DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
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June 26, 2015

Environmental Division

Ed Carlson
Solid Waste Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

Dear Mr. Carlson:

Enclosed please find the *Annual Monitoring Report* for FGGM-17, Closed Sanitary Landfill, Fort George G. Meade, Maryland (Report). The Report provides the results of the March 2015 sampling event along with historical data. Copies of the Report have also been furnished to Robert Stroud (U.S. Environmental Protection Agency), Fran Coulters (U.S. Army Environmental Command), Tim Peck (U.S. Army Corps of Engineers), Elisabeth Green (Maryland Department of the Environment), and the Fort George G. Meade Restoration Advisory Board.

Please provide comments on the Report within 60 calendar days of receipt of the Report. Written comments should be addressed to Fort George G. Meade, Attention: IMME-PWE (George Knight), 4216 Roberts Ave., Suite 5115, Fort Meade, Maryland 20755-7068 or george.b.knight7.civ@mail.mil.

If you have any questions, please feel free to contact Ms. Denise Tegtmeyer at (301) 677-9559 or me at (301) 677-7999.

Sincerely,

George B. Knight, PG
Program Manager, Installation Restoration Program
Directorate of Public Works - Environmental
Division

Enclosure

Imagine the result

Annual Monitoring Report

FGGM 17, Closed Sanitary Landfill Fort George G. Meade, Maryland

June 2015

FGGM-17, Closed Sanitary Landfill, Fort George G. Meade, Maryland

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Date:
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List of Acronyms and Abbreviations

°F	degree Fahrenheit
ARCADIS	ARCADIS U.S., Inc.
ASTM	American Society for Testing and Materials
CCl_4	carbon tetrachloride
Coastal Plain	Coastal Plain physiographic province
COC	constituent of concern
CSL	Closed Sanitary Landfill
FGGM	Fort George G. Meade
ft	feet
ID	Identification
IDW	investigative derived waste
LPA	Lower Patapsco Aquifer
LTM	Long-term Management
MCL	maximum contaminant level
MDL	method detection limit
MDE	Maryland Department of the Environment
mg/L	milligrams per liter
msl	mean sea level
PCE	Tetrachloroethene
Piedmont	Piedmont physiographic province
QA/QC	quality assurance/quality control
RAO	Remedial Action Operations
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SMCL	secondary maximum contaminant level
SVOC	semi-volatile organic compound
t.o.n.	threshold odor number
µg/L	micrograms per liter
UPA	Upper Patapsco Aquifer
UPL	upper prediction limits
URS	URS Group Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WMP	Waste Management Plan

Executive Summary

This report presents the results of the annual groundwater and surface water monitoring completed at the Closed Sanitary Landfill (CSL) (FGGM-17) at Fort George G. Meade (FGGM) in Anne Arundel County, Maryland in March 2015. The FGGM CSL is located in the southeastern portion of the base, south of U.S. Route 32 and west of the Amtrak railroad right of way. Cell 1 covers approximately 46 acres and Cell 2 covers 24 acres. A third area that lacks topographic expression is referred to informally as Cell 3, but is not a defined disposal area.

PIKA-Malcolm Pirnie JV LLC (PIKA-MP JV LLC) performed all work in accordance with Contract No.W912DR-12-D-0007 Task Order 0004 issued by the Unites States Army Corps of Engineers, Baltimore District to maintain Remedial Action Operations (RAOs) and Long-term Management (LTM) at FGGM. Under regulatory guidance including Federal regulations, 40 Code of Federal Regulations Part 258 and state regulations, Code of Maryland Regulation Title 26 Subtitle 04, a detection and assessment monitoring program is required at the CSL. The field effort was conducted between 9 March and 19 March 2015 and included a comprehensive water-level survey and groundwater sampling and analysis for constituents of concern (COCs). A total of 26 monitoring wells were sampled during the annual event.

In samples collected from Upper Patapsco Aquifer (UPA) wells, 23 metals were detected. One metal (arsenic) was detected at concentrations exceeding its maximum contaminant level (MCL). Twenty-two volatile organic compounds (VOCs) were detected in 12 samples from UPA wells, and 12 of 22 VOCs detected were chlorinated compounds. Benzene was the only VOC detected above its MCL. All other metals and VOCs detected were below MCLs.

In samples from Lower Patapsco Aquifer (LPA) wells, eight VOCs were detected in five samples. Tetrachloroethene (PCE) and carbon tetrachloride (CCl_4) were the only VOC constituents detected above their respective MCLs. Beryllium was the only metal detected above its MCL.

Three surface water samples were collected during the March 2015 monitoring event. Two metals (copper and lead) were detected at concentrations that exceeded State of Maryland Chronic Ambient Water Quality Criteria for Fresh Water and three metals (iron, manganese, and vanadium) were detected at concentrations that exceeded State of Maryland Water Quality Criteria for Human Health for Consumption of Drinking Water. No VOCs were detected above the State of Maryland Water Quality Criteria.

1. Introduction

This report presents the results of the annual groundwater and surface water monitoring completed at the Closed Sanitary Landfill (CSL) (FGGM-17) at Fort George G. Meade (FGGM) in Anne Arundel County, Maryland in March 2015. PIKA-Malcolm Pirnie JV LLC (PIKA-MP JV LLC) performed all work in accordance with Contract No.W912DR-12-D-0007 Task Order 0004 issued by the Unites States Army Corps of Engineers, Baltimore District to maintain Remedial Action Operations (RAOs) and Long-term Management (LTM) at FGGM. All work was performed in accordance with the CSL Monitoring Plan dated 25 February 2013 and most recent Addendum dated 29 January 2014.Under regulatory guidance including Federal regulations, 40 Code of Federal Regulations Part 258 and state regulations, Code of Maryland Regulation Title 26 Subtitle 04, a detection and assessment monitoring program is required at the CSL. The field effort was conducted between 9 March and 19 March 2015 and included a comprehensive water-level survey and groundwater sampling and analysis for constituents of concern (COCs). A total of 26 monitoring wells were sampled during the annual event.

2. Environmental Setting

2.1 Background

FGGM is located approximately midway between Washington, D.C. and Baltimore, Maryland in Anne Arundel County, Maryland, as illustrated on the regional map in **Figure 1**. The FGGM CSL is located in the southeastern portion of the base, south of U.S. Route 32 and west of the Amtrak railroad right of way. Cell 1 covers approximately 46 acres and Cell 2 covers 24 acres. A third area that lacks topographic expression is referred to informally as Cell 3, but is not a defined disposal area. Other features in the vicinity of the landfill include surface water retention ponds along a small stream flowing from east to west that bisects the site. A landfill-gas collection and treatment system operates along the eastern edge of the landfill cells to control emissions from the Site. Much of the Site, outside of the landfill cells, is wooded and there are several areas identified as wetlands. The Site map for the CSL is provided as **Figure 2**.

2.2 Climate

The climate at FGGM is variable and influenced by the Chesapeake Bay and the Atlantic Ocean to the east and the Appalachian Mountains to the west. The winter weather in the area is influenced primarily by cold, dry, continental-polar winds from the west and northwest, and less frequent maritime-tropical winds from the south and southwest that bring warm, often humid, air to the region. During the summer, the dominance of these two air masses is reversed, and warm, humid weather dominates.

Local weather data are compiled by the National Oceanic and Atmospheric Administration's Climatic Data center for the Baltimore-Washington Thurgood Marshall International Airport weather station. Annual precipitation averages about 40 inches per year. The distribution of precipitation is essentially even throughout the year, although slightly lower averages are posted for the summer months. Historical average monthly precipitation ranges between 2.8 and 3.5 inches for all months. The annual mean daily temperature for the FGGM area is 61 degrees Fahrenheit (°F), with a daily annual maximum of 72°F and minimum of 45°F. Annual temperature extremes vary from -6 to 101°F.

2.3 Topography

FGGM is located in the Coastal Plain physiographic province (Coastal Plain), which is characterized by low-rolling uplands and low-gradient streams. The ground elevation at FGGM generally ranges between 150 and 250 feet (ft) above mean sea level (msl). Ground elevation surveyed at monitoring well locations ranges from 135 to 177 ft above msl.

2.4 Surface Water

FGGM is almost entirely located within the Patuxent River watershed, which is one of the primary drainage systems in Anne Arundel County. The extreme northeastern portion of FGGM is within the Severn River drainage basin. The Patuxent River watershed encompasses approximately 932 square miles and comprises eight sub-basins from north to south:

- Brighton Dam
- Middle Patuxent River
- Little Patuxent River
- Rocky Gorge Dam
- Patuxent River Upper
- Western Branch
- Patuxent River Middle
- Patuxent River Lower

FGGM is predominantly located within the Little Patuxent River sub-basin. Several streams drain FGGM within the Little Patuxent River sub-basin. The streams are, from west to east:

- Little Patuxent River
- Midway Branch
- Franklin Branch

The only significant lake/reservoir present on FGGM is Burba Lake (formerly called Kelly Pool).

At the CSL, there are surface water retention ponds. There is also a small stream flowing from east to west that bisects the Site displayed on **Figure 2**. The unnamed stream enters the east side of the CSL from a culvert under the Amtrak right of way and flows westward through a retention pond between landfill Cells 1 and 2, through wooded wetlands and a retention pond, and exits the Site flowing westward into ponds adjacent to Range Road.

2.5 Geology

FGGM is located just within the western boundary of the Coastal Plain. The Coastal Plain geology is characterized by a wedge of unconsolidated Cretaceous and Quaternary alluvial sediments (unconsolidated sands, silts and clays) that dip and thicken toward the Atlantic Ocean.

West of the Coast Plain is the Piedmont physiographic province (Piedmont), comprising igneous and metamorphic rocks. The boundary between the Piedmont and Coastal Plain is termed the “Fall Line,” after falls and rapids were found where streams cross this boundary. The Fall Line is located near the western Anne Arundel County line, immediately west of FGGM.

Quaternary- and Cretaceous-aged unconsolidated deposits are exposed at the surface at FGGM. These deposits have a total thickness of about 700 ft at FGGM (URS Group Inc. [URS], 2003) and are underlain by bedrock consisting of Precambrian crystalline rock composed predominately of gabbro, gneiss and schist. The unconsolidated deposits from youngest to oldest consist of:

- Quaternary alluvium and Patuxent River terraces
- Patapsco Formation
- Arundel Clay
- Patuxent Formation

The Patuxent Formation is exposed at the surface west of FGGM, the Arundel Clay crops out over the western portion of FGGM, and the Patapsco Formation crops out over the central and eastern portions of FGGM. Quaternary alluvium and river terrace deposits locally overlay the Potomac Group near the Patuxent and Little Patuxent Rivers.

Coastal Plain groundwater predominantly occurs within the following three major Potomac Group aquifers which underlie FGGM:

- Upper Patapsco
- Lower Patapsco
- Patuxent

The upper and lower portions of the Patapsco Formation are locally separated by the Middle Patapsco. Similarly, the Arundel Formation acts as a confining layer that separates the Patuxent Formation from the Lower Patapsco Formation. Extensive and on-going hydrogeological investigations in the southeast corner of FGGM have documented the Middle Patapsco clay as thick and continuous beneath the CSL occurring at depths between approximately 40 to 50 ft below ground surface. The Middle Patapsco clay is approximately 60 to 80 ft in thickness with the Lower Patapsco Aquifer (LPA) occurring beneath it.

3. Monitoring Program

The CSL monitoring program includes 26 monitoring wells. In accordance with the CSL Monitoring Plan dated 25 February 2013 and most recent Addendum dated 29 January 2014, 16 monitoring wells screened in the Upper Patapsco Aquifer (UPA) are sampled semi-annually and ten monitoring wells screened in the LPA are sampled annually. During the March 2015 monitoring event, groundwater samples were collected between 9 March and 19 March 2014. Groundwater parameters monitored under Detection Monitoring and Assessment Monitoring are provided in **Tables 1** and **2**, respectively. **Table 3** presents a summary of analytical methods used during the Annual sampling at CSL.

All purging and sampling activities were completed in accordance with procedures outlined in Standard Operating Procedure E.7 – Low-flow Groundwater Purging and Sampling Procedures for Monitoring Wells provided in **Appendix A** of the FGGM Sampling and Analysis Plan (SAP) (ARCADIS, 2010a). Field parameter measurements, purging observations, sampling methods and materials, sampling personnel, and bottle requirements were recorded on Groundwater Sampling Forms, which are presented in **Appendix A**.

3.1 Well Gauging

The 26 monitoring wells included in the CSL sampling program were gauged for groundwater elevations prior to sampling activities commencing. Water-level measurements were collected using an electronic water level indicator and measurements were recorded on a Water-Level Measurement Form. Water-level measurements were referenced to a surveyed elevation point located on the top of the well casing. Water levels were measured at least two times to check the reproducibility of the measurement data and ensure accuracy before the measurements were recorded. Monitoring well locations, top of well casing elevations, depth to water readings, and groundwater elevations are presented in **Table 4**. Groundwater elevation contour maps for the UPA and LPA are presented as **Figures 3 and 4**, respectively.

Table B-1 in **Appendix B** provides a comparison of the groundwater elevations in March 2015 to the elevations measured in August 2014. Water levels in 11 UPA wells decreased, ranging between 1.30 ft (MW106) and 2.14 ft (MW107). Water levels in five wells increased, ranging between 1.14 ft (MW4S) and 4.26 (MW05). Water levels in all but two of the LPA wells decreased, ranging between 0.05 ft (MW101D) and 1.37 ft (MW4DR). Water levels increased 0.07 ft and 0.08 ft at MW108D and MW109D, respectively and the water level measured at MW110D did not change.

3.2 Groundwater Sampling

3.2.1 Purge Methodology

Groundwater samples were collected in accordance with United States Environmental Protection Agency (USEPA) Region III low-flow groundwater purging methodology (USEPA, 1997). To ensure that representative formation water was being sampled, monitoring wells were purged and sampled using a submersible pump and polyethylene tubing. The submersible pump intake was placed mid-screen. In addition, all non-dedicated equipment and materials were decontaminated prior to and after introduction into each of the monitoring wells.

During well purging, field parameters were monitored using a water quality meter with a flow-through cell. These field parameters included pH, specific conductance, turbidity, dissolved oxygen, temperature, and oxidation-reduction potential. Upon stabilization, groundwater samples were collected through the sample tubing.

3.2.2 Sampling Methodology

All groundwater samples were collected directly from the discharge point of the sample tubing connected to the submersible pump. Groundwater samples were preserved, labeled, recorded on a Chain of Custody, and packed on ice for shipment to Shealy Laboratories in West Columbia, South Carolina, for analytical methods identified in **Table 3**. For quality assurance/quality control (QA/QC) purposes, two duplicate samples were collected, and one trip blank was included in each cooler shipped for volatile organic compound (VOC) analysis. One matrix spike and matrix spike duplicate were also collected.

3.3 Surface Water Sampling

Three surface water samples were collected during the March 2015 monitoring event from the sampling stations (SW01, SW02 and SW03) along the stream that crosses the Site. The unnamed stream enters the east side of the CSL from a culvert under the Amtrak right of way and flows westward through a retention pond between landfill Cells 1 and 2, through wooded wetlands and a retention, and exits the Site flowing westward into ponds adjacent to Range Road. The upstream monitoring point SW01 is in the ditch below the railroad embankment along the eastern boundary of the landfill. Surface water sampling location SW02 is the outfall from the retention pond between landfill Cells 1 and 2. Surface water sampling location SW03 is located at the culvert beneath Magazine Road where the stream crosses the western boundary of the Site.

Surface water samples were collected by submerging an unpreserved bottle and pouring that water into the respective pre-preserved bottles. When water flow is sufficient at SW02 and SW03 each bottle is filled directly from the outfall. Similar to groundwater sample collection, the surface water VOC sample is collected first, followed by the other parameters in the order of decreasing volatility.

3.4 Quality Assurance/Quality Control and Sample Identification

In accordance with the FGGM Quality Assurance Project Plan (ARCADIS, 2010b), additional samples were collected for QC analysis at the rate of 1 per 20 field samples. Duplicate samples were collected at MW107 and MW110D. One matrix spike and matrix spike duplicate was also collected at MW10D. Daily equipment rinse blanks were also submitted with the groundwater samples each day that non-dedicated sampling equipment was used. Trip blanks were included with any sample cooler containing VOC samples.

Field sample nomenclature was conducted in accordance with the FGGM SAP (ARCADIS, 2010a). Specifically, sample identifications (IDs) were modified to include FM17, an abbreviation for the CSL Site. In addition to the site abbreviation and monitoring well ID, the date the sample was collected is also included in the sample ID in parenthesis. For example, FM17MW4S(032014) would be the ID for the sample collected at well MW4S if it was sampled on 20 March 2014.

