggars'-ticks, and spike rush. The other two wetlands were located along roads.

Ponds and isolated wet areas occurring in the formerly mined areas included four wet depressions or ponds (2D, 3D, 10D, 11D) and two broad old field swales (9D, 13D). Sedges and rushes dominated ponds on exposed clay substrates. Old field swales contained a more diverse assemblage of species with saplings of woody species becoming established. Swales were dominated by phragmites and soft rush and also included asters, goldenrod, deer-tongue witchgrass, broomsedge, fescue, woolgrass, path rush, beggars'-ticks, cattails, seed box, and rice cutgrass.

4. SUMMARY

The project as proposed will require the filling of a total of approximately 9.83 acres of wetland. Of this area, approximately 7.72 acres have been characterized as disturbed wetlands and 2.11 acres have been characterized as non-disturbed wetlands. A large proportion (37 percent) of the disturbed wetlands appear to have resulted from the conversion of upland areas underlain by Sassafras soils following surface mining of sands and gravels. Non-disturbed wetlands are characterized as river birch and sweetgum dominated, with Virginia pine and miscellaneous Coastal Plain species comprising the community.

REFERENCES

Federal Manual for Identifying and Delineating Jurisdictional Wetlands. 1989. U.S. Department of Defense, U.S. Environmental Protection Agency, U.S. Department of Agriculture, and U.S. Fish and Wildlife Service. 10 January.

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U.S. Department of Agriculture. 1973. Soil Survey: Anne Arundel County, Maryland. Soil Conservation Service in cooperation with Maryland Agriculture Experiment Station.

APPENDIX A

ARMY CORPS OF ENGINEERS (ACOE) DATA SHEETS FOR WETLANDS

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Wetland + N

Field Investigator(s): EWM KLD, JHB Date: 12-4-98
Project/Site: Choc Terrace State: MD County: AA Co
Applicant/Owner: Plant Community Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ____ (If yes, explain on back) ?

VEGETATION see back

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Red maple	FAC	C	11. Polygonum arifolium	OBL	H
2. Sweetgum	FAC	C	12. Ludwigia alternifolia	FACW	H
3. Green brier	FAC	V	13. Vernonia noveboracensis	FACW	H
4. River birch	FACW	C	14. Carex lurida	OBL	H
5. Juncus effusus	FACW	H	15. ~~Juncus effusus~~	~~OBL~~	
6. Scirpus c. pedicellatus	FACW	H	16. Eupatorium fistulosum	FACW	H
7. ~~Boehmeria~~ Acanthelium Clandestinum		H	17. Carpinus caroliniana	FAC	C/Understory
8. Jap. honeysuckle	FAC	V	18. Liriodendron tulipifera	FACU	C
9. fowl manna grass	OBL	H	19.		
10. Viburnum dentatum	FAC	S	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale: ____

SOILS

Series/phase: SA E - Bm Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: 10YR 4/2, 5YR 5/8 Mottle Colors: some gray mottles 5YR 5/2 1/2
Other hydric soil indicators: some saturation
Is the hydric soil criterion met? Yes ✓ No ____ Bright 10" 10" + gleyed
Rationale: 10YR 3/2 silt sand or = (Flag IN7)

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: Dom FAC, FACW species

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Wetland areas: Coarse, Sat. Sand 5YR 5/8 (full core)
Adjacent uplands 10YR 5/4

12/4/90 Chesapeake Terrace Wetland N

- Redmaple ~~||||~~ |||
- Sweet gum ~~||||~~
- Ironwood |

- Tulip Poplar
  ||||

Shrublayer

- greenbrier
- Jap. honeysuckle
- Viburnum

grasses

- fowl mannagrass

Further into wetland

- Solidago sp.
- Panicum Dichanthelium Clan
- Joe pye
- Softrush
- New York ironweed
- Arrow leaved polg.
- Seedbox
- Carex sp.

AT Flag 1N10

Soils 10YR 5/1 mottles 10YR 4/6 Entire core tight silty very fine sand

2D

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): JAB/KD EWM Date: 12/4/90
Project/Site: OHIO TERRACE State: MD County: AA
Applicant/Owner: HALLEY Plant Community #/Name: 2D WETLAND
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back) excavated pond between woods (downgradient) and stripmined area
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back) all three - outfall riprap, inflow eroding strip mine

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Locust	FACU	shrub	11.		
2. Rubus occidentalis	UPL	shrub	12. open water -		
3. Thistle		herb	13.		
4.			14. Shallow pond -		
5. MOSTLY OPEN GROUND			15.		
6.			16. Sediment trap		
7. ON LITTORAL EDGE OF			17.		
8.			18.		
9. POND			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC < 50
Is the hydrophytic vegetation criterion met? Yes ____ No ✓
Rationale:

SOILS

Series/phase: Sandsilt Subgroup:[2] Sassafrass
Is the soil on the hydric soils list? Yes ____ No X Undetermined ____
Is the soil a Histosol? Yes ____ No X Histic epipedon present? Yes ____ No X
Is the soil: Mottled? Yes ____ No X Gleyed? Yes ____ No X
Matrix Color: 10YR 6/6 Mottle Colors: ____
Other hydric soil indicators: saturation - heavy rain preceded by dry spell
Is the hydric soil criterion met? Yes ____ No X
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ✓ No ____ Surface water depth: < 1' - 1'
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole: POND AREA
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: see reverse

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Pond in an area probably upland prior to strip mining. Appears to be created to function as a detrent trap - appears to be working well. Not dominated by plants - few present in water or littoral zone. Upland plants and soils immediately adjacent to pond littoral zone

Appendix B

Examples of Data Sheets

Wetland 3 D

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): [illegible] JHB, KLD Date: 12-4-90
Project/Site: [illegible] State: MD County: AA
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Matted sedge			11. Scirpus purshianus	OBL	H
2. Juncus sp.			12. Juncus debilis	OBL	H
3. Eleocharis sp. obtusa	OBL	H	13.		
4. Polygonum sp.	UNK	H	14.		
5. Scirpus cyperinus	FACW	H	15.		
6. Carex spida	OBL	H	16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale:

SOILS

Series/phase: SAE - SaB2 Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ✓ No ____
Matrix Color: 10YR 7/2 Mottle Colors:
Other hydric soil indicators: gleyed, saturated
Is the hydric soil criterion met? Yes ____ No ____
Rationale: gleyed clay layer at 12" Coarse sand

HYDROLOGY

Is the ground surface inundated? Yes ✓ No ____ Surface water depth: 2" to 1'
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: ponded

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Wetland 4D
Flags 1-25

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): FWM KLD HPL Date: 12-5-90
Project/Site: Ches. Terrace State: MD County: AA
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back) reclaimed area
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha Latifolia	OBL	H	11. Sweetgum	FAC	C
2. Panicum Verrutum	FAC	H	12. River Birch	FACW	C
3. Bidens polylepsis	FACW	H	13. Virginia pine	UP	C
4. Juncus effusus	FACW	H	14. Locust	FACU	C
5. Barnyard grass	FACU	H	15. Polygonum perfoliatum	FAC	H
6. Seed box	FACW	H	16.		
7. Woolgrass	FACW	H	17.		
8. Eleocharis obtusa	OBL	H	18.		
9. Juncus tenuis	FACU	H	19.		
10. Cottonwood	FAC	C	20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale:

SOILS

Series/phase: Runford loamy sand 2-5% IIs Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____
Matrix Color: 2.5Y 5/2 or 5Y 5/1 Mottle Colors: 7.5 YR 5/4
Other hydric soil indicators: White clay 2.5Y 8/1
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: Saturated, gleyed, mottled, inundated Some 10 R 5/6 also

HYDROLOGY

Is the ground surface inundated? Yes ✓ No ____ Surface water depth: 3"
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: Ponded

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

WETLAND 5I

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): ENM KLA JYL
Project/Site: Chassiennice Terrace — Date: 12-5-90
Applicant/Owner: — State: MD — County: NA
Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back) Bermed pond, excavated?

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Orchid, Spiranthes sp	UNK	H	11. Cranberry Parsy	OBL	H
2. Yellow eyed grass	OBL	H	12. juncus defusus	OBL	H
3. goldenrod	UNK	H	13. soft rush	FACW	H
4. River Birch	FACW	C	14. spatterdock	OBL	H
5. Virginia pine	UP	C	15. Pickerelweed	FACW	S
6. Red maple	FAC	C	16. cattail	OBL	
7. Sweet gum	FAC	C	17. Chokeberry	FACW	S
8. Cattail	OBL	H	18. Lonicera japonica	FAC	V
9. Rice cutgrass	OBL	H	19. bidens - devils beggarticks	FACW	H
10. Woolgrass	FACW	H	20. buttonweed	OBL	H

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: dominated by hydrophytes

SOILS

Series/phase: SaC - SaC3 — Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ____ No ____
Matrix Color: 10YR 6/4 — Mottle Colors:
Other hydric soil indicators: root rhizomes 2.5Y 5/1
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: Along ditch [illegible] evidence of ponding

HYDROLOGY

Is the ground surface inundated? Yes ____ No ____ Surface water depth: Pond [illegible] several feet deep
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: pond with inflow channel

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

NO H_2O – ? to swamp

Wetland N 6

Flag 7
1-19

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): EWM JAB APL Date: 12-6-90
Project/Site: Chesapeake Terrace State: MD County: AA
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ____ (If yes, explain on back) ?

VEGETATION

Dichanthelium clandestinum

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Panicum sp.	FAC	H	11. Sweetgum	FAC	C
2. Elderberry	FACW	S	12. Rubus spiculus	FACW	S
3. Goldenrod sp.	UNK	H	13. Greenbrier	FAC	V
4. River Birch	FACW	C	14. Multiflora rose	FAC	S
5. Black willow	FACW	C	15. Sycamore	FACW	C
6. Impatiens	FACW	C	16.		
7. Honeysuckle	FAC	V	17.		
8. Red Maple	FAC	C	18.		
9. Polygonum sp.	UNK	H	19.		
10. Pokeberry	FACW	H	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: dominated by hydrophytes

SOILS

SaC3

Series/phase: Sassafras sandy loam Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____
Matrix Color: 8-14" 10YR 3/2 Mottle Colors: 10YR 5/6
Other hydric soil indicators: root rhizomes, saturated
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: gleyed, saturated, clay

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.
stained vegetation in basin
Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: [illegible]

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Ponded in tire Ruts

7D

Flag 1-15

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): EWM JPC HPL Date: 12-5-90
Project/Site: Chesapeake Terrace State: MD County: AA
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back)

Irregular depressions with standing water evidence of vehicle traffic disturbing soil

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha latifolia	OBL	H	11.		
2. Soft rush	FACW	H	12.		
3. Woolgrass	FACW	H	13.		
4. Goldenrod	UNK	H	14.		
5. Rubus sp. occidentalis	UP	S	15.		
6. Aster sp.	UNK	H	16.		
7. Juncus sp. scirpoides	FACW	H	17.		
8. Black willow	FACW	C	18.		
9. Hawthorn			19. ← Pyrus Coronaria	UP	S
10. Meadow fescue	FACU	H	20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ✓ No
Rationale: Dominance of FACW plants

SOILS

IIc

Series/phase: Butlertown silt loam Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____ (in areas of standing water)
Matrix Color: 7.5 YR 6/6 Mottle Colors:
Other hydric soil indicators: concretions
Is the hydric soil criterion met? Yes ✓ No ✓ clayey silt
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ✓ No ____ Surface water depth: 3" Up to 2' deep in deeper hole
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Wetland - 8D
8-flags

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): EWM, APL
Project/Site: Chesapeake Terrace Date: 12-7-90
State: MD County: AA
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Woolgrass	FACW	H	11.		
2. Panicum sp. (Verrgatum?)	FACW	H	12.		
3. Rubus sp. hispidus	FACW	S	13.		
4. Goldenrod sp	UNK	H	14.		
5. Broomsedge	FACW	H	15.		
6. Virginia pine	UP	C	16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ✓ No
Rationale: Dominated by FACW species

SOILS

Series/phase: Sassafrass fine sandy loam - Butlertown Subgroup:[2] IIIe/IIe
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No gleyed mottles
Matrix Color: 10YR 6/1 Mottle Colors: 10YR 6/2 and 10YR 5/2
Other hydric soil indicators: Saturation
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: Soil is coarse sand from 6-10"

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth:
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

The depression of this wetland has been created by excavating activities which have removed soil/gravel and altered the hydrology.

No Ponding -

D9 - 9D-1 → 9D-
22 Flags

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): EWM, APL Date: 12-7-90
Project/Site: Chesapeake Terrace State: MD County: AA
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Phragmites	FACW	H	11:		
2. Goldenrod (2 sp.)	UNK	H	12.		
3. Black willow	FACW	C	13.		
4. Woolgrass	FACW	H	14.		
5. Bachelor buttons	UP	H	15.		
6. Meadow fescue	FACU	H	16.		
7. Rice cutgrass	OBL	H	17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale:

SOILS

15-40%

Series/phase: Sassafrass fine sandy loam Subgroup:[2] VIc
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ✓ * No ____ *Bottom has 10 YR 7/1 gley below
Matrix Color: 10 YR 5/6 Mottle Colors:
Other hydric soil indicators: Saturated silty clay
Is the hydric soil criterion met? Yes ____ No ____
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth:
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ____
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Ponded

rushes veg. for

10D-1 → 10D-6
10D

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL, EWM
Project/Site: Chesapeake Terrace
Date: 12/7/90
State: MD
County: AA
Applicant/Owner:
Plant Community #/Name:

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back) 4 wheel traffic through roadside ponding
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. woolgrass	FACW	H	11.		
2. juncus sp. debilis	OBL	H	12.		
3. softrush	FACW	H	13.		
4. bramblebush	FACU	H	14.		
5. goldenrod sp.	UNK	H	15.		
6. red maple	FAC	C	16.		
7. river birch	FACW	C	17.		
8. tree of heaven / mimosa	FACU	C	18.		
9. loblolly pine	FAC	C	19.		
10. mimosa	UP	C	20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale:

SOILS

clayey-sandy silt saturated

Series/phase: Butlertown silt loam 2-5% Subgroup:[2] IIe
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ____ No ✓
Matrix Color: 10 YR 6/6 Mottle Colors: 10YR 6/3
Other hydric soil indicators: saturated, ponding
Is the hydric soil criterion met? Yes ____ No ____
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ✓ No ____ Surface water depth: 1-6" small pond/puddle
Is the soil saturated? Yes ____ No ____
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

12/15 Ponded in tire ruts depressions

HD

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL, EWM Date: 12/7/90
Project/Site: Chesapeake Furnace State: Md County: AA
Applicant/Owner: Plant Community #/Name: Festus Lane
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No ✓ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. River birch	FACW	C	11. ~~Thyssanolepis fodiatum~~		
2. Woodgrass	FACW	H	12. St johns wort	FAC	H
3. ~~[illegible]~~ sp debilis	OBL	C	13. Hypericum mutilum		
4. Soft rush Juncus effusus	FACW	H	14.		
5. small aster or button bush	FACW	H	15. ← Bidens polylepsis		
6. black willow	FACW	C	16.		
7. red maple	FAC	C	17.		
8. arrowwood	FACW	H	18.		
9. panic grass	FAC	H	19. ← Dichanthelium clandestinum		
10. goldenrod sp	UNK	H	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale: ____

SAA - submerged aquatic automobile - removed 12/11/90

SOILS

Series/phase: Buttertown silt loam 2-5% Subgroup:[2] IIe
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____
Matrix Color: 10YR 6/4 Mottle Colors: 10YR 5/2
Other hydric soil indicators: root rizoids
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: Silty clay

HYDROLOGY

Is the ground surface inundated? Yes ✓ No ____ Surface water depth: undetermined
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

12N

12N-1 → 12N-24

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL EWM KD Date: 12/11/90
Project/Site: State: County: AA
Applicant/Owner: Plant Community #/Name: 12N
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ✓ No ____ (If yes, explain on back) by heavy runoff - erosion

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. wolfgrass	FACW	H	11. lady's tresses	UNK	H
2. wolfgrass - Glycerie	OBL	H	12. river birch	FACW	C
3. st johns wort, dwarf	FAC	H	13. red maple	FAC	C
4. fowl mannagrass	FAC	H	14. sweetgum	FAC	C
5. bottlemoss	FACW	H	15. highbush blueberry	FACW	S
6. moss sp	UNK	H	16.		
7. virginia	UP	C	17.		
8. poplar deltoides	FAC	C	18.		
9. devilwalking stick	FAC	S	19.		
10. goldenrod (sp)	UNK	H	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: dom wolfgrass, lady's tresses, birch trees

SOILS

Series/phase: Sassafras fine sandy loam Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ✓ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ✓ No ____ color 10YR 5/2
Matrix Color: 10YR 5/3 Mottle Colors: ____
Other hydric soil indicators: organic alluvial sand
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ____ No ____ in channel
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.
leaf litter, debris dams, active erosion
Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

13D

flag #s 13D1 → 13D-1

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL EWM KLD Date: 12/11/90
Project/Site: Chesapeake Terrace State: _____ County: AA
Applicant/Owner: _____ Plant Community #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No _____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes _____ No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. rubus - raspberry hispidus	FACW	S	11. pathrush	FACW	H
2. bidens polylepsis	FACW	H	12. cattail scirpoides	OBL	H
3. sweet gum	FAC	C	13. juncus spp	FACW	H
4. goldenrod sp	UNK	H	14. staghorn sumac	UP	S
5. river birch	FACW	C	15. lonicera japonica	FAC	V
6. devils beggar ticks	FACW	H	16. eastern cottonwood	FAC	C
7. soft rush juncus effusus	FACW	H	17. multiflora rose	FAC	S
8. deer tongue panicum clandestinum	FAC	H	18. sweet bay magnolia	FACW	Understory
9. pepper / salt bush / ludwigia	FACW	H	19. greenbrier	FAC	V
10. beaked sedge Rhynchospora sp	UNK	H	20. eleocharis obtusa dom. in puddle area	OBL	H

Percent of dominant species that are OBL, FACW, and/or FAC _____
Is the hydrophytic vegetation criterion met? Yes ✓ No _____
Rationale: _____

SOILS

Series/phase: Sassafras fine sandy loam 10-15% Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____ Aroms't typical
Is the soil: Mottled? Yes / No _____ Gleyed? Yes _____ No _____ 10YR 7/1
Matrix Color: 10 YR 7/2 Mottle Colors: 10 YR 6/8
Other hydric soil indicators: root zones
Is the hydric soil criterion met? Yes / No _____
Rationale: Easy conditions

HYDROLOGY

Is the ground surface inundated? Yes _____ No / Surface water depth: _____
Is the soil saturated? Yes _____ No /
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No _____
Rationale: ponding - most likely due to storm runoff

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

NO H2O

Va Pine

14N
14N-1 → 14N-6
14N-7 - 14N-

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL EWM KLD Date: 12/11/90
Project/Site: Meadowbrook Terrace State: County: AA
Applicant/Owner: Plant Community #/Name: 14 N
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. River birch	FACW	C	11. willow oak	FAC	C
2. Loblolly pine	UP	C	12. sweetgum	FAC	C
3. greenbrier smilax	FAC	V	13. sweetbay magnolia	FACW	Under-st.
4. carpinus caroliniana	FAC	C	14. laurel (cherry)	FACUP	S
5. eastern cottonwood	FAC	C	15.		
6. red maple	FAC	C	16.		
7. deciduous holly chile	FAC	S	17.		
8. highbush blueberry	FACW	S	18.		
9. blackberry Rubus hispidus	FACW	S	19.		
10. viburnum dentatum	FAC	S	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale: ____

SOILS

Series/phase: Sa D3 Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____ 10YR 7/1
Matrix Color: 10YR 6/2 Mottle Colors: 10YR 6/6
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes ____ No ____ Surface water depth: ____
Is the soil saturated? Yes ____ No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

15N

15N-1 → 15N-3 3A,B
→ 15N-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL, EWM, KLD
Project/Site: Chesapeake Terrace Date: 12/12/90
Applicant/Owner: State: Md County: AA
Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
* 1. smilax	FAC	V	11.		
* 2. sweetgum	FAC	C	12.		
* 3. redmaple	FAC	C	13.		
* 4. dew berry	FACW	S	14.		
5. viburnum / deta tum	FAC	S	15.		
6. cinnamon fern Osmunda	FACW		16.		
7. highbush blueberry	FACW	S	17.		
8. birch	FACW	C	18.		
9. poplar	FAC	C	19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale:

SOILS

Series/phase: Bm-SAE-SaB2 Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____
Matrix Color: 10YR 5-12" 5/1 12"+ 6/2 Mottle Colors: 10YR 5/6 - 5/8
other colors 2.5Y 6/4
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ____ No ____
Rationale:

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth:
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: below drain pipe - small bowled area

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

16N

16N-1 → 16N-16

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL, ENM KLS
Project/Site: Chesapeake terrace — Date: 12/12/90
Applicant/Owner: — State: Md — County: AA
Plant Community #/Name: 16N
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community? Yes ____ No ____ (If no, explain on back) — more or less – logging road crossing w/ pipe to transfer storm H2O
Has the vegetation, soils, and/or hydrology been significantly disturbed? Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lonicera japonica	FAC	V	11. chestnut oak	FACU	H
2. greenbrier	FAC	V	12. shield fern	FAC	H
3. swamp magnolia	FACW	Underst	13. elder berry	FACW	S
4. fowl manna grass	OBL	H	14. rubus occidentalis	UP	S
5. muscadine grape	FAC	V	15. Hercules club	FAC	S
6. pepper	FAC	C	16. lady fern	FAC	H
7. cinnamon fern	FACW	H	17. beech	FACU	C
8. carpinus caroliniana	FAC	Underst	18. moss	UNK	H
9. birch river	FACW	C	19. holly (in edge)	FACU	Underst.
10. red maple	FAC	C	20.		

glycaria

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale: ____

SOILS

Series/phase: BM-SAE-WbB — Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ✓ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____
Matrix Color: 10YR 6/1 0-6" — Mottle Colors: 10YR 5/6-5/8
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: ____

upland soils
10YR 5/6 in north ditch
10YR 5/4
0-6" 10YR 6/1
6-11" 10YR 4/1
11"+ sand 10YR 7/1

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: ____ ponding below under road culvert/drain

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

17N

17N-1 → 17N-23

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL, BWM, KLD
Project/Site: Chesapeake Terrace Date: 12/12/90
Applicant/Owner: State: Md County: AA
Plant Community #/Name: 17N
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. PIN OAK	FACW	C	11. bugleweed	OBL	H
2. willow oak	FAC	C	12. soft rush	FACW	H
3. white oak	FACU	C	13. goldenrod sp.	UNK	H
4. red maple	FAC	C	14. deer tongue	FAC	H
5. smilax	FAC	V	15. sphagnum	OBL	H
6. river birch	FACW	C	16. loblolly pine	C	
7. fowl manna grass	OBL	H	17. umbrella leaf	FAC	H
8. carex bebbii	OBL	H	18. highbush blueberry	FACW	S
9. clethra alnifolia	FAC	S	19. hirsute club	FAC	S
10. seed box ludwigia	FACW	H	20. viburnum dentatum	FAC	S

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: ____

SOILS

Series/phase: Bibb silt loam - Woodstown loam Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ✓ Undetermined ____
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ✓ No ____
Matrix Color: 10YR 5/1 - 6/1 Mottle Colors: ____
Other hydric soil indicators: root rhizomes
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: clayey-silt

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation. ____
Is the wetland hydrology criterion met? Yes ✓ No ____
Rationale: old road bed/trail burned by adjacent maintained road and next to prop. boundary

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

18D

DA 18N-1-18N.3 tied to end of McCarthy's white orange do

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL ENVM KLD
Project/Site: Chesapeake Travel
Date: 12/12/10
State: Md
County: AA
Applicant/Owner:
Plant Community #/Name: 18N

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

picked up flagging from white w/ orange polka dots of McCarthy - see note on map.

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. river birch	FACW	C	11. highbush blueberry	FACW	D
2. sweetgum	FAC	C	12. carex paniculata inflorescens	OBL	H
3. willows	FACW	H	13. soft rush	FACW	H
4. loblolly pine	FAC	C	14. blackwillow	FACW	C
5. virginia pin	UP	C	15. smilax	FAC	V
6. deer tongue witch grass	FAC	H	16. pin oak	FACW	C
7. sphagnum	OBL	H	17. sycamore	FACW	C
8. red maple	FAC	C	18. pullbrush	FAC	C
9. sycamore	FACW	C	19.		
10. elderberry	FAC	S	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale:

SOILS

Series/phase: Urban land Complex Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ✓ Undetermined ____
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ✓ No ____
Matrix Color: 10YR 5/1 to 8" 10YR 7/1 at 8" plus Mottle Colors:
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ✓ No ____
Rationale:

0-6" 10YR 7/2
6-8 10YR 7/1 w/ mt of 5/1
then redf clay

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: berming by road & man trap water.
Is the soil saturated? Yes 40% No 60% depends on soil sample site
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation. stained leaves
Is the wetland hydrology criterion met? Yes ____ No ____
Rationale:

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision:

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

19N

19N-1 → 19N-29

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): APL RLD CWM Date: 12/12/90
Project/Site: Chesapeake Water State: Md County: AA
Applicant/Owner: Plant Community Number: 19N
Note: If a more detailed site description is necessary, use the back of data form or a field notebook

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. juncus effusus	FACW	H	11. highbush blueberry	FACW	S
2. sweetgum	FAC	C	12. sycamore	FACW	C
3. red maple	FAC	C	13. pinoak	FACW	C
4. virginia pine	UP	C	14. sphagnum	OBL	H
5. rubus hispidus	FACW	S	15. black willow	FACW	C
6. dentatum lockhamas	FAC	H	16.		
7. cottonwood	FAC	C	17.		
8. cherry	FACU	C	18.		
9. greenbrier	FAC	V	19.		
10. moss	UNK	H	20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale: ____

SOILS

Series/phase: Woodstown loam - Evesboro Urban land Complex Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes 10YR3/3 No ____
Matrix Color: 10YR 5/3 - 5/1 Mottle Colors: 10YR 4/6
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: ____

0-2" organic A
2-5" sand and gravel w/ mottles 10YR 4/6
5-7" gley 10YR 5/2
7-8" gley coarse sand and gravel 10YR 5/1

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ✓ No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

REPLY TO
ATTENTION OF

Operations Division

MAY 2 3 2008

Mr. Warren E. Halle
National Waste Manager, Inc.
c/o McCarthy & Associates, Inc.
Attn: Mr. Milt McCarthy
14458 Old Mill Road, Suite 201
Upper Marlboro, Maryland 20772

Dear Mr. McCarthy:

This is in reference to your request for re-authorization of your Department of the Army(DA) permit, **NAB-1991-01204-M18 (CHESAPEAKE TERRACE)** dated March 18, 1993. Enclosed is an initial proffered permit and an approved jurisdictional determination.

You are requested to indicate your acceptance of the terms and conditions set forth in the enclosed permit by placing your signature and the date on the permit where indicated. Please note that on March 28, 2000, the final rule was established for an administrative appeal process for the Regulatory Program of the Corps of Engineers for approved jurisdictional determinations (JD), permit denials, and declined individual permits. Enclosed you will find a Notification of Administrative Appeal Options and Process (NAO/NAP) fact sheet and Request for Appeal (RFA) form. You may accept or object to this initial proffered permit.

To accept this initial proffered permit and the approved jurisdictional determination associated with this permit, you may sign the permit document and return the signed and dated permit to this office with the required fee noted below for final authorization. A self-addressed, franked envelope is enclosed for this purpose. **You are also requested to submit a check or money order in the amount of $100.00 made payable to the Finance and Accounting Officer, U.S. Army Engineer District, Baltimore (FAO, USAED, Baltimore)**. Please write your application number, as shown in the first paragraph of this letter, and name on your remittance and mailing envelope. Your signature on this permit means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and the approved JD associated with this permit.

Upon receipt of the signed permit and fee, the permit will be validated with the appropriate District signature and returned to you. Failure to submit a copy of the signed permit and fee, if required, and initiating the work before receiving the validated permit from the District, could result in Federal enforcement proceedings. You are also advised that you are responsible for obtaining all other required state and/or local authorizations before starting construction on any of the work approved by this DA permit.

To object to the permit because of certain terms and conditions therein, a letter outlining your objections to this initial proffered permit, including any additional information to clarify your objections, must be received by our District Engineer at the address below within 60 days of the date of this letter, or you will forfeit your right to appeal the permit in the future. The letter must be mailed to the following address:

Commander, Baltimore District
U.S. Army Corps of Engineers
Attn: CENAB-OP-R
P.O. Box 1715
Baltimore, Maryland 21203-1715

Please note that if you decline this initial proffered individual permit, you do not have a valid permit to conduct regulated activities in waters of the United States, and must not begin construction of the work requiring a Corps permit unless and until you receive and accept a valid Corps permit.

If we do not receive the signed permit with the fee, if required, or a letter indicating your objections to the DA permit within 60 days of the date of this letter, we will assume you are no longer interested in the project and we will withdraw your application. The original application and plans will be returned to you and, if at a later date, you want to pursue the project again, you may resubmit your application. A copy of this letter is also being forwarded to Maryland Department of the Environment for informational purposes.

This letter also contains an approved jurisdictional determination. Those areas indicated as waters of the United States, including jurisdictional wetlands shown within the "Area of Review" on the enclosed drawing dated 26 June 1989 are regulated by this office pursuant to Section 10 of the River and Harbor Act of 1899 and/or Section 404 of the Clean Water Act. Enclosed is an Approved Jurisdictional Determination form that outlines the basis of our determination of jurisdiction over the "Area of Review" noted above. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR 331. If you request to appeal this determination, you must submit a completed RFA form to the North Atlantic Division Office at the following address:

Regulatory Appeals Review Officer
North Atlantic Division
U.S. Army Corps of Engineers
Fort Hamilton Military Community
General Lee Avenue, Building 301
Brooklyn, NY 11252-6700

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address within 60 days of the date of this letter.