The analytical results for all QA/QC samples (i.e., trip blanks and equipment blanks) collected are provided in **Appendix C**. Table C-1 presents a summary of abbreviations, laboratory flags, data validation flags, and data validation reason codes that provide additional information on the data qualifiers. Table C-2 is a summary of the QA/QC detections (the detections-only table) and Table C-3 is the comprehensive listing of all analytes for the QA/QC samples. Table C-4 presents detections above the reliable detection limits and method detection limits (MDLs) from samples collected from both aquifers.

3.4.1 Data Validation

All groundwater data collected during the March 2015 sampling event received level II data validation performed under USEPA guidelines by Laboratory Data Consultants, Inc. located in Carlsbad, California. The validation process establishes whether the data are usable for the intended purpose of evaluating conditions at the site.

The data validation process includes a review of QC data generated in both the field and the laboratory. Trip and equipment blanks provide information on potential sample contamination introduced in the field and in transit to the laboratory. Method blanks, which are generated in the laboratory, are used to assess such factors as the sensitivity, accuracy, reproducibility, and cleanliness. Validation includes reviewing holding times, daily laboratory calibration curves for the analytical instruments, spike recovery, and confirming laboratory standards are current. The validation concluded that the data are usable, as qualified, for the intended purpose of evaluating the groundwater and surface water at the CSL. The data validation reports for the March 2015 data are presented in **Appendix D**.

3.5 Investigative Derived Waste Management

All investigative derived waste (IDW) generated during the sampling event was managed in accordance with procedures outlined in the FGGM Waste Management Plan (WMP) (ARCADIS, 2010c).

3.5.1 Purge Water

Purge water and decontamination fluids were combined before being containerized. All waste was stored in 55-gallon Department of Transportation approved drums, properly labeled and staged in a secure location at the CSL. At the end of the sampling event, all IDW was relocated to the FGGM designated IDW storage area located inside the enclosure for the LPA hydraulic containment system located off Magazine Road. Liquid IDW will be treated using the hydraulic containment system granular activated carbon units and processed through the system.

3.5.2 Solid Waste

All personal protective equipment and disposable sampling equipment were collected in plastic trash bags and disposed of in accordance with the FGGM WMP (ARCADIS, 2010c).

4. Chemical Results - Groundwater

This section of the report presents analytical results for the March 2015 monitoring program and discusses the distribution of COCs in the UPA and LPA. To assess Site conditions, groundwater results were screened using USEPA Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs) for drinking water.

Laboratory analytical results are presented in three tables. UPA positive detections, detections above MCLs, and detections above SMCLs are presented in **Tables 5, 6, and 7**, respectively. LPA positive detections, detections above MCLs, and detections above SMCLs are presented in **Tables 8, 9, and 10**, respectively. Data qualifiers and laboratory abbreviations are provided in **Appendix C**. Full listings of the laboratory results for both aquifers are presented in **Appendix E**. Dissolved metals were analyzed during the March 2015 sampling event which is not a requirement of the detection and assessment monitoring program at the CSL. Dissolved metals data is presented in **Appendix E** but is not summarized in the following sections. Benzene and arsenic plume contour maps for the UPA are presented as **Figures 5 and 6**, respectively. Trend plots for arsenic and benzene in the UPA are presented as **Figures 7 and 8**, respectively. Tetrachloroethene (PCE) trend plots for the LPA are provided as **Figure 9**.

4.1 Upper Patapsco Aquifer

4.1.1 Summary of Detections

Positive detections in the UPA include pesticides, herbicides, metals, semi-volatile organic compounds (SVOCs), VOCs and miscellaneous parameters as shown on **Table 5**. Explosives were sampled at three UPA monitoring wells, but all compounds were not detected above laboratory detection limits.

Pesticides and herbicides were detected at concentrations below MCLs in two groundwater samples. Two herbicides 2,4,5-TP and 2,4-D were detected in the sample from well MW19. Seventeen pesticides, 4,4-DDE, 4,4-DDE, 4,4-DDT, aldrin, alpha-bhc, alpha-chlordane, beta-bhc, delta-bhc, dieldrin, endosulfane I, endosulfane II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, heptachlor epoxide, and methoxychlor were detected at concentrations below their respective MCLs from two monitoring wells (MW12S and MW19).

Twenty-three metals were detected in samples from the UPA wells. Arsenic was the only metal detected at a concentration exceeding its MCL as described in Section

4.1.2. Seven of these (barium, calcium, iron, magnesium, nickel, potassium, and sodium) are widespread and appear to be naturally occurring in the UPA. Fifteen metals (aluminum, antimony, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, selenium, silver, thallium, vanadium, and zinc) were detected at concentrations below MCLs and were not widespread.

Three SVOCs were detected in three groundwater samples below their respective MCLs. 1,4-dichlorobenzene, diethyl phthalate, and naphthalene were detected in the sample from MW19, and 1,4-dichlorobenzene was detected in the samples from MW12S and MW14.

Twenty-two VOCs were detected in 12 samples from UPA wells, and 12 of 22 VOCs detected were chlorinated compounds. Benzene was the only VOC detected above its MCL as described in Section 4.1.2. All other VOCs detected were below MCLs.

4.1.2 Summary of Exceedances above Maximum Contaminant Levels and Secondary Maximum Contaminant Levels

The UPA analytical results were screened against MCLs and SMCLs, as summarized in **Tables 6 and 7**, respectively. Two analytes exceeded their MCLs:

- Arsenic exceeded its MCL of 10 micrograms per liter (µg/L) in four samples at concentrations between 12 µg/L (MW12S) and 47 µg/L (MW19).

- Benzene exceeded its MCL of 5 µg/L in the sample from MW19 (9.4 µg/L).

Seven analytes exceeded their SMCLs:

- Aluminum exceeded its SMCL of 50 µg/L at 10 locations, with concentrations ranging from 73 µg/L (MW02S) to 3,500 µg/L (MW106).

- Chloride exceeded its SMCL of 250 milligrams per liter (mg/L) in the sample from MW19 (300 µg/L).

- Color exceeded its SMCL of 15 Color Units in the sample from MW18 (200 Color Units).

- Iron exceeded its SMCL of 300 µg/L at 12 locations, with concentrations ranging from 380 µg/L (MW106) to 110,000 µg/L (MW14).

- Manganese exceeded its SMCL of 50 µg/L at 12 locations with concentrations ranging from 98 µg/L (MW19) to 1,900 µg/L (MW12S).

- Odor exceeded its SMCL of 3 threshold odor number (t.o.n.) at two locations at concentrations of 4 t.o.n. (MW14) to 9.6 t.o.n. (MW19).

- Total Dissolved Solids exceeded its SMCL of 500 mg/L at two locations at concentrations of 550 mg/L (MW106) and 1,100 mg/L (MW19).

4.2 Lower Patapsco Aquifer

4.2.1 Summary of Detections

Positive detections in samples from the LPA include metals, pesticides, VOCs and miscellaneous parameters as shown in Table 8.

Fourteen pesticides, 4,4- DDE, 4,4- DDE, aldrin, alpha-bhc, beta-bhc, delta-bhc, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-bhc, and heptachlor epoxide were detected in the samples from two monitoring wells. No pesticides were detected above their respective MCLs.

Twenty-three metals were detected in the LPA samples. Beryllium was the only metal detected at a concentration exceeding its MCL as described in Section 4.2.2. Aluminum, beryllium, cadmium, calcium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, and sodium were widespread in the LPA including the upgradient wells MW4DR and MW7D, suggesting these metals are naturally occurring in the aquifer.

Eight VOCs were detected in five samples from LPA wells. PCE and carbon tetrachloride (CCl_4) were the only VOC constituents detected above their respective MCL (see section 4.2.2). All other detected VOCs were at concentrations below their respective MCLs.

4.2.2 Summary of Exceedances above Maximum Contaminant Levels and Secondary Maximum Contaminant Levels

The LPA groundwater results were screened against MCLs and SMCLs as summarized in **Tables 9 and 10**, respectively. Three analytes detected in samples from LPA wells exceeded their MCLs:

- Beryllium exceeded its MCL of 4 µg/L in the sample from MW7D at a concentration of 5.9 µg/L.

- Carbon Tetrachloride exceeded its MCL of 5 µg/L in the sample from MW4DR detected at a concentration of 7.8 µg/L.

- PCE exceeded its MCL of 5 µg/L in the sample from MW101D detected at a concentration of 31 µg/L.

Four analytes detected in samples from the LPA exceeded their SMCLs:

- Aluminum exceeded its SMCL of 50 µg/L in nine wells with concentrations ranging from 78 µg/L (MW13D) to 4,200 µg/L (MW07D).

- Color exceeded its SMCL of 15 color units in the sample from MW109D detected at a concentration of 160 color units.

- Iron exceeded its SMCL of 300 µg/L in four wells, with concentrations ranging from 1,300 µg/L (MW12D) to 6,700 µg/L (MW10D).

- Manganese exceeded its SMCL of 50 µg/L from eight wells, with concentrations ranging from 74 µg/L (MW109D) to 550 µg/L (MW10D).

5. Chemical Results – Surface Water

Three surface water samples were collected from the unnamed stream. **Table 11** presents positive surface water detections from samples collected during the March 2015 sampling event. Surface water analytical tables are included in **Appendix E**. Surface water analytical results were screened against State of Maryland Chronic Ambient Water Quality Criteria for Fresh Water and State of Maryland Water Quality Criteria for Human Health for Consumption of Drinking Water.

Three anions (chloride, nitrogen [nitrate], and sulfate) were detected in the surface water. Twenty metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc) were detected in the surface water samples. Two metals (copper and lead) were detected at concentrations that exceeded State of Maryland Chronic Ambient Water Quality Criteria for Fresh Water and three metals (iron, manganese, and vanadium) were detected at concentrations that exceeded State of Maryland Water Quality Criteria for Human Health for Consumption of Drinking Water.

No VOCs were detected above the State of Maryland Water Quality Criteria.

6. Statistical Analysis

The analytical data were analyzed statistically with a focus as to how the groundwater quality was changing over time. The historic database included data for 247 analytes in 26 monitoring wells in semi-annual monitoring events dated back to 1994. Previous statistical analyses have divided the data into four groups, three of which were in the UPA and one group for all LPA data. Interwell comparisons were made between data in a single well designated as background and a group of downgradient wells. In 2009, the USEPA released a Unified Guidance document for the statistical evaluation of groundwater (USEPA, 2009). Following the concepts in that document, the statistical approach presented herein was modified beginning with the first semiannual monitoring report for 2010. Another modification in the procedure is that the LPA is only monitored annually, in the spring. In this section, the following topics are discussed: the present approach, the data preparation, and the results for both groundwater-bearing units.

6.1 Statistical Procedure

The lack of uncontaminated background wells indicated that a proper statistical analysis program would have to be based on intrawell testing. The intrawell tests were conducted by testing each constituent in each monitoring well separately, as recommended in USEPA guidance. Each data subset is referred to as a “well-constituent pair” because it consisted of concentrations of a single constituent in a single monitoring well. Typical intrawell tests, such as comparison to intrawell upper prediction limits (UPLs) or Shewhart-CUSUM control charts are typically used to compare new data to previous data that represent unimpacted groundwater conditions. This is not possible at this site because all twenty-six of the wells have some history of detection of manmade chemicals. For these reasons, the best approach is an intrawell test that could measure trends. Mann-Kendall testing was selected as the test for these data. This nonparametric test can evaluate a set of data points in chronological order and determine if an increasing or decreasing slope is a statistically significant trend.

One important parameter in tests for trends is the number of data points selected from the data set. There have been 42 sampling events, two per year since 1994, for many of the constituent-well pairs. With a data set of this size, it is possible to miss a recent trend due to the legacy of twenty-one years of data. For this reason, a “sliding window” approach with 12 data points was selected as the most appropriate diagnostic approach. Data points representing the 12 most recent sampling events were selected. For the UPA, these data points cover the time from the autumn of 2009 to the spring of 2015. For the LPA, these data points cover the time from the March of

2008 to March 2015. These 12 points were evaluated for each constituent of concern for each well. In each set of semiannual or annual statistical tests, the oldest point is dropped from the test data sets, and the most recent point is added. The statistical tests are conducted on 12 data points, with new points added each sampling event and old ones being removed.

The data were loaded into a groundwater statistical program, Sanitas ™ prepared by Sanitas Technologies in Shawnee, Kansas. Version 9.5.15 (released in 2015) was used. The program was designed to automate the statistical analysis of Resource Conservation and Recovery Act (RCRA) hazardous waste (Subtitle C) and municipal (Subtitle D) landfill groundwater quality data. The program's decision logic guides the user through procedures that ensure that the analysis will meet the requirements of the USEPA, American Society for Testing and Materials (ASTM), and state regulations. In intrawell testing, there are separate data sets for each combination of monitoring wells and constituents.

As specified above, most of the data sets had 12 members. A small number of analytes, such as 1,4-dichlorobenzene, naphthalene, and 1,3,5-trimethylbenzene were not always in the monitoring program and have fewer members. For each data set, three tests were run using Sanitas: an outlier test, a distribution test, and a trend test. In these tests, non-detections were replaced with values equal to half of the detection limit.

Sanitas contains three outlier tests: EPA Outlier Screening (USEPA, 1989), Dixon's Test, and Rosner's Test. The EPA Outlier Screening test was used to specify suspect outliers and Dixon's Test was used to determine if the suspect data point was a statistically significant outlier. Dixon's Test is valid for data sets with up to 25 members. Rosner's Test is recommended for larger data sets. Because the data sets in this analysis always had 12 or less data points, Rosner's Test was not used. Both the tests were conducted at a 5% level of significance ($\alpha = 0.05$). All outliers identified in a data set were listed in the appropriate table. In some cases, a data set had more than one statistically significant outlier. The detection frequency was tabulated. In the event that there were fewer than four detections in a data set, the outliers were not counted.

The Shapiro-Wilk test for normality is recommended by the USEPA for data sets with 50 or fewer members (USEPA, 2009). This test was used to determine if the test data was normally distributed. If the data passed the Shapiro-Wilk test, "Normal" was recorded on the results table. If the data failed the Shapiro-Wilk test, they were logarithmically transformed and retested. If the data passed this test, "Lognormal" was recorded to indicate a lognormal distribution. If the data failed the second test

“Unknown” was recorded to indicate that the distribution of the data set was not known. Whenever there were fewer than four detections, the distribution testing indicated an unknown distribution. On the table “NDs” was recorded to indicate that there were too many non-detects to evaluate the true distribution of the data set.

Sen’s Slope Estimator was used for each data set in conjunction with the Mann-Kendall test to determine if the slope in the 12 data points was statistically significant at an $\alpha = 0.02$ level. If the slope was significant, a decreasing or increasing trend was indicated on the summary table. Increasing trends were noted in bold font. Trends were not reported for highly censored data sets (i.e., having fewer than four detections).

Descriptive statistics were tabulated for each COC in each monitoring well. These statistics included the number of detections, the number of samples (usually 12), the sample mean, the standard deviation, the variance, the maximum detected value, and the minimum detected value. In computing the mean, the standard deviation and the variance, non-detects were included at half the detection limit.

6.2 Data Preparation

Several steps were taken in order for the data to be input into the Sanitas program. First, qualified data, such as J-flagged values, were accepted as quantitative. Flags were removed and the data were converted to numerical values. No duplicate data points were included in the statistical analysis in order to satisfy the requirement of independence.

As stated above, detection limits were handled in some tests in Sanitas by inserting one half of the detection limit. This presented a practical challenge, because detection limits for non-detections that occurred prior to September 2009 were not available. One option, using “< 0” as an input, will generate a warning flag in Sanitas because such values can create instability in some tests. It was therefore necessary to determine a surrogate detection limit. For all of these data points, the MDLs that were available in the laboratory reports for spring 2010 were used. It was assumed that the MDLs had the same values in previous sampling events. This compromise seemed to work well, except for thallium. For some data sets, a detection limit of 1.0 μg/L from the autumn 2009 data was used as the detection limit instead.

As stated previously, analytes that were never detected or very rarely detected, as well as analytes that appeared to be laboratory contaminants were removed from the statistical analysis. This was necessary in order to minimize the number of tests on data sets composed of detection limits and make the statistical analysis more diagnostic. The decision to remove or keep an analyte was based upon detection frequency in the data base for all sampling events and not just the most recent 12 events.

In preparing the data tables, naphthalene was included with the SVOCs. Four metals (calcium, magnesium, potassium, and sodium) were tabulated with the inorganic parameters rather than the metals. Total 1,2-dichloroethene was excluded in favor of the individual isomers, cis-1,2-dichloroethene and trans-1,2-dichloroethene. The data for the two nitrate entries "nitrate" (measured prior to September 2009) and "nitrate-N" (measured since September 2009) were merged into a single entry designated "nitrate-N".

6.3 Statistical Results for the Upper Patapsco Aquifer

The input data sets used in the Sanitas program are included in **Appendix F**. These attachments show the chosen surrogate detection limits and the data points used in computing the statistical results. The metals input data are included in Attachment F-1 in **Appendix F**. Eighteen metals were statistically analyzed including aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, vanadium, and zinc. Eight inorganic groundwater parameters were analyzed: chloride, nitrate-N, nitrogen, sulfate, calcium, magnesium, potassium, and sodium. These can be found in Attachment F-2. The seventeen VOCs included in the statistical analysis were 1,1-dichloroethane, 1,2-dichlorobenzene, 1,2-dichloropropane, 1,3,5-trimethylbenzene, 1,4-dichlorobenzene, benzene, CFC-12, chlorobenzene, chloroethane, cis-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, total xylenes, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride (Attachment F-3). The two SVOCs can be found in Attachment F-4: 1,4-dichlorobenzene and naphthalene.

The Sanitas output data can also be found in **Appendix F**. The outlier analysis and the normality testing for the UPA COCs are included in Attachment F-5. The Sen's Slope Estimator and Mann-Kendall test results are in Attachment F-6.

Descriptive statistics for the analytes in the UPA can be found in **Appendix G**. These statistics are tabulated in Attachments G-1 to G-4 for each of the metals, inorganic analytes, VOCs, and SVOCs, respectively. Only analytes for which statistical analysis was conducted were included in **Appendix G**. Analytes deleted due to low detection frequency were not included.

The statistical results for the metals are summarized in **Table 12.** Two statistically significant increasing trends were identified out of 288 data sets. Both increasing trends were for zinc, in MW-20 and MW-105. Twenty-six decreasing trends were identified. Seven of the decreasing trends were in MW-17. MW-13S, MW-18, and MW-19 had the next highest number of increasing trends at three each. That there are 26 decreasing trends and two increasing trends is statistical evidence that the concentrations of metals are declining in the UPA.

The statistical results for the inorganic constituents are summarized in **Table 13**. Seven statistically significant increasing trends were identified out of 128 data sets. Two of the increasing trends were in MW-5 (chloride and calcium) and two in MW-7S (calcium and potassium). There were seven statistically significant decreasing trends identified, three of which were for chloride (in MW-13S, MW-8, and MW-12S).

The statistical results for VOCs in the UPA are summarized in **Table 14**. Two statistically significant increasing trends were identified out of 272 data sets. Both were for chlorobenzene, in MW-7S and MW-19. There were seven statistically significant decreasing trends identified, five of which were in MW-19: 1,2-dichlorobenzene, 1,3,5-trimethylbenzene, ethylbenzene, toluene, and total xylenes. Thus, the concentrations of VOCs are declining in the UPA.

The statistical results for SVOCs in the UPA are summarized in **Table 15**. No statistically significant increasing or decreasing trends were discernable.

In summary, there were eleven increasing trends and forty decreasing trends in the UPA. The decreasing trend particularly in the anthropogenic VOCs indicate that groundwater impacts in the UPA are declining.

6.4 Statistical Results for the Lower Patapsco

The input data sets used in the Sanitas program for the LPA were also included in **Appendix F**. The metals input data are included in Attachment F-7 in **Appendix F**. Eighteen metals were statistically analyzed including aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, vanadium, and zinc. Eight inorganic groundwater parameters were analyzed: chloride, nitrate-N, nitrogen, sulfate, calcium, magnesium, potassium, and sodium. These can be found in Attachment F-8. The seven VOCs included in the statistical analysis were 1,4-dichlorobenzene, benzene, chloroform, cis-1,2-dichloroethene, tetrachloroethene, toluene, and trichloroethene (Attachment F-9). No SVOCs were statistically analyzed due to low detection frequencies.

The Sanitas output can be found in **Appendix F**. The outlier analysis and the normality testing for the LPA COCs are included in Attachment F-10. The Sen's Slope Estimator and Mend-Kendall test results are in Attachment F-11.

Descriptive statistics for the analytes in the LPA can be found in **Appendix G**. These statistics are tabulated in Attachments G-5 to G-7 for each of the metals, inorganic analytes, and VOCs, respectively. Only analytes for which statistical analysis was conducted were included in **Appendix G**. Analytes deleted due to low detection frequency were not included.

The statistical results for the metals are summarized in **Table 16**. Nineteen statistically significant increasing trends were identified out of 180 data sets. Four of the increasing trends were in MW-110D. MW-4DR, MW-10D and MW-108D had the next highest number of increasing trends at three each. Barium and manganese exhibited a statistically significant increasing trend in three wells. There are nineteen increasing trends for metals in the LPA and no decreasing trends. One might consider the statistically increasing trends indicated downward migration, but the results at the upgradient well, MW-7D make it more likely that metals are migrating in the LPA from an upgradient source.

The statistical results for the inorganic constituents are summarized in **Table 17**. Twelve statistically increasing trends were identified out of 80 data sets. Two inorganic constituents were increasing in the background well, MW-7D. MW-4DR had five statistically significant increasing trends (out of eight parameters). MW-7D, MW-101D, and MW-110D had two increasing trends. There was only one decreasing trend, nitrate-N at MW-2D

The statistical results for VOCs in the LPA are summarized in **Table 18**. One statistically significant increasing trend was identified in MW-101D. This trend for PCE was also exhibited in the previous statistical analysis. Six statistically significant decreasing trends were identified, three of which were in MW-4DR.

The large number of increasing trends for conservative substances, such as the metals and ions, and the relatively small number of increasing trends in the VOCs supports the conclusion that the LPA is not connected hydraulically to the UPA, as described in the CSL Remedial Investigation Report (EM, 2007).

6.5 Observations and Interpretation

This section presents an interpretation of the statistical analysis completed at the CSL. The notable observations include:

- The UPA samples had twenty-six statistically significant decreasing and two increasing metal trends.

- The UPA samples had seven statistically significant increasing and decreasing inorganic constituent trends.

- The combined number of increasing trends in VOC or SVOCs concentrations in the UPA was two, but there were seven decreasing trends for VOCs. The larger number of decreasing trends and the lower number of detections compared to the previous sampling event indicate that groundwater VOC impacts in the UPA are declining.

- The low detection frequencies of the constituents from the UPA provide additional evidence that the LPA is not connected hydraulically to the UPA.

- Detection monitoring parameters were detected above MCLs in the UPA samples listed below. Increasing trends were not observed in any of these well-constituents pairs.

    - Nitrate in MW-13S
    - Arsenic in MW-7S, MW-12S, MW-14, and MW-19
    - Benzene in MW-19

- Results from the LPA indicate 19 increasing metal trends and 12 increasing inorganic constituent trends.

- One statistically significant VOC increasing trend was identified in MW-101D.

- Detection monitoring parameters were above the MCL in three LPA samples, beryllium in MW-7D, chloride in MW-109D, and tetrachloroethene in MW-101D. An increasing trend was also observed for one of these well-constituent pairs, tetrachloroethene in MW-101D.

- Aluminum, iron, and manganese were often detected above their respective secondary drinking water standards.

The absence of patterns and correlation in the UPA and LPA sample analytical results supports the Remedial Investigation conclusion that the units are separated by the Middle Patapsco clay, which is a thick and effective confining unit (EM, 2007). That most trends are positive in the LPA and negative in the UPA also support this conclusion; the concentrations of monitored groundwater constituents in the two water bearing units are progressing in opposite directions.

7. Conclusion and Recommendations

7.1 Summary of March 2015 Monitoring Results

The results of the March 2015 groundwater and surface water monitoring are consistent with the results of prior sampling events. MCL exceedances were sporadic and isolated and include benzene and arsenic, concentrations of which exceeded their respective MCLs in samples from the UPA mainly at the southeast corner of Cell 1. In the LPA, beryllium exceeded its MCL at MW7D. PCE and CCl_4 concentrations exceeded their MCLs in the samples from MW101D and MW4DR, respectively. Historical data for all sampling rounds completed to date are provided in **Appendix H**.

7.1.1 Monitoring in the Upper Patapsco Aquifer

Groundwater sampling activities have been completed under the monitoring requirements for the UPA. Arsenic and benzene are constituents detected in samples from the UPA that have concentrations exceeding MCLs during the March 2015 event and have exceeded MCLs previously; data trend plots for arsenic and benzene concentrations in selected UPA wells are provided as **Figures 7 and 8**, respectively. The trend plots visually display constituent concentrations at selected sampling locations since sampling activities commenced. Neither constituent shows an increasing trend. Statistical analysis shows increasing trends in other constituents detected in samples from the UPA; however, none of these constituents exceeded their MCLs.

A general assessment of the UPA indicates that samples with constituents exceeding their MCLs are generally collected from wells south of landfill Cell 1 and wells located between the cells and the railroad right of way, though MW-7S located on the west of Cell 2 has exceeded the arsenic MCL (10 µg/L) sporadically since the inception of the CSL monitoring program. The occasional historical detections of other compounds are in samples from wells from the same part of the Site.

7.1.2 Monitoring in the Lower Patapsco Aquifer

Groundwater sampling activities have been completed under the monitoring requirements for the LPA. PCE in the sample from MW101D, CCl_4 in the sample from MW4DR, and beryllium in the sample from MW07D exceeded their respective MCLs. A data trend plot for PCE is provided as **Figure 9**. At MW101D, PCE was detected at its maximum concentration to date (31 µg/L). The statistical analysis shows a significantly increasing trend for PCE at this location.

7.1.3 Monitoring in Surface Water

Three surface water samples were collected during the March 2015 monitoring event. Constituent detections in these samples are summarized in Section 5. Two metals (copper and lead) were detected at concentrations that exceeded State of Maryland Chronic Ambient Water Quality Criteria for Fresh Water and three metals (iron, manganese, and vanadium) were detected at concentrations that exceeded State of Maryland Water Quality Criteria for Human Health for Consumption of Drinking Water. No VOCs were detected above the State of Maryland Water Quality Criteria.

7.1.4 Comparison of Monitoring Results in the Upper and Lower Patapsco Aquifers

PCE, with historical MCL exceedances in the LPA, has been detected generally in only trace concentrations in the UPA, including one estimated concentration during the March 2015 sampling event. CCl_4, consistently detected in MW4DR in the LPA, has never been detected in samples collected from the UPA. Fuel constituents including benzene and ethylbenzene that have been detected in several UPA wells along the east side of the landfill are infrequent trace detections in the LPA. Certain inorganic analytes, most notably arsenic, are persistent in the UPA, but are detected infrequently and at trace concentrations in samples from the LPA.

7.2 Evaluation of the Adequacy of the Monitoring Well Network

7.2.1 Upper Patapsco Aquifer Monitoring Wells

The groundwater monitoring well network for the UPA consists of 16 shallow monitoring wells. These wells are located along the periphery of the waste cells and around the CSL property boundary. Three of the shallow monitoring wells are located southeast of the landfill and off FGGM property. Sampling of these three shallow wells has indicated that constituents detected in the shallow groundwater at the landfill have not migrated an appreciable distance southeast of the installation boundary within the UPA. In order to further characterize shallow UPA groundwater off-post, groundwater samples were collected from a series of soil borings installed in Anne Arundel County Right-of-Way southeast of the Amtrak property. Sampling methodology and analytical results are presented in the December 2014 Final *Focused Feasibility Study/Assessment of Corrective Measures*.

7.2.2 Lower Patapsco Aquifer Monitoring Wells

The groundwater monitoring network for the LPA consists of ten monitoring wells. These wells are located northwest and southeast of the waste cells and landfill property boundary. Groundwater flow in the LPA in this area is from the northwest to the southeast. Based on the existing monitoring well network, three of the deep monitoring wells are located hydraulically upgradient of the landfill. Two of the deep monitoring wells are located crossgradient and five are located downgradient. Three of the deep monitoring wells are located southeast of the landfill and off FGGM property.

Sampling of the deep wells has indicated the presence of constituents. However, these constituents are not related to those detected in samples from the UPA as described in the statistical analysis section (Section 6 and Section 7.1.4). Additionally, the Remedial Investigation Report (EM, 2007) documented the presence and effectiveness of the Middle Patapsco Clay as a hydraulic barrier between the UPA and LPA. Although the locations of the LPA wells surround the CSL in areal extent, they do not serve to monitor potential releases to groundwater from the CSL.

The LPA is now being handled under a separate Comprehensive Environmental Response, Compensation, and Liability Act Operable Unit (Operable Unit 4 / LPA) and has its own detailed Remedial Investigation, Feasibility Study, Proposed Plan, and Record of Decision.

An Addendum to the CSL Monitoring Plan dated 20 June 2012 was prepared in response to comments dated 6 April 2012 from the Maryland Department of the Environment (MDE) that agreed to the reduction of monitoring frequency of the ten deep LPA wells from semi-annual to annual. Deep LPA groundwater monitoring wells will continue to be monitored on an annual basis moving forward. The correspondence from MDE dated 6 April 2012 also noted that once a corrective action has been approved for Operable Unit 4 / LPA, a request to discontinue monitoring of the deep LPA wells under the CSL Monitoring Program will be re-evaluated. The revised CSL Monitoring Plan reflecting these changes was submitted on 25 February 2013.

8. References

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Tables

Table 1
Summary of Detection Monitoring Parameters
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics			
1. Antimony	5. Cadmium	9. Lead	13. Thallium
2. Arsenic	6. Chromium	10. Nickel	14. Vanadium
3. Barium	7. Cobalt	11. Selenium	15. Zinc
4. Beryllium	8. Copper	12. Silver	
Organics - List 1			
16. Acetone	28. 1,2-Dibromo-3-chloropropane	40. trans-1,3-Dichloropropene	52. 1,1,2,2-Tetrachloroethane
17. Acrylonitrile	29. 1,2-Dibromoethane	41. Ethylbenzene	53. Tetrachloroethene
18. Benzene	30. 1,2-Dichlorobenzene	42. 2-Hexanone	54 Toluene
19. Bromochloromethane	31. 1,4-Dichlorobenzene	43. Bromomethane	55. 1,1,1-Trichloroethane
20. Bromodichloromethane	32. trans 1,4-Dichloro-2-butene	44. Chloromethane	56. 1,1,2-Trichloroethane
21. Bromoform	33. 1,1 -Dichloroethane	45. Dibromomethane	57. Trichloroethene
22. Carbon disulfide	34. 1,2-Dichloroethane	46. Methylene chloride	58. Trichlorofluoromethane
23. Carbon tetrachloride	35. 1,1-Dichloroethene	47. 2-Butanone	59. 1,2,3-Trichloropropene
24. Chlorobenzene	36. cis-1,2-Dichloroethene	48. Methyl iodide	60. Vinyl acetate
25. Chloroethane	37. trans-1,2-Dichloroethene	49. 4-Methyl-2-pentanone	61. Vinyl chloride
26. Chloroform	38. 1,2-Dichloropropane	50. Styrene	62. Xylenes
27. Dibromochloromethane	39. cis-1,3-Dichloropropene	51. 1,1,1,2-Tetrachloroethane	
State and Fort George G. Meade Required Parameters			
63. Total Alkalinity	69. Total Dissolved Solids	75. Sodium	81. Color
64. Hardness	70. Mercury	76. Chemical Oxygen Demand	82. Aluminum
65. Ammonia	71. Calcium	77. pH	83. Manganese
66. Nitrate	72. Iron	78. Turbidity	
67. Chloride	73. Magnesium	79. Specific Conductance	
68. Sulfate	74. Potassium	80. Odor	