It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

This approved jurisdictional determination associated with this permit is valid for five years from the date of this letter or until the Corps permit expiration date, whichever is less, unless new information warrants a revision before the expiration date, or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

Enclosed is a compliance self-certification form. Upon completion of the authorized work and required mitigation, you are required to complete the enclosed compliance certification form and return it to the address indicated thereon.

If you have any questions concerning this matter, please call Mr. Richard Kibby of this office at 410-962-0694.

Sincerely,

Vance G. Hobbs
Chief, Maryland Section Northern

Enclosures

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): MAY 2 3 2008

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Baltimore; CHESAPEAKE TERRACE (NAB-1991-01204-M18)

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State:MD County/parish/borough: Anne Arundel City: Odenton
Center coordinates of site (lat/long in degree decimal format): Lat. 39.125° N, Long. 76.725° W.
Universal Transverse Mercator:
Name of nearest waterbody: Little Patuxent River
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Little Patuxent River
Name of watershed or Hydrologic Unit Code (HUC): 02060004
- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
- ☐ Office (Desk) Determination. Date:
- ☒ Field Determination. Date(s): May 1, 2008

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There Pick List *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There Pick List *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☐ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☒ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: .1/2 acres.

   c. **Limits (boundaries) of jurisdiction** based on: Pick List
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: .

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW:

   Summarize rationale supporting determination:

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) **General Area Conditions:**
   Watershed size: Pick List
   Drainage area: Pick List
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) **Physical Characteristics:**
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through Pick List tributaries before entering TNW.

   Project waters are Pick List river miles from TNW.
   Project waters are Pick List river miles from RPW.
   Project waters are Pick List aerial (straight) miles from TNW.
   Project waters are Pick List aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]:
   Tributary stream order, if known:

---

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☐ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☐ Cobbles
- ☐ Bedrock
- ☐ Other. Explain: .
- ☐ Sands
- ☐ Gravel
- ☐ Vegetation. Type/% cover:
- ☐ Concrete
- ☐ Muck

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☐ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ☐ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☐ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

---

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: McCarthy & Associates.
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☒ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☐ U.S. Geological Survey map(s). Cite scale & quad name: .
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ☐ National wetlands inventory map(s). Cite name: .
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- ☐ Photographs: ☐ Aerial (Name & Date): .
  - or ☐ Other (Name & Date): .
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

This notice of authorization must be conspicuously displayed at the site of work.

United States Army Corps of Engineers
Baltimore District

MAR 18 1993
19

A permit to construct a rubble landfill by filling and grading 5.0 acres of non-tidal wetlands.

xat In non-tidal wetlands adjacent to the floodplain of the Little Patuxent River, Odenton, Anne Arundel County, Maryland.

has been issued to Mr. Warren Halle National Waste Managers, Inc. on MAR 18 1993

Address of Permittee 2900 Linden Lane, Ste 300, Silver Spring, MD 20910

Permit Number

CENAB-OP-RW(Chesapeake Terrace)91-1204-3

DONALD W. ROESEKE
Ch, Regulatory Branch

for the *District Engineer*

ENG FORM 4336, Jul 81 (ER 1145-2-303) EDITION OF JUL 70 MAY BE USED (Proponent: DAEN-CWO)

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

REPLY TO
ATTENTION OF
Operations Division

MAR 18 1993

Subject: CENAB-OP-RW(Chesapeake Terrace)91-1204-3

Mr. Warren Halle
National Waste Managers, Inc.
2900 Linden Lane, Suite 300
Silver Spring, Maryland 20910

Dear Mr. Halle:

I am replying to your application for a Department of the Army permit. Enclosed is the original and one copy of permit form NAB-FC-1000.

You are requested to indicate your acceptance of the terms and conditions set forth in the enclosed permit by placing your signature and the date on the permit where indicated. Upon your acceptance of the terms and conditions and your return of a copy of the original permit signed by you to the Baltimore District, you are authorized to proceed with the construction indicated therein. Failure to submit a copy of the signed permit before initiating the work could result in Federal enforcement proceedings.

A self-addressed, franked envelope is enclosed for this purpose. Also, enclosed is your NOTICE OF AUTHORIZATION, ENG FORM 4336, which must be conspicuously displayed at the site of work prior to commencement of construction.

If you have any questions concerning this matter, please call Mr. Steve Harman of this office at (410)962-4253.

Sincerely,

Donald W. Roeseke
Chief, Regulatory Branch

Enclosure

Copy Furnished:

NOAA, Norfolk and Rockville
DOI, Annapolis
NMFS, Oxford
EPA, Philadelphia
CENAB-OP-R

Chesapeake Terrace Plant

DEPARTMENT OF THE ARMY PERMIT

Application Name and Permit Number: CENAB-OP-RW(Chesapeake Terrace)91-1204-3

Issuing Office:

U.S. Army Engineer District, Baltimore
Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

To construct a rubble landfill by filling and grading 5.00 acres of non-tidal wetlands. All work is to be completed in accordance with the enclosed plan(s).

Project Location:

In non-tidal wetlands adjacent to the floodplain of the Little Patuxent River, Odenton, Anne Arundel County, Maryland.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2000. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned Water Quality Certification has been issued for your project, you must comply with conditions specified in the Certification as special conditions to this permit. For your convenience, a copy of the Certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall successfully create 3.22 acres of emergent non-tidal wetlands and 3.56 acres of forested non-tidal wetlands in accordance with the enclosed mitigation concept plan prepared by J.A. Chisholm, Inc., and McCarthy and Associates, Inc., dated October, 1992. An executed performance bond in the format of the enclosed approved draft shall be submitted to this office by June 30, 1993, to insure the successful creation of the above described wetland creation work. The performance bond in the amount of $174,660.60 shall cover the cost of the grading work, planting work, environmental consultant design, supervision and monitoring work, and any required re-grading or re-planting work.

2. The wetland project shall be either performed or supervised by an environmental consultant with documented success in wetland creation, and in accordance with final grading and planting plans submitted to this office by June 30, 1993, and approved by the Corps prior to commencement of any of the authorized work in Waters of the United States, including jurisdictional wetlands. Final mitigation plans shall be prepared and submitted in accordance with the enclosed "Compensatory Mitigation, SUBJECT: Required Information for Site Development Plan." A schedule of the grading and planting activities shall be provided by June 30, 1993 to the Corps for approval.

3. The environmental consultant shall monitor the groundwater hydrology of the site for at least one growing season prior to and three growing seasons after completion of the grading of the mitigation area to the elevation of the two year floodplain of the Little Patuxent River (elevation 62.0'). If the consultant documents that the groundwater level is different from this elevation, the mitigation area, with the prior approval of the Corps, shall be either regraded or backfilled to the documented groundwater elevation. The site shall then be covered with a 12 to 18 inch layer planting substrate material comprised of topsoil and rootmat from on-site and Leaf Pro and Com Pro soil amendments from off-site. This substrate must be saturated to the surface or there must be water on the surface or a combination of surface water and saturated soils for at least 5% of the growing season.

4. The approved environmental consultant shall survey the wetland creation site prior to any planting to insure the elevations of the existing wetland or newly graded surfaces are correct for successful growth of the wetland plants selected. All fill materials must be clean, free of contaminates, and suitable for growth and establishment of wetland plants. Should settlement of the fill materials occur after planting, resulting in too low an elevation for wetland establishment, the elevation shall be corrected and the area shall be replanted.

5. The emergent mitigation site shall be seeded with plant species seeds indicated on the approved mitigation concept plan. Natural colonization in the emergent wetland area by herbaceous wetland species shall be allowed to proceed. The performance standard that shall be met is as follows:

a. Second Growing Season -- Achieve 45% areal cover of emergent wetland species (herbaceous) at a minimum density of 43,560 living stems per acre, consisting of a minimum of three (3) wetland species.

b. Third Growing Season -- Achieve 70% areal cover of emergent wetland species (herbaceous) at a minimum density of 43,560 living stems per acre, consisting of a minimum of three (3) wetland species. No individual wetlands species shall comprise more than 40% of the 70% areal cover achieved.

c. Fifth Growing Season -- Achieve 85% areal cover of emergent wetland species (herbaceous) at a minimum density of 43,560 living stems per acre, consisting of a minimum of three (3) wetland species. No individual wetland species shall comprise more than 50% of the 85% areal cover achieved.

6. The forested wetlands with the scrub-shrub understory shall be planted with species specified on the approved mitigation concept plan. The following performance standards shall be met:

a. Scrub-Shrub Plantings:

1. Second Growing Season -- Achieve a minimum density of 435 living planted and naturally regenerated wetland shrubs per acre and 85% survivability of the planted individuals. (Note: Nursery tags may be used to identify planted individuals.)

2. Third Growing Season -- Achieve a minimum density of 534 living planted and naturally regenerated wetland shrubs per acre and 75% survivability of planted individuals. (Note: The survivability measurement will account for replacement plantings that occurred after the second growing season. No individual wetland shrub species shall comprise more than 70% of the total density achieved.)

3. Fifth Growing Season -- Achieve a minimum density of 600 living planted and naturally regenerated wetland shrubs per acre and 70% survivability of planted individuals. (Note: The survivability measurement will account for replacement plantings that occurred after the second growing season. No individual wetland shrub species shall comprise more than 70% of the total density achieved.)

b. Tree Plantings:

1. Second Growing Season -- Achieve a minimum density of 538 living planted and naturally regenerated wetland trees and shrubs per acre and 85% survivability of the planted individuals. (Note: Nursery tags may be used to identify planted individuals).

2. Third Growing Season -- Achieve a minimum density of 538 living planted and naturally regenerated wetland trees and shrubs per acre and 75% survivability of planted individuals. (Note: The survivability measurement will account for replacement plantings that occurred after the second growing season. No individual wetland tree or shrub species shall comprise more than 50% of the total density achieved).

3. Fifth Growing Season -- Achieve a minimum density of 600 living planted and naturally regenerated wetland trees and shrubs per acre and 70% survivability of planted individuals. (Note: The survivability measurement will account for replacement plantings that occurred after the second growing season. No individual wetland tree or shrub species shall comprise more than 50% of the total density achieved).

7. The environmental consultant shall monitor the mitigation site for a 10-year period after completion of the planting and seeding work. The monitoring shall occur on a bi-annual basis for a period of three years, annual monitoring for an additional three years, and annual monitoring for year 7 and 10 after the wetland creation is complete. The monitoring reports submitted to the Corps shall include the names and companies of all participants, field data sheets, detailed plant community structure analysis (including quantitative monitoring data in accordance with the performance standards), and photographic documentation. An as-built plan and photographs shall be submitted to the Corps within 30 days following the required monitoring, including topography/contours, planting locations and photo locations based upon surveys and measurements on the site.

8. All seeds and plants shall be obtained from sources genetically adapted to saturated conditions or having been propagated and grown in saturated conditions.

9. The permittee will construct gate(s) or use other restrictive measures to limit unauthorized vehicular access into the mitigation site.

10. That all earthwork operations shall be carried out in a manner as to minimize erosion of the material into wetlands or waterways.

11. That upon completion of earthwork operations, all fills and other areas disturbed during construction shall be seeded, riprapped, or given some other type of protection for subsequent soil erosion.

12. That the permittee shall employ measures during construction to prevent spills of fuels or lubricants. If a spill occurs, it shall be controlled to prevent its entry into the waterway.

13. The approved Conservation Easements (enclosed), shall be recorded with the Land Records of Anne Arundel County in accordance with the terms set forth in the easements and a copy of the executed easements sent to this office. The provisions of these easements are considered to be covenants running with and binding to the property containing the wetland mitigation site and the remaining undisturbed Waters of the United States, including jurisdictional wetlands on the property (Boundary Plat Herbert Plummer property). The recordation of the Conservation Easements shall be concluded within 30 days of the date of this permit and prior to any further conveyance of any part or parcel of this property. The permittee shall refer to the Conservation Easements in each transfer or conveyance of any part of parcel of the property that contains the mitigation site or Waters of the United States, including jurisdictional wetlands included in the easement.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 404 of the Clean Water Act (33 U.S.C.1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law or to comply with the appropriate local critical area regulations.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

_____ _____

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Issued for and in behalf of
Colonel J. Richard Capka
District Engineer

Donald W. Roeseke 18 Mar 93
Donald W. Roeseke Date
Chief, Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____
TRANSFEREE DATE

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

RECEIVED
JUL 19 1993

REPLY TO
ATTENTION OF

JUL 14 1993

Operations Division

Subject: CENAB-OP-RW(Chesapeake Terrace)91-1204-3

Mr. J. A. Chisholm
The Halle Companies
2900 Linden Lane
Suite 300
Silver Spring, Maryland 20910

Dear Mr. Chisholm:

I am replying to your letter dated June 23, 1993, concerning the conservation easement, performance bond, and mitigation plans submitted in accordance with the conditions of the above referenced Department of the Army permit issued March 18, 1993.

The performance bond and easement will be retained in our files. You are reminded that the easement must be recorded in the Land Records Office of Anne Arundel County.

Our review of the final mitigation plan is satisfactory. However, in accordance with special condition #2, a schedule of the grading and planting work was required to be submitted by June 30, 1993. Please prepare a calendar schedule of the proposed wetland grading and planting work for our review. Special condition #2 also requires that the wetland creation work be completed prior to commencement of any wetland or other waters of the United States.

If you have any questions, please call Mr. Steven Harman of this office at (410)962-4253.

Sincerely,

for Linda A. Morrison
Chief, Western Shore Permits Section

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
ATTN: REGULATORY BRANCH
2 HOPKINS PLAZA
BALTIMORE, MD 21201

January 3, 2019

Operations Division

National Waste Manager, Inc.
Attn: Mr. Warren E. Halle
2900 Linden Lane, Suite #6
Silver Spring, Maryland 20910

Dear Mr. Halle:

This is in reference to your request for an extension of time to the Department of the Army Permit, **CENAB-OP-RMN (CHESAPEAKE TERRACE RUBBLE LANDFILL) 1991-01204-M18**. The property is located adjacent to the Little Patuxent River on Patuxent Road, Odenton, Anne Arundel County, Maryland.

As there have been no significant changes in the attendant circumstances since authorization was granted, the District has determined that it is not contrary to the public interest to grant an extension of time. Accordingly, the time limit for completing the work authorized ends on December 31, 2023. Please note, no additional extensions for the proposed work will be granted by this office.

All conditions of the original permit remain in effect. You may proceed with the construction indicated therein, provided you have obtained all other required state and/or local authorizations.

If you have any questions concerning this matter, please call Mr. Richard Kibby of this office at (410)962-0694.

By Authority of the Secretary of the Army:

Issued for and in Behalf of

John T. Litz, PMP
Colonel, U.S. Army
Commander and District Engineer

DAVIA.JOSEPH.P.1229279170

Digitally signed by DAVIA.JOSEPH.P.1229279170
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAVIA.JOSEPH.P.1229279170
Date: 2019.01.03 11:23:08 -05'00'

Joseph P. DaVia
Chief, Maryland Section Northern

Enclosure

Cc: (via e-mail) Mr. Milt McCarthy, Bay Environmental, Inc. <info@bayenvinc.com>

To identify how we can better serve you, we need your help. Please take the time to fill out our new customer service survey at:
http://www.nab.usace.army.mil/Wetlands%20Permits/survey.htm

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

REPLY TO
ATTENTION OF

MAY 2 0 2013

Operations Division

Mr. Warren E, Halle
National Waste Manager, Inc.
c/o McCarthy & Associates, Inc.
Mr. Milt McCarthy
14458 Old Mill Road, Suite 201
Upper Marlboro, Maryland 20772

Dear Mr. Halle:

This is in reference to your letter dated January 30, 2013, requesting an extension of time for Department of the Army permit, **CENAB-OP-RMN (CHESAPEAKE TERRACE) 1991-01204-M18** issued on May 23, 2008. The property is located adjacent to the Little Patuxent River on Patuxent Road, Odenton, Anne Arundel County, Maryland.

As there have been no significant changes in the attendant circumstances since authorization was granted, the District has determined that it is not contrary to the public interest to grant an extension of time. Accordingly, general condition (1) of the permit is revised to read as follows:

"The time limit for completing the work authorized ends on December 31, 2018. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached."

All other conditions of the original permit remain in effect. All required State and local authorizations must be secured prior to commencement of construction. A copy of this letter is being forwarded to Mr. Milt McCarthy with McCarthy & Associates, Inc. for informational purposes.

If you have any questions concerning this matter, please call Mr. Richard Kibby, of this office, at (410) 962-0694.

By Authority of the Secretary of the Army:

Joseph P. DaVia
Chief, Maryland Section Northern

Issued For and in Behalf of
J. Richard Jordan, III
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

DEPARTMENT OF THE ARMY PERMIT

Application Name and Permit Number: **CENAB-1991-01204-M18(CHESAPEAKE TERRACE)**

Issuing Office:

U.S. Army Engineer District, Baltimore
Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The applicant, Mr. Warren Halle of National Waste Managers, Inc., proposes to construct a rubble landfill on approximately 215 acres of the 460 acre tract of land. The creation of the rubble landfill will result in the discharge of fill material into approximately 3.66 acres of wetlands. Previous proposals would have resulted in the filling of 9.83 acres of WUS. Changes in project design and a more accurate delineation in the limits of WUS have resulted in a reduction of 6.17 acres of impacts to WUS. This is a reduction of nearly 63% of the original area of WUS proposed for impact. The rubble land-fill will accept large, bulky, non-toxic items such as residential and industrial construction debris.

Project Location: Town of Odenton
Patuxent Road
Fourth Tax Assessment District
Anne Arundel County, Maryland
N 39° 02' 32"/W 76° 44' 07"

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2013. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

7. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

The U.S. Code of Federal Regulations, Title 33, Subpart 64 states that all structures erected in navigable waters require obstruction lights unless the applicant is advised to the contrary by the Coast Guard District Commander. If the structures authorized by this permit are to be built in navigable waters, then you must contact the Commander (oan), Fifth Coast Guard District, 431 Crawford Street, Portsmouth, Virginia, 23704, to ascertain the need for obstruction lights.

Special Conditions:

1. All activities must be accomplished in accordance with special conditions and best management practices associated with the original Department of the Army permit dated March 18, 1993.

2. Prior to the start of construction, the permittee shall identify and demarcate with high visibility fencing or super-silt fence all waters of the U.S. not authorized to be filled and immediately adjacent to construction, staging, and access areas. Super silt fence or its equivalent will be used in and along streams and wetlands.

3. Construction staging areas will be located in upland areas and shall not impact waters of the U.S., including jurisdictional wetlands.

4. No construction material, excavated or dredged material shall be stockpiled in or stored in a manner that would affect waters of the U.S. including jurisdictional wetlands unless authorized by this permit.

5. All construction work is to be conducted in the dry. Construction activity, equipment and or machinery shall not impact waters of the U.S. including jurisdictional wetlands beyond the limit of disturbance as shown on the construction plans.

6. Wetlands and waters of the U.S. shall not be used as access ways to the construction site by construction vehicles or equipment unless authorized by this permit and indicated on the construction plans.

7. The permittee shall employ measures during construction to prevent spills of fuels or lubricants, etc. If a spill occurs, it will be controlled to prevent its entry into wetlands and /or waterways.

8. The permittee will construct gates or use other restrictive measures to limit unauthorized vehicular access into the mitigation site.

9. The environmental consultant shall install groundwater wells prior to excavation and after completion of the mitigation site.

10. Best management practices shall be employed to minimize temporary impacts to wetlands and waterways. Temporary disturbance to wetlands and waterways will be restored to preconstruction conditions. Should it be determined that any of the temporarily disturbed wetlands are no longer jurisdictional due to changed vegetation or hydrology, mitigation will be assessed for the additional impacts.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law or to comply with the appropriate local critical area regulations.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be

required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

May 29, 2008

(PERMITTEE) (DATE)

STEPHEN N. FLEISCHMAN
VICE PRESIDENT

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Issued for and in behalf of Colonel Peter W. Mueller

Vance G. Hobbs Date
Chief, Maryland Section Northern
Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

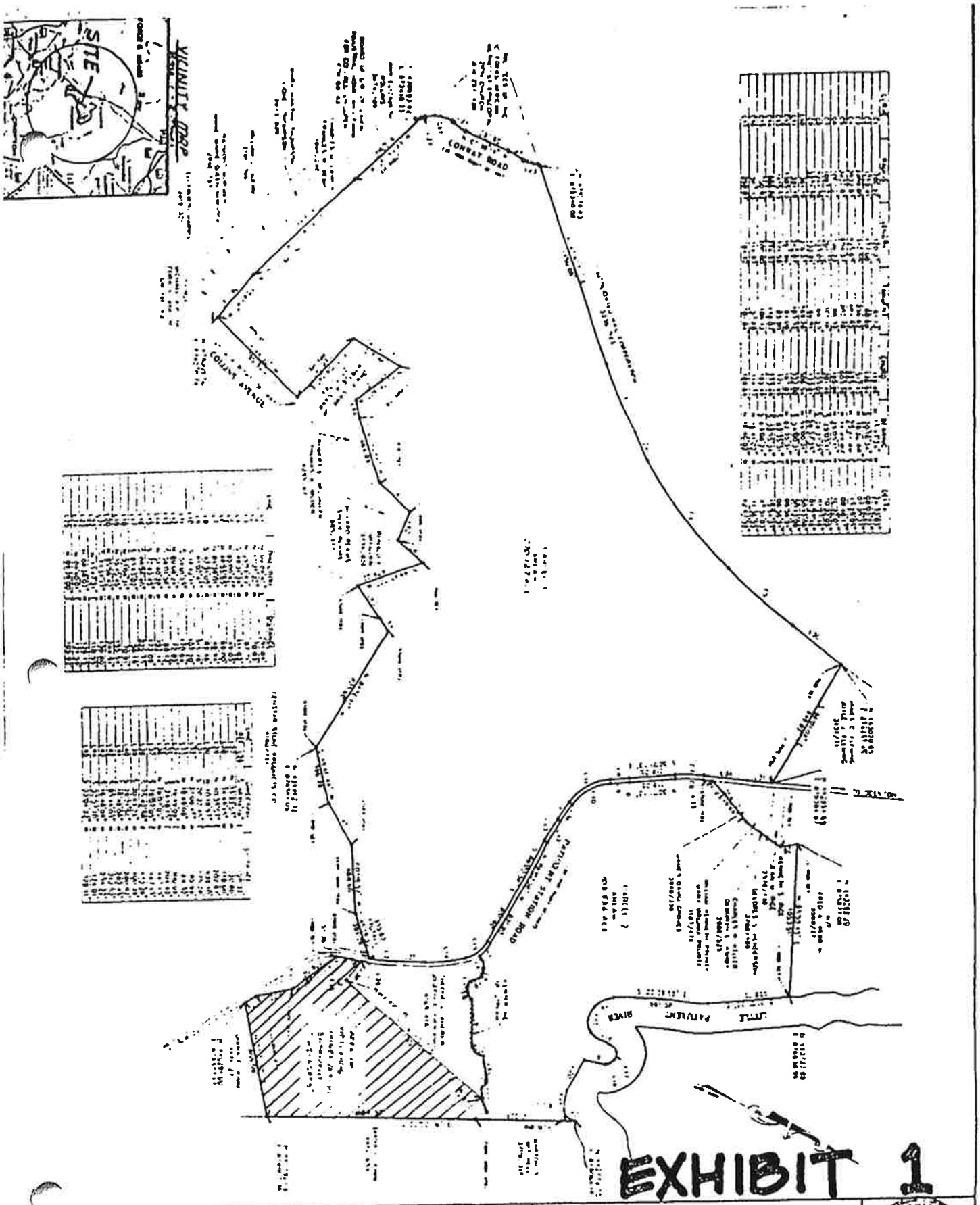


EXHIBIT 1

THE LANDS OF
CHESAPEAKE TERRACE INC

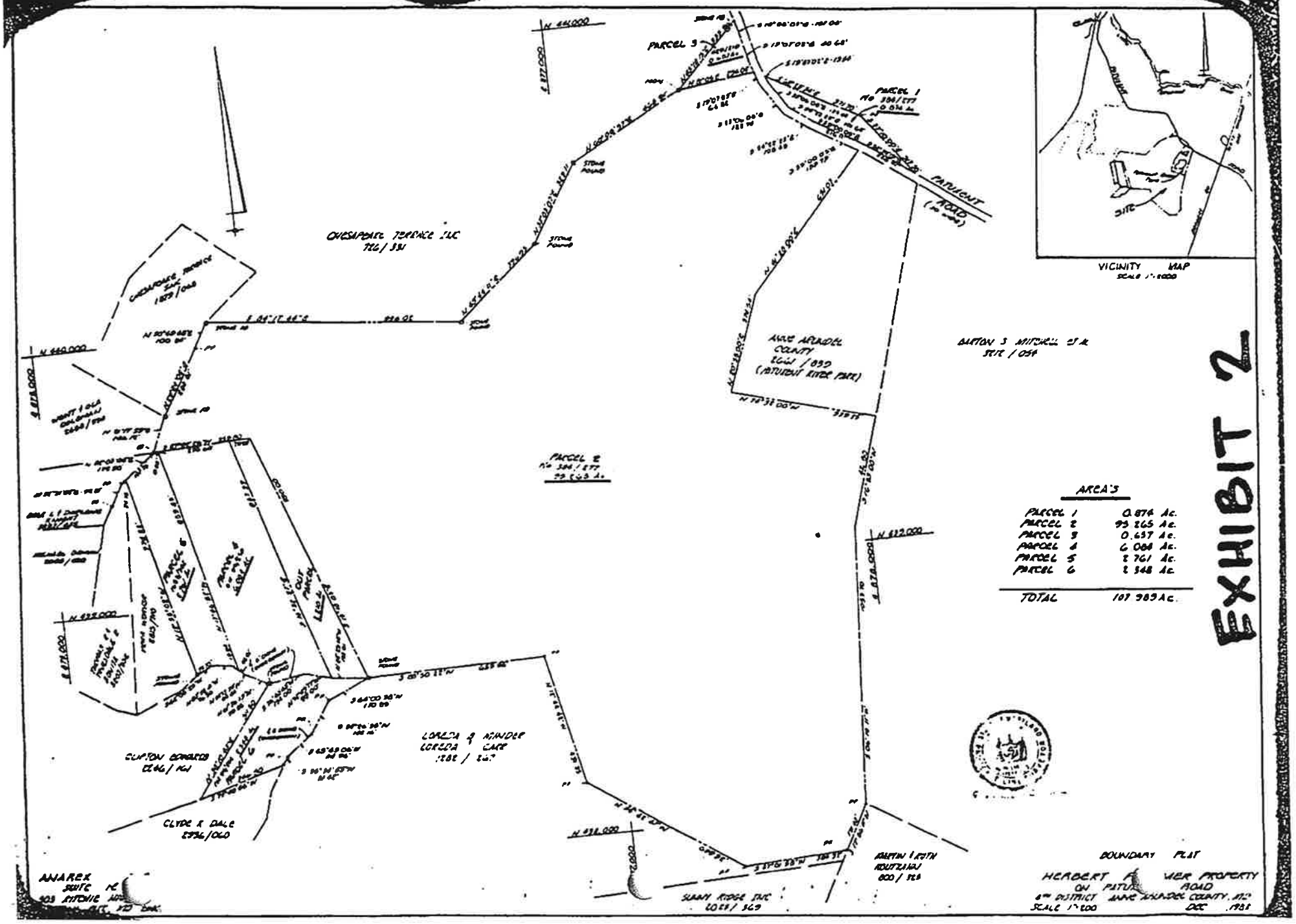
SHEET NO. 1

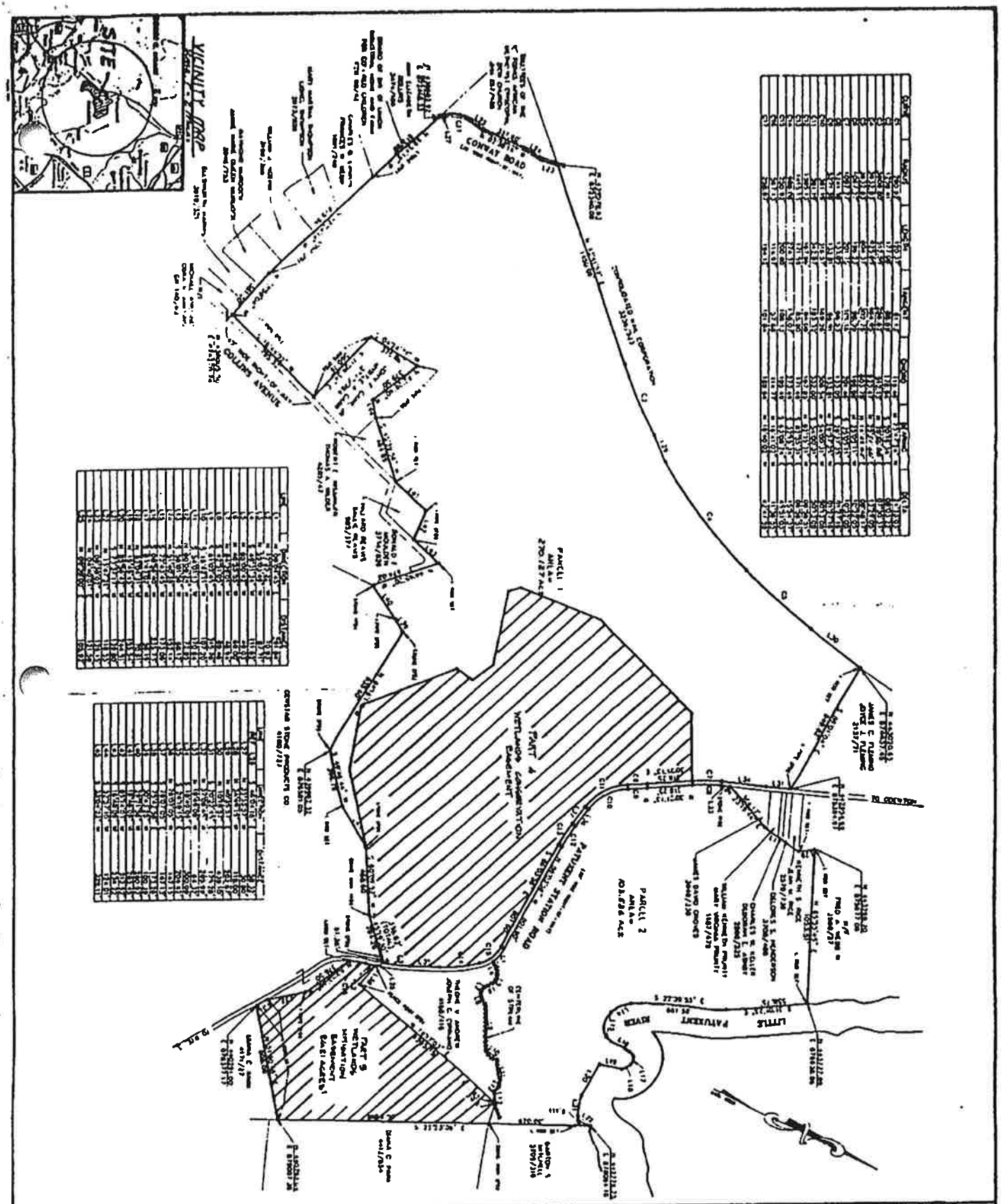
Rauch, Walls and Lane, Inc.