Table 2
Summary of Assessment Monitoring Parameters
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics			
1 Antimony	5. Cadmium	9. Lead	13. Thallium
2. Arsenic	6. Chromium	10. Nickel	14. Vanadium
3. Barium	7. Cobalt	11. Selenium	15. Zinc
4. Beryllium	8. Copper	12. Silver	
Organics - List 1 (same as Detection Monitoring Parameters)			
Organics - List 2			
63. Acenaphthene	86. Bis(2-ethylhexyl)phthalate	109. Di-n-butyl phthalate	132. Dinoseb
64. Acenaphthylene	87. 4-Bromophenyl phenyl ether	110. Dichlorobenzene	133. Di-n-octyl phthalate
65. Acetonitrile; Methyl cyanide	88. Butyl benzyl phthalate	111. 3,3-Dichlorobenzidine	134. Diphenylamine
66. Acetophenone	89. Chlordane	112. Dichlorodifluoromethane	135. Disulfoton
67. 2-Acetylaminofluorene;2-AAF	90. p-Chloroaniline	113. 2,4-Dichlorophenol	136. Endosulfan I
68. Acrolein	91. Chlorobenzilate	114. 2,6-Dichlorophenol	137. Endosulfan II
69. Aldrin	92. 4-Chloro-3-methylphenol	115. 1,3-Dichloropropane	138. Endosulfan sulfate
70. Allyl chloride	93. 2-Chloronaphthalene	116. 2,2-Dichloropropane	139. Endrin
71. 4-Aminobiphenyl	94. 2-Chlorophenol	117. 1,1-Dichloropropene	140. Endrin aldehyde
72. Anthracene	95. 4-Chlorophenyl phenyl ether	118. Dieldrin	141. Ethyl methacrylate
73. Benzo[a]anthracene	96. Chloroprene	119. Diethyl phthalate	142. Ethyl methanesulfonate
74. Benzo[b]fluoranthene	97. Chryscne	120. Thionazin	143. Famphur
75. Benzo[k]fluoranthene	98. 3-methylphenol	121. Dimethoate	144. Fluoranthene
76. Benzo[ghi]perylene	99. 2-methylphcnol	122. p-(Dimethylamino)azobenzene	145. Fluorene
77. Benzo[a]pyrene	100. 4-methylphenol	123. 7.12-Dimethylbenz[a]anthracene	146. Heptachlor
78. Benzyl alcohol	101. Cyanide	124. 3,3-Dimethylbenzidine	147. Heptachlor epoxide
79. alpha-BHC	102. 2,4-D	125. 2,4-Dimethylphenol	148. Hexachlorobenzene
80. beta-BHC	103. 4,4-DDD	126. Dimethyl phthalate	149. Hexachlorobutadiene
81. deita-BHC	104. 4,4-DDE	127. m-Dinitrobenzene	150. Hexachlorocyclopentadiene
82. gamma-BHC; Lindane	105. 4,4-DDT	128. 4,6-Dinitro-2-methylphenol	151. Hexachloroethane
83. Bis(2-chloroethoxy) methane	106. Diallate	129. 2,4-Dinitrophenol	152. Hexachloropropene
84. Bis(2-chloroethyl) ether	107. Dibenz[a,h]anthracene	130. 2,4-Dinitrotoluene	153. Indeno(l,2,3-cd)pyrene
85. Bis(2-chloro-l-methylethyl) ether	108. Dibenzofuran	131. 2,6-Dinitrotoluene	154. Isobutyl alcohol
155. Isodrin	170. 2-Naphthylamine	185. 5-Nitro-o-toluidine	200. Silvex; 2,4,5-TP
156. Isophorone	171. 2-Nitroaniline	186. Parathion	201. Sulfide
157 Isosafrole	172. 3-Nilroaniline	187. Pentachlorobenzene	202. 2,4,5-T
158. Kepone	173. 4-Nitroaniline	188. Pentachloronitrobenzene	203. 1,2,4,5-Tetrachlorobenzene
159. Methacrylonitrile	174. Nitrobenzene	189. Pentachlorophenol	204. 2,3,4,6-Tetraochlorophenol
160. Methapyrilcne	175. 2-Nitrophenol	190. Phenacetin	205. Tin
161. Methoxychlor	176. 4-Nitrophenol	191. Phenanthrene	206. o-Toluidine
162. 3-Methylcholanthrene	177. N-Nitrosodi-n-butylamine	192. Phenol	207. Toxaphene
163. Methyl methacrylate	178. N-Nitrosodiethylamine	193. p-Phenylenediamine	208. 1,2,4-Trichlorobenzene
164. Methyl methanesulfonate	179. N-Nitrosodimethylamine	194. Phorate	209. 2,4,5-Trichlorophenol
165. 2-Methylnaphthalene	180. N-Nitrosodiphenylamine	195. Polychlorinated biphenyls	210. 2,4,6-Trichlorophenol
166. Methyl parathion	181. N-Nitrosodipropylamine	196. Pronamide	211. 0,0,0-Triethyl phosphorothioate
167. Naphtlialene	182. N-Nitrosomethylethyiamine	197. Propionitrile	212. sym-Trinitrobenzene
168. 1,4-Naphthoquinone	183. N-Nitrosopiperidirie	198. Pyrene	
169. 1-Naphthylamine	184. N-Nitrosopyrrolidine	199. Safrole	
State and Fort George G. Meade Required Parameters			
213. Total Alkalinity	223. Magnesium	233 1.3-Dinitrobenzene	243. Nitrobenzene
214. Hardness	224. Potassium	234. 2,4,6-Trinitrotoluene	244. RDX
215. Ammonia	225. Sodium	235. 2,4-Dinitrotoluene	245. Tetryl
216. Nitrate	226. Chemical Oxygen Demand	236. 2,6-Dinitrotoluene	246. pH
217. Chloride	227. Aluminum	237. 2-Amino-4.6-dinitrotoluene	247. Turbidity
218. Sulfate	228. Manganese	238. 2-Nitrotoluene	
219. Total Dissolved Solids	229. Specific Conductance	239. 3-Nitrotoluene	
220. Mercury	230. Odor	240. 4-Amino-2,6-dinitrotoluene	
221. Calcium	231. Color	241. 4-Nitrotoluene	
222. Iron	232. 1,3,5-Trinitrobenzene	242. HMX	

Table 3
Summary of Analytical Methods
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Chemical Class			
Analyte	**EPA Analytical Method**	**Sample Container**	**Preservative**
Explosives	8330A	1,000mL Glass	Cool to 4º C
Herbicides	8151A	1,000mL Glass	Cool to 4º C
PCBs	8082A	1,000mL Glass	Cool to 4º C
Pesticides	8081B	1,000mL Glass	Cool to 4º C
Mercury	7470A	500 mL Plastic	pH <2 HNO3
SVOCs	8270D	1,000mL Glass	Cool to 4º C
TAL Metals	6010C	500 mL Plastic	pH <2 HNO3
VOCs	8260	40 mL Glass	pH <2 HCL

Wet Chemistry			
Analyte	**EPA Analytical Method**	**Sample Container**	**Preservative**
Alkalinity	SM2320B	250 mL Plastic	Cool to 4º C
Ammonia - N	350.1	250mL Plastic	pH <2 H2SO4
Chemical Oxygen Demand	SM5220D	250mL Plastic	pH <2 H2SO4
Chloride	300.1	250mL Plastic	Cool to 4º C
Color	SM2120B	500mL Plastic	Cool to 4º C
Cyanide	9012B	250mL Plastic	pH >12 NaOH
Hardness	SM2320C	250mL Plastic	pH <2 HNO3
Odor	2150	500mL plastic	Cool to 4º C
pH	SM2400-HB	100mL Plastic	Cool to 4º C
Specific Conductance	120.1	250mL Plastic	Cool to 4º C
Sulfate	300.1	250mL Plastic	Cool to 4º C
Sulfide	SM4500-S2F	500mL Plastic	Zinc Acetate, pH>9 NAOH
Total Dissolved Solids	SM2540C	250mL Plastic	Cool to 4º C
Turbidity	180.1	250mL Plastic	Cool to 4º C

Notes:
EPA - United Stated Environmental Protection Agency
mL - milliliter
º C - degrees Celsius
PCB - polychlorinated biphenyl
SVOC - semi-volatile organic compound
TAL metals - Target Analyte List Metals
VOC - volatile organic compound
HNO3 - Nitric Acid
H2SO4 - Sufluric Acid
HCL - Hydrochloric Acid
NaOH - Sodium Hydroxide

Table 4
Monitoring Well Network
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Well ID	Well Material	Well Diameter	Ground Surface Elevation	Top of Casing Elevation	Measured Total Depth	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length	Depth to Water (3/9/2015)	Groundwater Elevation (MSL)
Upper Patapsco Aquifer										
MW2S	PVC	4	161.60	163.93	27.63	24	29	5	16.35	147.58
MW4S	PVC	4	159.34	161.88	15.20	7	12	5	6.94	154.94
MW5	PVC	4	147.35	148.50	29.33	8	28	20	2.06	146.44
MW7S	PVC	4	136.16	137.99	27.30	5.5	25.5	20	2.93	135.06
MW8	PVC	4	140.58	141.76	24.46	8	23	15	6.63	135.13
MW10S	PVC	4	157.93	159.39	19.52	8	18	10	5.14	154.25
MW12S	PVC	4	172.88	174.44	29.94	18	28	10	23.38	151.06
MW13S	PVC	4	167.36	169.16	35.71	19	34	15	24.22	144.94
MW14	PVC	4	163.46	165.68	32.34	20	30	10	17.93	147.75
MW17	PVC	4	170.21	171.81	36.91	20	35	15	23.60	148.21
MW18	PVC	4	166.58	167.84	36.99	20	35	15	23.61	144.23
MW19	PVC	4	168.61	170.01	38.54	22.5	37.5	15	21.51	148.50
MW20	PVC	4	170.27	171.70	32.99	21	31	10	21.61	150.09
MW105	PVC	4	192.84	192.70	62.27	49	59	10	52.85	139.85
MW106	PVC	4	169.21	171.41	33.84	21.5	31.5	10	26.83	144.58
MW107	PVC	4	177.81	179.91	46.23	31.5	41.5	10	34.97	144.94
Lower Patapsco Aquifer										
MW2D	PVC	4	160.32	162.27	88.55	76.5	86.5	10	71.52	90.75
MW4DR	PVC	4	165.58	167.76	150.99	129	149	20	68.47	99.29
MW7D	PVC	4	135.43	137.37	107.51	98	108	10	38.95	98.42
MW10D	PVC	4	158.03	159.62	133.68	117	127	10	63.48	96.14
MW12D	PVC	4	172.45	174.52	136.11	121	131	10	84.05	90.47
MW13D	PVC	4	167.35	168.05	125.45	100	120	20	72.46	95.59
MW101D	PVC	4	160.77	161.17	151.34	133	143	10	73.73	87.44
MW108D	PVC	4	177.15	179.55	176.46	155	165	10	91.41	88.14
MW109D	PVC	4	171.51	171.26	166.42	133.5	153.5	20	84.37	86.89
MW110D	PVC	4	165.42	167.91	159.06	140	160	20	79.59	88.32

Notes:
All measurements in feet
MSL = Mean Sea Level
ft bgs = feet below ground surface
PVC = polyvinyl chloride

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Inorganics			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW02S FM17-MW2S(031915) 3/19/2015	FM17MW04S FM17-MW4S(031715) 3/17/2015	FM17MW05 FM17-MW5(031315) 3/13/2015	FM17MW07S FM17-MW7S(031715) 3/17/2015	FM17MW08 FM17-MW8(031815) 3/18/2015
Analyte	**MCL**	**SMCL**	**Units**						
Aluminum	NS	**50**	ug/l	14/16	**73**	**2,000 J**	**720**	--	**560**
Antimony	6	NS	ug/l	9/16	--	0.21 J	0.32 J	0.37 J	0.20 J
Arsenic	10	NS	ug/l	11/16	1.6	--	--	20	--
Barium	2000	NS	ug/l	16/16	34	72	37	99	44
Beryllium	4	NS	ug/l	13/16	0.063 J	0.45	1	0.028 J	0.43
Cadmium	5	NS	ug/l	9/16	0.059 J	0.27	0.35	--	0.16
Calcium	NS	NS	ug/l	16/16	6,900	3,200	2,400	60000	4,800
Chromium	100	NS	ug/l	9/16	--	0.41 J	0.44 J	0.68 J	--
Cobalt	NS	NS	ug/l	14/16	4.9 J	6.5	14	29	33
Copper	1000	1,000	ug/l	7/16	4.7	2.8	7.4	--	--
Iron	NS	**300**	ug/l	16/16	**29,000**	210	**740**	**67000**	**1,300**
Lead	15	NS	ug/l	11/16	0.22 J	0.41 J	0.45 J	0.51 J	0.25 J
Magnesium	NS	NS	ug/l	16/16	2,300	1,200	1,900	22000	2,000
Manganese	NS	**50**	ug/l	15/16	**340**	52	**570**	**950**	**310**
Mercury	2	NS	ug/l	1/16	--	--	--	--	--
Nickel	NS	NS	ug/l	16/16	1.2 J	5.9	38	3.4 J	22
Potassium	NS	NS	ug/l	16/16	2,000	690	1,100	6700	930
Selenium	50	NS	ug/l	7/16	--	--	--	1	0.41 J
Silver	NS	100	ug/l	9/16	0.014 J	0.039 J	0.065 J	--	0.031 J
Sodium	NS	NS	ug/l	16/16	17,000	2,700	6,500	76000	2,700
Thallium	2	NS	ug/l	1/16	--	--	--	--	--
Vanadium	NS	NS	ug/l	4/16	--	--	--	2.4 J	--
Zinc	NS	5,000	ug/l	13/16	--	50	41	14	25

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Inorganics			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW105 FM17-MW105(031315) 3/13/2015	FM17MW106 FM17-MW106(031315) 3/13/2015	FM17MW107 FM17-DUP01(031215) 3/12/2015	FM17MW107 FM17-MW107(031215) 3/12/2015
Analyte	**MCL**	**SMCL**	**Units**					
Aluminum	NS	**50**	ug/l	14/16	**260**	**3,500**	24 J	14 J
Antimony	6	NS	ug/l	9/16	0.54 J	--	--	--
Arsenic	10	NS	ug/l	11/16	--	5.6 J	--	0.38 J
Barium	2000	NS	ug/l	16/16	69	150	28	28
Beryllium	4	NS	ug/l	13/16	0.22 J	2.6	--	--
Cadmium	5	NS	ug/l	9/16	0.16	--	--	--
Calcium	NS	NS	ug/l	16/16	4,300	30,000	22,000	22,000
Chromium	100	NS	ug/l	9/16	2.9 J	--	--	--
Cobalt	NS	NS	ug/l	14/16	8.1	25 J	0.031 J	--
Copper	1000	1,000	ug/l	7/16	64	8.0 J	--	--
Iron	NS	**300**	ug/l	16/16	270	**380**	83	86
Lead	15	NS	ug/l	11/16	0.93 J	0.90 J	0.051 J	--
Magnesium	NS	NS	ug/l	16/16	4,000	12,000	2,400	2,400
Manganese	NS	**50**	ug/l	15/16	38	**270**	--	--
Mercury	2	NS	ug/l	1/16	--	0.063 J	--	--
Nickel	NS	NS	ug/l	16/16	9.3	22 J	0.75 J	0.66 J
Potassium	NS	NS	ug/l	16/16	1,500	1,700 J	1,500 J	1,500 J
Selenium	50	NS	ug/l	7/16	--	--	--	--
Silver	NS	100	ug/l	9/16	0.031 J	--	--	--
Sodium	NS	NS	ug/l	16/16	11,000	140,000	3,100	3,200
Thallium	2	NS	ug/l	1/16	0.088 J	--	--	--
Vanadium	NS	NS	ug/l	4/16	--	--	--	--
Zinc	NS	5,000	ug/l	13/16	54	68 J	6.4 J	6.5 J

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Inorganics			**Sample Location / Sample ID / Date**	**Frequency of Detection**	FM17MW10S FM17-MW10S(031815) 3/18/2015	FM17MW12S FM17-MW12S(031215) 3/12/2015	FM17MW13S FM17-MW13S(031315) 3/13/2015	FM17MW14 FM17-MW14(031215) 3/12/2015
Analyte	**MCL**	**SMCL**	**Units**					
Aluminum	NS	**50**	ug/l	14/16	--	24 J	**940**	4.7 J
Antimony	6	NS	ug/l	9/16	--	0.17 J	0.21 J	--
Arsenic	10	NS	ug/l	11/16	0.97 J	12 J	0.53 J	29 J
Barium	2000	NS	ug/l	16/16	58	65	25	80
Beryllium	4	NS	ug/l	13/16	--	--	0.56	0.030 J
Cadmium	5	NS	ug/l	9/16	--	0.099 J	0.52	--
Calcium	NS	NS	ug/l	16/16	13,000	43,000	33,000	73,000
Chromium	100	NS	ug/l	9/16	--	0.41 J	1.5 J	0.87 J
Cobalt	NS	NS	ug/l	14/16	30	6.8 J	19	2.4 J
Copper	1000	1,000	ug/l	7/16	--	--	8.7	--
Iron	NS	**300**	ug/l	16/16	**27,000**	**86,000**	**1,600**	**110,000**
Lead	15	NS	ug/l	11/16	--	0.086 J	1.5	--
Magnesium	NS	NS	ug/l	16/16	3,500	7,200	4,700	20,000
Manganese	NS	**50**	ug/l	15/16	**740**	**1,900**	**470**	**720**
Mercury	2	NS	ug/l	1/16	--	--	--	--
Nickel	NS	NS	ug/l	16/16	14	4.6 J	8.5	1.8 J
Potassium	NS	NS	ug/l	16/16	2,100	2,900 J	3,800	8,200 J
Selenium	50	NS	ug/l	7/16	0.50 J	0.32 J	--	0.50 J
Silver	NS	100	ug/l	9/16	--	0.022 J	0.12 J	--
Sodium	NS	NS	ug/l	16/16	3,800	2,200	5,600	9,300
Thallium	2	NS	ug/l	1/16	--	--	--	--
Vanadium	NS	NS	ug/l	4/16	--	--	2.1 J	2.1 J
Zinc	NS	5,000	ug/l	13/16	--	27	29	10

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Inorganics			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW17 FM17-MW17(031815) 3/18/2015	FM17MW18 FM17-MW18(031015) 3/10/2015	FM17MW19 FM17-MW19(031215) 3/12/2015	FM17MW20 FM17-MW20(031315) 3/13/2015
Analyte	**MCL**	**SMCL**	**Units**					
Aluminum	NS	**50**	ug/l	14/16	**190**	**56**	7.5 J	**230**
Antimony	6	NS	ug/l	9/16	--	--	0.14 J	0.25 J
Arsenic	10	NS	ug/l	11/16	--	6.2	47 J	0.48 J
Barium	2000	NS	ug/l	16/16	38	89	380	100
Beryllium	4	NS	ug/l	13/16	0.030 J	0.074 J	0.030 J	0.62
Cadmium	5	NS	ug/l	9/16	--	0.082 J	--	0.26
Calcium	NS	NS	ug/l	16/16	42,000	26,000	100,000	3,700
Chromium	100	NS	ug/l	9/16	--	--	2.6 J	0.59 J
Cobalt	NS	NS	ug/l	14/16	--	1.9 J	0.14 J	11
Copper	1000	1,000	ug/l	7/16	--	3.4	--	--
Iron	NS	**300**	ug/l	16/16	**1,700**	**61,000**	**48,000**	240
Lead	15	NS	ug/l	11/16	0.26 J	0.12 J	--	--
Magnesium	NS	NS	ug/l	16/16	3,600	4,500	56,000	2,400
Manganese	NS	**50**	ug/l	15/16	4.1 J	**320**	**98**	**170**
Mercury	2	NS	ug/l	1/16	--	--	--	--
Nickel	NS	NS	ug/l	16/16	0.90 J	2.2 J	13	8.3
Potassium	NS	NS	ug/l	16/16	2,000	2,600	63,000 J	1,200
Selenium	50	NS	ug/l	7/16	0.40 J	--	5.5	--
Silver	NS	100	ug/l	9/16	--	0.013 J	--	0.039 J
Sodium	NS	NS	ug/l	16/16	24,000	69,000	240,000	3,100
Thallium	2	NS	ug/l	1/16	--	--	--	--
Vanadium	NS	NS	ug/l	4/16	--	--	25	--
Zinc	NS	5,000	ug/l	13/16	--	16	42	61

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Pesticides/Herbicides			**Sample Location**	FM17MW12S	FM17MW19
			Sample ID	FM17-MW12S(031215)	FM17-MW19(031215)
			Date	3/12/2015	3/12/2015
Analyte	**MCL**	**SMCL**	**Units**		
2,4,5-TP	50		ug/l	--	0.69
2,4-D	70	NS	ug/l	--	0.63 J
4,4-DDD	NS	NS	ug/l	0.0019 J	0.0010 J
4,4-DDE	NS	NS	ug/l	0.0018 J	0.0021 J
4,4-DDT	NS	NS	ug/l	0.0066 J	0.0057 J
Aldrin	NS	NS	ug/l	--	0.0028 J
Alpha-Bhc	NS	NS	ug/l	0.0070 J	0.0096 J
Alpha-chlordane	NS	NS	ug/l	0.0058 J	0.012 J
Beta-Bhc	NS	NS	ug/l	--	0.065 J
Delta-Bhc	NS	NS	ug/l	--	0.0058 J
Dieldrin	NS	NS	ug/l	0.0011 J	0.0086 J
Endosulfan I	NS	NS	ug/l	0.0051 J	--
Endosulfan II	NS	NS	ug/l	0.0023 J	0.0054 J
Endosulfan Sulfate	NS	NS	ug/l	0.0035 J	0.0014 J
Endrin	250000	NS	ug/l	0.0011 J	0.017 J
Endrin Aldehyde	NS	NS	ug/l	--	0.0093 J
Endrin Ketone	NS	NS	ug/l	0.0035 J	--
Heptachlor Epoxide	0.2	NS	ug/l	0.0057 J	0.0030 J
Methoxychlor	40	NS	ug/l	0.0040 J	0.0037 J

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Semi-Volatile Organic Compounds			**Sample Location**	FM17MW12S	FM17MW14	FM17MW19
			Sample ID	FM17-MW12S(031215)	FM17-MW14(031215)	FM17-MW19(031215)
			Date	3/12/2015	3/12/2015	3/12/2015
Analyte	**MCL**	**SMCL**	**Units**			
1,4-Dichlorobenzene	75	NS	ug/l	1.2 J	2.5 J	8
Diethyl Phthalate	NS	NS	ug/l	--	--	5.8
Naphthalene	NS	NS	ug/l	--	--	4.0 J

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Volatile Organic Compounds			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW02S FM17-MW2S(031915) 3/19/2015	FM17MW05 FM17-MW5(031315) 3/13/2015	FM17MW07S FM17-MW7S(031715) 3/17/2015	FM17MW105 FM17-MW105(031315) 3/13/2015
Analyte	**MCL**	**SMCL**	**Units**					
1,1-Dichloroethane	NS	NS	ug/l	4/16	0.18 J	--	0.29 J	--
1,2,4-Trichlorobenzene	70	NS	ug/l	1/16	--	--	--	--
1,2-Dichlorobenzene	600	NS	ug/l	1/16	--	--	--	--
1,2-Dichloroethane	5	NS	ug/l	1/16	--	--	--	--
1,3-Dichlorobenzene	NS	NS	ug/l	3/16	--	--	--	--
1,4-Dichlorobenzene	75	NS	ug/l	6/16	--	--	1.7	--
2-Phenylbutane	NS	NS	ug/l	3/16	--	--	--	--
Acetone	NS	NS	ug/l	3/16	--	--	3.5 J	--
Benzene	5	NS	ug/l	6/16	--	--	1.2	--
CFC-12	NS	NS	ug/l	4/16	--	--	--	--
Chlorobenzene	100	NS	ug/l	7/16	0.26 J	--	3.1	--
Chloroethane	NS	NS	ug/l	4/16	--	--	0.69	--
Chloroform	80	NS	ug/l	2/16	--	--	--	--
cis-1,2-Dichloroethene	70	NS	ug/l	6/16	--	0.12 J	0.10 J	--
Isopropylbenzene	NS	NS	ug/l	1/16	--	--	--	--
Methyl-Tert-Butylether	NS	NS	ug/l	3/16	--	--	0.41 J	1.8
Naphthalene	NS	NS	ug/l	2/16	--	--	--	--
N-Butylbenzene	NS	NS	ug/l	1/16	--	--	--	--
N-Propylbenzene	NS	NS	ug/l	1/16	--	--	--	--
Tert-Butylbenzene	NS	NS	ug/l	1/16	--	--	--	--
Tetrachloroethene	5	NS	ug/l	1/16	--	--	--	--
Trichloroethene	5	NS	ug/l	2/16	--	0.31 J	--	--

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Volatile Organic Compounds			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW106 FM17-MW106(031315) 3/13/2015	FM17MW107 FM17-DUP01(031215) 3/12/2015	FM17MW107 FM17-MW107(031215) 3/12/2015
Analyte	**MCL**	**SMCL**	**Units**				
1,1-Dichloroethane	NS	NS	ug/l	4/16	--	--	--
1,2,4-Trichlorobenzene	70	NS	ug/l	1/16	--	--	--
1,2-Dichlorobenzene	600	NS	ug/l	1/16	--	--	--
1,2-Dichloroethane	5	NS	ug/l	1/16	--	--	--
1,3-Dichlorobenzene	NS	NS	ug/l	3/16	--	--	--
1,4-Dichlorobenzene	75	NS	ug/l	6/16	--	--	--
2-Phenylbutane	NS	NS	ug/l	3/16	--	--	--
Acetone	NS	NS	ug/l	3/16	--	--	--
Benzene	5	NS	ug/l	6/16	--	--	--
CFC-12	NS	NS	ug/l	4/16	--	--	--
Chlorobenzene	100	NS	ug/l	7/16	--	--	--
Chloroethane	NS	NS	ug/l	4/16	--	--	--
Chloroform	80	NS	ug/l	2/16	1.7	0.20 J	0.23 J
cis-1,2-Dichloroethene	70	NS	ug/l	6/16	--	--	--
Isopropylbenzene	NS	NS	ug/l	1/16	--	--	--
Methyl-Tert-Butylether	NS	NS	ug/l	3/16	--	--	--
Naphthalene	NS	NS	ug/l	2/16	--	--	--
N-Butylbenzene	NS	NS	ug/l	1/16	--	--	--
N-Propylbenzene	NS	NS	ug/l	1/16	--	--	--
Tert-Butylbenzene	NS	NS	ug/l	1/16	--	--	--
Tetrachloroethene	5	NS	ug/l	1/16	--	--	--
Trichloroethene	5	NS	ug/l	2/16	--	--	--

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Volatile Organic Compounds			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW10S FM17-MW10S(031815) 3/18/2015	FM17MW12S FM17-MW12S(031215) 3/12/2015	FM17MW13S FM17-MW13S(031315) 3/13/2015
Analyte	**MCL**	**SMCL**	**Units**				
1,1-Dichloroethane	NS	NS	ug/l	4/16	0.58	--	--
1,2,4-Trichlorobenzene	70	NS	ug/l	1/16	--	--	--
1,2-Dichlorobenzene	600	NS	ug/l	1/16	--	--	--
1,2-Dichloroethane	5	NS	ug/l	1/16	--	--	--
1,3-Dichlorobenzene	NS	NS	ug/l	3/16	--	0.19 J	--
1,4-Dichlorobenzene	75	NS	ug/l	6/16	0.5	1.6	--
2-Phenylbutane	NS	NS	ug/l	3/16	--	0.14 J	--
Acetone	NS	NS	ug/l	3/16	--	--	--
Benzene	5	NS	ug/l	6/16	0.51	0.93	--
CFC-12	NS	NS	ug/l	4/16	--	0.35 J	0.16 J
Chlorobenzene	100	NS	ug/l	7/16	0.23 J	0.61	--
Chloroethane	NS	NS	ug/l	4/16	--	0.71 J	--
Chloroform	80	NS	ug/l	2/16	--	--	--
cis-1,2-Dichloroethene	70	NS	ug/l	6/16	0.57	0.22 J	--
Isopropylbenzene	NS	NS	ug/l	1/16	--	--	--
Methyl-Tert-Butylether	NS	NS	ug/l	3/16	--	--	--
Naphthalene	NS	NS	ug/l	2/16	--	--	--
N-Butylbenzene	NS	NS	ug/l	1/16	--	--	--
N-Propylbenzene	NS	NS	ug/l	1/16	--	--	--
Tert-Butylbenzene	NS	NS	ug/l	1/16	--	--	--
Tetrachloroethene	5	NS	ug/l	1/16	0.26 J	--	--
Trichloroethene	5	NS	ug/l	2/16	--	--	--

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Volatile Organic Compounds			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW14 FM17-MW14(031215) 3/12/2015	FM17MW18 FM17-MW18(031015) 3/10/2015	FM17MW19 FM17-MW19(031215) 3/12/2015
Analyte	**MCL**	**SMCL**	**Units**				
1,1-Dichloroethane	NS	NS	ug/l	4/16	--	--	0.73
1,2,4-Trichlorobenzene	70	NS	ug/l	1/16	--	--	0.37 J
1,2-Dichlorobenzene	600	NS	ug/l	1/16	--	--	0.63
1,2-Dichloroethane	5	NS	ug/l	1/16	--	--	0.57
1,3-Dichlorobenzene	NS	NS	ug/l	3/16	0.91	--	6.3
1,4-Dichlorobenzene	75	NS	ug/l	6/16	4.6	0.98	14
2-Phenylbutane	NS	NS	ug/l	3/16	0.34 J	--	2.7
Acetone	NS	NS	ug/l	3/16	3.5 J	--	6.5 J
Benzene	5	NS	ug/l	6/16	1.2	0.20 J	9.4
CFC-12	NS	NS	ug/l	4/16	3.2	--	1.2
Chlorobenzene	100	NS	ug/l	7/16	22	0.34 J	6.5
Chloroethane	NS	NS	ug/l	4/16	0.59	--	1.5
Chloroform	80	NS	ug/l	2/16	--	--	--
cis-1,2-Dichloroethene	70	NS	ug/l	6/16	0.21 J	--	0.53
Isopropylbenzene	NS	NS	ug/l	1/16	--	--	5.1
Methyl-Tert-Butylether	NS	NS	ug/l	3/16	--	--	2
Naphthalene	NS	NS	ug/l	2/16	0.24 J	--	6.2
N-Butylbenzene	NS	NS	ug/l	1/16	--	--	2.6
N-Propylbenzene	NS	NS	ug/l	1/16	--	--	5.3
Tert-Butylbenzene	NS	NS	ug/l	1/16	--	--	0.77
Tetrachloroethene	5	NS	ug/l	1/16	--	--	--
Trichloroethene	5	NS	ug/l	2/16	--	--	0.14 J

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Wet Chemistry			**Sample Location**	FM17MW02S	FM17MW04S	FM17MW05	FM17MW07S
			Sample ID	FM17-MW2S(031915)	FM17-MW4S(031715)	FM17-MW5(031315)	FM17-MW7S(031715)
			Date	3/19/2015	3/17/2015	3/13/2015	3/17/2015
Analyte	**MCL**	**SMCL**	**Units**				
Alkalinity	NS	NS	mg/l	21	--	--	210
Ammonia Nitrogen	NS	NS	mg/l	0.85	0.094 J	--	6.4
Chemical Oxygen Demand	NS	NS	mg/l	9.5 J	7.4 J	--	34
Chloride	NS	**250**	mg/l	35	5.6	35 J	120
Nitrate-N	10	NS	mg/l	--	0.052	--	--
Nitrogen, as Ammonia	NS	NS	mg/l	0.85	0.094 J	--	6.4
Odor	NS	**3**	t.o.n.	--	1	1	2.64
pH	NS	8.5	SU	5.85	3.83	3.3	5.98
Platinum Cobalt Color Units	NS	**15**	color unit	--	--	--	--
Specific Conductivity	NS	NS	umhos/cm	247	124	226	1220
Sulfate	NS	250	mg/l	9.2	67	53 J	19
Sulfide	NS	NS	mg/l	--	--	--	--
Total Dissolved Solids	NS	**500**	mg/l	110	41	--	440
Total Hardness	NS	NS	mg/l	27 J	16	17	220
Turbidity	NS	NS	ntu	63	3	7.7	370

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Wet Chemistry			**Sample Location Sample ID Date**	FM17MW08 FM17-MW8(031815) 3/18/2015	FM17MW105 FM17-MW105(031315) 3/13/2015	FM17MW106 FM17-MW106(031315) 3/13/2015	FM17MW107 FM17-DUP01(031215) 3/12/2015
Analyte	**MCL**	**SMCL**	**Units**				
Alkalinity	NS	NS	mg/l	--	--	--	45
Ammonia Nitrogen	NS	NS	mg/l	--	--	--	--
Chemical Oxygen Demand	NS	NS	mg/l	--	9.9 J	5.9 J	--
Chloride	NS	**250**	mg/l	3.6	16 J	250	3.2
Nitrate-N	10	NS	mg/l	0.03	3.1	0.14	1.6
Nitrogen, as Ammonia	NS	NS	mg/l	--	--	--	--
Odor	NS	**3**	t.o.n.	1	1	1	1.15
pH	NS	8.5	SU	4	4.23	3.99	5.98
Platinum Cobalt Color Units	NS	**15**	color unit	--	--	--	10
Specific Conductivity	NS	NS	umhos/cm	128	212	1460	233
Sulfate	NS	250	mg/l	54	23 J	160 J	15
Sulfide	NS	NS	mg/l	--	--	--	--
Total Dissolved Solids	NS	**500**	mg/l	53	--	**550**	69
Total Hardness	NS	NS	mg/l	24	31	120	65
Turbidity	NS	NS	ntu	3.4	22	8.9	2.6

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Wet Chemistry			**Sample Location** **Sample ID** **Date**	FM17MW107 FM17-MW107(031215) 3/12/2015	FM17MW10S FM17-MW10S(031815) 3/18/2015	FM17MW12S FM17-MW12S(031215) 3/12/2015
Analyte	**MCL**	**SMCL**	**Units**			
Alkalinity	NS	NS	mg/l	45	52	80
Ammonia Nitrogen	NS	NS	mg/l	--	0.89	3.7
Chemical Oxygen Demand	NS	NS	mg/l	--	7.1 J	--
Chloride	NS	**250**	mg/l	3.2	6	2.2
Nitrate-N	10	NS	mg/l	1.6	--	1.8
Nitrogen, as Ammonia	NS	NS	mg/l	--	0.89	3.7
Odor	NS	**3**	t.o.n.	1	2	2
pH	NS	8.5	SU	6.05	5.47	5.67
Platinum Cobalt Color Units	NS	**15**	color unit	--	--	--
Specific Conductivity	NS	NS	umhos/cm	237	226	734
Sulfate	NS	250	mg/l	15	29	240
Sulfide	NS	NS	mg/l	--	--	--
Total Dissolved Solids	NS	**500**	mg/l	66	110	300
Total Hardness	NS	NS	mg/l	67	48 J	120
Turbidity	NS	NS	ntu	2.7	36	58