Engineers • Design Planning • Surveyors

EASTON • MARYLAND

EXHIBIT 2


PARCEL 3
PARCEL 1
PATUXENT ROAD
CHESAPEAKE TERRACE LLC
ANNE ARUNDEL COUNTY
(PATUXENT RIVER PARK)
BARTON S MITCHELL ET AL
PARCEL 2
CLYDE R DALE
SUNNY RIDGE INC
VICINITY MAP
AREA'S
PARCEL 1 0.874 Ac.
PARCEL 2 99.265 Ac.
PARCEL 3 0.657 Ac.
PARCEL 4 6.084 Ac.
PARCEL 5 2.761 Ac.
PARCEL 6 2.348 Ac.
TOTAL 107.989 Ac.
BOUNDARY PLAT
HERBERT A. WEIR PROPERTY
ON PATUXENT ROAD
4TH DISTRICT ANNE ARUNDEL COUNTY, MD.
SCALE 1"=200
DEC. 1985



PLAT SHOWING

THE LAND OF

CHESAPEAKE TERRACE, INC.

IN THE FOURTH ELECTION DISTRICT

ANNE ARUNDEL COUNTY, MARYLAND

SHEET NO. 1 of 1

Rauch, Walls and Lane, Inc.

Engineers • Design Planning • Surveyors

EASTON • MARYLAND

6-26-89

EXHIBIT 4

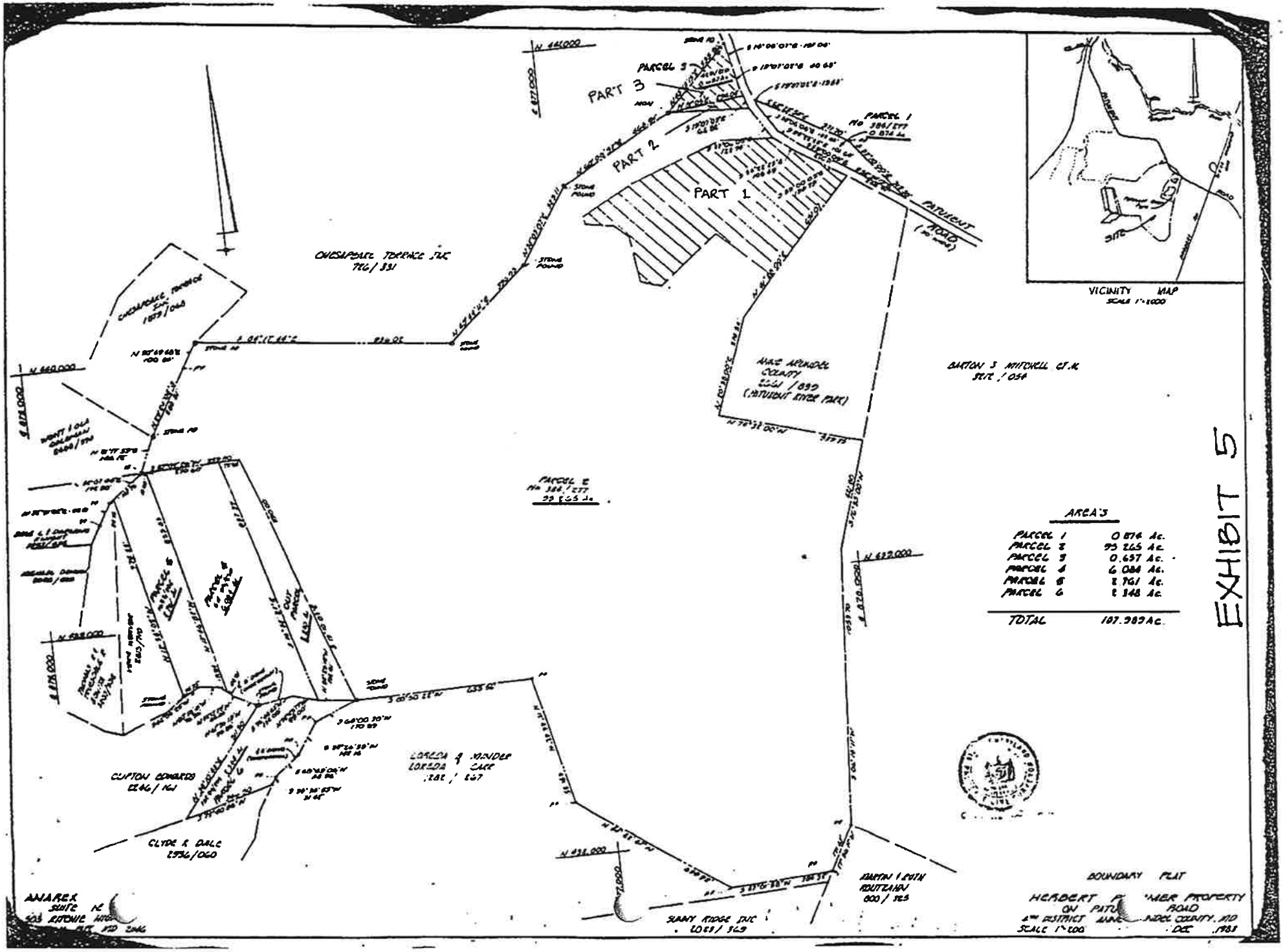


EXHIBIT 5
PART 1
PART 2
PART 3
PARCEL 1
PARCEL 2
PARCEL 3
PARCEL 4
PARCEL 5
PARCEL 6
PATUXENT ROAD
CHESAPEAKE TERRACE INC
BARTON S MITCHELL ET AL
CLIFTON EDWARDS
CLYDE R DALE
LORETTA A WINDER
SUNNY RIDGE INC
VICINITY MAP
AREA'S
PARCEL 1 0.874 Ac.
PARCEL 2 93.265 Ac.
PARCEL 3 0.657 Ac.
PARCEL 4 6.084 Ac.
PARCEL 5 2.761 Ac.
PARCEL 6 2.348 Ac.
TOTAL 107.987 Ac.
BOUNDARY PLAT

4819	FINANCE AND ACCOUNTING OFFICER	05/29/2008		0001582
Description	**Invoice**	**Date**	**Account**	**Amount**
CORPS PERMIT	MAY 2008	5/29/2008	0004-0004-6205-0000	$100.00

0004-0004-O PROVIDENT BANK OF MARYLAND

TOTAL: $100.00

NATIONAL WASTE MANAGERS, INC.
OPERATING ACCOUNT
2900 LINDEN LANE, SUITE 300
SILVER SPRING, MD 20910

PROVIDENT BANK OF MARYLAND
BALTIMORE, MD 21203-1661

NO: **0001582**

7-7301
2520

Check No.	Date	Amount
0001582	05/29/2008	$100.00

One Hundred and 0/100 Dollars**********
Pay to the order of

FINANCE AND ACCOUNTING OFFICER
U.S. ARMY ENGINEER DISTRICT
BALTIMORE (FOA, USAED)

⑈0001582⑈ ⑆252073018⑆ 005⑈588464⑈

ENDORSE HERE:

X

DO NOT SIGN / WRITE / STAMP BELOW THIS LINE
FOR FINANCIAL INSTITUTION USAGE ONLY*

*FEDERAL RESERVE BANK REGULATION CC

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DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

REPLY TO
ATTENTION OF

Operations Division

SEP 2 8 1995

Subject: CENAB-OP-RW(Chesapeake Terrace)91-1204-3

Mr. Milt McCarthy
McCarthy and Associates
14458 Old Mill Road, Suite #201
Upper Marlboro, Maryland 20772

Dear Mr. McCarthy:

I am providing a written reply, as a follow-up to previous field meetings, to your March 4, 1994 letter, and the February 8, 1995 map submittal. You requested that the isolated wetland areas be reconsidered as non-jurisdictional and the subject issued Department of the Army permit be modified accordingly. The subject permit was issued on March 18, 1993, for fill associated with a proposed rubble landfill site on Patuxent Road, Anne Arundel County, Maryland.

Based upon our site investigations we have determined that wetlands 6N, 4D, and 9D are not regulated because they either do not meet the technical parameters of a wetland in accordance with the 1987 Wetland Delineation Manual or do not meet the definition of Waters of the United States. Enclosed is a map which shows these areas that are not regulated. The remaining wetlands are "Waters of the United States", the use, degradation or destruction of which could affect interstate or foreign commerce. The definition of "Waters of the United States" in the current DA regulations (33 CFR 328.3(a)(3)) was promulgated through the Administrative Procedures Act rulemaking process and remains in effect, notwithstanding the Tabb Lakes or Hoffman Homes decisions. While the remaining wetlands on-site are actually adjacent to Waters of the United States and not isolated, even "isolated" waters are encompassed in the definition of Waters of the United States. Specific examples cited in the definition include prairie potholes, wet meadows and playa lakes.

We will modify the mitigation requirements when we receive a correct listing of the acreage of these sites not regulated and of the remaining regulated wetlands to be impacted.

Any future application submittal outside the study cited boundaries of the proposed landfill, must include a delineation of the waters of the United States (to be confirmed by the Corps) and all the waters of the United States within the property boundaries that are not correctly shown on the February 1995 map submission.

If you have any questions concerning this letter, please call Mr. Steven Harman of this office at (410)962-4522.

Sincerely,

Linda A. Morrison

Linda A. Morrison
Chief, Western Shore Permits Section

McCARTHY & ASSOCIATES, INC.

REGULATORY and ENVIRONMENTAL
CONSULTANTS

March 4, 1994

Mrs. Linda Morrison
U.S. Army Corps of Engineers
Baltimore District
City Crescent Building
10 S. Howard Street, 8TH FLOOR
P.O. Box 1715
Baltimore, Maryland 21201

Re: Chesapeake Terrace
(RW 91-1204-3)

Dear Mrs. Morrison:

I am writing in reference to the above referenced permit, which was issued by the Baltimore District, Corps of Engineers on March 18, 1993. The Federal 404 Permit authorizes the discharge of fill material into 5.0 acres of non-tidal wetlands for the construction of the Chesapeake Terrace Rubble Landfill. The fill authorized by your agency is for both headwater areas that drain to other waters of the United States and isolated wetlands which are not part of a surface tributary system to other waters of the United States or navigable waters regulated by your agency. Specifically, we are requesting that the isolated wetland areas be reconsidered as non jurisdictional waters and the issued permit be modified and amended accordingly. Our rationale for soliciting this request is the result of the Tabb Lakes and Hoffman Homes, Inc. Circuit Court rulings that are specific to the scope of Federal 404 authority on isolated intrastate wetlands. In addition, should these areas be considered isolated and not subject to Corps' jurisdiction, we believe the mitigation requirements should be amended to decrease the required mitigation acreage.

The Federal regulations require that for an isolated wetland to be considered "waters of the United States", pursuant to 40 CFR 230.3(s)(3), it must satisfy the commerce clause as defined in (i) through (iii) of that section which states:

> (3) All other waters such as intra-state lakes, rivers, streams mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

14458 Old Mill Road #201
Upper Marlboro, MD 20772

(301) 627-7505

> (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
>
> (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
>
> (iii) Which are used or could be used for industrial purposes by industries in interstate commerce...

The Tabb Lakes and Hoffman Homes Circuit Court decisions have specifically addressed these requirements. In the case of Hoffman Homes v. United States (Hoffman Homes), the United States Court of Appeals for the Seventh Circuit ruled that Hoffman Homes did not have to pay an administrative penalty for filling an isolated wetland. More importantly, the Court found that filling an isolated wetland had no effect on interstate commerce. As they stated, "[the area in question] is an intrastate, isolated wetland. Such wetlands are not part of aquatic ecosystems and protection of them would not further the stated policy of the [Clean Water] Act 'to restore and maintain the chemical, physical, and biological integrity of the Nation's waters'". Thus, the 7th Circuit Court found that the wetland in question was non Jurisdictional for purposes of Section 404 of the Clean Water Act.

In another landmark case, Tabb Lakes, LTD v. United States of America (Tabb Lakes LTD), the United States District Court for the Eastern District of Virginia ruled in favor of the plaintiff. Following guidance from the Kelly Memorandum, dated November 8, 1985, the Corps asserted jurisdiction over an isolated wetland on the basis that the areas may have use or possible use by migratory birds that cross state lines as sufficient interstate commerce connection. However, the Court ruled that the Kelly Memorandum was not exempt from the informal rulemaking requirements of the Administrative Procedure Act (APA). Therefore, in the absence of formal rulemaking requirements as stipulated in the APA, the Corps could not assert jurisdiction over the wetland in question. This case clearly states that the Corps cannot use the presence of migratory birds in an isolated wetland to exercise jurisdiction under the Clean Water Act. Furthermore, in Hoffman Homes, the Court ruled that "Although the Act mentions wildlife as an important result of controlling pollution, the purpose of the Act is to restore and maintain clean water, not to conserve wildlife".

We believe that the isolated wetland areas at Chesapeake Terrace should not be regulated by your agency on the following basis:

- The wetlands are hydrologically isolated and do not have a surface tributary connection to other waters of the United States. These wetlands are perched as a result of an underlying impermeable layer and are maintained by precipitation.

- The wetlands are manmade as a result of past sand and gravel mining operations. The National Wetland Inventory maps depict two of the areas in question as being excavated ponds, and not natural wetlands. These wetlands are completely surrounded by uplands.

- Precedents established in Hoffman Homes and Tabb Lakes LTD clearly state that isolated intrastate wetlands are not jurisdictional waters of the United States. In addition, the use or possible use of the isolated wetlands by migratory birds do not constitute a sufficient commerce connection to be regulated by the Federal Government.

- Precedents set by the Baltimore District Corps of Engineers, whereby the Corps did not exert jurisdiction over isolated intrastate waters. The Corps has in the recent past elected not to regulate isolated wetlands, both natural and man-made, since there was no commerce nexus.

- The isolated wetlands located at Chesapeake Terrace do not satisfy the regulatory requirements of 40 CFR 230.3(5)(3)(i-iii) for interstate or foreign commerce.

In light of this information, I respectfully request that the jurisdictional determination made for Chesapeake Terrace be modified to eliminate the isolated wetlands from Section 404 Jurisdiction, with a corresponding modification of the mitigation requirements. In addition, I also respectfully request a written response to my letter. I appreciate your attention to this matter. Please call me if you have any questions or comments.

Sincerely,

Milton L. McCarthy

Milton L. McCarthy

cc: Mr. Warren E. Halle, Halle Enterprises
Mr. Andy Chisholm, Halle Enterprises

McCARTHY & ASSOCIATES, INC.

REGULATORY and ENVIRONMENTAL
CONSULTANTS

April 2, 1997

Certified Mail
Return Receipt Requested # Z 011 753 902

Mr. Steve Harman
U.S. Army Corps of Engineers
Baltimore District
City Crescent Building, 8th Floor
10 South Howard Street
Baltimore, Maryland 21201

Re: Chesapeake Terrace
CENAB-OP-RW 91-1204-3

Dear Mr. Harman:

I am writing as a follow up to our previous site visits to the Chesapeake Terrace Rubble landfill located in Anne Arundel County, Maryland. The purpose of the site visits were to examine the isolated wetland areas to determine whether or not they were waters of the United States, as defined in 40 CFR 230.3(5)(3). Based on the re-evaluation of those areas, it was determined by you and Mrs. Linda Morrison that the following wetland areas were not subject to Federal jurisdiction pursuant to Section 404 of the Clean Water Act.

Area	Forested	Non Forested	Total
3D	--------	.08	.08
4D	.21	.14	.35
6N	.22	------	.22
7D	--------	.29	.29
9D	--------	.07	.07
10D	--------	.01	.01
11D	--------	.69	.69
			1.71

Of these referenced areas, isolated areas 6N, 4D, and 9D, were determined not to be jurisdictional "waters of the United States". These areas total .64 acres and are referenced in your September 29, 1995 letter to me regarding this subject.

14458 Old Mill Road #201
Upper Marlboro, MD 20772

(301) 627-7505

During the site visit with you and Mrs. Morrison on June 3, 1996, Mrs. Morrison further indicated that areas 10D, 11D, 7D, 3D were not considered waters of the United States subject to Section 404 jurisdiction. These areas total 1.07 acres; for a combined total of 1.71 acres of non jurisdictional areas. In addition, there are two areas that were examined, but no decision has been to determine whether or not these areas are considered waters of the United States, or wetlands, by satisfying the technical wetland criteria as stipulated in the 1987 Corps of Engineers Wetland Delineation Manual. These include areas 13D and 14N. A determination by your agency in the near future, or guidance to me regarding these two areas, would be sincerely appreciated.

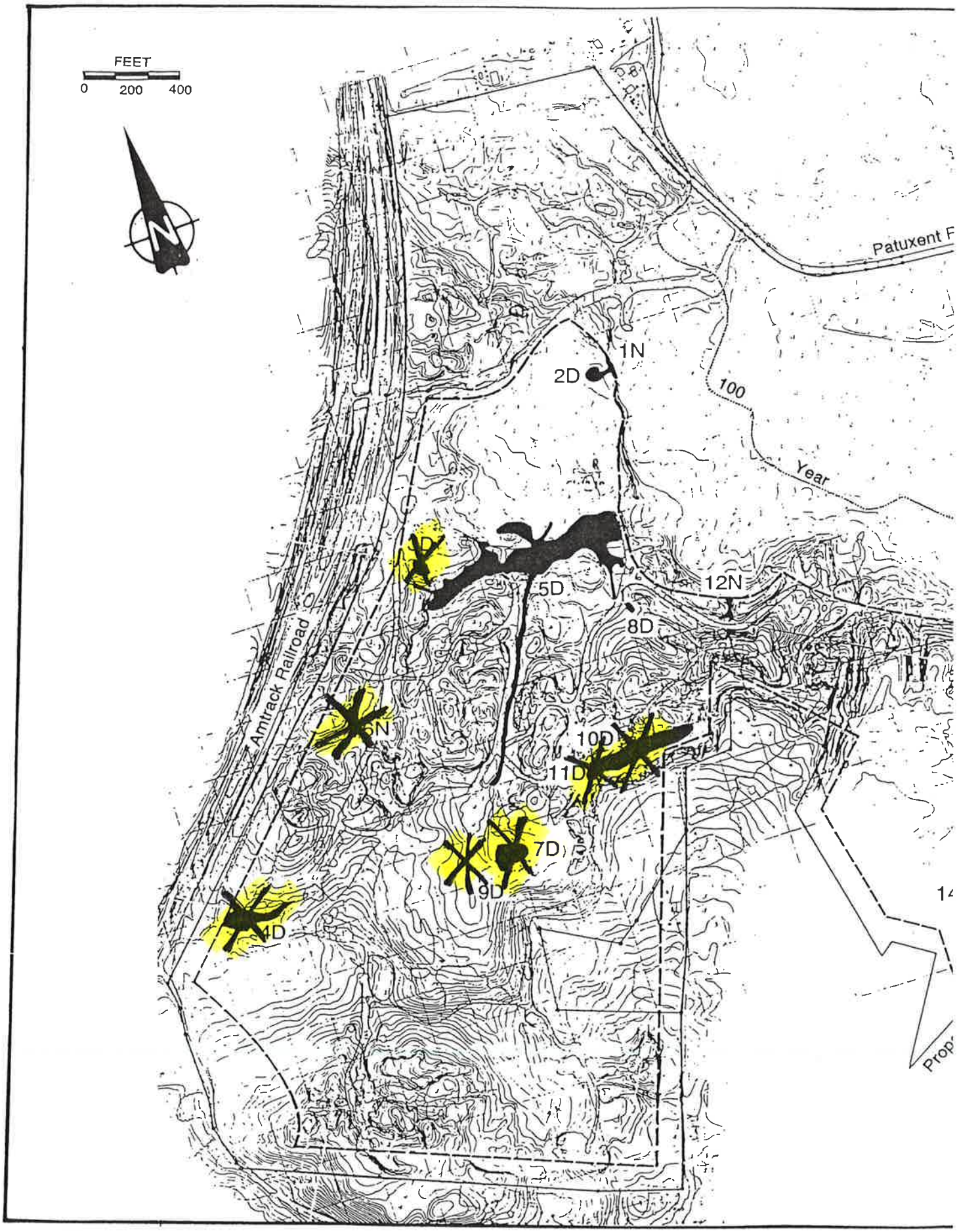
By copy of this letter, we request that the referenced permit be revised to reflect the reduction of impact based of the re-evaluation of those areas discussed above (i.e., 6N, 4D, 9D, 10D, 11D, 7D, and 3D). The revised impact would be 5.37 acres -1.71 acres, or a revised total of 3.66 acres. Based on the revised impact, there is a corresponding reduction in the required compensatory wetland mitigation. The permit requires a total of 6.78 acres of wetland mitigation, at a 2:1 replacement ratio for forested areas, and a 1:1 replacement ratio for emergent and open water impacts. The impact reduction of 1.71 acres, by type, is .43 acres of forested wetland, and 1.28 acres of emergent and open water wetland . At the appropriate ratio, this would reduce the forested wetland mitigation requirement from 3.56 acres to 2.7 acres, and decrease the 3.22 acres of emergent and open water wetlands to 1.94 acres for a revised total of 4.64 acres, instead of the original 6.78 acre requirement.

Your attention to this matter is sincerely appreciated.

Very truly yours,

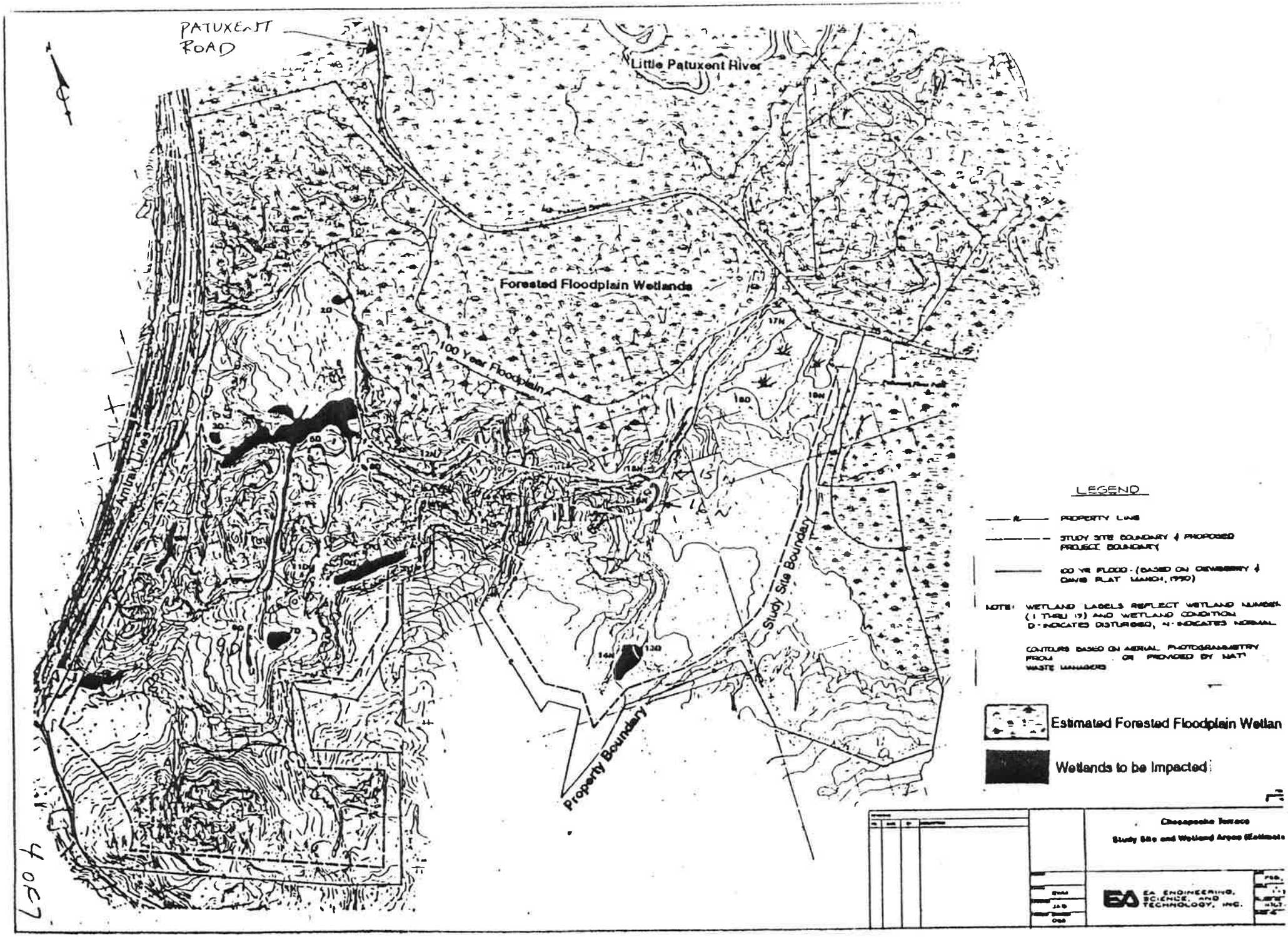
Milton L. McCarthy

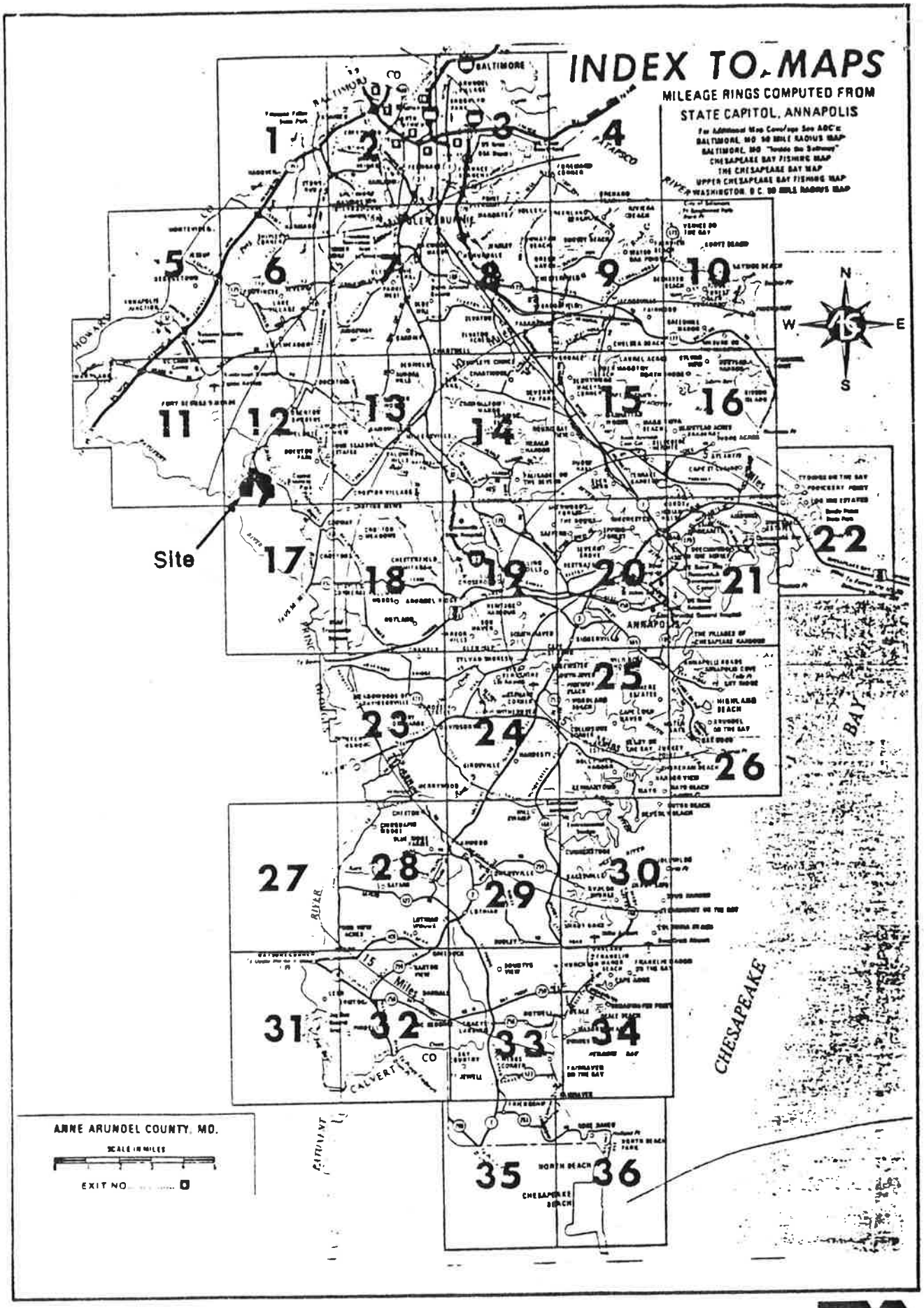
cc: Mr. Warren Halle (Halle Enterprises, Inc.)