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Wet Chemistry			Sample Location Sample ID Date	FM17MW13S FM17-MW13S(031315) 3/13/2015	FM17MW14 FM17-MW14(031215) 3/12/2015	FM17MW17 FM17-MW17(031815) 3/18/2015
Analyte	**MCL**	**SMCL**	**Units**			
Alkalinity	NS	NS	mg/l	28	290	51
Ammonia Nitrogen	NS	NS	mg/l	--	12	0.051 J
Chemical Oxygen Demand	NS	NS	mg/l	21	45	--
Chloride	NS	**250**	mg/l	4.0 J	5.3	84
Nitrate-N	10	NS	mg/l	11	--	0.82
Nitrogen, as Ammonia	NS	NS	mg/l	--	12	0.051 J
Odor	NS	**3**	t.o.n.	1	**4**	2.64
pH	NS	8.5	SU	5.86	5.87	6.2
Platinum Cobalt Color Units	NS	**15**	color unit	--	--	--
Specific Conductivity	NS	NS	umhos/cm	335	977	523
Sulfate	NS	250	mg/l	42 J	22	8.7
Sulfide	NS	NS	mg/l	--	--	0.90 J
Total Dissolved Solids	NS	**500**	mg/l	--	340	320
Total Hardness	NS	NS	mg/l	99	--	130
Turbidity	NS	NS	ntu	35	36	41

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 5
Upper Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade

Wet Chemistry			**Sample Location** **Sample ID** **Date**	FM17MW18 FM17-MW18(031015) 3/10/2015	FM17MW19 FM17-MW19(031215) 3/12/2015	FM17MW20 FM17-MW20(031315) 3/13/2015
Analyte	**MCL**	**SMCL**	**Units**			
Alkalinity	NS	NS	mg/l	100	730	--
Ammonia Nitrogen	NS	NS	mg/l	2.1	63	--
Chemical Oxygen Demand	NS	NS	mg/l	23	130	7.0 J
Chloride	NS	**250**	mg/l	98	**300**	4.6 J
Nitrate-N	10	NS	mg/l	0.37	--	0.33
Nitrogen, as Ammonia	NS	NS	mg/l	2.1	63	--
Odor	NS	**3**	t.o.n.	1	**9.61**	2.3
pH	NS	8.5	SU	5.83	6.18	4.32
Platinum Cobalt Color Units	NS	**15**	color unit	**200**	--	--
Specific Conductivity	NS	NS	umhos/cm	769	3830	119
Sulfate	NS	250	mg/l	27	13	41 J
Sulfide	NS	NS	mg/l	--	--	--
Total Dissolved Solids	NS	**500**	mg/l	260	**1100**	--
Total Hardness	NS	NS	mg/l	81 J	450	22
Turbidity	NS	NS	ntu	110	300	2.6

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
NS - no standard
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
R - quality control indicates the data is not usuable
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 6
Upper Patapsco Aquifer Detections Above Maximum Contaminant Levels
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics

Well ID	Analyte	Concentration (ug/L)	MCL*
FM17MW07S	Arsenic	20	10
FM17MW12S	Arsenic	12	10
FM17MW14	Arsenic	29	10
FM17MW19	Arsenic	47	10

Volatile Organic Compounds

Well ID	Analyte	Concentration (ug/L)	MCL*
FM17MW19	Benzene	9.4	5

*MCLs are from the "National Primary Water Drinking Water" regulations, USEPA website updated May 2009

Notes:
Laboratory Data qualifiers are defined in Appendix C Table C-1
ug/L= micrograms per liter
MCL= Maximum Contaminant Level
USEPA = United States Environmental Protection Agency

Table 7
Upper Patapsco Aquifer Detections Above Secondary Maximum Contaminant Levels
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics

Well ID	Analyte	Concentration (ug/L)	SMCL*
FM17MW02S	Aluminum	73	50
	Iron	29000	300
	Manganese	340	50
FM17MW04S	Aluminum	2000	50
FM17MW05	Aluminum	720	50
	Iron	740	300
	Manganese	570	50
FM17MW07S	Iron	59000	300
	Manganese	960	50
FM17MW08	Aluminum	560	50
	Iron	1300	300
	Manganese	310	50
FM17MW105	Aluminum	260	50
FM17MW106	Aluminum	3500	50
	Iron	380	300
	Manganese	270	50
FM17MW10S	Iron	27000	300
	Manganese	740	50
FM17MW12S	Iron	86000	300
	Manganese	1900	50
FM17MW13S	Aluminum	940	50
	Iron	1600	300
	Manganese	470	50
FM17MW14	Iron	110000	300
	Manganese	720	50
FM17MW17	Aluminum	190	50
	Iron	1700	300
FM17MW18	Aluminum	56	50
	Iron	61000	300
	Manganese	320	50
FM17MW19	Iron	48000	300
	Manganese	98	50
FM17MW20	Aluminum	230	50
	Manganese	170	50

Notes:

*SMCLs are from the "National Secondary Water Drinking Water" regulations, United States Environmental Protection Agency website updated May 2009

Laboratory Data qualifiers are defined in Appendix C Table C-1

ug/L= micrograms per liter

SMCL= Maximum Contaminant Level

t.o.n = threshold odor number

Table 7
Upper Patapsco Aquifer Detections Above Secondary Maximum Contaminant Levels
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Wet Chemistry

Well ID	Analyte	Concentration	Units	SMCL*
FM17MW106	Total Dissolved Solids	550	mg/l	500
FM17MW14	Odor	4	t.o.n.	3
FM17MW18	Platinum Cobalt Color Units	200.00	color unit	15
FM17MW19	Chloride	300	mg/l	250
	Odor	9.6	t.o.n.	3
	Total Dissolved Solids	1100	mg/l	500

Notes:

*SMCLs are from the "National Secondary Water Drinking Water" regulations, United States Environmental Protection Agency website updated May 2009

Laboratory Data qualifiers are defined in Appendix C Table C-1

mg/l= milligrams per liter

SMCL= Maximum Contaminant Level

J = estimated concentration

t.o.n = threshold odor number

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW02D FM17-MW2D(031915) 3/19/2015	FM17MW04DR FM17-MW4DR(031715) 3/17/2015	FM17MW07D FM17-MW7D(031715) 3/17/2015	FM17MW101D FM17-MW101D(031615) 3/16/2015	FM17MW108D FM17-MW108D(031615) 3/16/2015	FM17MW109D FM17-MW109D(031615) 3/16/2015
Analyte	**MCL**	**SMCL**	**Units**							
Aluminum	NS	**50**	ug/l	10/10	50	**610 J**	**4200 J**	**95**	**480**	**1300**
Antimony	6	NS	ug/l	3/10	--	0.13 J	0.30 J	--	--	--
Arsenic	10	NS	ug/l	5/10	--	--	0.30 J	0.29 J	--	2.7
Barium	2000	NS	ug/l	9/10	13	130	210	130	52	24
Beryllium	4	NS	ug/l	10/10	0.18 J	1.1	5.9	1.1	2.4	0.23 J
Cadmium	5	NS	ug/l	10/10	0.16	0.35	1.2	0.25	0.53	0.097 J
Calcium	NS	NS	ug/l	10/10	1400	5200	40000	22000	3700	27000
Chromium	100	NS	ug/l	9/10	--	28	2.2 J	7	27	16
Cobalt	NS	NS	ug/l	10/10	6.5	27	89	20	44	3.6 J
Copper	1000	1000	ug/l	10/10	7.6	25	24	8.5	38	11
Iron	NS	**300**	ug/l	10/10	17 J	290	160	150	150	**1500**
Lead	15	NS	ug/l	10/10	0.065 J	4.1	0.62 J	0.56 J	3.6	6.1
Magnesium	NS	NS	ug/l	10/10	380	3800	8900	3900	1800	2500
Manganese	NS	**50**	ug/l	10/10	3.5 J	**150**	**510**	**260**	**130**	**74**
Mercury	2	NS	ug/l	4/10	0.13	--	--	--	0.038 J	0.087 J
Nickel	NS	NS	ug/l	10/10	8.9	57	150	33	92	13
Potassium	NS	NS	ug/l	10/10	570	3100	3200	4700	1500	7000
Selenium	50	NS	ug/l	5/10	0.27 J	0.28 J	2	--	--	--
Silver	NS	100	ug/l	9/10	0.026 J	0.066 J	0.18 J	0.044 J	0.095 J	0.11 J
Sodium	NS	NS	ug/l	10/10	1500	50000	41000	43000	18000	130000
Thallium	2	NS	ug/l	5/10	0.076 J	0.090 J	0.16 J	0.088 J	--	--
Vanadium	NS	NS	ug/l	1/10	--	--	--	--	--	8.9
Zinc	NS	5000	ug/l	9/10	--	90	160	59	150	28

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW10D FM17-MW10D(031815) 3/18/2015	FM17MW110D FM17-MW110D(031615) 3/16/2015	FM17MW110D FM17-DUP02(031615) 3/16/2015	FM17MW12D FM17-MW12D(031215) 3/12/2015	FM17MW13D FM17-MW13D(031915) 3/19/2015
Analyte	**MCL**	**SMCL**	**Units**						
Aluminum	NS	**50**	ug/l	10/10	**680**	**1100**	**1100 J**	**120 J**	**78**
Antimony	6	NS	ug/l	3/10	0.38 J	--	--	--	--
Arsenic	10	NS	ug/l	5/10	--	0.39 J	--	--	1.3
Barium	2000	NS	ug/l	9/10	130	53	51	--	95
Beryllium	4	NS	ug/l	10/10	2.5	1.2	1.4	0.46	0.29 J
Cadmium	5	NS	ug/l	10/10	0.32	0.32	0.3	0.061 J	0.18
Calcium	NS	NS	ug/l	10/10	23000	5600	5400	3300	49000
Chromium	100	NS	ug/l	9/10	0.47 J	11 J	5.7	2.5 J	2.2 J
Cobalt	NS	NS	ug/l	10/10	57	30	29	5.6 J	10
Copper	1000	1000	ug/l	10/10	36	20	15	7.3	7.6
Iron	NS	**300**	ug/l	10/10	**6700**	93	62	**1300**	**1600**
Lead	15	NS	ug/l	10/10	0.29 J	1.4	1.1	0.25 J	0.51 J
Magnesium	NS	NS	ug/l	10/10	4900	1700	1700	430	5200
Manganese	NS	**50**	ug/l	10/10	**550**	**75**	**73**	38	**120**
Mercury	2	NS	ug/l	4/10	--	0.15	0.17	--	--
Nickel	NS	NS	ug/l	10/10	30	48	44	9.9	14
Potassium	NS	NS	ug/l	10/10	1700	1600	1700	550 J	3700
Selenium	50	NS	ug/l	5/10	1.2	--	--	--	0.98 J
Silver	NS	100	ug/l	9/10	0.063 J	0.060 J	0.061 J	--	0.059 J
Sodium	NS	NS	ug/l	10/10	72000	19000	19000	1700	17000
Thallium	2	NS	ug/l	5/10	0.19 J	--	0.11 J	--	--
Vanadium	NS	NS	ug/l	1/10	--	--	--	--	--
Zinc	NS	5000	ug/l	9/10	96	88	77	19	33

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Pesticide/Herbicides			**Sample Location** **Sample ID** **Date**	FM17MW07D FM17-MW7D(031915) 3/17/2015	FM17MW13D FM17-MW13D(031915) 3/19/2015
Analyte	**MCL**	**SMCL**	**Units**		
4,4-DDD	NS	NS	ug/l	--	0.0013 J
4,4-DDE	NS	NS	ug/l	--	0.0035 J
Aldrin	NS	NS	ug/l	--	0.0028 J
Alpha-Bhc	NS	NS	ug/l	0.0013 J	0.0058 J
Delta-Bhc	NS	NS	ug/l	--	0.0026 J
Endosulfan I	NS	NS	ug/l	--	0.0022 J
Endosulfan II	NS	NS	ug/l	--	0.0080 J
Endosulfan Sulfate	NS	NS	ug/l	--	0.0056 J
Endrin	250,000	NS	ug/l	0.0016 J	0.013 J
Endrin Aldehyde	NS	NS	ug/l	--	0.0021 J
Endrin Ketone	NS	NS	ug/l	0.0027 J	0.0034 J
Gamma-Bhc	0.2	NS	ug/l	--	0.0049 J
Heptachlor Epoxide	0.2	NS	ug/l	0.0034 J	0.0038 J

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Volatile Organic Compounds			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW04DR FM17-MW4DR(031715) 3/17/2015	FM17MW101D FM17-MW101D(031615) 3/16/2015	FM17MW108D FM17-MW108D(031615) 3/16/2015
Analyte	**MCL**	**SMCL**	**Units**				
1,1,2,2-Tetrachloroethane	NS	NS	ug/l	2/10	--	--	0.12 J
4-Methyl-2-Pentanone	NS	NS	ug/l	1/10	--	--	--
Acetone	NS	NS	ug/l	1/10	--	--	--
Carbon Tetrachloride	5	NS	ug/l	1/10	7.8	--	--
Chloroform	80	NS	ug/l	1/10	0.96	--	--
cis-1,2-Dichloroethene	70	NS	ug/l	1/10	--	4.8	--
Tetrachloroethene	5	NS	ug/l	3/10	--	31	2
Trichloroethene	5	NS	ug/l	2/10	--	2.2	1.7

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Volatile Organic Compounds			**Sample Location Sample ID Date**	**Frequency of Detection**	FM17MW109D FM17-MW109D(031615) 3/16/2015	FM17MW110D FM17-MW110D(031615) 3/16/2015	FM17MW110D FM17-DUP02(031615) 3/16/2015
Analyte	**MCL**	**SMCL**	**Units**				
1,1,2,2-Tetrachloroethane	NS	NS	ug/l	2/10	--	0.27 J	0.23 J
4-Methyl-2-Pentanone	NS	NS	ug/l	1/10	0.32 J	--	--
Acetone	NS	NS	ug/l	1/10	3.4 J	--	--
Carbon Tetrachloride	5	NS	ug/l	1/10	--	--	--
Chloroform	80	NS	ug/l	1/10	--	--	--
cis-1,2-Dichloroethene	70	NS	ug/l	1/10	--	--	--
Tetrachloroethene	5	NS	ug/l	3/10	--	0.40 J	0.44 J
Trichloroethene	5	NS	ug/l	2/10	--	--	--

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Wet Chemistry			**Sample Location**	FM17MW02D	FM17MW04DR	FM17MW07D	FM17MW101D
			Sample ID	FM17-MW2D(031915)	FM17-MW4DR(031715)	FM17-MW7D(031715)	FM17-MW101D(031615)
			Date	3/19/2015	3/17/2015	3/17/2015	3/16/2015
Analyte	**MCL**	**SMCL**	**Units**				
Alkalinity			mg/l	--	--	35	41
Ammonia Nitrogen			mg/l	0.12	--	0.3	0.16
Chemical Oxygen Demand			mg/l	--	--	--	--
Chloride		250	mg/l	5.1	85	60	84
Cyanide	0.3		mg/l	--	--	--	--
Nitrate-N	10		mg/l	0.19	2.5	0.053	0.86
Nitrogen, as Ammonia			mg/l	0.12	--	0.3	0.16
Odor		3	t.o.n.	1	1	1.15	1
pH		8.5	SU	4.58	4.4	5.47	6.36
Platinum Cobalt Color Units		**15**	color unit	--	--	--	--
Specific Conductivity			umhos/cm	33.3	435	678	570
Sulfate		250	mg/l	--	28 J	110	1.1 J
Total Dissolved Solids		500	mg/l	22	180	280	220
Total Hardness			mg/l	5.5 J	31	120	74
Turbidity			ntu	--	20	12	2.7

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Wet Chemistry			**Sample Location**	FM17MW108D	FM17MW109D	FM17MW10D	FM17MW110D
			Sample ID	FM17-MW108D(031615)	FM17-MW109D(031615)	FM17-MW10D(031815)	FM17-MW110D(031615)
			Date	3/16/2015	3/16/2015	3/18/2015	3/16/2015
Analyte	**MCL**	**SMCL**	**Units**				
Alkalinity			mg/l	--	85	27	--
Ammonia Nitrogen			mg/l	0.26	0.74	0.69	0.20 J
Chemical Oxygen Demand			mg/l	--	79	10	--
Chloride		250	mg/l	41	170	120	42
Cyanide	0.3		mg/l	--	0.0037 J	--	--
Nitrate-N	10		mg/l	0.83	0.053	--	1.7
Nitrogen, as Ammonia			mg/l	0.26	0.74	0.69	0.20 J
Odor		3	t.o.n.	1	1.74	1	1.32
pH		8.5	SU	4.26	6.79	5.52	4.78
Platinum Cobalt Color Units		**15**	color unit	--	**160**	--	--
Specific Conductivity			umhos/cm	225	997	657	256
Sulfate		250	mg/l	2.0 J	6.8 J	38	1.7 J
Total Dissolved Solids		500	mg/l	87	420	300	120
Total Hardness			mg/l	20	74	66 J	25
Turbidity			ntu	2.2	180	42	2.8

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 8
Lower Patapsco Aquifer Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Wet Chemistry			**Sample Location**	FM17MW110D	FM17MW12D	FM17MW13D
			Sample ID	FM17-DUP02(031615)	FM17-MW12D(031215)	FM17-MW13D(031915)
			Date	3/16/2015	3/12/2015	3/19/2015
Analyte	**MCL**	**SMCL**	**Units**			
Alkalinity			mg/l	--	7.2 J	73
Ammonia Nitrogen			mg/l	--	--	--
Chemical Oxygen Demand			mg/l	--	--	12
Chloride		250	mg/l	42	4.5	23
Cyanide	0.3		mg/l	--	--	--
Nitrate-N	10		mg/l	1.7	0.75	0.54
Nitrogen, as Ammonia			mg/l	--	--	--
Odor		3	t.o.n.	1	1	2
pH		8.5	SU	4.65	5.35	5.88
Platinum Cobalt Color Units		**15**	color unit	--	--	--
Specific Conductivity			umhos/cm	215	66.9	469
Sulfate		250	mg/l	1.2 J	2.6 J	74
Total Dissolved Solids		500	mg/l	130	7.0 J	230
Total Hardness			mg/l	25	14	140
Turbidity			ntu	2.2	24	14

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
-- - non detects
mg/L - milligrams per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS- No Standard
MCL-Maximum Concentration Level
SMCL-Secondary Maximum Concentration Level
Concentrations that exceed the MCL are shaded.
Concentrations that exceed the SMCL are bold.

Table 9
Lower Patapsco Aquifer Detections Above Maximum Contaminant Levels
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics

Well ID	Analyte	Concentration (ug/L)	MCL*
FM17MW07D	Beryllium	5.9	4

Organics

Well ID	Analyte	Concentration (ug/L)	MCL*
FM17MW04DR	Carbon Tetrachloride	7.8	5
FM17MW101D	Tetrachloroethene	31	5

Notes:

*MCLs are from the "National Primary Water Drinking Water" regulations, United Stated Environmental Protection Agency website updated May 2009

Laboratory Data qualifiers are defined in Appendix C Table C-1

ug/L= micrograms per liter

MCL= Maximum Contaminant Level

Table 10
Lower Patapsco Aquifer Detections Above Secondary Maximum Contaminant Levels
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics

Well ID	Analyte	Concentration (ug/L)	SMCL*
FM17MW04DR	Aluminum	610	50
	Manganese	150	50
FM17MW07D	Aluminum	4200	50
	Manganese	510	50
FM17MW101D	Aluminum	95	50
	Manganese	260	50
FM17MW108D	Aluminum	480	50
	Manganese	130	50
FM17MW109D	Aluminum	1300	50
	Iron	1500	300
	Manganese	74	50
FM17MW10D	Aluminum	680	50
	Iron	6700	300
	Manganese	550	50
FM17MW110D	Aluminum	1100	50
	Manganese	75	50
FM17MW12D	Aluminum	120	50
	Iron	1300	300
FM17MW13D	Aluminum	78	50
	Iron	1600	300
	Manganese	120	50

Notes:

*SMCLs are from the "National Secondary Water Drinking Water" regulations, United States Environmental Protection Agency website updated May 2009

Laboratory Data qualifiers are defined in Appendix C Table C-1

ug/L= micrograms per liter

SMCL= Maximum Contaminant Level

J = estimated concentration

Table 10
Lower Patapsco Aquifer Detections Above Secondary Maximum Contaminant Levels
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Wet Chemistry

Well ID	Analyte	Units	Concentration	SMCL*
FM17MW109D	Platinum Cobalt Color Units	color unit	160	15

Notes:

*SMCLs are from the "National Secondary Water Drinking Water" regulations, United States Environmental Protection Agency website updated May 2009

Laboratory Data qualifiers are defined in Appendix C Table C-1

SMCL= Maximum Contaminant Level

mg/L= milligram per liter

J=estimated concentration

Table 11
Surface Water Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Inorganics	**Sample Location Sample ID Date**	Maryland Water Quality Criteria		FM17SW01 FM17-SW1(031015) 3/10/2015	FM17SW02 FM17-SW2(031015) 3/10/2015	FM17SW03 FM17-SW3(031015) 3/10/2015
Analyte	**Units**	Drinking Water	Fresh Water			
Aluminum	ug/l	3700	NS	2500	760	470
Antimony	ug/l	6	NS	1.1	--	--
Arsenic	ug/l	10	150	2.9	--	--
Barium	ug/l	2000	NS	41	26	29
Beryllium	ug/l	4	NS	0.30 J	0.092 J	--
Cadmium	ug/l	225	0.25	0.095 J	--	--
Calcium	ug/l	NS	NS	25000	30000	30000
Chromium	ug/l	100	NS	7.8	--	--
Cobalt	ug/l	NS	NS	1.4 J	0.066 J	0.48 J
Copper	ug/l	1300	9	14	4.7	15
Iron	ug/l	**2600**	NS	**3300**	910	1300
Lead	ug/l	15	2.5	9.9	1.8	1.2
Magnesium	ug/l	NS	NS	3700	4000	5100
Manganese	ug/l	**73**	NS	**88**	--	52
Nickel	ug/l	73	52	8.3	2.4 J	2.3 J
Potassium	ug/l	NS	NS	3600	2500	2500
Silver	ug/l	18	NS	0.043 J	0.021 J	0.022 J
Sodium	ug/l	NS	NS	120000	79000	35000
Vanadium	ug/l	**3.7**	NS	**9.1**	2.5 J	1.5 J
Zinc	ug/l	1100	120	75	15	10

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
Bolded - value exceeds State of Maryland Water Quality Criteria for Human Health for Consumption of Drinking Water
Shaded- value exceeds State of Maryland Chronic Ambient Water Quality Criteria for Fresh Water (Code of Maryland Regulations 26.08.02.03-2)
-- - non detects
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS - not specified

Table 11
Surface Water Positive Detections
FGGM-17 Closed Sanitary Landfill
Fort George G. Meade, Maryland

Wet Chemistry	**Sample Location Sample ID Date**	Maryland Water Quality Criteria		FM17SW01 FM17-SW1(031015) 3/10/2015	FM17SW02 FM17-SW2(031015) 3/10/2015	FM17SW03 FM17-SW3(031015) 3/10/2015
Analyte	**Units**	Drinking Water	Fresh Water			
Alkalinity	mg/l	NS	NS	39	66	72
Chemical Oxygen Demand	mg/l	NS	NS	39	27	18
Chloride	mg/l	NS	NS	200	120	55
Cyanide	mg/l	0.2	NS	0.0017 J	--	--
Nitrate-N	mg/l	NS	NS	0.38	0.63	0.41
Odor	t.o.n.	NS	NS	1	1	1
pH	SU	NS	NS	6.77	6.82	6.88
Specific Conductivity	umhos/cm	NS	NS	1000	720	465
Sulfate	mg/l	NS	NS	14	9.4	17
Total Dissolved Solids	mg/l	NS	NS	390	310	210
Total Hardness	mg/l	NS	NS	79	93	100
Turbidity	ntu	NS	NS	140	50	28

Notes:
Laboratory data qualifiers are defined in Appendix C Table C-1
Bolded - value exceeds Maryland Water Quality Criteria for Human Health for Consumption of Drinking Water
Shaded- value exceeds State of Maryland Chronic Ambient Water Quality Criteria for Fresh Water (Code of Maryland Regulations 26.08.02.03-2)
-- - non detects
mg/L - milligrams per liter
ug/L - micrograms per liter
ntu - nephelometric turbidity units
t.o.n - threshold odor number
umhos/cm - micromhos per centimeter
SU - standard units
J - estimated concentration
NS - not specified

Table 12. Statistical Analysis of Metals Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Vanadium	Zinc
MW-4S																		
Outliers	Yes (2)	No	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No
Distribution	Normal	ND	ND	Normal	Normal	Normal	Unknown	Normal	Normal	Normal	Lognormal	Normal	ND	Lognormal	ND	ND	ND	Lognormal
Detection Freq.	11	3	3	12	9	8	6	11	8	12	9	12	3	8	1	0	2	12
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-5																		
Outliers	No	No	No	No	Yes (2)	Yes	No	No	Yes	No	No	No	No	Yes	No	No	No	No
Distribution	Normal	Lognormal	ND	Normal	Normal	Normal	Unknown	Normal	Normal	Lognormal	Lognormal	Lognormal	Lognormal	Lognormal	ND	Unknown	ND	Normal
Detection Freq.	9	4	2	12	7	7	4	12	12	12	10	12	4	12	3	5	0	12
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Decreasing	No	No
MW-7S																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Unknown	Unknown	Normal	Normal	ND	ND	Unknown	Normal	ND	Normal	Unknown	Normal	Lognormal	Lognormal	Unknown	ND	Unknown	Lognormal
Detection Freq.	6	5	9	12	3	0	5	12	1	12	4	12	4	6	5	2	6	4
Trend	No	No	No	No	No	No	No	No	No	No	No	No	Decreasing	No	No	No	No	No
MW-13S																		
Outliers	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Normal	Lognormal	Lognormal	Normal	Normal	Normal	Lognormal	Lognormal	Lognormal	Lognormal	Unknown	Normal	ND	Normal	Lognormal	ND	ND	Lognormal
Detection Freq.	11	5	5	12	11	11	7	12	12	12	9	12	0	12	5	3	3	12
Trend	No	No	No	No	No	No	No	Decreasing	No	No	No	Decreasing	No	No	No	No	No	Decreasing
MW-17																		
Outliers	No	No	No	No	No	No	Yes (2)	No	No	No	Yes	No	No	No	No	No	No	No
Distribution	Normal	Lognormal	Lognormal	Normal	Unknown	ND	Normal	Unknown	Unknown	Lognormal	Lognormal	Unknown	ND	Lognormal	Lognormal	ND	Unknown	Lognormal
Detection Freq.	10	6	6	12	4	1	8	7	10	12	9	11	3	7	6	2	5	6
Trend	No	Decreasing	Decreasing	No	Decreasing	No	No	Decreasing	No	No	Decreasing	No	No	No	Decreasing	No	Decreasing	No
MW-10S																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No
Distribution	Unknown	ND	Unknown	Normal	ND	ND	ND	Normal	ND	Normal	Unknown	Normal	Lognormal	Normal	ND	ND	ND	Normal
Detection Freq.	6	1	4	12	1	2	1	12	2	12	5	12	4	8	1	2	0	8
Trend	Decreasing	No	No	No	No	No	No	No	No	No	Decreasing	No	No	No	No	No	No	No
MW-8																		
Outliers	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	No	No	No
Distribution	Normal	ND	ND	Normal	Lognormal	Lognormal	Unknown	Normal	Lognormal	Normal	Lognormal	Normal	ND	Normal	ND	ND	ND	Normal
Detection Freq.	9	2	2	12	8	8	4	12	5	12	9	12	2	12	2	0	1	12
Trend	No	No	No	No	Decreasing	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-12S																		
Outliers	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes	No	No	No
Distribution	Lognormal	Lognormal	Lognormal	Normal	Unknown	Lognormal	Lognormal	Lognormal	Unknown	Normal	Lognormal	Lognormal	ND	Lognormal	Lognormal	ND	ND	Lognormal
Detection Freq.	9	4	9	12	5	7	7	11	11	12	7	12	1	7	8	2	0	10
Trend	No	No	No	No	No	No	No	No	No	No	Decreasing	No	No	No	No	No	No	No
MW-2S																		
Outliers	No	No	Yes (2)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Lognormal	ND	Normal	Normal	Unknown	Lognormal	ND	Lognormal	Lognormal	Normal	Lognormal	Normal	ND	Normal	Lognormal	ND	ND	Normal
Detection Freq.	9	2	7	12	5	6	3	11	10	12	8	12	3	7	5	1	1	10
Trend	No	No	No	No	No	Decreasing	No	No	No	No	No	No	No	No	No	No	No	No

Footnotes on page 2.

Table 12. Statistical Analysis of Metals Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Vanadium	Zinc
MW-14																		
Outliers	No	No	No	No	No	No	Yes (2)	Yes	No	No	No	No	No	No	Yes	No	No	No
Distribution	Unknown	Unknown	Normal	Normal	ND	ND	Normal	Normal	Lognormal	Normal	Lognormal	Lognormal	ND	Unknown	Lognormal	ND	Normal	Lognormal
Detection Freq.	9	4	12	12	2	2	10	8	6	12	6	12	3	7	6	2	7	8
Trend	No	Decreasing	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-18																		
Outliers	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No
Distribution	Lognormal	Unknown	Normal	Normal	Lognormal	ND	Lognormal	Normal	Lognormal	Normal	Lognormal	Lognormal	ND	Lognormal	Lognormal	ND	ND	Lognormal
Detection Freq.	9	4	10	12	5	1	4	8	11	12	7	12	3	8	5	2	1	8
Trend	No	Decreasing	No	No	Decreasing	No	No	No	No	No	Decreasing	No	No	No	No	No	No	No
MW-19																		
Outliers	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Lognormal	Unknown	Normal	Normal	Unknown	ND	Normal	Unknown	Lognormal	Normal	Unknown	Normal	ND	Unknown	Unknown	ND	Normal	Lognormal
Detection Freq.	8	6	12	12	4	0	9	7	6	12	6	12	1	7	7	2	12	7
Trend	No	Decreasing	No	No	Decreasing	No	No	Decreasing	No	No	No	No	No	No	No	No	No	No
MW-20																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Distribution	Unknown	ND	Lognormal	Normal	Unknown	Normal	ND	Normal	Lognormal	Lognormal	Lognormal	Normal	ND	Unknown	ND	ND	Unknown	Normal
Detection Freq.	10	3	4	12	6	8	2	12	7	12	7	12	2	7	3	1	4	12
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	**Increasing**
MW-105																		
Outliers	Yes	No	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes
Distribution	Normal	Lognormal	ND	Lognormal	Unknown	Normal	Lognormal	Normal	Lognormal	Lognormal	Lognormal	Normal	Lognormal	Normal	Unknown	ND	ND	Normal
Detection Freq.	11	4	3	11	7	8	8	12	12	11	8	11	4	10	5	1	1	11
Trend	No	No	No	No	No	No	No	No	No	No	No	No	Decreasing	No	No	No	No	**Increasing**
MW-106																		
Outliers	No	No	No	No	Yes	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No
Distribution	Normal	ND	Lognormal	Normal	Normal	Lognormal	Normal	Unknown	Normal	Lognormal	Normal	Normal	Lognormal	Unknown	ND	ND	ND	Normal
Detection Freq.	12	3	5	12	12	9	5	12	11	12	9	12	7	12	3	1	2	12
Trend	No	No	No	No	No	No	No	No	No	No	Decreasing	No	No	No	No	No	No	No
MW-107																		
Outliers	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No
Distribution	Lognormal	ND	ND	Normal	ND	ND	ND	Unknown	Lognormal	Normal	Lognormal	Unknown	ND	Unknown	ND	ND	ND	Normal
Detection Freq.	8	1	2	12	2	0	2	5	5	11	6	4	2	6	2	0	0	7
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Footnotes:

Detection Freq. is the detection frequency.

If more than one outlier is found, the number is indicated in parentheses after "Yes."

NDs indicates that there was an insufficient number of detections to determine the distribution.

If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and the distribution was reported as ND, regardless of the findings of SANITAS.

If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.

If the trend was statstically significant but decreasing, then "Decreasing" was indicated.