FEET
0
200
400
N
Patuxent F
1N
2D
100
Year
5D
12N
8D
Amtrack Railroad
6N
10D
11D
7D
9D
4D
Prop

WETLAND	TOTAL	FORESTED	NON-FORESTED
1N	0.02	0.02	0.08
2D	0.08	----	0.08
✓3D	0.08	----	0.08
✓4D	0.35	0.21	0.14
5d	2.53	0.98	1.55
✓6N	0.22	----	0.22
✓7D	0.29	----	0.29
8D	0.02	----	0.02
✓9D	0.07	----	0.07
✓10D	0.01	----	0.01
✓11D	0.69	----	0.69
12N	0.03	0.03	----
13D	0.07	----	0.07
14N	0.46	0.46	----
15N	0.01	0.01	----
16N	0.07	0.07	----
~~17N~~	~~0.26~~	~~0.26~~	Eliminated Impact
18D	0.37 ~~3.53~~	~~3.11~~	0.42
	Reduced to Road impact		
~~19N~~	~~1.04~~	~~1.02~~	~~0.02~~
	Eliminated Impact		
~~TOTAL~~	~~9.83 Ac.~~	6.17 Ac.	3.66 Ac.
NEW TOTAL	5.37 Acres - May 1991 Redesigned Proposed		

4.73 - regulated
0.64 - not-regulated


PATUXENT ROAD
Little Patuxent River
Forested Floodplain Wetlands
100 Year Floodplain
Amtrak Lines
Study Site Boundary
Property Boundary
LEGEND
PROPERTY LINE
STUDY SITE BOUNDARY & PROPOSED PROJECT BOUNDARY
100 YR FLOOD - (BASED ON DEWBERRY & DAVIS PLAT MARCH, 1990)
NOTE: WETLAND LABELS REFLECT WETLAND NUMBER (1 THRU 17) AND WETLAND CONDITION D - INDICATES DISTURBED, N - INDICATES NORMAL
CONTOURS BASED ON AERIAL PHOTOGRAMMETRY FROM OR PROVIDED BY MATT WASTE MANAGERS
Estimated Forested Floodplain Wetlan
Wetlands to be Impacted
Chesapeake Terrace
Study Site and Wetland Areas (Estimate
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.



Vicinity map. (Source: ADC map of Anne Arundel County.)

2 of 7

Public Notice

US Army Corps of Engineers
Baltimore District

In Reply Refer to Application Number CE-NABOP. RW(Chesapeake Terrace)91-1204-3 Revised

Date November 22, 1991

Comment Period: Nov. 22, 1991 to Dec. 22, 1991

THE PURPOSE OF THIS NOTICE IS TO SOLICIT A RESPONSE FROM THE PUBLIC ABOUT THE WORK DESCRIBED BELOW. AT THIS TIME, NO DECISION HAS BEEN MADE AS TO WHETHER OR NOT A PERMIT WILL BE ISSUED.

This District has received an application for a Department of the Army permit pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) as described below:

APPLICANT: Mr. Warren E. Halle
National Waste Managers, Inc.
2900 Linden Lane, Suite 300
Silver Spring, Maryland 20910

WATERWAY: In isolated and adjacent wetlands near the floodplain of the Little Patuxent River, Patuxent Road, Anne Arundel County, Maryland.

WORK: To fill and grade 5.37 acres of non-tidal wetlands to convert 215 acres of a 460 sand and gravel surface mine to a rubble fill operation. The work is to be done in accordance with the enclosed plans. If any additional information is needed on the proposed rubble fill project, please contact Mr. Joseph Berg, the applicant's consultant at (410)771-4950. If there are questions concerning the wetland areas or the permit process, call Mr. Steven Harman of this office at (410)962-4253.

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be exptected to accure from the proposal must be balanced against its reasonably forseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, and, in general, the needs and welfare of the people.

"The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity."

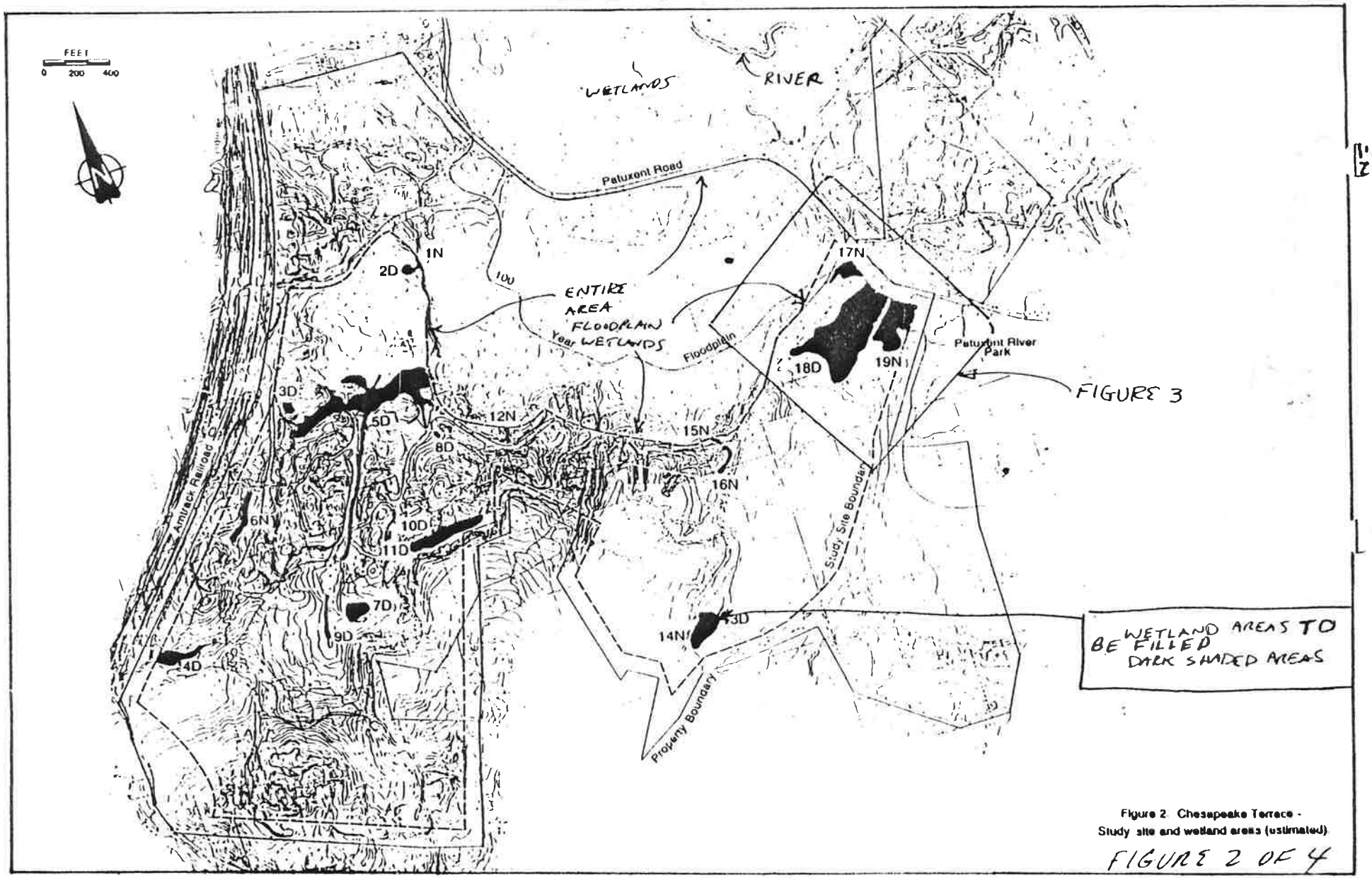


Figure 2. Chesapeake Terrace - Study site and wetland areas (estimated).

FIGURE 2 OF 4

EA

5 OF 7

Kevin Dooley → 410- 222-7436

- NTW - Floodplain

1) wetland acreage (460) Ac based on Fed Maps
2) Floodplain Acreage - Based on FEMA
3) Forest Acreage - Best Guess

- Ches. Terrace -
- Kevin Dooley - Wetlands Maps OK But prefer actual wetland calculations based on a surveyed line.

Article 21

Specific

Floodplain - engineered floodplain Based on Engineering Calculation

Forest - Take from aerial photo.

can use existing data but run the risk of some one changing the information

Dave Hursch A-6 FEMA EL. 70 (100 yr)

wetlands Prof Easement

80.03
.66
.22
6.70

Exhibit #5 Total wetlands in Easement = 107.989 Acres

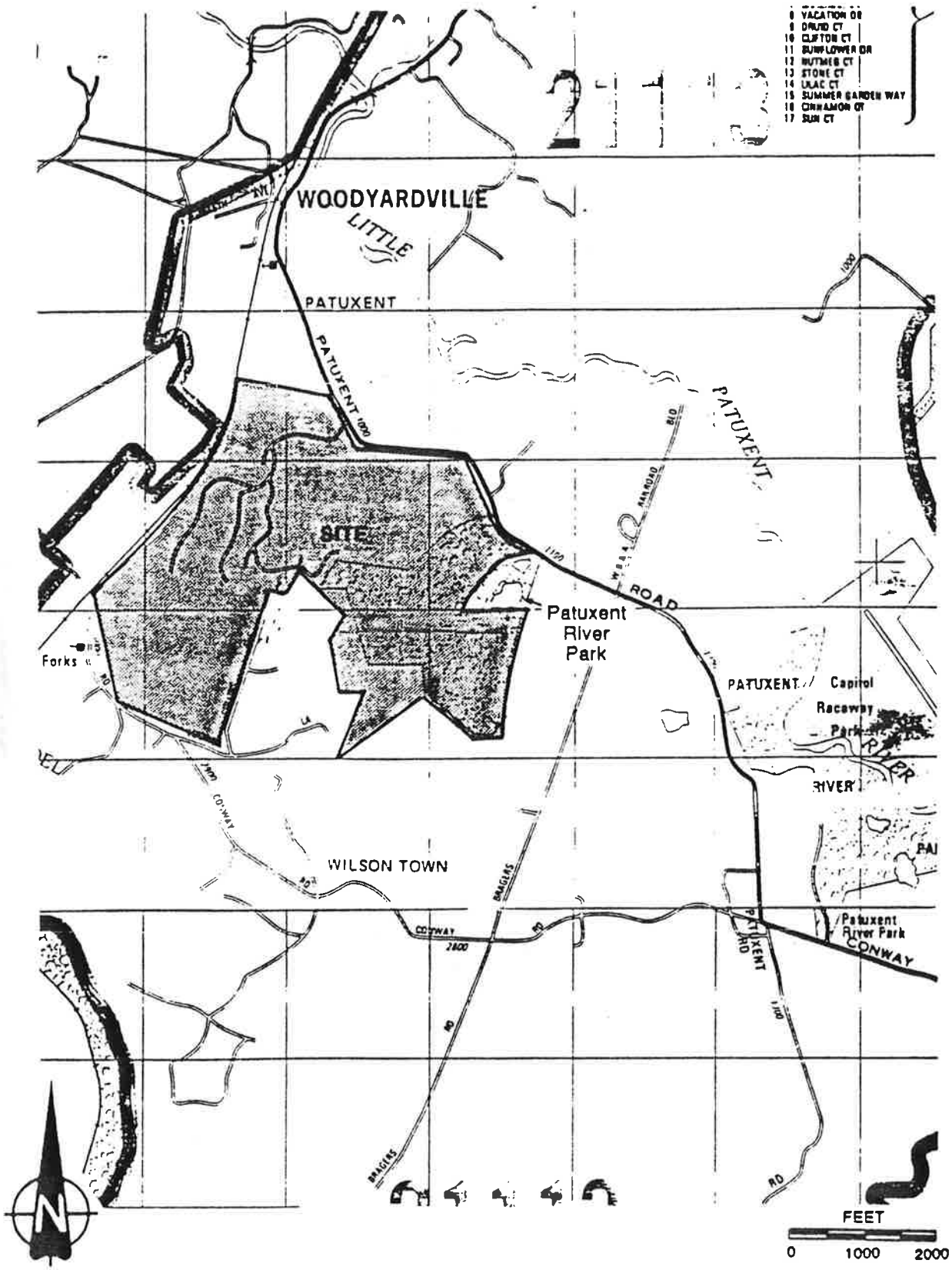
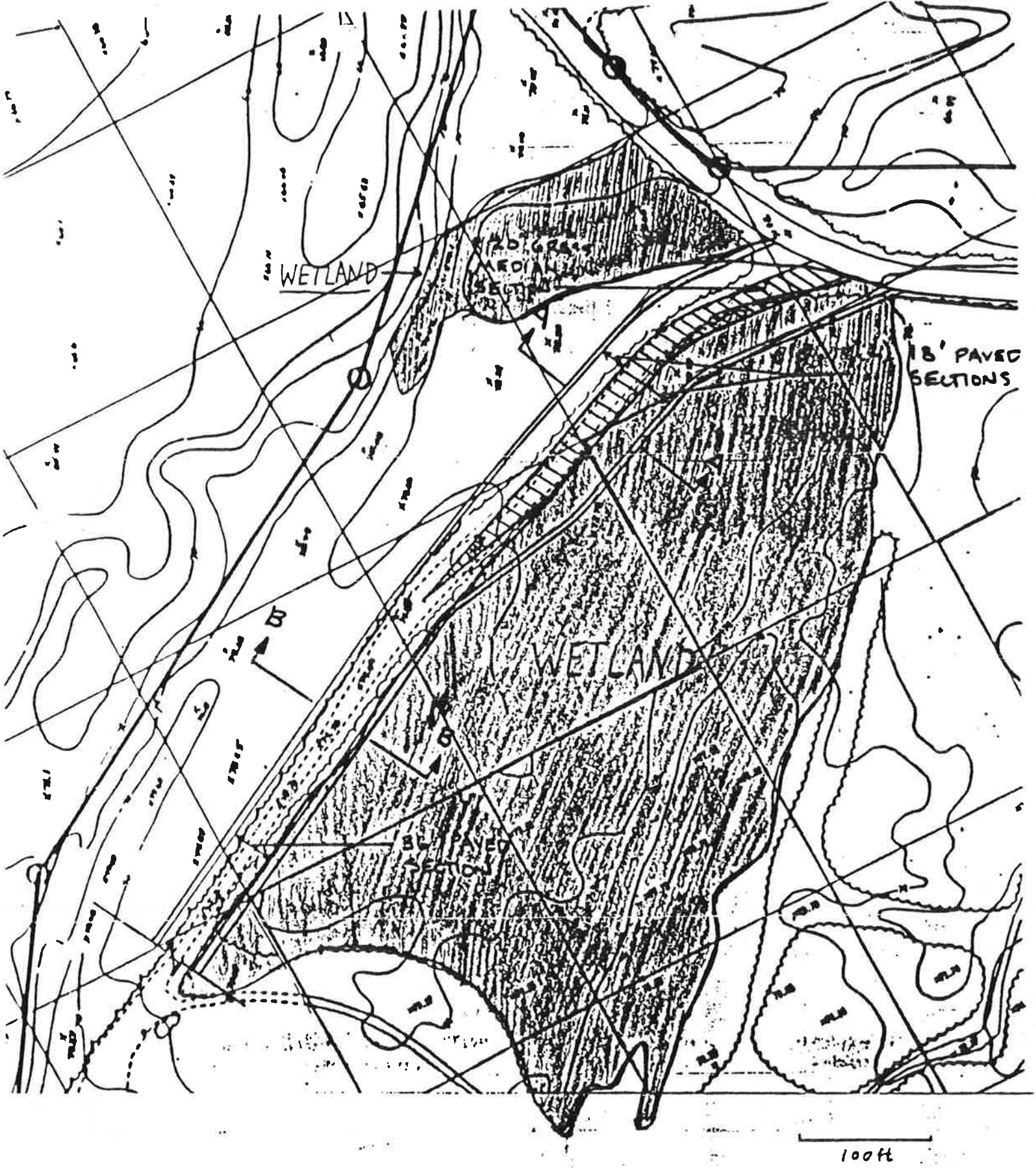
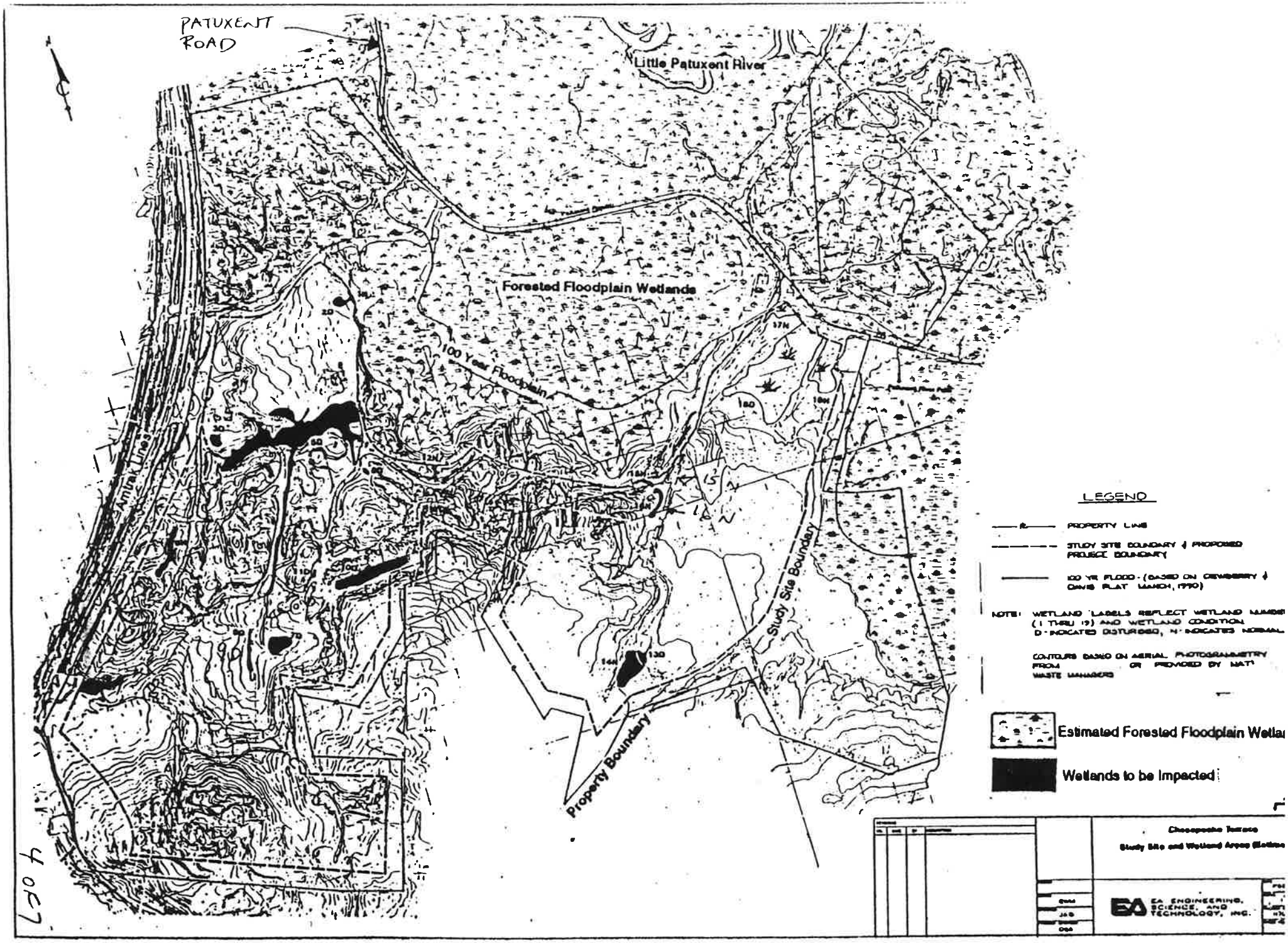


Figure 1. Vicinity map. (Source: ADC map of Anne Arundel County, p.12)

FIGURE 3 of 7



Chesapeake Terrace Entrance Road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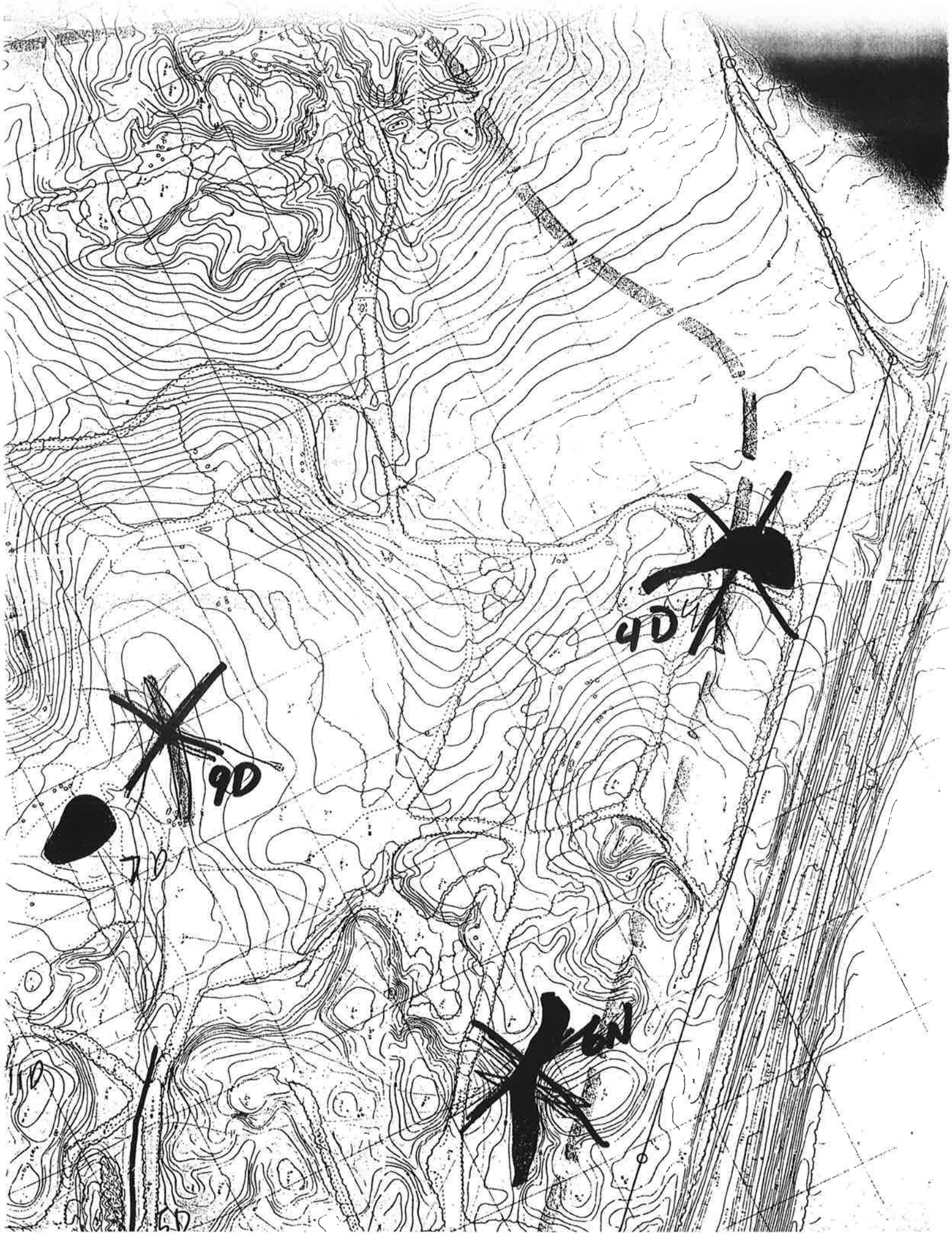
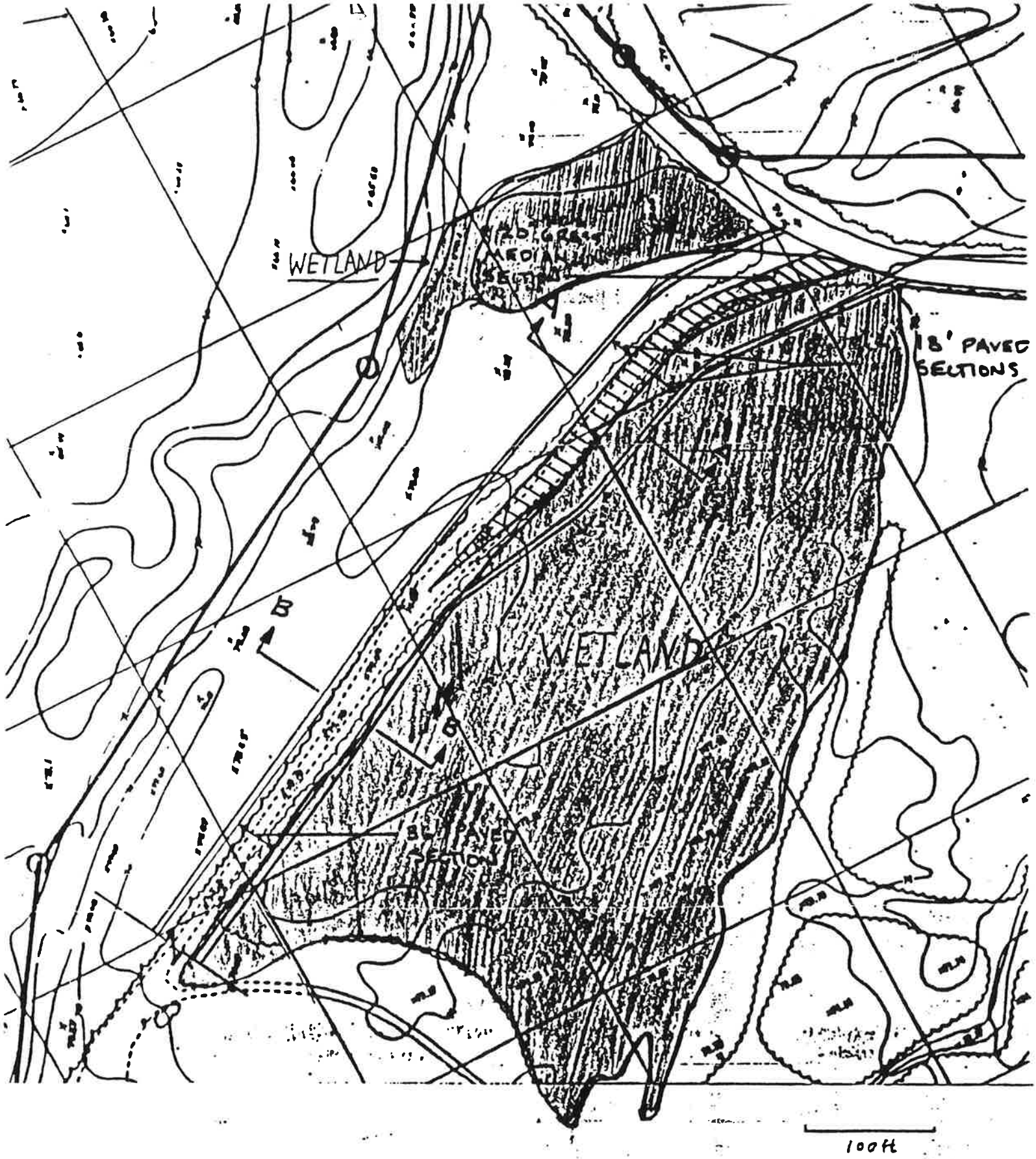
Chesapeake Terrace
Study Site and Wetland Areas Exhibit
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.


9D
9D
7D
6D
6D



Chesapeake Terrace Entrance Road

BAY ENVIRONMENTAL, INC.

December 13, 2018

Via Electronic Mail

Mr. Richard Kibby
Baltimore District Office
U.S. Army Corps of Engineers
2 Hopkins Plaza
Baltimore, Maryland 21201

Re: Chesapeake Terrace Rubble Landfill
RW91-1204

Dear Mr. Kibby,

In accordance with your request, please find the Permit drawings and spreadsheet for the Chesapeake Terrace Rubble Landfill. You will note on the spreadsheet (Sheet 1) that the impacts are given by area. Furthermore, they are designated by 'D' ("disturbed") and 'N' ("natural"). You will also note the acreages in an adjoining column.

I have placed checkmarks by Impact Areas 3D, 4D, 6N, 7D, 9D, 10D, and 11D. Based on my request of April 2, 1997 and our onsite evaluation with the Corps on June 3, 1996, the Corps determined that these areas were isolated and, therefore, not subject to federal jurisdiction under Section 404 of the Clean Water Act. By Corps letter dated October 17, 1997, the Corps revised the permit to reflect this reduction of impact. A copy of the Corps letter is attached. If you have any questions, please do not hesitate to call.

Very truly yours,

Milton L. McCarthy

Milton L. McCarthy

cc Steve Fleishman
Andy Chisolm

2661 Riva Road, Suite A, Building 800 • Annapolis, MD 21401
301 627 7505 • 301 627 5571 fax • email: info@bayenvinc.com

BAY ENVIRONMENTAL, INC.

November 2, 2018

VIA ELECTRONIC MAIL

Mr. Richard Kibby
Maryland Section Northern, Regulatory Functions Branch
Baltimore District Army Corps of Engineers
2 Hopkins Plaza
Baltimore, MD 21201

Re: CENAB-OP-RMN (Chesapeake Terrace) 1991-01204-M18
Chesapeake Terrace Rubble Landfill
Odenton, Anne Arundel County, Maryland

Dear Mr. Kibby,

In accordance with Paragraph 3 of your May 20, 2013 letter, please consider this correspondence as a request for a 5-year extension of time for the above referenced project. The current permit expires on December 31, 2018. If you have any questions, please do not hesitate to contact me. Your attention to this request is sincerely appreciated.

Very truly yours,

Milton L. McCarthy

CC: Amanda Sigillito (Maryland Department of the Environment)
Stephen N. Fleischman (The Halle Companies)
Andy Chisholm (J.A. Chisholm, P.E. LLC)

2661 Riva Road, Suite A, Building 800 • Annapolis, MD 21401
301.627.7505 • 301.627.5571 fax • email: info@bayenvinc.com

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

April 26, 2019

Mr. Stephen N. Fleischman
The Halle Companies
2900 Linden Lane
Suite 300
Silver Spring, Maryland 20190

Re: Chesapeake Terrace Rubble Landfill
Water Quality Certification No. 91-WQ-0516
AI No. 63592

Dear Mr. Fleischman:

The purpose of this letter is to confirm that the Water Quality Certification No. 91-WQ-0516, originally issued for the U.S. Army Corps of Engineers' Chesapeake Terrace Rubble Landfill Permit (No. CENAB-OP-RMN 1991-01204-M18), remains in effect until the December 31, 2023 expiration date of the federal permit. Should you have any questions, please feel free to contact me at 410-537-3766 or at amanda.sigillito@maryland.gov .

Sincerely,

Amanda Sigillito, Chief
Nontidal Wetlands Division

C: Richard Kibby (Maryland Section Northern, Regulatory Functions Branch, Baltimore District Army Corps of Engineers, 2 Hopkins Plaza, Baltimore, MD 21201)

Milton L. McCarthy (Bay Environmental, Inc., 2661 Riva Road, Bldg. 800, Suite A, Annapolis, MD 21401)

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101 • www.mde.state.md.us

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Robert M. Summers, Ph.D.
Secretary

May 28, 3013

Mr. Warren E. Halle
National Waste Manager, Inc.
2900 Linden Lane, Suite 300
Silver Spring, Maryland 20910

Project: WQC 91-WQ-0516/199101204
Chesapeake Terrace Rubble Fill, Anne Arundel County

Dear Mr. Halle:

The Wetlands and Waterways Program (Program) has reviewed your request to extend the expiration date of the Water Quality Certification (WQC) for the Chesapeake Terrace Rubble Fill located in Odenton, Anne Arundel County. The request asks the Program to renew the expiration date of the WQC to coincide with the expiration of the US Army Corps of Engineers (Corps) letter, dated May 20, 2013. That letter extends the Corps authorization until December 31, 2018.

Accordingly, by way of this letter, the Program extends the expiration date for WQC 91-WQ-0516/199101204 until December 31, 2018.

If you have any questions please contact me by phone at 410-537-3766 or by email at asigillito@mde.state.md.us.

Sincerely,

Amanda Sigillito, Chief
Nontidal Wetlands Division

cc: WMA Compliance Program (Central)
US Army Corps of Engineers (Northern)
McCarthy & Associates, Inc. (Milton McCarthy)

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

October 1, 2010

Mr. Milton McCarthy
McCarthy & Associates, Inc.
14458 Old Mill Road, Suite 201
Upper Marlboro, MD 20772

Project: WQC 91-NT-0516/199101204
Chesapeake Terrace Rubble Fill, Anne Arundel County

Dear Mr. McCarthy:

The Nontidal Wetlands and Waterways Division has reviewed your request to extend the expiration date of the Water Quality Certification for the Chesapeake Terrace Rubble Fill to coincide with the Corps' expiration date while the proposed project moves forward through the local and State permitting process.

By way of this letter, the Nontidal Wetlands and Waterways Division is extending the expiration date of WQC 91-NT-0516 through December 31, 2013.

Please contact me at 410-537-3769 or by email at jbroersma@mde.state.md.us if you have any questions.

Sincerely,

Judy Broersma

Judy Broersma
Wetlands Specialist

cc: Elder Ghigiarelli

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000

Parris N. Glendening
Governor

Nontidal Wetlands and Waterways Division
Southern Maryland Regional Field Office
Goldstein State Office Building
200 Duke Street, Suite 2700
Prince Frederick, Maryland 20678
Phone: (410)414-3400 Fax: (410)414-3410

Jane T. Nishida
Secretary

February 25, 1998

Mr. Milt McCarthy
McCarthy & Associates, Inc.
14458 Old Mill Road, Suite 201
Upper Marlboro, MD 20772

Application Tracking No: 199101204
WOC No. 91-WO-0516
Project: Chesapeake Terrace, Anne Arundel County

Dear Mr. Milt:

The Division has received and reviewed the resubmittal of information dated January 29, 1998 for Chesapeake Terrace Rubble Fill. We have determined that the project is in compliance with the Water Quality Certification conditions in the original WQC issued in 1991.

Therefore, 91-WO-0516 now expires on December 31, 2000 in conjunction with the U.S. Army Corps of Engineers authorization.

Please call me if you have any further questions.

Sincerely,

Judy B. Cole

Judy Broersma-Cole
Project Manager
Nontidal Wetlands and Waterways Division

cc: COE - Steve Harman
Andrew Der

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT
WATER MANAGEMENT ADMINISTRATON

WATER QUALITY CERTIFICATION

CERTIFICATION NUMBER: 91-WQ-0516 (Re-Issuance)

CORPS OF ENGINEERS NUMBER: 199101204

ISSUED TO: National Waste Managers
C/o Mr. Warren Halle
2900 Linden Lane, Suite 6
Silver Spring, Maryland 20910

Description of Certified Project: Construction of a rubble landfill known as Chesapeake Terrace. The project will result in permanent loss of approximately 3.66 acres of nontidal wetlands. The project is located on the south side of Patuxent Road, approximately 2.5 miles west of Md. 3, near Woodwardville, Anne Arundel County. The wetlands to be impacted are associated with drainage to Patuxent River.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 through 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the U.S. Army Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the project described above will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The certification holder shall comply with the conditions listed below.

GENERAL CONDITIONS

1. The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify the Water Management Administration (WMA) Compliance Program ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

2. The proposed project shall be constructed in accordance with the plan and its revisions.

3. All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

4. This certification is valid only for use by the certification holder. Certification may be transferred only with prior written approval of WMA. The new owner/operator shall request, in writing, transfer of this water quality certification to his/her name. In the event of transfer, transferee agrees to comply with all terms and conditions of this certification.

5. The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

SPECIAL CONDITIONS

6. The disturbance of the bottom of the water and sediment transport into adjacent State waters shall be minimized. The applicant shall obtain and certify compliance with a grading and sediment control plan which has been approved by the:

X (a) Anne Arundel Soil Conservation District or;
__ (b) Erosion and Sediment Control Representative, Division of Environmental Services, Bureau of Highways, Department of Public Works of the City of Baltimore or;
__ (c) The Department of the Environment, Water Management Administration or;
__ (d) Montgomery County Department of Environmental Protection.

The approved plan shall be available at the project site during all phases of construction.

7. X Work in waters shall be done only in the period **June 16 through February 28** inclusive, of any year.

8. X Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated, and maintained in accordance with the applicable approving authority.

9. __ Stormwater Management Plan: The certification holder shall provide to the Administration for review and approval a stormwater management plan including cross sections, and other applicable drawings which incorporates effective pollutant removal strategies in uplands to treat the required volume of runoff from impervious surfaces prior to the release of stormwater into state waters, tidal wetlands, or nontidal wetlands. There shall be no discharge of untreated stormwater to State waters and tidal and nontidal wetlands. The plan shall be provided by __ and shall be implemented by _____.

10. X Nontidal Wetland/Waters Mitigation Requirement: The certification holder shall mitigate for nontidal wetlands losses as required by the U.S. Army Corps of Engineers Permit.

11. __ The certification holder shall provide a stream restoration plan for review and approval by ___. The approved plan shall be implemented by _____.

12. __ At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

13. X Stormwater Discharges: Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity of no greater than four feet per second for the two year storm in order to prevent erosion in the receiving water or wetland.

14. __ Future Stormwater Discharges: Future stormwater discharges to authorized pond(s) are prohibited unless the required volume of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

15. __ Stormwater Detention Ponds: Authorized stormwater detention or extended detention ponds shall have a maximum detention time of ___ for temporarily impounded stormwater volumes in excess of any permanent pool elevations or pond bottom.

16. __ Integrated Pest Management: An Integrated Pest Management Plan for any proposed golf course shall be developed in accordance with the University of Maryland, Department of Entomology.

17. X Stormwater Drainage Facilities: Stormwater management and drainage facilities shall be maintained in accordance with the requirements of the applicable approving authority.

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway ● Baltimore, Maryland 21224
(410) 631-3000

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 1
To Jim IRRe	From Valerie
Co.	Co.
Dept.	Phone #
Fax # 1-301-627-7505	Fax #

October 24, 1995

Mr. Andy Chisolm
The Halle Companies
c/o McCarthy & Associates, Inc.
Attn: James Irre
14458 Old Mill Road, Suite 201
Upper Marlboro, Maryland 20772

RE: Chesapeake Terrace
91-WQ-0516

Dear Mr. Irre:

We are in receipt of your request for extension of the expiration date for the above reference water quality certification. The Maryland Department of the Environment will extend the expiration date to September 28, 1997.

If you have any questions, please call me at (410) 631-3609.

Sincerely,

Daniel J. O'Leary

Daniel J. O'Leary, P.E., Chief
Water Quality Certification Division

DJO:vs

18. __ Use of Stormwater Management Facility: Stormwater management facility may not be used until all stabilization is completed and all temporary sediment control devices have been removed.

19. __ Maintenance of Stormwater Management Facility: If maintenance of a stormwater management facility is the responsibility of a homeowner's association, maintenance shall be conducted according to County specifications.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the certification holder in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED

for/ Amanda Sigillito, Chief
Nontidal Wetlands and Waterways Division

December 31, 2006
Expiration Date

Cc: U.S. Army Corps of Engineers (Janet Vine)
WMA Compliance Program w/file
McCarthy & Associates, Inc. (Milton McCarthy)

WATER QUALITY CERTIFICATION

December 13, 2007

NABOP 1991-1204-3 CERTIFICATION 91-WQ-0516

PUBLIC NOTICE DATE November 22, 1991

RE: Chesapeake Rubble Terrace land Fill

TO: National Waste Managers, Inc.
2900 Linden Lane, Suite 300
Silver Spring, Maryland 20910
Attention: Mr. Warren E. Halle

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 - 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the construction of this facility and its subsequent operation as noted herein will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The Permittee shall comply with the conditions marked (X) below:

(X) (1) The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify this department ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

(X) (2) The proposed project shall be constructed in accordance with the plan and its revisions as approved by the:

(X) (a) Corps of Engineers
(X) (b) Water Management Administration

(X) (3) All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

(X) (4) The applicant shall notify this Department upon transferring this ownership or responsibility for compliance with these conditions to another person. The new owner/operator shall request transfer of this water quality certification to his/her name.

(X) (5) The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

( ) (6) Construction of any bulkhead shall be completed prior to filling behind the bulkhead. The bulkhead shall be constructed in such a manner so as to prevent the loss of fill material to waters of this State. Only clean fill, which is free of organic, metallic, toxic or deleterious materials shall be used.

(X) (7) The disturbance of the bottom of the water and sediment transport into the adjacent State waters shall be minimized. The applicant shall obtain and certify compliance with a grading and sediment control plan which has been approved by the:

(X) (a) Anne Arundel Soil Conservation District or
( ) (b) Erosion and Control Representative, Division of Environmental Services, Bureau of Highways, Department of Public Works of the City of Baltimore or
( ) (c) The Department of the Environment, Water Management Administration or
( ) (d) Montgomery County Department of Environmental Protection.

The approved plan shall be available at the project site during all phases of construction.

( ) (8) The spoil disposal area(s), including dikes where applicable, shall be constructed to limit the suspended solids content in the discharge to the waters of this State to four hundred (400) parts per million or less.

( ) (9)_____ shall be done only in the period _____.

(X) (10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated and maintained in accordance with the requirements of the applicable approving authority.

(X) (11) National Waste Managers, Inc. shall provide to the Water Management Administration a stormwater management plan including cross-sections which incorporates effective pollutant removal strategies in uplands to treat a minimum of the first one-half inch of runoff from impervious surfaces prior to release of stormwater into State waters or wetlands. There shall be no discharge of untreated stormwater to State waters or wetlands. The plan shall be provided by March 1, 2008 and shall be implemented prior to any stormwater discharge from the site.

(X) (12) National Waste Managers, Inc. Shall provide to the Water Management Administration a mitigation plan for the construction of 4.64 acres (PFO = 2.7 acres and PEM 1.94 acres) of wetland mitigation for review and approval by Water Management Administration. The plan shall be submitted by August 1, 2008. The plan shall show:

-the source of hydrology for the constructed wetland
-the source and amount of soil to be used in constructing the wetland
-the species, size and density of vegetation to be planted in the constructed wetland and a planting schedule.
-a monitoring/maintenance plan.

(X) (13) National Waste Management Inc. Shall monitor the mitigation site for a period of five years and shall determine whether the wetland construction has been successful. A successful mitigation project shall result in: 435 woody plants/acre and 85% survivability of plants in forested and scrub/shrub wetlands and plants covering 85% of the area for emergent wetlands. If these standards are not met, National Waste Management, Inc. shall determine the reason(s) for failure, the problem(s) shall be corrected, and the area(s) shall be replanted and monitored.

(X) (14) The mitigation site shall be constructed in accordance with the revised plans, dated August 2008.

(X) (15) National Waste Management, Inc, shall provide a copy of the sediment and erosion controls plans for the complete and entire project by June 1, 2008. This plan shall be implemented prior to the initiation of any other grading on site.

( ) (16) At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

(X) (17) Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity no greater than four feet per second for the two year storm in order to prevent erosion in the receiving waterway or wetland.

(X) (18) Future stormwater discharges to certified pond(s) are prohibited unless the first one half inch of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

( ) (19) Authorized stormwater detention ponds shall have a maximum detention time of _____ hours.

( ) (20) _____ shall restore and revegetate all temporarily disturbed waters and wetlands to original contours upon completion of construction.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the applicant in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED

_____ December 31, 2010
Water Management Administration Expiration Date

cc: MDE Waste Management Administration (Ed Dexter)
MDE Compliance Program (Central Region)
US Army Corps of Engineers (Rich Kibby)
McCarthy & Associates, Inc. (Milton McCarthy)

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX N

Not Used

APPENDIX O

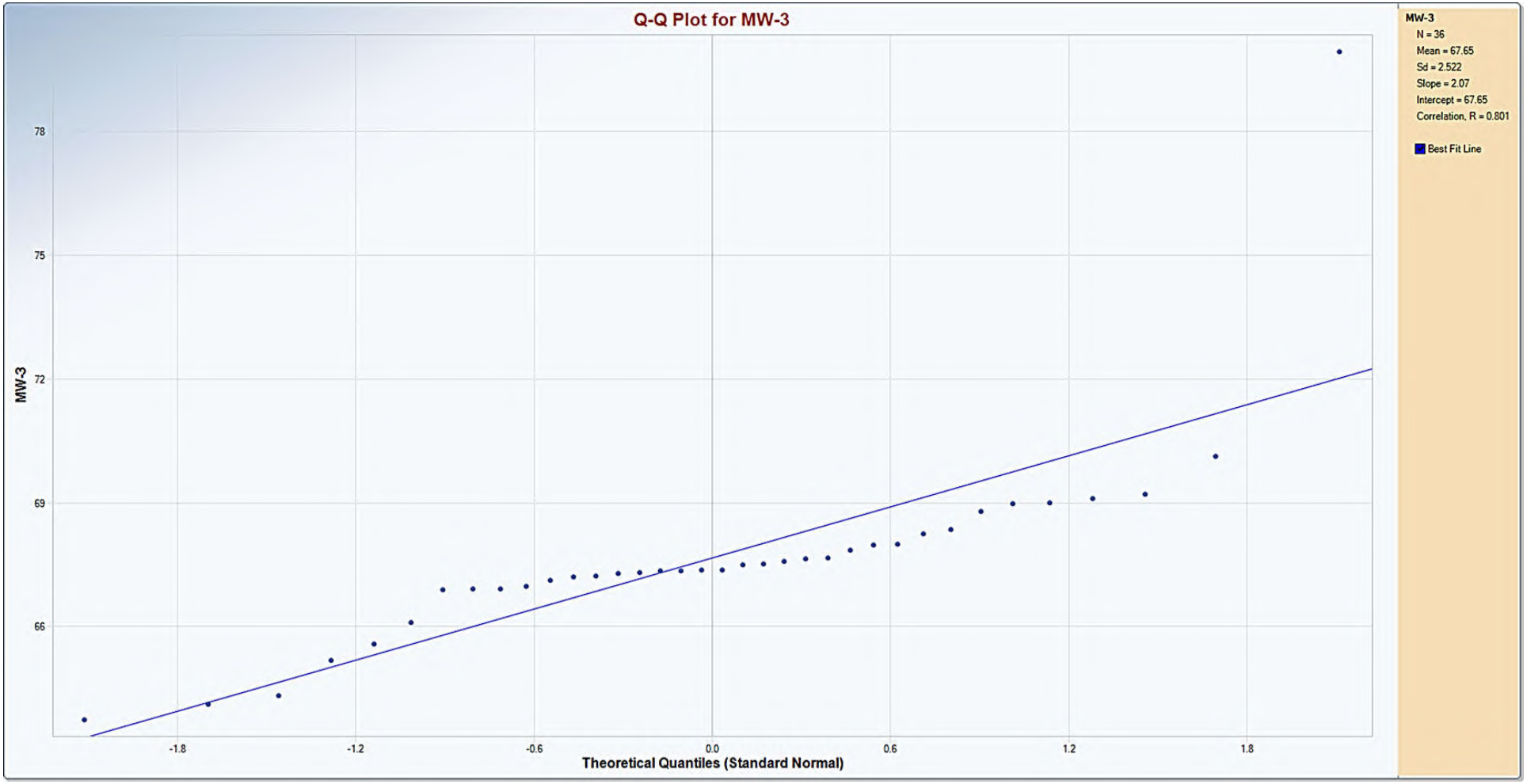
Groundwater Elevation Outlier Statistics

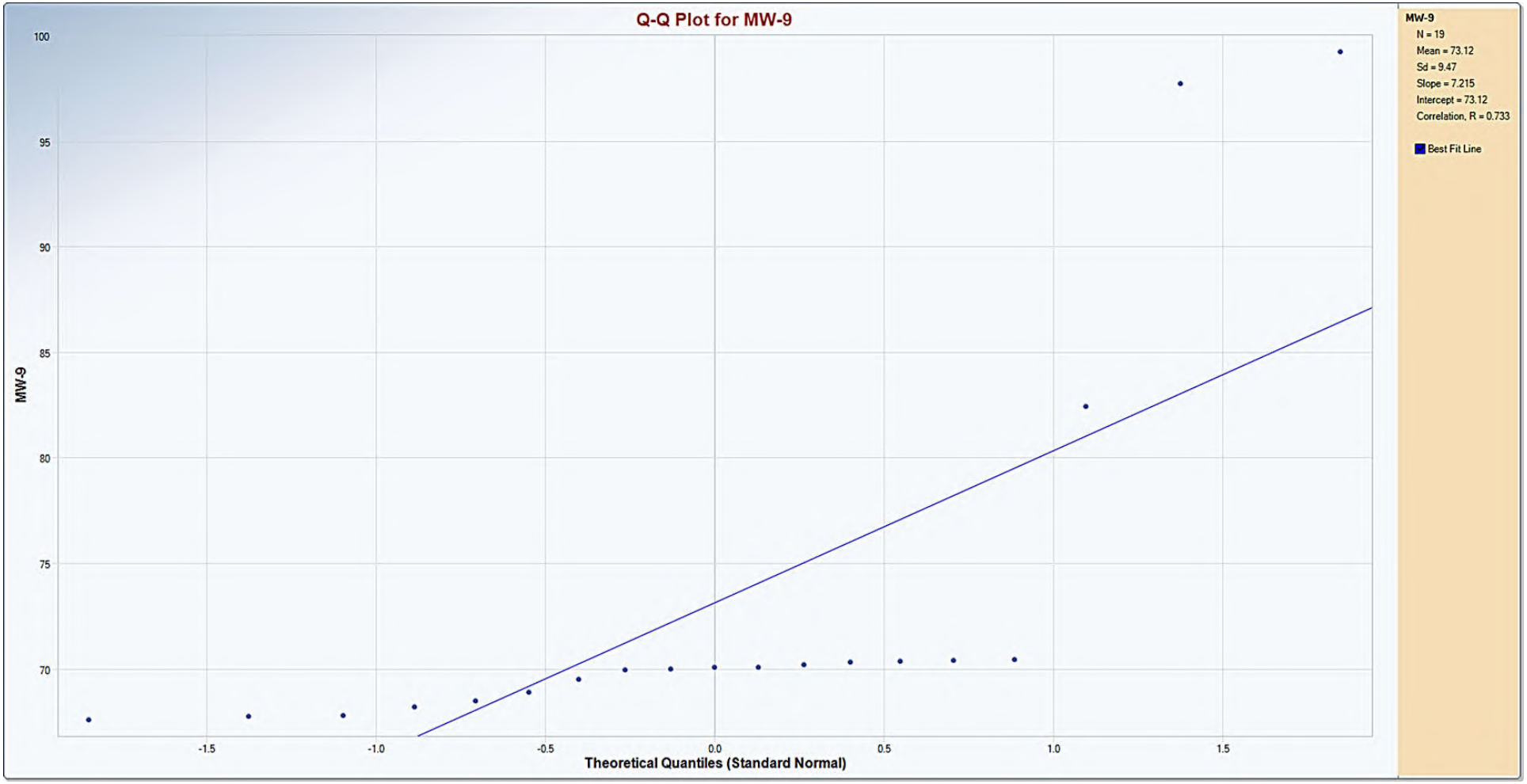
	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2			**User Selected Options**									
3			Date/Time of Computation	1/27/2020 11:24:39 AM								
4				From File	ProUCL water level data input.xls							
5				Full Precision	OFF							
6												
7												
8				**Rosner's Outlier Test for MW-3**								
9												
10												
11				**Mean**	**67.65**							
12				**Standard Deviation**	**2.522**							
13				**Number of data**	**36**							
14				**Number of suspected outliers**	**1**							
15												
16				Potential	Obs.	Test	Critical	Critical				
17	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
18	1	67.65	2.486	79.92	35	4.934	2.99	3.33				
19												
20	For 5% Significance Level, there is 1 Potential Outlier											
21	Potential outliers is: 79.92											
22												
23	For 1% Significance Level, there is 1 Potential Outlier											
24	Potential outliers is: 79.92											
25												
26												
27				**Rosner's Outlier Test for MW-16**								
28												
29												
30				**Mean**	**100.5**							
31				**Standard Deviation**	**3.22**							
32				**Number of data**	**32**							
33				**Number of suspected outliers**	**1**							
34												
35				Potential	Obs.	Test	Critical	Critical				
36	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
37	1	100.5	3.169	116.8	17	5.134	2.94	3.27				
38												
39	For 5% Significance Level, there is 1 Potential Outlier											
40	Potential outliers is: 116.8											
41												
42	For 1% Significance Level, there is 1 Potential Outlier											
43	Potential outliers is: 116.8											
44												
45												
46				**Dixon's Outlier Test for MW-9**								
47												
48	Number of Observations = 19											
49	10% critical value: 0.412											
50	5% critical value: 0.462											
51	1% critical value: 0.547											
52												

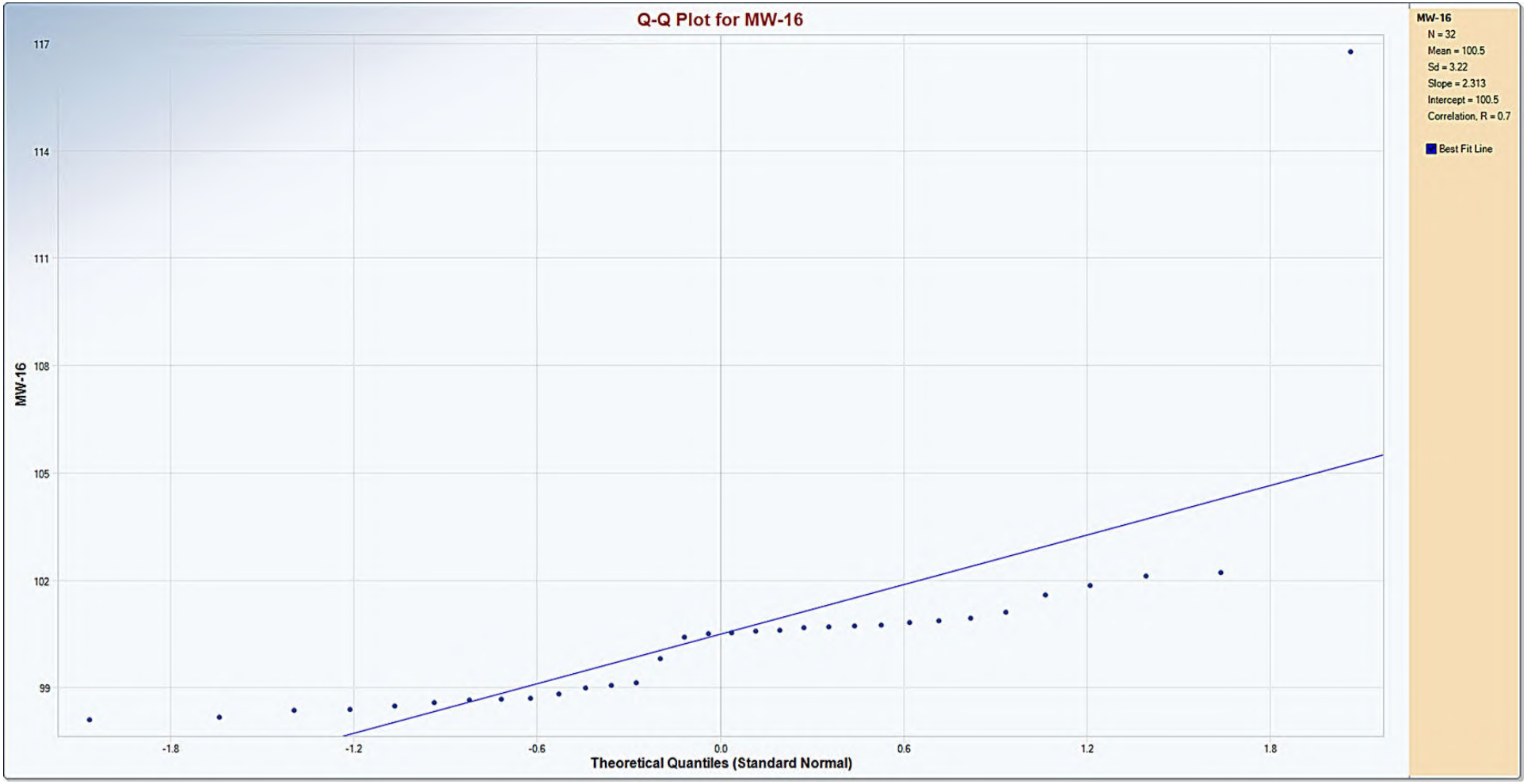
	A	B	C	D	E	F	G	H	I	J	K	L
53	**1. Observation Value 99.21 is a Potential Outlier (Upper Tai**											
54												
55	Test Statistic: 0.534											
56												
57	For 10% significance level, 99.21 is an outlier.											
58	For 5% significance level, 99.21 is an outlier.											
59	For 1% significance level, 99.21 is not an outlier.											
60												
61	**2. Observation Value 67.59 is a Potential Outlier (Lower Tail**											
62												
63	Test Statistic: 0.011											
64												
65	For 10% significance level, 67.59 is not an outlier.											
66	For 5% significance level, 67.59 is not an outlier.											
67	For 1% significance level, 67.59 is not an outlier.											
68												
69												
70	**Dixon's Outlier Test for PMW-18**											
71												
72	Number of Observations = 16											
73	10% critical value: 0.454											
74	5% critical value: 0.507											
75	1% critical value: 0.595											
76												
77	**1. Observation Value 62.67 is a Potential Outlier (Upper Tai**											
78												
79	Test Statistic: 0.094											
80												
81	For 10% significance level, 62.67 is not an outlier.											
82	For 5% significance level, 62.67 is not an outlier.											
83	For 1% significance level, 62.67 is not an outlier.											
84												
85	**2. Observation Value 46.55 is a Potential Outlier (Lower Tail**											
86												
87	Test Statistic: 0.793											
88												
89	For 10% significance level, 46.55 is an outlier.											
90	For 5% significance level, 46.55 is an outlier.											
91	For 1% significance level, 46.55 is an outlier.											
92												

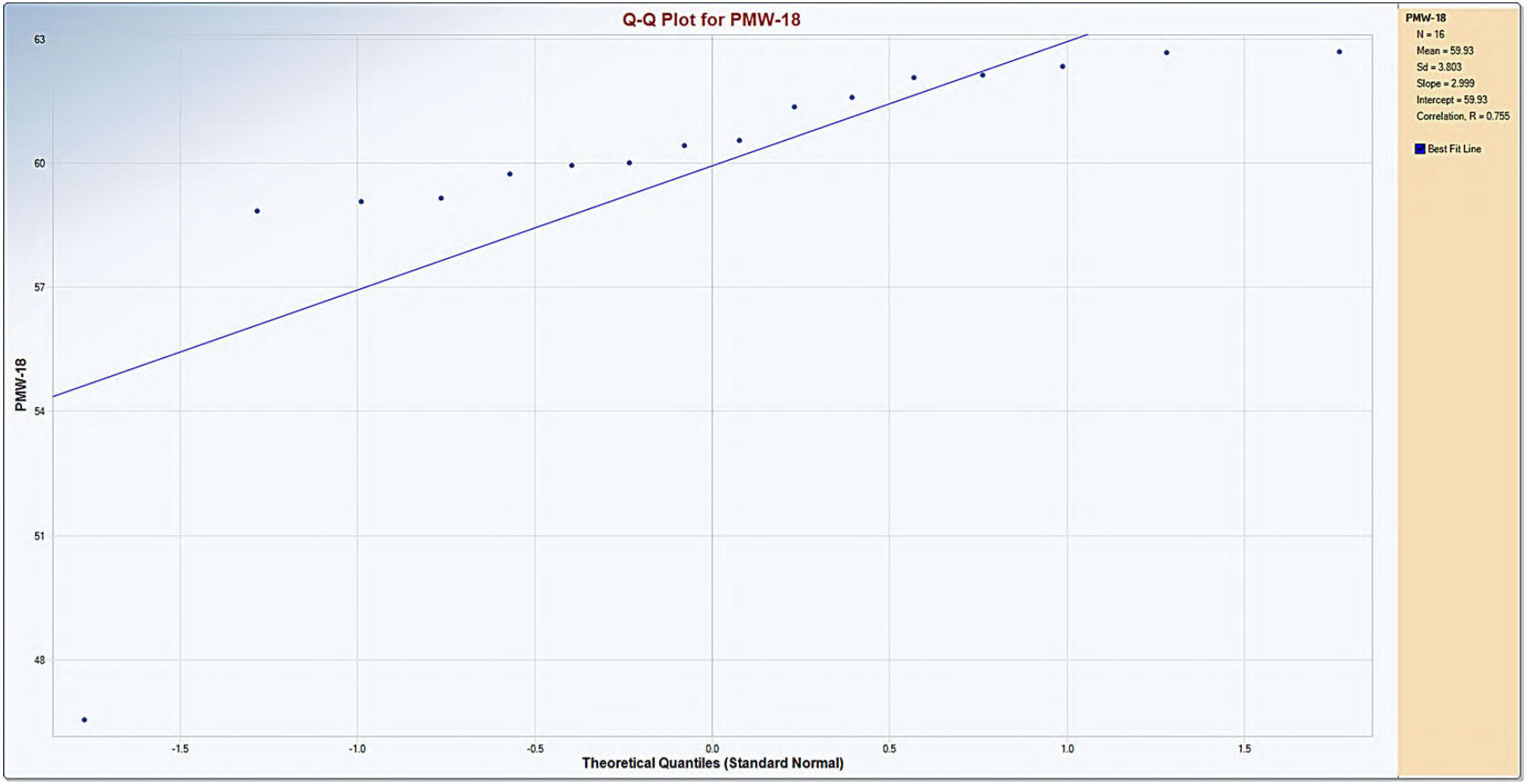
Groundwater Elevation Utilized for Outlier Test

Date	MW-3	MW-16	MW-9	PMW-18
Screened Interval (Note 9)	UC	UC	MCU	Conf/TZ
09/14/89	66.91	NR	NR	NR
10/30/89	67.35	NR	NR	NR
11/20/89	67.37	NR	NR	NR
12/27/89	67.11	NR	NR	NR
01/22/90	67.31	NR	NR	NR
02/26/90	67.50	NR	NR	NR
04/13/90	67.65	NR	NR	NR
05/13/90	68.35	NR	NR	NR
06/01/90	NR	NR	NR	NR
07/11/90	NR	NR	NR	NR
08/24/90	NR	NR	NR	NR
08/19/02	64.10	99.12	68.49	NR
09/26/02	63.74	98.97	67.73	NR
10/25/02	64.31	98.82	67.59	NR
11/25/02	65.17	98.68	67.76	NR
12/23/02	65.57	98.56	68.20	NR
01/28/03	66.09	98.47	68.87	NR
03/04/03	66.97	98.36	69.51	NR
03/27/03	67.84	98.64	69.99	NR
04/28/03	67.58	98.17	70.34	NR
05/28/03	67.64	98.69	70.42	NR
06/23/03	69.00	99.06	70.40	NR
07/21/03	67.96	99.81	70.29	NR
08/25/03	67.21	100.94	70.07	NR
09/16/03	66.90	101.58	69.94	NR
10/15/03	67.20	102.12	70.06	NR
11/08/03	67.34	102.21	70.20	NR
05/28/13	68.79	**116.75**	NR	62.06
06/27/13	69.10	100.69	NR	62.11
07/29/13	67.98	100.39	NR	60.53
08/27/13	67.49	100.58	NR	60.42
09/23/13	66.89	100.49	NR	59.14
10/29/13	67.27	100.60	NR	59.99
12/06/13	67.36	100.73	NR	59.07
01/31/14	68.23	100.80	NR	59.93
02/24/14 & 02/28/14	68.97	100.53	NR	62.67
03/24/14	69.20	98.38	NR	62.65
04/21/14	**79.92**	100.71	NR	61.58
05/28/14	70.12	100.66	NR	**46.55**
06/16/14	NR	100.85	NR	62.33
11/29/18	NR	98.10	**97.71**	58.83
01/10/19	NR	101.10	**82.41**	59.72
02/15/19	NR	101.84	**99.21**	61.35
06/27/19	NR	104.51	74.49	60.48
Highest Recorded	**79.92**	**116.75**	**99.21**	62.67
Lowest Recorded	63.74	98.10	67.59	**46.55**


Q-Q Plot for MW-3
MW-3
N = 36
Mean = 67.65
Sd = 2.522
Slope = 2.07
Intercept = 67.65
Correlation, R = 0.801
Best Fit Line
78
75
72
69
66
MW-3
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)


Q-Q Plot for MW-9
MW-9
N = 19
Mean = 73.12
Sd = 9.47
Slope = 7.215
Intercept = 73.12
Correlation, R = 0.733
Best Fit Line
MW-9
100
95
90
85
80
75
70
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Theoretical Quantiles (Standard Normal)


Q-Q Plot for MW-16
MW-16
N = 32
Mean = 100.5
Sd = 3.22
Slope = 2.313
Intercept = 100.5
Correlation, R = 0.7
Best Fit Line
117
114
111
108
105
102
99
MW-16
-1.8
-1.2
-0.6
0.0
0.6
1.2
1.8
Theoretical Quantiles (Standard Normal)


Q-Q Plot for PMW-18
PMW-18
63
60
57
54
51
48
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Theoretical Quantiles (Standard Normal)
PMW-18
N = 16
Mean = 59.93
Sd = 3.803
Slope = 2.999
Intercept = 59.93
Correlation, R = 0.755
Best Fit Line

ADVANCED GeoServices
a Montrose Environmental Group company

APPENDIX P

Groundwater Sampling Purge Sheets

ADVANCED GeoServices

a Montrose Environmental Group company

2020 Groundwater Sampling Purge Sheets

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/29/20

Well ID: MW-17
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 1.74
DTB (ft.TOC): 7.65
1 Volume (Gal):

Purge start/stop time: 0815
Purge Rate (ml/min): 115
Pump Setting (ft. TOC): 5'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0834	5.72	6.4	0.046	8.96	251.2	—
0838	4.70	7.1	0.040	7.11	254.5	—
	DTW = 2.84 ↓ (→)			Flow = 115 ml/min		
0842	4.34	6.9	0.039	6.82	263.4	162
0846	4.19	6.9	0.040	6.47	269.2	125
0850	4.14	7.0	0.039	6.25	273.0	116
0854	4.19	7.1	0.039	5.73	270.5	102.9
0858	4.20	7.0	0.040	5.38	269.1	98.5
0902	4.19	7.0	0.039	5.39	268.7	99.7
0905	4.20	7.0	0.039	5.33	268.3	96.2
0908	4.24	7.0	0.039	5.45	266.4	93.4
0911	4.26	7.0	0.039	5.42	266.4	93.6
0914	4.24	6.8	0.039	5.28	267.3	98.7
0917	4.22	6.8	0.039	5.14	268.3	88.9
0920	4.21	6.9	0.039	5.19	270.0	87.8
0923	4.27	7.0	0.038	5.19	267.3	88.9
0926	4.26	6.9	0.038	5.08	268.2	87.9
0929	4.24	6.8	0.039	5.05	269.8	83.7
0932	4.23	6.8	0.039	4.90	271.2	82.5
0935	4.22	6.8	0.039	4.92	272.7	83.7
0938	4.25	6.9	0.039	5.01	272.0	82.5
0941	4.24	6.7	0.039	4.96	~~233~~ 273.0	82.8
0944	4.25	7.0	0.039	4.93	273.4	81.3
0947	4.23	6.9	0.039	4.89	273.2	77.2
0950	4.26	6.8	0.039	4.87	274.8	74.8
0951	Sample MW-17 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 0951
Volume removed: 2.5 gallons
Final DTW: 3.05
Sampled By: AWJ/MCB
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/29/20

Well ID: MW-18
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 14.29
DTB (ft.TOC): 19.50
1 Volume (Gal):

Purge start/stop time: 1043
Purge Rate (ml/min): 220
Pump Setting (ft. TOC): 17'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1053	5.48	10.8	0.083	6.60	233.9	104
1057	5.55	11.0	0.086	4.03	226.2	57.8
	DTW = 14.30 → Flow = 220 ml/min					
1101	5.54	10.9	0.088	4.05	225.4	42.0
1105	5.50	11.0	0.086	4.08	223.1	31.1
1109	5.50	11.1	0.081	3.87	222.0	27.8
1113	5.34	11.0	0.082	3.66	223.2	20.3
1117	5.42	11.1	0.083	3.67	222.8	18.6
1121	5.43	11.3	0.081	3.57	221.1	23.9
1125	5.42	11.1	0.082	3.54	221.6	23.1
1129	5.40	11.5	0.083	3.49	222.9	21.2
1133	5.48	11.9	0.085	3.46	217.5	15.0
1137	5.41	11.4	0.086	3.45	222.3	13.8
1140	5.41	11.6	0.086	3.44	221.4	13.3
1143	5.44	11.6	0.085	3.47	218.7	13.4
1146	5.49	12.2	0.086	3.43	215.5	13.2
1147	Sample MW-18 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1147
Volume removed: 3 gallons
Final DTW: 14.30
Sampled By: MCB
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/29/20

Well ID: MW-19
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 23.00
DTB (ft.TOC): 29.95
1 Volume (Gal):

Purge start/stop time: 1330
Purge Rate (ml/min): 220/160/110
Pump Setting (ft. TOC): 26'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

	Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1336	~~MW-19~~	4.22	12.09	0.073	6.17	338	>1000
	1340	4.23	12.14	0.073	6.10	339	582
	Flow = 220 ml/min			DTW = 23.02 →			
lower flow to 160 ml/min →	1344	4.23	12.28	0.071	6.04	342	224
	1359	4.20	12.27	0.068	6.03	359	47.9
	1404	4.19	12.18	0.068	5.97	362	40.7
	1407	4.18	12.38	0.068	6.19	365	32.1
	1410	4.19	12.28	0.068	6.41	354	29.3
	1413	4.20	12.25	0.068	6.64	349	26.0
	1416	4.20	12.25	0.068	6.41	354	24.1
lower flow to 110 ml/min →	1419	4.19	12.25	0.068	6.33	363	22.0
	1422	4.19	12.14	0.069	5.89	366	20.3
	1425	4.19	11.98	0.069	5.86	367	19.9
	1428	4.19	11.92	0.068	5.84	368	19.5
	1430 sample MW-19 for all parameters except diss metals						
	Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1430
Volume removed: 3 gallons
Final DTW: 23.02
Sampled By: AWD
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/29/20

Purge start/stop time: 1250
Purge Rate (ml/min): 210
Pump Setting (ft. TOC): 53
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Well ID: MW-2D
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 44.08
DTB (ft.TOC): 57.20
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1300	~~4.08~~ 4.08	11.8	0.067	7.85	238.2	534
1304	~~4.02~~ 4.02	11.4	0.067	4.06	248.9	542
	DTW = 44.15 →		Flow Rate = 210 ml/min			
1308	3.97	11.2	0.067	3.89	258.0	593
1312	3.98	11.3	0.067	4.15	262.7	576
1317	3.92	11.5	0.067	6.37	276.2	487
1322	3.91	11.4	0.066	7.09	288.8	432
1327	3.92	11.6	0.066	7.39	300.3	329
1332	3.96	11.6	0.065	7.20	310.2	276
1337	3.95	11.5	0.065	7.24	315.4	254
1342	3.94	11.4	0.065	7.69	323.1	227
1347	3.94	11.4	0.064	8.21	324.1	182
1352	3.92	11.2	0.064	8.28	335.5	195
1357	3.93	11.2	0.064	8.54	338.3	150
1402	3.96	11.2	0.064	8.48	342.4	156
1407	3.97	11.2	0.064	8.64	341.8	152
1410	3.95	11.2	0.064	8.65	345.4	150
1413	3.95	11.0	0.064	8.79	345.5	138
1416	3.92	10.4	0.064	9.05	349.5	132
1419	3.85	10.2	0.064	9.01	354.9	120
1443	3.92	9.9	0.064	9.41	355.9	114
1446	3.92	9.9	0.064	9.45	358.2	105.8
1449	3.94	10.0	0.065	9.35	359.5	108.6
1451	3.95	10.0	0.063	9.46	358.9	102.6
1454	3.96	9.9	0.064	9.55	355.4	101.9
1457	3.96	9.8	0.065	9.63	359.5	98.1
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1458
Volume removed: 4.5 gallons
Final DTW: 44.45
Sampled By: MCB

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dissolved Metals

Filter Type/Analysis:

Well Condition/Comments: Well burried in ≈ 3' of sand, had to be dug out and sloped to prevent sand from entering well

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/27/20
Purge start/stop time: 1552 / 1725 Ap
Purge Rate (ml/min): 220/100
Pump Setting (ft. TOC): 210
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Well ID: PMW-11
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 84.30
DTB (ft.TOC): 219.5
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1608	4.13	9.2	0.031	9.82	352.2	42.2
1612	4.25	10.3	0.030	7.79	344.4	220
	Flow = 220 ml/min		DTW = 85.43 →			
1616	4.24	10.6	0.030	7.40	345.3	176
1620	4.23	10.7	0.030	5.48	347.3	215
1624	4.23	11.0	0.030	4.36	344.9	325
1628	4.14	11.0	0.030	3.61	355.9	336
1634	4.27	10.0	0.030	3.16	354.9	325
1638	3.88	9.7	0.030	2.80	374.8	282
1642	4.12	10.1	0.030	2.78	362.2	271
1646	4.10	9.2	0.030	2.73	365.0	260
1650	4.01	8.9	0.030	2.79	370.7	213
1654	3.99	8.7	0.030	2.67	373.1	192
1658	4.00	8.8	0.030	2.56	372.7	177
1702	4.06	8.9	0.030	2.50	370.0	148
1706	4.08	8.7	0.030	2.51	370.2	126
1710	4.06	8.8	0.030	2.40	371.3	122
1713	4.07	8.5	0.030	2.44	371.7	124
1716	4.05	8.6	0.030	2.38	373.4	116
1719	4.09	8.5	0.030	2.34	373.3	128
1722	4.06	8.2	0.030	2.32	375.8	~~1725~~ Ap 135
1725	4.02	8.4	0.030	2.23	376.9	137
☆ 1726	Sample PMW-11 for all parameters					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1726
Volume removed: 3 gallons
Final DTW: 85.43
Sampled By: AWD / MCB
Well Condition/Comments:

Analysis: All
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dissolved Metals
Filter Type/Analysis: 0.45 micron / Diss Metals

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/30/20

Well ID: PMW-13
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 103.27
DTB (ft.TOC): 274.0
1 Volume (Gal):

Purge start/stop time: 0830
Purge Rate (ml/min): 140
Pump Setting (ft. TOC): 260
Screened Interval: 250-270
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0850	4.06	8.5	0.051	2.29	243.2	235
0854	4.06	8.8	0.055	2.39	241.0	318
0858	Flow = 140 ml/min			DTW = 103.50		
0858	4.00	8.7	0.057	1.98	293.1	359
0902	3.92	8.8	0.057	1.66	298.1	390
0906	3.90	8.9	0.058	1.41	301.1	348
0910	3.84	9.1	0.059	1.16	312.1	304
0915	3.85	9.1	0.059	1.03	319.6	254
0920	3.84	9.1	0.059	0.98	320.5	215
0925	3.82	9.1	0.060	0.91	326.1	166
0930						AND
0935	3.83	9.1	0.060	0.82	335.6	98.8
0938	3.82	9.2	0.060	0.77	336.9	73.4
0941	3.81	8.9	0.060	0.79	338.3	62.4
0944	3.82	9.0	0.060	0.73	341.5	58.5
0947	3.84	9.2	0.060	0.75	341.6	48.2
0950	3.83	9.0	0.060	0.73	343.3	46.7
0953	3.83	9.1	0.060	0.69	343.9	41.0
0956	3.83	9.0	0.060	0.71	344.2	37.9
0959	3.82	8.9	0.060	0.69	345.7	37.1
10:00 sample PMW-13 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 10:00
Volume removed: 2-5 gallons
Final DTW: 103.70
Sampled By: MCB

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~

Well Condition/Comments: Collect FD, PMW-13-D w/sample time = 10:30

Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/30/20

Well ID: MW-15
Well Diameter/Material: 4" PVC
DTW (ft. TOC): 78.20
DTB (ft.TOC): 83.95
1 Volume (Gal):

Purge start/stop time: 0850
Purge Rate (ml/min): 200/~~100~~ 115/100
Pump Setting (ft. TOC): 85
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0906	5.29	9.86	0.029	4.64	241	39.9
	Flow = 200 ml/min			DTW = 78.38 ↓(→)		
0910	Lower flow to 115 ml/min			DTW = 78.92 ↓→		
0914	4.55	9.38	0.031	4.08	240	40.9
0918	4.48	9.34	0.032	3.63	236	43.3
0927	4.35	9.14	0.035	2.99	230	50.2
0934	4.39	9.43	0.037	2.47	220	53.5
	Lower flow to 100 ml/min			DTW = 79.16 →		
0940	4.50	9.47	0.039	2.05	208	53.1
0944	4.51	9.63	0.040	2.05	206	54.5
0947	4.52	9.99	0.041	1.90	202	53.1
0950	4.55	10.11	0.041	1.85	199	52.9
0953	4.57	10.18	0.042	1.78	196	48.4
0956	4.58	10.09	0.042	1.75	194	49.5
0959	4.60	10.13	0.042	1.71	192	50.1
1002	4.60	10.11	0.043	1.64	190	50.4
1005	4.59	10.03	0.043	1.61	190	49.3
⊗ 1006	Sample MW-15 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1006
Volume removed: 2 gallons
Final DTW: 79.16
Sampled By: AWD

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~

Well Condition/Comments:

Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/30/20

Purge start/stop time: 1150
Purge Rate (ml/min): 130
Pump Setting (ft. TOC): 80
Screened Interval: 75-85
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Well ID: MW-16
Well Diameter/Material: 4" PVC
DTW (ft. TOC): 76.80
DTB (ft.TOC): 82.90
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1212	5.41	8.52	0.085	10.05	288	2.6
	Flow = 130 ml/min DTW = 77.14 →					
1220	5.42	8.66	0.072	9.61	307	2.7
1232	5.39	8.66	0.072	9.43	320	3.4
1241	5.24	8.84	0.068	6.11	331	2.8
1244	5.26	8.84	0.068	6.06	333	3.0
1247	5.26	9.01	0.066	6.13	335	3.1
1250	5.26	9.06	0.066	6.19	336	2.8
1251	Sample MW-16 for all parameters except dis metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1251
Volume removed: 2 gallons
Final DTW: 77.14
Sampled By: AWD
Well Condition/Comments:

Analysis: All except dis metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/30/20

Well ID: PMW-12
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 115.85
DTB (ft.TOC): 239.20
1 Volume (Gal):

Purge start/stop time: 1130
Purge Rate (ml/min): 200/100
Pump Setting (ft. TOC): 220
Screened Interval: 210-230
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1136	5.25	9.9	0.066	2.18	281.2	153
1141	5.43	10.1	0.066	1.97	244.6	219
~~1148~~	Flow = 200 ml/min		DTW = 115.70 →			
1153	5.45	10.6	0.066	1.50	194.2	323
1158	5.43	10.8	0.067	1.07	175.1	273
1203	5.41	10.9	0.067	0.82	164.3	237
1208	5.46	10.9	0.067	0.72	152.1	209
1213	5.39	9.6	0.069	0.72	143.1	195
1218	5.18	8.3	0.070	0.77	144.6	194
1223	5.06	9.5	0.071	0.68	144.3	201
1228	5.47	9.8	0.071	0.70	110.6	186
1233	5.34	9.4	0.069	0.71	113.1	185
1238	5.39	9.8	0.067	0.67	108.2	186
1243	5.40	9.6	0.067	0.68	107.0	173
	Reduce flow to 100 ml/min					
1248	5.32	9.2	0.066	0.66	111.6	169
1253	5.30	9.6	0.069	0.61	110.6	167
☆ 1254	Sample PMW-12 for all parameters					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1254
Volume removed: 3.25 gallons
Final DTW: 115.7
Sampled By: MCB
Well Condition/Comments:

Analysis : All
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dissolved Metals
Filter Type/Analysis: 0.45 micron / diss metals

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/30/20

Well ID: MW-24
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 17.94
DTB (ft.TOC): 30.70
1 Volume (Gal):

Purge start/stop time: 1550
Purge Rate (ml/min): 200/120
Pump Setting (ft. TOC): 26
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1556	5.09	10.6	0.070	7.18	154.7	261
1601	5.12	10.5	0.070	7.21	154.3	183
	Flow = 200 ml/min		DTW = 18.94 →			
1606	5.09	10.4	0.070	7.16	159.6	140
1611	4.95	9.8	0.070	7.19	177.4	73.5
1616	4.91	10.0	0.070	6.91	187.2	44.9
1621	4.98	9.9	0.070	7.23	187.6	37.7
	Adjust flow to 120 ml/min					
1626	4.92	9.8	0.070	6.97	196.1	30.8
1629	4.93	10.1	0.070	6.82	197.7	31.8
1632	4.97	10.1	0.070	7.11	193.0	24.2
1635	4.95	9.8	0.070	7.14	199.8	23.1
1638	4.91	9.9	0.070	7.03	209.2	20.8
1641	4.92	10.1	0.070	7.02	206.5	16.6
1644	4.94	10.1	0.070	7.10	208.8	15.9
1647	4.94	9.8	0.070	7.22	210.1	14.0
1650	4.92	10.0	0.070	6.99	215.5	10.12
1653	4.92	10.0	0.070	7.10	216.6	9.69
1656	4.91	10.1	0.070	7.09	217.7	9.82
1657	Sample MW-24 for all parameters except diss Metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1657
Volume removed: 2.25 gallons
Final DTW: 18.93
Sampled By: MCB

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dissolved Metals

Well Condition/Comments:

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/30/20
Purge start/stop time: 1548
Purge Rate (ml/min): 160/100
Pump Setting (ft. TOC): 58'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Well ID: MW-21
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 54.44
DTB (ft.TOC): 61.90
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1600	10.24	4.83	0.069	7.68	343	458
1605	10.44	4.67	0.070	7.14	380	536
	Flow = 160 ml/min		DTW = 54.87 ↓(→)			
1610	10.54	4.63	0.071	7.32	396	389
1617	10.67	4.50	0.070	7.13	411	265
1622	10.64	4.46	0.069	7.09	413	260
	Flow = 100 ml/min		DTW = 54.68 →			
1626	10.39	4.52	0.070	7.06	408	236
1630	9.44	4.45	0.069	6.98	415	214
1638	9.56	3.10	0.069	6.92	475	177
1645	9.37	2.92	0.070	6.87	483	137
1649	9.24	2.86	0.070	6.89	486	109
1653	9.26	2.84	0.069	7.31	469	79.1
1656	9.29	2.83	0.068	7.01	478	58.0
1659	9.27	2.83	0.068	7.00	480	51.5
1702	9.19	2.80	0.067	6.96	483	38.7
1705	9.15	2.82	0.068	7.03	483	28.5
1708	9.13	2.83	0.068	7.00	482	30.4
1711	9.09	2.84	0.067	6.98	482	28.1
1712 Sample MW-21 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1712
Volume removed: 2.75 gallons
Final DTW: 54.68
Sampled By: AWD
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/31/20

Well ID: MW-5
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 32.18
DTB (ft.TOC): 53.50
1 Volume (Gal):

Purge start/stop time: 0905
Purge Rate (ml/min): 200
Pump Setting (ft. TOC): 49
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0920	3.83	7.69	0.051	8.06	362	17.3
0924	3.70	8.86	0.050	7.42	364	14.2
	Flow = 200 ml/min			DTW = 32.30 →		
0928	3.66	10.35	0.050	7.26	374	14.9
0948	3.33	11.33	0.049	9.93	410	9.3
0951	3.34	11.33	0.049	9.80	413	7.4
0954	3.36	11.32	0.049	9.68	415	7.1
0957	3.37	11.33	0.049	9.57	416	6.9
1000	3.38	11.34	0.049	9.51	417	6.8
☆ 1001 sample MW-5 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 10:01
Volume removed: 2gal/loc
Final DTW: 32.30
Sampled By: AWP
Well Condition/Comments: Also collect MS/MSD here

Analysis : All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/5/20

Well ID: MW-4
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 30.06
DTB (ft.TOC): 46.5
1 Volume (Gal):

Purge start/stop time: 0942
Purge Rate (ml/min): 180/100
Pump Setting (ft. TOC): 41'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0958	~~4.43~~ 5.53	10.9	0.064	9.02	224.9	20.4
1003	5.26	11.1	0.065	8.07	232.4	19.4
	Flow = 180		DTW = 30.05 →			
1008	4.98	11.1	0.063	6.32	263.0	12.4
1013	4.93	11.0	0.063	5.88	270.1	13.0
* 1015	Flow rate lowered to 100 ml/min					
1018	4.93	10.7	0.064	5.27	274.6	10.53
1023	4.86	10.1	0.063	5.02	287.2	8.78
1028	4.84	10.5	0.063	4.38	286.8	9.13
1033	4.82	10.4	0.063	4.54	290.0	8.32
1036	4.82	10.4	0.063	3.95	290.8	8.31
1039	4.80	10.3	0.063	3.74	293.8	7.45
1042	4.81	10.4	0.063	3.73	295.0	6.95
1045	4.82	10.4	0.063	3.60	295.2	6.54
1048	4.82	10.4	0.063	3.60	295.4	7.08
* Sample	MW-4	for	all parameters @		10:49	
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1049
Volume removed: 2 gallons
Final DTW: 30.05
Sampled By: MCB

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dissolved Metals

Well Condition/Comments:

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/31/20

Well ID: PMW-28
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 65.65
DTB (ft.TOC): 74.70
1 Volume (Gal):

Purge start/stop time: 1255
Purge Rate (ml/min): 170/100
Pump Setting (ft. TOC): 69
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1310	4.42	10.84	0.065	7.78	385	>1000
1314	4.90	11.06	0.063	7.59	367	801
	Flow = 170 ml/min DTW = 65.81 →					
1318	4.62	11.31	0.053	8.19	369	550
1322	4.45	11.38	0.053	8.39	377	419
1326	4.24	11.43	0.049	8.89	370	200
1330	4.95	11.40	0.049	8.61	361	171
1334	5.19	11.41	0.048	8.33	341	144
1338	5.32	11.37	0.048	8.24	330	136
1342	5.35	11.29	0.048	8.15	329	128
	Lower flow to 100 ml/min DTW = 65.81 →					~~109~~ 4ms
1346	5.31	11.31	0.048	8.07	332	~~97.3~~ 109
1350	5.28	11.39	0.048	8.11	331	~~87.2~~ 97.3
1354	5.30	11.43	0.048	8.09	328	87.2
1357	5.34	11.41	0.048	8.12	327	87.0
1400	5.30	11.40	0.048	8.16	327	89.0
☆ 1407	Sample PMW-28 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1407
Volume removed: 3 gallons
Final DTW: 65.81
Sampled By: AWJ
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/31/20

Well ID: PMW-6
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 14.50
DTB (ft.TOC): 30.55
1 Volume (Gal):

Purge start/stop time: 1335
Purge Rate (ml/min): ~~160/110~~ 160
Pump Setting (ft. TOC): 20
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1340	5.06	11.1	0.054	5.78	289.1	37.7
1345	5.06	11.4	0.055	5.54	287.9	31.3
	DTW =	14.48 →		Flow = 160	ml/min	
1350	5.05	11.3	0.055	5.43	287.7	22.8
1355	5.02	11.3	0.055	5.44	288.7	19.2
1400	4.96	11.3	0.054	5.31	292.9	9.42
1405	4.94	11.3	0.053	5.32	293.8	8.12
1408	4.95	11.3	0.054	5.22	293.7	8.97
1411	4.95	11.3	0.054	5.23	293.4	8.13
⊠ 1412	Sample	PMW-6	for all	parameters	except dis	metals
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 14:12
Volume removed: 1.25
Final DTW: 1442
Sampled By: MCB

Analysis: All except dis metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~

Well Condition/Comments: collect FD labeled PMW-6-D @ 1442 (sample time recorded on COC as 1442)

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/31/20

Well ID: MW-30
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 13.85
DTB (ft.TOC): 20.50
1 Volume (Gal):

Purge start/stop time: 1548
Purge Rate (ml/min): 100
Pump Setting (ft. TOC): 17/18.5
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1603	4.50	4.50 8.99	0.057	5.90	327	84.9
1612	4.17	9.09	0.056	3.06	334	41.9
1624	5.56	9.25	0.056	2.62	266	40.7
	Flow = 100 ml/min		DTW = 15.45 ↓ (very, very small change)			
1630	5.39	10.11	0.055	2.34	274	34.2
1633	5.40	10.13	0.055	2.41	276	33.4
1636	5.37	10.09	0.054	2.34	279	33.9
1639	5.35	10.03	0.054	2.30	282	33.6
1640	sample MW-30 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

lower pump to 18.5

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1640
Volume removed: 1 gallon
Final DTW: 17.12
Sampled By: AWD
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dis~~solved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 1/31/20

Well ID: MW-25
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 35.44
DTB (ft.TOC): 45.95
1 Volume (Gal):

Purge start/stop time: 1600
Purge Rate (ml/min): 110
Pump Setting (ft. TOC): 42
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1602	4.87	11.0	0.044	6.08	305.3	448
1607	4.88	10.9	0.043	5.84	305.9	366
	Flow =	110 ml/min		DTW = 35.35 →		
1612	4.80	11.1	0.043	5.53	313.2	243
1617	4.81	11.1	0.043	5.43	314.1	238
1622	4.82	11.2	0.043	5.27	315.0	186
1627	4.80	11.2	0.043	5.02	317.4	163
1632	4.80	11.2	0.043	4.81	318.9	142
1635	4.78	11.3	0.043	4.61	321.2	125
1638	4.79	11.3	0.043	4.67	321.0	117
1641	4.81	11.4	0.043	4.68	320.4	109.6
1644	4.82	11.4	0.043	4.53	320.6	102.4
1647	4.81	11.4	0.043	4.50	320.9	96.3
1650	4.77	11.3	0.043	4.38	324.1	89.8
1653	4.77	11.2	0.043	4.30	325.5	90.0
1654	Sample MW-25 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1654
Volume removed: 2 gallons
Final DTW: 35.33
Sampled By: ACB
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/3/20

Well ID: PMW-23
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 108.20
DTB (ft.TOC): 228.0
1 Volume (Gal):

Purge start/stop time: 0810
Purge Rate (ml/min): 180 / 110
Pump Setting (ft. TOC): 218
Screened Interval: 208-228
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0832	4.77	10.1	0.030	7.96	291.9	342
0837	4.12	10.5	0.029	8.58	271.1	474
Flow = 180 ml/min DTW = 107.90 →						
0842	3.81	9.8	0.029	9.44	293.6	417
0847	3.74	9.9	0.029	8.71	299.7	398
Lowered flow to 110 ml/min						
0852	3.92	10.3	0.029	8.02	290.6	336
0857	3.97	11.0	0.029	6.78	290.5	342
0902	4.00	11.3	0.029	6.41	291.0	276
0907	4.00	11.3	0.029	6.10	294.4	343
0912	3.99	11.8	0.029	5.74	300.1	378
0917	4.01	11.6	0.029	5.78	303.2	309
0922	3.95	11.5	0.029	5.54	308.7	283
0927	3.97	12.0	0.029	5.31	314.5	278
0930	3.99	12.0	0.029	5.32	314.2	253
0933	3.98	11.9	0.029	5.31	316.7	266
0936	3.99	11.9	0.029	5.30	321.8	256
0939	3.92	11.7	0.029	5.18	327.2	244
0942	3.90	11.8	0.029	5.12	328.5	263
☆ 0943 Sample PMW-23 for all parameters						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 0943
Volume removed: 2.25
Final DTW: 107.90
Sampled By: MCB
Well Condition/Comments:

Analysis : All
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, Dissolved Metals
Filter Type/Analysis: 0.45 micron / Diss Metals

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3864
Date: 2/3/20

Well ID: MW-22
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 27.09
DTB (ft.TOC): 36.25
1 Volume (Gal):

Purge start/stop time: 0837
Purge Rate (ml/min): 170/100
Pump Setting (ft. TOC): 31'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0858	4.12	8.75	0.067	5.95	282	994
0905	3.89	9.18	0.057	5.11	319	828
Flow = 170 ml/min DTW = 27.14 →						
0908	3.96	9.90	0.054	4.91	328	636
0913	4.12	10.35	0.052	4.70	334	322
0920	4.06	10.77	0.051	4.60	343	152
0929	4.76	10.93	0.049	6.14	312	95.3
0933	4.85	11.02	0.049	4.32	316	57.9
0937	5.02	11.13	0.049	4.47	314	45.2
0940	4.81	11.09	0.049	4.28	323	51.9
0943	4.73	11.22	0.049	4.22	331	57.6
Lower flow rate to 100 ml/min					~~314~~ →	~~57.6~~ AW
0946	5.02	10.92	0.049	4.39	319	58.1
0949	5.05	10.90	0.049	4.29	317	59.5
0952	4.99	11.03	0.049	4.27	322	63.9
0953 Sample MW-22 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 0953
Volume removed: 2.5 gal(s)
Final DTW: 27.14
Sampled By: AW
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/3/20

Well ID: MW-6
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 27.55
DTB (ft.TOC): 44.53
1 Volume (Gal):

Purge start/stop time: 1147
Purge Rate (ml/min): 160
Pump Setting (ft. TOC): 41
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1158	4.65	15.22	0.049	7.39	320	8.5
Flow = 160 ml/min DTW = 27.70 →						
1209	4.85	14.66	0.046	7.02	321	0.1
1214	4.89	14.49	0.046	6.99	325	0.0
1218	4.87	14.11	0.046	6.91	327	0.1
1222	4.88	14.11	0.046	6.86	331	0.0
1225	4.88	14.05	0.045	7.04	325	0.0
1228	4.86	14.03	0.046	6.90	327	0.0
1231	4.90	13.99	0.045	6.88	329	0.0
1234	4.92	13.99	0.045	6.82	329	0.0
1235	Sample MW-6 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 12:35
Volume removed: 1.5 gallons
Final DTW: 27.70
Sampled By: AWD

Analysis : All except diss Metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~

Well Condition/Comments: FD collected with sample time = 1305 (MW-6-D)

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/3/20

Well ID: MW-29
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 4.12
DTB (ft.TOC): 22.5
1 Volume (Gal):

Purge start/stop time: 1153
Purge Rate (ml/min): 180/110
Pump Setting (ft. TOC): 18
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1156	4.16	13.4	0.074	7.80	310.2	95.4
1201	4.03	13.7	0.067	1.40	314.6	59.6
Flow = 180 ml/min			DTW = 4.07 →			
1206	4.09	13.3	0.067	1.57	315.5	40.6
1211	4.00	13.2	0.067	2.09	323.1	32.3
1216	4.03	13.2	0.067	1.12	320.6	28.7
1221	4.04	13.1	0.067	1.01	317.8	21.6
1226	4.06	13.3	0.065	0.82	308.9	22.9
1229	4.08	13.2	0.065	0.79	306.7	20.1
1232	4.08	13.3	0.064	0.74	305.0	15.4
Lowered flow to 110 ml/min						
1235	4.08	13.3	0.064	0.72	301.9	12.1
1238	4.07	13.3	0.064	0.70	302.3	12.6
1241	4.07	13.3	0.064	0.70	298.6	12.0
1244	4.03	13.6	0.064	0.67	297.3	12.1
1247	4.10	13.6	0.063	0.68	295.2	10.92
1250	4.12	13.4	0.063	0.67	293.7	11.02
1253	4.09	13.5	0.063	0.67	294.2	11.00
1254	Sample MW-29 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1254
Volume removed: 2.25 gallons
Final DTW: 4.06
Sampled By: MCB

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~

Well Condition/Comments:

Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/3/20

Well ID: MW-14
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 41.75
DTB (ft.TOC): 80.20
1 Volume (Gal):

Purge start/stop time: 1425
Purge Rate (ml/min): 160/100
Pump Setting (ft. TOC): 76
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1430	5.74	15.0	0.113	1.19	-2.6	112
1435	5.84	14.9	0.113	1.09	-10.7	108.4
Flow = 160 ml/min			DTW = 43.21 ↓			
1440	5.81	14.5	0.114	0.69	-12.5	159
1445	5.83	14.4	0.113	0.59	-15.2	144
1450	5.92	14.8	0.113	0.47	-25.7	76.6
Flow decreased to 100 ml/min, No RECHARGE						
1455	5.99	14.6	0.113	0.46	-27.3	81.3
1458	5.90	14.3	0.113	0.47	-22.6	73.3
1501	5.90	14.1	0.113	0.45	-22.7	78.1
1504	5.91	14.1	0.113	0.47	-23.0	77.1
1507	5.90	13.9	0.113	0.45	-22.3	75.7
1510	5.90	14.1	0.113	0.44	-22.8	70.0
1513	5.95	13.9	0.113	0.42	-25.2	70.5
1516	5.94	13.7	0.113	0.41	-24.7	73.2
1519	5.87	13.4	0.113	0.41	-19.7	66.5
1522	5.86	13.5	0.113	0.42	-19.4	60.6
1525	5.86	13.4	0.113	0.41	-20.8	63.2
* 1526 Sample MW-14 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1526
Volume removed: 1.75 gal/bcs
Final DTW: 52.39
Sampled By: MCB
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/3/20

Well ID: PMW-18
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 14.17
DTB (ft.TOC): 85.11
1 Volume (Gal):

Purge start/stop time: 1424
Purge Rate (ml/min): 200/100
Pump Setting (ft. TOC): 85'
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1439	4.46	15.25	0.029	9.32	328	260
1444	3.44	14.67	0.026	6.88	387	>1000
	Flow = 200 ml/min			DTW = 14.15 →		
1450	4.11	14.19	0.028	6.61	384	>1000
1456	3.83	13.89	0.029	6.47	413	751
1500	3.45	13.72	0.029	6.35	431	422
1504	3.89	13.59	0.029	6.16	414	333
1508	4.03	13.41	0.029	6.14	384	270
1512	4.11	13.38	0.029	10.49	~~208~~ 378	208
1516	4.20	13.36	0.029	6.33	~~191~~ 386	191
	Lower flow to 100 ml/min					
1539	3.05	13.71	0.029	6.03	448	130
1542	3.28	13.70	0.029	6.05	426	127
1545	3.50	13.69	0.029	6.08	417	122
1548	3.96	13.65	0.029	5.94	398	114
1551	4.30	13.59	0.029	5.97	387	114
~~1554~~	~~4.29~~	~~13.49~~				
1557	4.29	13.46	0.029	6.00	393	111
1600	4.27	13.40	0.029	6.02	396	112
1603	4.17	13.32	0.029	5.99	401	102
1606	4.23	13.24	0.029	5.99	~~95.5~~ 399	95.5
1609	4.15	13.24	0.028	5.92	~~98.3~~ 399	98.3
1612	4.16	13.23	0.029	6.01	~~96.1~~ 403	96.1
1613	Sample Pulled for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Horiba cycled off

AWD

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1613
Volume removed: 3 gallons
Final DTW: 14.15
Sampled By: AWD
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/3/20

Well ID: MW-28
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 42.88
DTB (ft.TOC): 69.80
1 Volume (Gal):

Purge start/stop time: 1620
Purge Rate (ml/min): 150/100
Pump Setting (ft. TOC): 65
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1626	5.67	14.1	0.090	0.77	10.8	190
1631	5.72	13.9	0.088	0.58	0.7	192
	Flow =	150 ml/min		DTW =	43.93 →	
1636	5.83	13.8	0.090	0.47	-11.9	170
1641	5.88	13.5	0.091	0.45	-14.8	161
	Flow lowered	to 100	ml/min			
1646	5.89	13.4	0.094	0.42	-25.6	151
1651	5.92	13.3	0.097	0.39	-31.7	156
1656	5.92	13.3	0.098	0.36	-33.5	156
1659	5.93	13.2	0.099	0.35	-36.0	156
1702	5.93	13.1	0.100	0.33	-37.7	148
1705	5.94	13.0	0.100	0.31	-38.7	152
1708	5.93	12.9	0.100	0.30	-38.6	136
1711	5.93	12.8	0.101	0.29	-40.1	146
1714	5.94	12.9	0.101	0.29	-41.3	131
1717	5.97	13.0	0.102	0.27	-44.2	130
1720	5.99	12.9	0.102	0.26	-45.3	119
1723	5.97	12.9	0.102	0.25	-46.2	115
1726	5.97	12.9	0.102	0.25	-46.1	116
1729	5.96	12.6	0.102	0.24	-46.0	110
1732	5.95	12.7	0.103	0.23	-45.8	116
1735	5.99	12.5	0.103	0.23	-49.0	98.7
1738	5.98	12.5	0.103	0.22	-49.0	96.0
1741	5.98	12.3	0.104	0.22	-49.2	97.5
1742	Sample MW-28 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1742
Volume removed: 3 gallons
Final DTW: 44.01
Sampled By: MCB
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/4/20

Well ID: MW-27
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 1.42
DTB (ft.TOC): 7.90
1 Volume (Gal):

Purge start/stop time: 0900
Purge Rate (ml/min): 100
Pump Setting (ft. TOC): 6
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
0906	3.54	9.1	0.100	4.75	446.2	19.4
0911	3.32	9.1	0.108	4.00	459.7	11.3
Flow = 100 ml/min DTW = 2.56 → (↓)						
0916	3.37	9.2	0.107	4.13	455.5	10.8
0921	3.43	9.2	0.103	4.49	449.1	6.46
0926	3.50	9.2	0.096	4.81	445.3	5.27
0931	3.51	9.1	0.095	4.88	444.5	5.18
0936	3.52	9.0	0.090	5.11	441.5	4.83
0941	3.61	9.3	0.089	5.15	429.9	5.71
0944	3.60	9.2	0.085	5.18	428.6	3.77
0947	3.63	9.3	0.086	5.21	430.1	3.98
0950	3.65	9.3	0.084	5.19	428.4	3.81
0953	3.66	9.3	0.085	5.20	427.3	3.57
0956	3.67	9.4	0.083	5.26	428.0	3.27
☆ 0957	Sample MW-27 for all parameters except diss metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 0957
Volume removed: 1.25
Final DTW: 2.75
Sampled By: MCB

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~

Well Condition/Comments:

Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/4/20

Well ID: MW-10
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 27.55
DTB (ft.TOC): 54.70
1 Volume (Gal):

Purge start/stop time: 11:30
Purge Rate (ml/min): 170
Pump Setting (ft. TOC): 50
Screened Interval:
Pump Type: ~~Submersible Bladder~~ peristaltic
Tubing/Bladder Material: LDPE / ~~LDPE~~ No bladder

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1136	5.45	13.73	0.044	2.72	177	82.2
1142	5.62	13.61	0.043	1.04	156	37.6
	Flow: 170 ml/min		DTW = 27.00 →			
1146	5.71	13.42	0.041	0.78	153	29.5
1150	5.75	13.45	0.041	0.81	152	18.1
1154	5.65	13.42	0.040	0.65	158	15.1
1158	5.58	13.40	0.039	0.58	163	10.8
1202	5.54	13.42	0.038	0.57	167	9.5
1205	5.44	13.41	0.037	0.55	172	8.2
1208	5.47	13.43	0.037	0.46	174	7.2
1211	5.44	13.45	0.037	0.45	175	6.8
1214	5.56	13.47	0.036	0.44	175	6.8
1217	5.56	13.49	0.036	0.45	175	6.0
⊗ 1218	sample MW-10 for all parameters except Diss Metals					
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1218
Volume removed: 2.5 gallons
Final DTW: 27.00
Sampled By: AWD

Analysis: All except Diss Metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis:

Well Condition/Comments:
well slightly effervescent

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 2/4/20

Well ID: PMW-19
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 43.24
DTB (ft.TOC): 89.90
1 Volume (Gal):

Purge start/stop time: 1220
Purge Rate (ml/min): 100
Pump Setting (ft. TOC): 85
Screened Interval:
Pump Type: Submersible Bladder
Tubing/Bladder Material: LDPE / LDPE

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)
1227	5.32	15.4	0.048	2.83	44.6	41.4
1232	5.27	15.5	0.047	3.21	41.5	31.5
	Flow =	100 ml/min		DTW =	43.00	
1237	5.09	15.5	0.048	3.43	46.4	19.5
1242	5.07	15.4	0.048	3.56	46.2	19.6
1247	5.03	15.4	0.048	3.44	48.9	18.5
1252	4.99	15.4	0.048	3.28	51.2	16.1
1257	4.99	15.9	0.048	3.11	49.5	12.8
1300	5.02	15.4	0.048	3.02	46.8	12.5
1303	5.02	15.6	0.048	2.86	46.2	11.4
1306	5.01	15.6	0.048	2.77	46.3	12.9
1309	5.03	15.7	0.048	2.81	46.4	11.6
1312	5.02	15.6	0.047	2.83	45.7	10.57
1315	5.01	17.3	0.048	2.64	47.2	11.7
1318	5.09	16.6	0.048	2.70	43.8	10.43
1321	4.98	15.9	0.048	2.54	47.6	11.6
1322 Sample PMW-19 for all parameters except diss Metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 75-300 ml/min.

Sample Time: 1322
Volume removed: 1.5 gallons
Final DTW: 43.00
Sampled By: MCB
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply) TDS, Chloride, Sulfate, Nitrate, Alkalinity
VOCs, Ammonia, COD, Hardness
Total Metals, ~~Dissolved Metals~~
Filter Type/Analysis: —

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/23/20

Purge start/stop time: 1710
Purge Rate (ml/min): 240 ml/min
Pump Setting (ft. TOC): 50'
Screened Interval:
Pump Type: peristaltic
Tubing/Bladder Material: poly

Well ID: MW-10
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 26.32
DTB (ft.TOC): 54.70
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1715	6.03	11.31	0.035	2.63	216	26.9	26.53
1719	6.01	11.61	0.033	1.28	206	20.5	26.53
1732	5.87	11.67	0.030	0.42	209	10.0	26.53
1735	5.83	11.69	0.029	0.15	211	12.6	26.53
1738	5.86	11.79	0.028	0.23	209	13.8	26.53
1741	5.83	11.77	0.028	0.20	210	11.4	26.53
1744	5.76	11.84	0.027	0.21	213	9.3	26.53
1747	5.70	11.81	0.026	0.19	211	11.7	26.53
1750	5.69	11.81	0.026	0.21	211	12.1	26.53
1753	5.65	11.80	0.025	0.19	213	12.3	26.53
1756	5.66	11.80	0.025	0.20	213	11.9	26.53
1759	5.66	11.81	0.025	0.19	213	11.8	26.53
☆ 1800 sample MW-10 + MS/MSD							
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1800
Volume removed: ~3 gallons
Final DTW: 26.53
Sampled By: AWD/MCB
Well Condition/Comments:

Analysis: All except Diss Metals
(circle all that apply) MS/MSD collected here

Filter Type/Analysis: None

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Purge start/stop time: 9:00
Purge Rate (ml/min): 180
Pump Setting (ft. TOC): 20
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Well ID: PMW-6
Well Diameter/Material: 2in
DTW (ft. TOC):
DTB (ft.TOC):
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
930	4.34	10.6	.050	4.53	282.7	4.56	14.32
935	4.38	10.7	.051	4.27	295.3	4.02	14.32
940	4.42	10.7	.050	4.06	300.6	3.56	14.32
945	4.45	10.8	.050	3.90	302.8	3.00	14.31
950	4.46	10.8	.050	3.83	305.2	2.94	14.31
953	4.45	10.9	.050	3.91	308.9	2.97	14.31
956	4.46	10.9	.050	3.96	311.3	2.79	14.31
959	4.46	10.9	.050	3.93	313.2	2.81	14.31
1002	4.45	10.9	.050	3.94	314.9	2.85	14.30
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1005
Volume removed: 2 gal
Final DTW: 14.30
Sampled By: MCB

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

Well Condition/Comments:
FD (PMW-6-D) w/ sample time of 10:35)

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Purge start/stop time: 0935
Purge Rate (ml/min): 200/100
Pump Setting (ft. TOC): 69'
Screened Interval: 57-77
Pump Type: QED 1.75"
Tubing/Bladder Material: poly/poly (dedicated)

Well ID: PMW-28
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 65.10
DTB (ft.TOC): 74.70
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
0955	4.65	11.39	0.061	5.76	343	>1000	65.48
1000	4.58	11.45	0.062	6.41	359	>1000	65.53
1005	4.50	11.56	0.064	4.61	392	>1000	65.69
	Flow = 200 ml/min			DTW = 65.69 →			
1010	4.52	11.56	0.062	4.45	406	760	65.69
1015	4.53	11.58	0.061	4.58	408	829	65.69
1020	4.63	11.56	0.056	5.74	404	429	65.69
1025	4.69	11.59	0.054	6.23	403	284	65.69
1030	4.77	11.56	0.049	7.06	400	193	65.69
1035	4.81	11.59	0.046	7.65	399	107	65.69
1038	4.80	11.64	0.045	7.60	399	108	65.69
	Flow = 100 ml/min, empty flow-thru cell						
1045	4.61	11.60	0.047	7.05	406	102	65.69
1048	4.60	11.56	0.047	6.90	407	98.7	65.69
1051	4.56	11.45	0.048	6.65	411	100	65.69
1054	4.51	11.41	0.048	6.46	414	96.0	65.69
1057	4.49	11.42	0.049	6.28	414	98.3	65.69
1100	4.47	11	0.050	6.12	416	97.7	65.69
@ 11:01 Sample PMW-28 for all parameters + Diss Metals							
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 11:01
Volume removed: ≈ 4 gallons
Final DTW: 65.69
Sampled By: AW
Well Condition/Comments:

Analysis: All + Diss Metals
(circle all that apply)

Filter Type/Analysis: Diss Metals
0.45 micron filter for diss metals

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Well ID: MW-6
Well Diameter/Material: 2in
DTW (ft. TOC): ~~[illegible]~~ 26.00
DTB (ft.TOC):
1 Volume (Gal):

Purge start/stop time: 1220
Purge Rate (ml/min): 160
Pump Setting (ft. TOC): 41 ft
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1235	4.82	12.3	.051	2.48	321.6	70.8	26.00
1240	4.80	12.6	.051	2.28	327.9	21.6	
1245	4.81	12.6	.051	2.25	327.7	20.4	
1250	4.76	12.6	.051	2.26	327.5	15.2	
1255	4.75	12.7	.051	2.13	329.5	11.3	26.00
1300	4.78	12.8	.051	2.07	329.7	7.22	26.00
1305	4.76	12.7	.051	2.01	330.9	6.79	25.99
1308	4.74	12.8	.051	1.98	332.5	6.21	25.95
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1310
Volume removed: 1.75 gal
Final DTW: 25.95
Sampled By: MCB
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

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ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Well ID: MW-4
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 29.83
DTB (ft.TOC): 46.5
1 Volume (Gal):

Purge start/stop time: 12:25
Purge Rate (ml/min):
Pump Setting (ft. TOC): 41'
Screened Interval: 36-46
Pump Type: QED 1.75"
Tubing/Bladder Material: poly/poly dedicated

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
12:34	5.13	11.23	0.043	9.32	355	23.0	29.94
12:46	4.97	12.08	0.042	7.54	378	18.4	29.94
12:50	4.99	12.11	0.042	7.41	381	12.3	29.94
	Flow = 200 ml/min		DTW = 29.94 →				
12:54	5.01	12.17	0.043	7.36	385	9.3	29.94
12:58	5.00	12.21	0.043	7.24	389	6.1	29.94
1302	4.99	12.27	0.043	7.16	392	6.3	29.94
1306	5.03	12.35	0.043	7.00	394	5.2	29.94
1310	5.03	12.39	0.043	6.92	395	7.3	29.94
1313	5.04	12.43	0.043	6.93	396	7.5	29.94
1316	5.05	12.48	0.043	6.96	396	7.1	29.94
1317	Sample MW-4 for all parameters except Diss Metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1317
Volume removed: 2.75 gallons
Final DTW: 29.94
Sampled By: AWD
Well Condition/Comments:

Analysis : All except diss met
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
A Montrose Environmental Group Company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Purge start/stop time: 1410
Purge Rate (ml/min): 100
Pump Setting (ft. TOC): 18 ft
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Well ID: MW-29
Well Diameter/Material: 2 in
DTW (ft. TOC): 2.90
DTB (ft.TOC):
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1415	3.99	12.1	.060	2.38	363.1	100.4	4.19
1420	3.92	12.2	.060	1.58	362.4	96.1	5.49
1425	4.10	12.4	.060	1.50	357.9	98.3	5.53
1430	4.19	12.8	.060	1.53	355.8	40.4	↓
1435	4.19	12.8	.060	1.54	356.7	36.2	↓
1440	4.12	12.6	.060	1.47	361.8	28.2	5.53
1445	4.19	12.9	.060	1.22	354.5	28.1	5.53
1448	4.21	12.9	.060	1.17	353.1	24.3	5.53
1451	4.20	13.0	.060	1.16	352.4	22.8	5.53
1454	4.22	13.0	.060	1.23	350.9	23.6	5.53
1457	4.21	13.0	.060	1.25	350.5	25.4	5.53
1500	4.11	13.0	.060	1.19	352.8	24.5	5.53
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1505
Volume removed: 1 gal
Final DTW: 5.53
Sampled By: MCB
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

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ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Well ID: MW-5
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 32.02
DTB (ft.TOC): 53.5
1 Volume (Gal):

Purge start/stop time: 1420
Purge Rate (ml/min): 220 ml/min
Pump Setting (ft. TOC): 49'
Screened Interval: 44-54
Pump Type: QED 1.75 bladder
Tubing/Bladder Material: poly/polyethylene

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1428	5.49	13.88	0.041	10.01	325	28.9	32.15
1434	4.60	13.36	0.048	6.86	386	25.6	32.15
	Flow ~ ~~160 ml/min~~ 220 ml/min			DTW ~ 32.15			
1438	4.42	13.16	0.050	5.05	409	17.1	32.15
1451	4.40	12.75	0.051	3.96	423	5.9	32.15
1454	4.43	12.70	0.050	3.82	420	5.1	32.15
1457	4.44	12.70	0.050	3.88	420	4.8	32.15
1500	4.44	12.72	0.047	4.03	421	4.2	32.15
1503	4.45	12.79	0.049	4.16	420	3.4	32.15
1506	4.45	12.81	0.049	4.28	420	3.2	32.15
☆ 1507	Sample MW-5 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1507
Volume removed: 2.75 gallons
Final DTW: 32.15
Sampled By: AWD
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Well ID: MW - 14
Well Diameter/Material: 2in
DTW (ft. TOC): 37.00
DTB (ft.TOC):
1 Volume (Gal):

Purge start/stop time: 1630
Purge Rate (ml/min): 180
Pump Setting (ft. TOC): 76 ft
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1640	6.21	14.6	.122	7.32	285.3	73.0	
1645	5.99	14.5	.120	2.41	286.1	71.8	
1650	6.08	14.1	.123	2.41	265.2	52.1	
1655	6.13	13.9	.123	2.37	250.6	52.8	
1700	6.26	14.3	.123	2.26	229.9	50.1	
1705	6.26	14.3	.123	2.15	224.7	46.9	
1710	6.25	14.1	.123	2.15	222.1	44.8	
1718	6.26	14.1	.123	2.20	221.5	47.9	
1716	6.26	14.1	.123	2.17	220.8	47.7	
1719	6.28	14.1	.123	2.19	220.9	48.7	45.87
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1725
Volume removed: 1.5 gal
Final DTW: 45.69
Sampled By:
Well Condition/Comments: dropped to 100 ml/m @ 1655

Analysis : All except diss metals
(circle all that apply)
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/24/20

Purge start/stop time: 16:45
Purge Rate (ml/min): 260/140/100
Pump Setting (ft. TOC): 80
Screened Interval: 75-85
Pump Type: QED 1.75 bladder
Tubing/Bladder Material: poly/poly dedicated

Well ID: PMW-18
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 13.60
DTB (ft.TOC): 85.1
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW	
16:57	4.79	13.39	0.023	8.25	369	9.9	~~13.80~~	12.80
17:01	4.52	13.27	0.034	6.82	406	823	~~13.80~~	12.80
Flow = 260 ml/min				DTW = 12.80				
1705	4.17	13.23	0.043	4.46	446	>1000	~~13.80~~	12.80
1730	~~13.66~~ 4.01	13.66	0.051	1.69	464	352	12.80	
1734	4.01	13.54	0.051	1.67	466	173	12.80	
Lower flow to 140 ml/min				DTW = 12.80				
1738	4.00	13.03	0.052	0.92	468	128	12.80	
1742	3.99	12.68	0.053	0.51	470	113	12.80	
1745	3.98	12.46	0.055	0.63	472	107.0	12.80	
* 1748	3.46	12.39	0.056	0.68	473	117	12.80	
1751	3.97	12.37	0.052	0.63	473	104.8	12.80	
1754	3.97	12.29	0.053	0.62	473	103.4	12.80	
1757	3.98	12.27	0.053	0.65	473	97.1	~~12.80~~	12.80
1800	3.97	12.23	0.054	0.69	474	96.2	12.80	
1803	3.97	12.20	0.054	0.71	473	98.3	12.80	
☆ 1804 Sample PMW-18 for all parameters								
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%		

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min
* = lowered flow to 100 ml/min

Sample Time: 18:04
Volume removed: 4.25
Final DTW: 12.80
Sampled By: AWD

Analysis : All + Diss metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

Well Condition/Comments:
Well is effervescent, many tiny bubbles

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ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/25/20

Well ID: MW-13
Well Diameter/Material: 2in
DTW (ft. TOC): 102.50
DTB (ft.TOC): 274
1 Volume (Gal):

Purge start/stop time: 915
Purge Rate (ml/min): 110
Pump Setting (ft. TOC): 260
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
925	3.74	10.1	.046	2.86	351.1	520	1025
930	3.71	10.2	.050	2.52	358.3	64.6	
935	3.70	10.4	.054	1.94	361.9	198.3	
940	3.69	10.4	.054	1.65	369.0	255	
945	3.72	10.6	.055	1.38	362.1	295	
950	3.67	10.5	.055	1.20	367.6	345	
955	3.68	10.6	.055	1.00	369.8	352	
1000	3.69	10.7	.056	0.91	375.5	318	
1005	3.69	10.7	.056	0.86	377.8	279	
1010	3.71	10.7	.056	0.76	387.3	236	
1015	3.71	10.7	.056	0.74	386.5	227	
1020	3.71	10.7	.056	0.71	387.3	204	
1025	3.71	10.8	.056	.67	390.1	173	
1030	3.72	10.7	.056	.64	342.6	140	
1035	3.70	10.7	.056	.68	345.0	136	
1038	3.68	10.6	.056	.67	346.8	97.6	
1041	3.72	10.8	.056	.64	345.8	60.6	
1044	3.73	10.8	.056	.64	345.2	52.3	
1047	3.75	10.7	.056	.63	344.4	41.1	
1050	3.75	10.8	.057	.63	345.1	29.1	
1053	3.75	10.8	.056	.62	343.8	27.4	
1056	3.74	10.7	.056	.62	343.3	28.1	102.43
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1058
Volume removed: 3 gal
Final DTW: 102.43
Sampled By: MCB
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/25/20

Well ID: MW-15
Well Diameter/Material: 4" PVC
DTW (ft. TOC): 78.53
DTB (ft.TOC): 84.0
1 Volume (Gal):

Purge start/stop time: 0910
Purge Rate (ml/min): 130/100
Pump Setting (ft. TOC): 81'
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
0922	4.22	11.94	~~0.000~~	14.18	247	27.3	78.55
	Flow = 130 ml/min		0.046	DTW = 78.55 → (↓)			
0930	3.90	10.13	0.038	5.36	362	188	78.55
0938	3.81	10.59	0.038	3.04	342	50.6	78.61
0942	3.79	10.72	0.039	2.15	332	53.2	78.60
0946							
0950	Changing CO_2 Tank						
~~40~~ 0954							
0958							
1001	3.87	10.01	0.042	2.07	109.7	318	78.60
1004	3.85	10.02	0.041	1.71	316	101.6	78.60
1007	3.83	10.04	0.041	1.38	315	92.4	78.60
1013	3.80	10.66	0.042	1.16	342	121	78.60
1017	3.80	10.66	0.042	1.11	346	123	78.68
1021	3.81	10.71	0.043	0.98	322	124	78.73
1025	3.81	10.76	0.043	0.80	311	125	78.80
1029	3.81	10.78	0.043	0.66	311	127	78.80
Lower	Flow to 100 ml/min			DTW = 78.80 →			
1033	3.82	10.59	0.043	0.60	311	114	78.80
1042	3.81	10.41	0.044	0.61	311	117	78.80
1046	3.80	10.36	0.044	0.60	311	116	78.80
1050	3.81	10.36	0.044	0.59	310	119	78.80
1054	3.81	10.39	0.044	0.61	310	121	78.80
1057	3.81	10.42	0.045	0.58	310	120	78.80
1100	3.82	10.41	0.045	0.60	310	119	78.80
1103	Sample						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 11:03
Volume removed: 3 gallons
Final DTW: 78.80
Sampled By: AWD

Analysis: All + Diss
(circle all that apply)

Well Condition/Comments: well is effervescent, similar to MW-18 (but not as effervescent)

Filter Type/Analysis: Diss metals 45 micron

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ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/25/20

Purge start/stop time: 1240
Purge Rate (ml/min):
Pump Setting (ft. TOC): 80'
Screened Interval: 75-85
Pump Type: QED 0.75" Bladder
Tubing/Bladder Material: poly/poly electrical

Well ID: MW-16
Well Diameter/Material: 4" PVC
DTW (ft. TOC): 77.22
DTB (ft.TOC): 82.9
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1254	4.87	10.20	0.034	5.53	369	19.8	77.48
1258	4.92	10.70	0.033	5.51	371	28.7	77.48
	Flow =	170 ml/min		DTW = 77.48			
1302	5.11	11.43	0.032	5.69	361	~~44.9~~	77.48
1306	5.15	11.50	0.032	5.93	356	16.2 K	77.48
1310	5.14	11.51	0.031	6.18	357	16.0	77.48
1314	5.14	11.52	0.031	6.21	359	15.7	74.49
1318	5.12	11.60	0.031	6.19	362	14.3 L	74.50
1321	5.09	11.63	0.031	6.13	365	14.0	74.50
1324	5.07	11.70	0.030	6.08	369	13.8	74.52
1327	5.05	11.76	0.030	6.03	371	13.3	74.52
1330	5.03	11.78	0.030	5.98	375	13.6	74.53
1331	Sample MW-16 for All parameters except diss metals						
	Also collect MS/MSD here						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1331
Volume removed: 2.25 gallons
Final DTW: 77.53
Sampled By: AJ

Analysis: All except diss metals
(circle all that apply)

Well Condition/Comments:
Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/25/20

Well ID: PMW-12
Well Diameter/Material: 2 in
DTW (ft. TOC): 115.03
DTB (ft.TOC):
1 Volume (Gal):

Purge start/stop time: 1225
Purge Rate (ml/min): 110
Pump Setting (ft. TOC): 220
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1235	5.24	10.1	.061	2.76	229.6	65.0	115.03
1240	5.41	11.1	.065	2.75	198.4	119	
1245	5.43	11.1	.065	2.73	163.3	271	
1250	5.47	11.1	.066	2.18	143.5	309	
1255	5.47	11.3	.066	1.47	132.4	309	
1300	5.47	10.9	.066	1.13	124.6	275	
1305	5.46	11.2	.066	0.96	121.2	262	
1310	5.42	10.9	.066	0.78	117.6	284	
1315	5.43	10.9	.066	0.77	115.9	270	
1320	5.48	10.7	.066	0.66	111.2	288	
1325	5.46	10.6	.066	0.63	111.3	285	115.43
1328	5.47	10.6	.066	0.64	111.2	278	
1331	5.43	10.5	.066	0.63	111.0	280	
1334	5.47	10.6	.066	0.56	105.7	300	
1337	5.49	10.6	.066	0.57	105.8	277	
1340	5.48	10.6	.066	0.55	105.3	271	
1343	5.47	10.6	.066	0.52	105.3	258	
1346	5.52	10.6	.066	0.52	104.7	280	
1349	5.51	10.5	.066	0.51	101.5	294	
1352	5.49	10.5	.066	0.49	101.7	312	
1355	5.51	10.7	.066	0.48	100.1	287	
1358	5.52	10.8	.066	0.47	99.7	290	
1401	5.50	10.8	.066	0.47	99.3	281	
1404	5.55	11.2	.066	0.41	97.4	297	
1407	5.53	11.0	.066	0.41	97.4	285	
1410	5.53	11.0	.066	0.37	97.1	279	115.73
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1415
Volume removed: 3 gal
Final DTW: 115.73
Sampled By: MCB
Well Condition/Comments:

Analysis : All + Diss metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

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ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/25/20

Well ID: MW-18
Well Diameter/Material:
DTW (ft. TOC): 14.07
DTB (ft.TOC): 19.57
1 Volume (Gal):

Purge start/stop time: 1540
Purge Rate (ml/min): 180
Pump Setting (ft. TOC): 17
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1550	5.30	9.7	.073	5.46	18.6.1	185	14.07
1555	5.39	10.6	.075	4.65	183.2	146	
1600	5.41	10.6	.076	4.50	185.7	97.1	
1605	5.39	10.6	.077	4.43	192.0	76.3	14.00
1610	5.37	10.6	.076	4.51	196.3	53.2	
1615	5.35	10.7	.074	4.60	201.1	26.0	
1620	5.34	10.6	.074	4.38	209.9	16.2	
1623	5.34	10.6	.074	4.40	210.7	12.1	14.00
1626	5.32	10.6	.074	4.38	214.6	9.25	
1629	5.32	10.6	.074	4.36	215.1	10.19	
1632	5.31	10.5	.074	4.37	217.3	9.71	14.00
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1635
Volume removed: 1.75 gal
Final DTW: 14.00
Sampled By: RCB
Well Condition/Comments: FD (MW-18) w/ sample time of 16:55

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/25/20

Purge start/stop time: 1550
Purge Rate (ml/min):
Pump Setting (ft. TOC):
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Well ID: MW-17
Well Diameter/Material:
DTW (ft. TOC):
DTB (ft.TOC):
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1600	4.08	9.75	0.038	10.92	414	39.0	1.51
1610	4.23	9.88	0.032	8.63	398	178 ↑	2.07
	Flow ≈150 ml/min			DTW = 2.15 → (↓)			
1615	4.32	9.80	0.029	6.17	375	141	2.23
1620	4.33	9.73	0.028	5.73	367	113	2.23
1624	4.34	9.69	0.027	5.48	361	94.0 ↓	2.23
1628	4.34	9.67	0.027	5.19	360	93.2	2.23
1632	4.35	9.65	0.026	4.99	358	88.6	2.23
1636	4.35	9.63	0.025	4.91	357	84.8	2.23
1640	4.35	9.61	0.025	4.77	358	72.9	2.23
1643	4.37	9.62	0.024	4.73	356	67.5	2.23
1646	lower flow to 100 ml/min						
1649	4.36	9.57	0.024	4.71	357	77.2	2.07
1652	4.38	9.55	0.024	4.67	356	68.8	2.02
1655	4.39	9.52	0.024	4.58	355	71.2	1.99
1658	4.40	9.57	0.024	4.62	355	73.7	1.95
1701	4.39	9.51	0.024	4.58	356	71.3	1.93
1704	4.40	9.50	0.024	4.51	355	73.2	1.91
* 1705	Sample MW-17 for all parameters + Diss Metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 17:05
Volume removed: 2.75 gallons
Final DTW: 1.91
Sampled By: AWD
Well Condition/Comments:

Analysis : All + Diss Metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26/20

Purge start/stop time: 945
Purge Rate (ml/min): 180 → 100
Pump Setting (ft. TOC): 53
Screened Interval: 47.5 – 58
Pump Type:
Tubing/Bladder Material:

Well ID: MW-20
Well Diameter/Material: 2 in
DTW (ft. TOC): 49.51
DTB (ft.TOC): 57.2
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
905	3.81	11.0	.061	6.76	324.5	288	
910	3.85	11.2	.061	6.27	351.6	255	
915	3.84	11.4	.061	6.29	366.8	259	
920	3.85	11.5	.060	7.09	378.9	260	
925	3.85	11.7	.060	8.55	390.6	218	
930	3.88	11.8	.058	7.92	394.1	176	
935	3.88	11.8	.058	8.09	395.2	147	
940	3.88	11.8	.058	8.03	396.3	127	
945	3.89	11.7	.058	8.57	399.7	106.4	
948	3.89	11.9	.057	8.44	395.5	102.0	
951	3.93	11.4	.057	8.68	395.7	89.4	
954	3.92	11.6	.057	8.57	399.8	83.0	
957	3.88	11.7	.057	8.72	404.6	77.0	
1000	3.84	11.5	.057	8.59	409.7	75.9	
1003	3.84	11.9	.057	8.45	406.6	76.0	
1006	3.87	11.9	.057	8.46	405.2	72.0	
1009	3.88	11.8	.057	8.49	406.1	74.2	
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1015
Volume removed: 2.75 gal
Final DTW: 49.53
Sampled By: MCB
Well Condition/Comments:

Analysis : All + Diss Metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26/20

Purge start/stop time: 0857
Purge Rate (ml/min): 160/100
Pump Setting (ft. TOC): 55'
Screened Interval: 52-62
Pump Type: QED 1.75" Bladder
Tubing/Bladder Material: Poly/Bladder

Well ID: MW-21
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 54.65
DTB (ft.TOC): 61.90
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
0907	5.60	9.79	0.085	12.51	338	617	55.01
0912	4.97	10.55	0.087	10.21	374	506	55.15
Flow = 160 ml/min				DTW = 55.15 ↓(→)			
0918	4.82	11.29	0.087	10.07	389	307	55.40
0922	4.84	11.76	0.082	9.58	401	250	55.52
0926	4.81	11.78	0.081	9.03	406	243	55.60
0930	4.79	11.83	0.080	8.79	410	273	55.66
0934	4.76	11.88	0.079	8.52	415	287	55.70
Lower flow to 100 ml/min				DTW = 55.65 ↑(→)			
0938	4.75	11.71	0.077	8.48	401	265	55.60
0950	4.74	11.70	0.074	8.12	421	158	55.45
0954	4.77	11.73	0.074	7.96	422	71.6	55.41
0958	4.67	11.63	0.074	8.04	428	41.8	55.38
1001	4.75	11.62	0.073	8.09	423	26.1	55.35
1004	4.74	11.93	0.073	8.11	424	20.3	55.35
1007	4.73	12.21	0.074	8.13	425	17.2	55.35
1010	4.73	12.34	0.074	8.40	425	14.7	55.35
1013	4.76	12.27	0.075	8.39	425	13.8	55.35
1016	4.77	12.20	0.075	8.36	425	13.4	55.35
1017	Sample MW-21 for all parameters except Diss Metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1017
Volume removed: 2.75 gallons
Final DTW: 55.35
Sampled By: AWD
Well Condition/Comments:

Analysis: All except Diss Metals
(circle all that apply)

Filter Type/Analysis: Non-P

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26/20

Purge start/stop time: 1208
Purge Rate (ml/min):
Pump Setting (ft. TOC): 31
Screened Interval: 26-36
Pump Type: QED 1.75" bladder
Tubing/Bladder Material: poly/poly

Well ID: MW-22
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 26.95
DTB (ft.TOC): 36.30
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1224	4.90	12.31	0.057	4.39	422	86.5	26.98
1228	4.94	12.49	0.059	3.75	423	73.2	26.98
	Flow ~ 200 ml/min			DTW = 26.98 →			
1232	4.95	12.56	0.060	3.19	420	60.4	26.98
1236	4.94	12.63	0.060	3.09	419	57.0	26.98
1240	4.95	12.56	0.059	3.01	418	32.3	26.98
1244	4.94	12.60	0.058	2.91	418	28.3	26.98
1248	4.93	12.66	0.058	2.85	417	22.4	26.98
1252	4.92	12.72	0.057	2.70	418	21.7	26.98
1255	4.94	12.83	0.057	2.64	418	21.3	26.98
1258	4.95	12.90	0.056	2.67	418	21.2	26.98
1301	4.95	12.88	0.056	2.70	418	21.6	26.98
☆ 1302	Sample MW-22 for all parameters except Diss Metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1302
Volume removed: 2.75 gallons
Final DTW: 26.98
Sampled By: AWD
Well Condition/Comments:

Analysis: All except diss metals
(circle all that apply)

Filter Type/Analysis: None

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ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26/20

Purge start/stop time: 11 45
Purge Rate (ml/min): 18 ~~8~~ 100
Pump Setting (ft. TOC): 218
Screened Interval: 208 -228
Pump Type: ~~#~~
Tubing/Bladder Material:

Well ID: PMW-23
Well Diameter/Material: 2/7
DTW (ft. TOC): 107.43
DTB (ft.TOC): 228.0
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1155	4.50	12.7	.026	4.75	357.8	466	
1200	4.20	12.9	.027	4.56	371.1	442	
1205	4.21	13.1	.027	4.60	391.2	445	
1210	4.25	12.9	.028	5.06	384.6	431	
1215	4.08	13.1	.027	5.28	395.6	406	
1220	4.07	12.7	.027	5.70	402.3	404	
1225	4.08	13.1	.027	5.71	403.1	364	
1230	4.21	13.9	.027	5.77	395.6	347	
1235	4.20	15.0	.027	5.90	398.9	349	
1240	4.26	15.0	.027	5.52	398.0	292	
1245	4.19	15.2	.027	4.91	395.0	215	
1300	4.25	15.8	.027	4.59	389.2	180	
1303	4.27	15.8	.027	4.63	387.1	172	
1306	4.28	15.9	.027	4.69	390.7	170	
1309	4.26	16.1	.027	4.86	390.1	168	
1312	4.21	15.8	.027	4.57	392.2	172	
1315	4.12	15.8	.027	4.39	397.4	142	
1318	4.18	16.2	.027	4.27	395.7	140	
1321	4.09	15.8	.027	4.07	394.1	124	
1324	4.07	16.1	.027	4.06	406.8	121	
1327	4.15	16.5	.027	4.01	394.3	126	107.51
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1375
Volume removed: 2.75 gal
Final DTW: 107.51
Sampled By: MCB
Well Condition/Comments: Naighbor stoped by

Analysis : All + diss metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26/20

Purge start/stop time: 1495
Purge Rate (ml/min): 180
Pump Setting (ft. TOC): 26 ft
Screened Interval: 20 - 70
Pump Type:
Tubing/Bladder Material:

Well ID: MW-19
Well Diameter/Material: 2 in
DTW (ft. TOC): 23.71
DTB (ft.TOC): 30.0
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1456	4.22	15.00	.069	8.34	439	35.8	
1500	4.21	15.00	.068	8.15	445	21.0	
1505	4.18	13.94	.067	8.03	452	12.0	
1510	~~4.12~~ 4.13	13.72	.066	8.0	464	7.32	
1515	4.10	14.83	.066	8.01	467	7.11	
1520	4.10	13.73	.067	8.05	465	5.14	
1525	4.14	13.60	.067	7.85	467	3.48	
1530	4.14	13.55	.067	7.86	469	2.55	
1533	4.13	14.00	.066	7.81	471	2.49	
1536	4.14	14.05	.066	7.76	469	2.61	23.71
~~1542~~							
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

EB-03
1045

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1540
Volume removed: 2.75 gallons
Final DTW: 23.71
Sampled By: MCB
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: ~~PAW-11~~ 3/26/21
Purge start/stop time: 1450
Purge Rate (ml/min):
Pump Setting (ft. TOC): 210'
Screened Interval: 200-220
Pump Type: QED 1.25" Bladder
Tubing/Bladder Material: poly/poly dedicated

Well ID: PAW-11
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 84.62
DTB (ft.TOC): 219.5
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1504	3.14	16.8	0.028	2.67	414.8	321	84.67
1508	3.22	15.2	0.028	3.00	426.5	290	84.65
Flow = 200 ml/min				DTW = ~~200~~ 84.62 →			
1515	3.35	13.6	0.028	2.92	433.9	337	84.63
1520	3.43	13.6	0.028	2.71	432.9	353	84.63
1525	3.57	13.7	0.028	2.04	430.3	338	84.63
1530	3.58	13.6	0.028	1.73	433.4	306	84.63
1535	3.67	13.8	0.028	2.18	432.5	247	84.63
1540	3.70	13.9	0.028	2.26	431.9	233	84.63
1545	3.73	14.0	0.028	2.22	431.3	226	84.63
1550	3.78	14.1	0.028	2.28	430.2	247	84.63
Lower flow to 100 ml/min				DTW = 84.63			
1555	3.95	15.8	0.028	2.13	422.5	252	84.63
1600	4.02	16.0	0.028	2.28	420.5	261	84.63
1605	4.03	16.1	0.028	2.10	418.8	255	84.63
Lower flow to ~~750~~ 40 ml/min				DTW =			
1610	4.07	16.3	0.028	2.26	418.2	235	84.63
1615	4.12	16.7	0.028	2.40	415.9	223	84.63
1620	4.07	16.6	0.028	2.27	417.5	183	84.63
1625	4.08	17.2	0.028	2.18	413.2	160	84.63
1630	4.09	17.5	0.028	2.08	412.6	146	84.63
1635	4.08	17.6	0.028	2.03	412.3	110.3	
1640	4.07	17.7	0.028	2.10	412.7	67.6	
1643	4.07	17.6	0.028	2.16	413.1	63.2	
1646	4.08	17.9	0.028	2.10	412.3	57.9	
1649	4.06	18.0	~~18.0~~ 0.028	2.12	413.1	48.8	
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: (continued on next sheet)
Volume removed:
Final DTW:
Sampled By:
Well Condition/Comments:

Analysis :
(circle all that apply)
Filter Type/Analysis:

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26

Purge start/stop time: 1450 (previous page)
Purge Rate (ml/min):
Pump Setting (ft. TOC):
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Well ID: PMW-11
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 84.82
DTB (ft.TOC): 219.5
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1652	4.05	17.8	0.028	2.18	412.6	46.9	84.63
1655	4.03	17.6	0.028	2.29	411.3	46.6	84.63
1658	4.03	17.8	0.028	2.26	411.2	57.3	84.63
1701	4.03	17.4	0.028	2.25	411.0	51.4	84.63
1704	3.98	16.7	0.028	2.28	413.3	49.8	84.63
1705	Sample PMW-11 for all parameters						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1705
Volume removed: 4.75 gallons
Final DTW: 84.63
Sampled By: AWD
Well Condition/Comments:

Analysis : All + diss metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/26/20

Purge start/stop time: 1700
Purge Rate (ml/min): 110
Pump Setting (ft. TOC): 6
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Well ID: MW-27
Well Diameter/Material: 2"
DTW (ft. TOC): 1.71
DTB (ft.TOC): 7.9
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1700	4.09	12.55	.088	3.50	316	12.0	
1705	4.10	11.94	.085	2.83	314	8.81	
1710	4.03	11.60	.083	2.68	318	6.51	1.93
1715	3.99	11.26	.080	3.12	333	5.43	
1720	3.98	10.95	.078	3.42	339	4.64	2.54
1725	3.97	10.81	.075	3.79	341	4.31	2.45
1730	3.95	10.57	.070	3.77	356	4.00	2.10
1733	3.93	10.12	.071	3.77	358	4.02	2.79
1736	3.90	10.10	.071	3.81	358	3.99	2.93
1739	3.81	10.12	.070	3.85	357	3.71	2.82
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

100mL

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1745
Volume removed: 1.25 gallons
Final DTW: 2.82
Sampled By: MCB
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

MS/MSD collected for all parameters

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/27/20

Purge start/stop time: 905
Purge Rate (ml/min): 125
Pump Setting (ft. TOC): 25
Screened Interval: 21-31
Pump Type:
Tubing/Bladder Material:

Well ID: MW-24
Well Diameter/Material: 2in
DTW (ft. TOC): 18.20
DTB (ft.TOC): 30.7
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU).	DTW
910	4.63	13.1	.081	5.74	314.3	452	
915	4.61	13.2	.081	5.74	313.5	480	
920	4.65	13.5	.080	5.46	280.2	488	
925	4.89	13.9	.080	5.43	240.1	421	
930	4.84	14.2	.080	5.25	245.2	453	
935	4.81	13.4	.080	5.39	256.8	408	
940	4.71	13.2	.080	5.50	268.9	383	
945	4.92	13.7	.080	5.50	269.6	306	
950	4.86	13.3	.083	5.68	277.9	465	
953	4.76	12.9	.082	5.43	290.0	24.3	
956	4.77	12.9	.082	5.51	290.7	26.1	
959	4.82	13.0	.082	5.42	291.7	21.4	
1002	4.98	13.0	.083	5.58	292.6	16.9	
1005	4.91	13.0	.083	5.49	293.0	15.4	
1008	4.89	12.9	.083	5.65	294.4	15.7	
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1010
Volume removed: 2 gallons
Final DTW: 18.23
Sampled By: NCB

Analysis : All except diss metals
(circle all that apply)

Well Condition/Comments:
Filter Type/Analysis:

Field Duplicate MW-24-D @ 1040

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: ~~3/26~~ 3/27/20

Purge start/stop time: 1044
Purge Rate (ml/min):
Pump Setting (ft. TOC): 42
Screened Interval: 37-47
Pump Type: QED 1.75"
Tubing/Bladder Material:

Well ID: MW-25
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 35.31
DTB (ft.TOC): 46.08
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1055	4.35	13.8	0.044	5.12	329.4	1114	35.45
	Flow = 200 ml/min			35.45	→ (↓)		
1100	4.28	14.1	.043	4.75	336.5	748	35.45
1105	4.30	14.0	.042	4.32	376.8	72	35.45
1110	4.47	14.0	.042	4.20	377.8	97.5	
1115	4.47	14.0	.042	4.15	343.2	57.7	
1120	4.48	14.0	.041	3.94	341.5	50.9	
1125	4.51	14.1	.041	3.89	345.3	47.4	
1130	4.51	14.3	.041	3.90	347.4	39.7	
1133	4.53	14.3	.041	3.91	347.5	38.3	
1136	4.51	14.4	.041	3.87	347.5	37.1	
1139	4.56	14.4	.041	3.83	347.5	35.3	
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

EB-04 @ 12:15

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1145
Volume removed: 1.75
Final DTW: 35.47
Sampled By: MCG
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 5/27/20

Purge start/stop time: 11:22
Purge Rate (ml/min):
Pump Setting (ft. TOC): 18.5'
Screened Interval: 11-21
Pump Type: QED 1.75" Bladder
Tubing/Bladder Material: poly/poly (dedicated)

Well ID: MW-30
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 13.27
DTB (ft.TOC): 20.5
1 Volume (Gal):

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1137	5.26	13.72	0.058	4.02	356	33.6	14.50
1140	5.29	13.60	0.058	3.30	356	35.8	14.93
1143	5.33	13.45	0.058	2.71	357	32.0	15.44
1146	Flow = 600 ml/min			DTW = 15.44 ✓		(very, very slight →)	
1149	5.33	13.66	0.058	2.70	357	31.2	15.65
1152	Flow lowered to ≈ 80 ml/min			DTW = 15.74			
1153	5.33	13.80	0.058	2.72	357	31.8	15.83
1156	5.33	13.84	0.059	2.73	357	29.9	15.96
1159	5.33	13.88	0.058	2.72	355	31.7	16.03
1202	5.33	13.93	0.058	2.75	348	30.6	16.10
1205	5.33	13.94	0.058	2.78	342	31.5	16.21
★ 1206	Sample MW-30 for all parameters except diss metals						
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1206
Volume removed: 1 gallon
Final DTW: 17.03
Sampled By: AaD
Well Condition/Comments:

Analysis: All except diss Metals
(circle all that apply)

Filter Type/Analysis: None

ADVANCED GeoServices
a Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/27/20

Well ID: PMW-19
Well Diameter/Material: 2 in
DTW (ft. TOC): 42.41
DTB (ft.TOC): 89.9
1 Volume (Gal):

Purge start/stop time: 1415
Purge Rate (ml/min): 180 recharge
Pump Setting (ft. TOC): 85
Screened Interval:
Pump Type:
Tubing/Bladder Material:

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1425	4.68	16.5	.044	2.7	99.9	40.8	
1430	4.54	15.6	.043	6.1	81.7	25.0	
1435	4.83	15.4	.043	5.5	59.2	14.4	
1440	4.93	15.3	.041	5.1	40.1	14.7	
1445	5.00	15.3	.037	4.7	39.7	13.3	
1450	5.04	15.2	.037	3.4	39.5	12.2	42.50
1455	5.01	15.1	.032	3.1	38.6	9.98	
1458	5.05	15.1	.030	2.9	37.3	9.15	
1501	5.03	15.1	.030	2.8	35.6	9.21	42.50
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1505
Volume removed: 1.5 gal
Final DTW: 42.50
Sampled By: MCB
Well Condition/Comments:

Analysis : All except diss metals
(circle all that apply)

Filter Type/Analysis:

ADVANCED GeoServices
A Montrose Environmental Group company

Project Name: Chesapeake Terrace Landfill
Project Number: 2018-3854
Date: 3/27/20

Well ID: MW-28
Well Diameter/Material: 2" PVC
DTW (ft. TOC): 42.32
DTB (ft.TOC): 69.8
1 Volume (Gal):

Purge start/stop time: 1405
Purge Rate (ml/min): 150/100
Pump Setting (ft. TOC): 65
Screened Interval: 60-70
Pump Type: QED ~~MP~~ 1.75" bladder
Tubing/Bladder Material: poly/poly

Time	pH (pH units)	Temp. (°C)	Sp. Cond. (µS)	D.O. (mg/L)	O.R.P. (mV)	Turbidity (NTU)	DTW
1418	6.68	19.54	0.098	4.59	39	130	43.10
1422	6.53	19.25	0.097	2.89	-19	171	43.45
	Flow =	150	ml/min	DTW =	43.45 ✓	(→)	
1426	6.66	18.57	0.102	2.90	-57	175	43.61
1430	6.67	18.24	0.103	2.91	-62	179	43.82
1434	6.65	18.26	0.103	2.84	-67	218	~~44.13~~ 43.82
1438	6.69	17.64	0.105	2.87	-75	218	~~44.32~~ 43.80
1442	6.66	17.60	0.105	2.82	-77	203	43.78
	Lower	flow to	100 ml/min		DTW = 43.80 →	(1)	
1446	6.64	17.73	0.105	2.76	-78	154	43.80
1450	6.67	17.72	0.106	2.73	-81	140	43.60
1454	6.69	17.76	0.106	2.70	-85	133	43.48
1458	6.70	17.80	0.107	2.66	-87	125	43.48
1502	6.69	17.70	0.107	2.57	-89	120	43.44
1504	6.68	17.65	0.107	2.52	-91	127	43.44
1508	6.67	17.58	0.107	2.45	-91	106.0	43.44
1512	6.67	17.56	0.106	2.43	-92	97.0	43.44
1516	6.68	17.52	0.106	2.37	-94	87.3	43.44
1520	6.67	17.48	0.106	2.33	-95	81.0	43.44
1523	6.66	17.45	0.106	2.30	-95	76.9	43.44
1526	6.65	17.44	0.106	2.29	-95	71.0	43.44
1529	Lower	flow to	80 ml/min				43.44
1532	6.66	17.42	0.107	2.29	-98	77.4	43.44
1535	6.66	17.40	0.107	2.30	-98	66.9	~~43.44~~ 43.25
1538	6.65	17.45	0.108	2.30	-98	67.6	~~43.44~~ 43.25
1541	6.64	17.56	0.108	2.28	-96	70.3	43.25
Stabilization Criteria	+/- 0.1 units	+/- 10%	+/- 3%	+/- 10%	+/- 10-mV	+/- 10%	

Field measurements taken every 3-5 min. Stabilization achieved over 3 consecutive readings
Maintain purge rate of 100-300 ml/min

Sample Time: 1542
Volume removed: 3 gallons
Final DTW: 43.44
Sampled By: AWD
Well Condition/Comments:

Analysis: All + diss metals
(circle all that apply)

Filter Type/Analysis: 0.45 micron filter for diss metals

~~44.50~~ 43.44