If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Table 13. Statistical Analysis of Inorganic Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	Chloride	Nitrate-N	Nitrogen	Sulfate	Calcium	Magnesium	Potassium	Sodium
MW-4S								
Outliers	No	No	No	Yes	No	No	Yes	No
Distribution	Normal	Lognormal	ND	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	9	3	12	12	10	9	12
Trend	No	No	No	No	No	No	No	No
MW-5								
Outliers	No	No	No	No	Yes	Yes (3)	No	No
Distribution	Normal	Lognormal	ND	Normal	Normal	Normal	Unknown	Normal
Detection Freq.	12	8	3	12	12	10	7	12
Trend	**Increasing**	No	No	No	**Increasing**	No	No	No
MW-7S								
Outliers	No	Yes	No	No	Yes	Yes	No	No
Distribution	Unknown	Lognormal	Normal	Normal	Normal	Normal	Lognormal	Normal
Detection Freq.	12	5	12	12	12	12	12	12
Trend	No	No	No	Decreasing	**Increasing**	No	**Increasing**	No
MW-13S								
Outliers	No	No	No	No	No	No	No	No
Distribution	Normal	Normal	Unknown	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	12	7	12	12	12	12	12
Trend	Decreasing	No	No	No	No	No	No	No
MW-17								
Outliers	No	No	No	No	No	No	No	No
Distribution	Lognormal	Lognormal	Unknown	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	12	4	12	12	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-10S								
Outliers	Yes	No	No	No	No	Yes	No	Yes
Distribution	Lognormal	ND	Normal	Normal	Unknown	Normal	Normal	Normal
Detection Freq.	12	3	12	12	12	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-8								
Outliers	Yes	No	No	No	Yes	Yes	No	No
Distribution	Normal	Unknown	Unknown	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	4	5	12	12	11	8	12
Trend	Decreasing	No	No	No	No	No	No	No
MW-12S								
Outliers	Yes	No	Yes (2)	No	No	No	Yes	Yes (2)
Distribution	Normal	Lognormal	Normal	Normal	Normal	Unknown	Normal	Normal
Detection Freq.	11	12	11	12	12	12	12	11
Trend	Decreasing	No	No	**Increasing**	No	No	No	No
MW-2S								
Outliers	No	No	Yes	No	No	No	No	No
Distribution	Lognormal	Unknown	Normal	Normal	Normal	Unknown	Normal	Lognormal
Detection Freq.	12	5	11	12	12	8	9	10
Trend	**Increasing**	No	No	No	No	No	No	**Increasing**

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Table 13. Statistical Analysis of Inorganic Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	Chloride	Nitrate-N	Nitrogen	Sulfate	Calcium	Magnesium	Potassium	Sodium
MW-14								
Outliers	No	No	No	Yes (2)	No	Yes	No	No
Distribution	Lognormal	Unknown	Normal	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	5	12	11	12	12	12	12
Trend	No	No	No	No	No	No	Decreasing	No
MW-18								
Outliers	No	No	No	No	No	No	No	No
Distribution	Normal	Unknown	Lognormal	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	7	12	10	12	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-19								
Outliers	No	No	No	No	No	No	No	Yes (2)
Distribution	Normal	Unknown	Lognormal	Unknown	Normal	Normal	Normal	Normal
Detection Freq.	12	5	12	10	12	12	12	11
Trend	No	No	Decreasing	No	No	No	Decreasing	No
MW-20								
Outliers	No	No	No	No	Yes	No	Yes	No
Distribution	Normal	Normal	Unknown	Unknown	Lognormal	Normal	Normal	Normal
Detection Freq.	12	12	4	12	12	12	9	12
Trend	No	No	No	No	No	No	No	No
MW-105								
Outliers	No	No	No	No	Yes (2)	No	Yes	No
Distribution	Lognormal	Normal	ND	Lognormal	Normal	Lognormal	Lognormal	Lognormal
Detection Freq.	12	12	1	12	11	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-106								
Outliers	Yes	Yes	No	No	No	No	Yes (3)	Yes
Distribution	Normal	Normal	ND	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	11	1	12	12	12	11	12
Trend	No	No	No	No	No	No	No	No
MW-107								
Outliers	No	No	No	No	Yes	No	Yes (2)	No
Distribution	Normal	Normal	ND	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	12	2	12	12	11	11	12
Trend	No	No	No	No	No	No	No	No

Footnotes:
Detection Freq. is the detection frequency.
If more than one outlier is found, the number is indicated in parentheses after "Yes."
NDs indicates that there was an insufficient number of detections to determine the distribution.
If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and
the distribution was reported as ND, regardless of the findings of SANITAS.
If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.
If the trend was statstically significant but decreasing, then "Decreasing" was indicated.
If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Table 14. Statistical Analysis of VOC Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	1,1-Dichloro-ethane	1,2-Dichloro-benzene	1,2-Dichloro-propane	1,3,5-Trimethyl-benzene	1,4-Dichloro-benzene	Benzene	CFC-12	Chloro-benzene	Chloro-ethane	cis-1,2-Dichloro-ethene	Ethylbenzene	Tetrachloro-ethene	Toluene	Total Xylenes	trans-1,2-Dichloro-ethene	Trichloro-ethene	Vinyl chloride
MW-4S																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-5																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	Lognormal	ND	ND	ND	ND	ND	Normal	ND
Detection Freq.	0	0	0	0	0	1	0	2	0	8	0	0	1	0	0	12	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-7S																	
Outliers	Yes	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No
Distribution	Unknown	ND	ND	ND	Normal	Normal	ND	Normal	Normal	Lognormal	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	9	0	3	0	12	12	1	12	10	7	0	0	0	0	0	0	0
Trend	No	No	No	No	No	No	No	**Increasing**	No	No	No	No	No	No	No	No	No
MW-13S																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	1	0	0	0	1	0	3	1	0	2	0	0	1	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-17																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-10S																	
Outliers	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Normal	ND	ND	ND	Lognormal	Normal	Normal	Unknown	ND	Normal	ND	ND	ND	ND	ND	ND	Unknown
Detection Freq.	11	0	0	0	12	12	7	5	3	12	0	1	1	0	0	0	4
Trend	No	No	No	No	No	No	Decreasing	No	No	No	No	No	No	No	No	No	No
MW-8																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-12S																	
Outliers	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	Normal	Lognormal	Normal	Lognormal	Lognormal	Normal	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	2	0	0	12	10	6	9	7	7	0	0	2	0	0	2	1
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-2S																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	Unknown	ND	ND	Unknown	ND	ND	ND	ND	ND	ND	ND	ND	Lognormal
Detection Freq.	2	0	0	0	5	2	1	6	0	0	0	0	0	0	0	0	5
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

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Table 14. Statistical Analysis of VOC Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	1,1-Dichloro-ethane	1,2-Dichloro-benzene	1,2-Dichloro-propane	1,3,5-Trimethyl-benzene	1,4-Dichloro-benzene	Benzene	CFC-12	Chloro-benzene	Chloro-ethane	cis-1,2-Dichloroethene	Ethylbenzene	Tetrachloro-ethene	Toluene	Total Xylenes	trans-1,2-Dichloroethene	Trichloro-ethene	Vinyl chloride
MW-14																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	Unknown	ND	ND	Normal	Normal	Lognormal	Lognormal	Normal	Lognormal	ND	ND	Unknown	ND	ND	ND	Unknown
Detection Freq.	1	7	0	0	12	12	11	12	10	9	0	0	6	1	2	2	4
Trend	No	No	No	No	Decreasing	No	No	No	No	No	No	No	No	No	No	No	No
MW-18																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	Normal	Normal	ND	Unknown	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	11	7	2	6	1	2	0	0	1	1	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-19																	
Outliers	Yes	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No
Distribution	Normal	Unknown	Normal	Unknown	Normal	Normal	Normal	Normal	Normal	Normal	Unknown	ND	Normal	Unknown	Normal	ND	Unknown
Detection Freq.	12	10	8	6	12	12	11	12	11	12	7	0	10	6	10	3	6
Trend	No	Decreasing	No	Decreasing	No	No	No	**Increasing**	No	No	Decreasing	No	Decreasing	Decreasing	No	No	No
MW-20																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-105																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Normal	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	0	0	1	0	0	0	0	4	1	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-106																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-107																	
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Footnotes:

Detection Freq. is the detection frequency.

If more than one outlier is found, the number is indicated in parentheses after "Yes."

NDs indicates that there was an insufficient number of detections to determine the distribution.
If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and
the distribution was reported as ND, regardless of the findings of SANITAS.

If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.
If the trend was statstically significant but decreasing, then "Decreasing" was indicated.
If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Table 15. Statistical Analysis of SVOC Data - Upper Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	1,4-Dichlorobenzene	Naphthalene
MW-4S		
Outliers	No	No
Distribution	ND	ND
Detection Freq.	0	0
Trend	No	No
MW-7S		
Outliers	No	No
Distribution	ND	ND
Detection Freq.	1	1
Trend	No	No
MW-10S		
Outliers	No	No
Distribution	ND	ND
Detection Freq.	0	1
Trend	No	No
MW-8		
Outliers	No	No
Distribution	ND	ND
Detection Freq.	0	1
Trend	No	No
MW-12S		
Outliers	No	No
Distribution	ND	ND
Detection Freq.	2	0
Trend	No	No
MW-14		
Outliers	No	No
Distribution	Unknown	ND
Detection Freq.	4	2
Trend	No	No
MW-19		
Outliers	No	No
Distribution	Unknown	Normal
Detection Freq.	9	12
Trend	No	No
MW-107		
Outliers	No	No
Distribution	ND	ND
Detection Freq.	0	1
Trend	No	No

Footnotes:

Detection Freq. is the detection frequency.

If more than one outlier is found, the number is indicated in parentheses after "Yes."

NDs indicates that there was an insufficient number of detections to determine the distribution.

If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and the distribution was reported as ND, regardless of the findings of SANITAS.

If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.

If the trend was statstically significant but decreasing, then "Decreasing" was indicated.

If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Table 16. Statistical Analysis of Metals Data - Lower Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Vanadium	Zinc
MW-7D																		
Outliers	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Lognormal	ND	ND	Normal	Normal	Normal	Lognormal	Normal	Normal	Normal	Unknown	Normal	ND	Normal	ND	Unknown	ND	Normal
Detection Freq.	12	2	3	12	12	11	6	12	12	8	8	12	3	12	3	6	0	12
Trend	**Increasing**	No	No	No	No	No	No	No	No	No	No	**Increasing**	No	No	No	No	No	No
MW-2D																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Distribution	Unknown	ND	ND	Lognormal	ND	Unknown	Normal	Unknown	Normal	Unknown	Unknown	Unknown	Normal	Unknown	ND	ND	ND	Normal
Detection Freq.	4	2	1	12	3	7	5	6	10	8	5	5	9	4	3	2	0	11
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-4DR																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	Yes (2)	No	Yes	No	No	No	Yes (2)
Distribution	Lognormal	ND	ND	Normal	Normal	Normal	Lognormal	Normal	Normal	Normal	Lognormal	Normal	Lognormal	Normal	ND	Unknown	ND	Normal
Detection Freq.	10	2	1	12	12	8	8	12	12	12	9	12	4	12	3	6	2	12
Trend	No	No	No	**Increasing**	No	**Increasing**	No	No	No	No	No	**Increasing**	No	No	No	No	No	No
MW-10D																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Unknown	Lognormal	Lognormal	Normal	Normal	Unknown	Normal	Normal	Normal	Normal	Lognormal	Normal	Lognormal	Normal	Unknown	Lognormal	ND	Normal
Detection Freq.	10	5	4	12	11	9	8	12	10	12	7	12	5	12	4	9	0	12
Trend	No	No	No	No	**Increasing**	No	No	No	**Increasing**	No	No	No	No	No	No	No	No	**Increasing**
MW-12D																		
Outliers	Yes	No	No	Yes	Yes (2)	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes (2)
Distribution	Lognormal	ND	ND	Lognormal	Normal	ND	Lognormal	Unknown	Lognormal	Lognormal	Lognormal	Normal	ND	Unknown	ND	ND	ND	Lognormal
Detection Freq.	10	2	3	11	7	3	8	7	10	11	6	12	2	7	1	1	1	11
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-13D																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Distribution	Normal	ND	Unknown	Normal	Normal	Normal	Unknown	Normal	Normal	Lognormal	Lognormal	Lognormal	ND	Normal	Unknown	ND	ND	Normal
Detection Freq.	9	2	8	12	7	8	9	12	10	12	8	12	1	10	7	3	1	12
Trend	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
MW-101D																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No
Distribution	Lognormal	Unknown	ND	Normal	Lognormal	Unknown	Normal	Normal	Normal	Lognormal	Unknown	Normal	Lognormal	Normal	ND	Unknown	ND	Normal
Detection Freq.	9	4	3	12	8	6	10	12	10	12	5	12	4	12	3	6	1	12
Trend	No	No	No	**Increasing**	No	No	No	No	No	No	No	No	No	No	No	No	No	**Increasing**
MW-108D																		
Outliers	Yes (2)	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No
Distribution	Normal	ND	ND	Normal	Unknown	Unknown	Lognormal	Normal	Lognormal	Lognormal	Lognormal	Normal	Unknown	Normal	Unknown	Unknown	ND	Normal
Detection Freq.	11	2	2	12	12	7	8	12	12	11	7	12	4	12	4	5	0	12
Trend	No	No	No	No	**Increasing**	No	No	No	No	No	No	**Increasing**	No	**Increasing**	No	No	No	No
MW-109D																		
Outliers	No	No	Yes	No	No	No	No	No	No	No	No	Yes (2)	No	Yes (2)	No	No	No	No
Distribution	Lognormal	Unknown	Lognormal	Normal	Normal	Lognormal	Normal	Normal	Normal	Lognormal	Lognormal	Lognormal	Normal	Normal	ND	ND	Unknown	Normal
Detection Freq.	11	4	5	12	11	8	11	11	10	12	9	12	11	11	3	3	6	12
Trend	No	No	No	No	No	No	No	No	No	**Increasing**	**Increasing**	No	No	No	No	No	No	No
MW-110D																		
Outliers	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Distribution	Normal	ND	ND	Normal	Unknown	Unknown	Lognormal	Normal	Normal	Normal	Unknown	Normal	Unknown	Normal	ND	ND	ND	Normal
Detection Freq.	11	2	3	12	7	7	7	12	10	11	4	12	5	12	1	3	0	11
Trend	**Increasing**	No	No	**Increasing**	No	No	No	No	No	**Increasing**	No	No	No	**Increasing**	No	No	No	No

Footnotes:

Detection Freq. is the detection frequency.

If more than one outlier is found, the number is indicated in parentheses after "Yes."

NDs indicates that there was an insufficient number of detections to determine the distribution.
If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and
the distribution was reported as ND, regardless of the findings of SANITAS.

If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.
If the trend was statstically significant but decreasing, then "Decreasing" was indicated.
If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Table17. Statistical Analysis of Inorganic Data-Lower Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	Chloride	Nitrate-N	Nitrogen	Sulfate	Calcium	Magnesium	Potassium	Sodium
MW-7D								
Outliers	No	Yes	No	No	No	No	Yes	No
Distribution	Normal	Lognormal	Unknown	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	12	7	12	12	12	12	12
Trend	No	No	No	**Increasing**	No	**Increasing**	No	No
MW-2D								
Outliers	No	No	No	No	No	No	Yes	No
Distribution	Normal	Unknown	ND	Lognormal	Lognormal	Unknown	Normal	Normal
Detection Freq.	12	9	3	7	11	6	8	10
Trend	No	Decreasing	No	No	No	No	No	No
MW-4DR								
Outliers	No	No	No	No	No	No	Yes	No
Distribution	Normal	Normal	ND	Lognormal	Normal	Normal	Normal	Normal
Detection Freq.	12	12	3	12	12	12	12	12
Trend	**Increasing**	No	No	**Increasing**	**Increasing**	No	**Increasing**	**Increasing**
MW-10D								
Outliers	No	No	No	Yes	No	No	Yes	Yes
Distribution	Normal	Unknown	Normal	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	5	10	12	12	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-12D								
Outliers	Yes	No	No	No	No	No	No	No
Distribution	Lognormal	Unknown	Unknown	Normal	Lognormal	Unknown	Unknown	Unknown
Detection Freq.	11	12	4	10	12	6	7	9
Trend	No	No	No	No	No	No	No	No
MW-13D								
Outliers	No	No	No	No	No	No	No	No
Distribution	Normal	Lognormal	Unknown	Unknown	Normal	Normal	Normal	Normal
Detection Freq.	12	10	10	12	12	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-101D								
Outliers	No	Yes	No	No	No	No	No	No
Distribution	Normal	Normal	Unknown	Normal	Normal	Normal	Normal	Normal
DetectionFreq.	12	11	4	8	12	12	12	12
Trend	No	No	No	No	**Increasing**	No	**Increasing**	No
MW-108D								
Outliers	No	Yes	No	No	Yes	No	Yes	No
Distribution	Unknown	Normal	Unknown	Normal	Normal	Normal	Lognormal	Normal
Detection Freq.	12	12	4	10	12	12	12	12
Trend	No	No	No	No	No	No	No	No
MW-109D								
Outliers	No	Yes	No	No	No	No	No	No
Distribution	Unknown	Normal	Unknown	Unknown	Normal	Lognormal	Unknown	Lognormal
Detection Freq.	12	11	4	9	12	11	12	12
Trend	No	No	No	**Increasing**	No	No	No	No
MW-110D								
Outliers	No	No	No	No	No	No	No	No
Distribution	Normal	Normal	ND	Normal	Normal	Normal	Normal	Normal
Detection Freq.	12	12	1	10	12	8	10	12
Trend	**Increasing**	No	No	No	No	No	No	**Increasing**

Footnotes:

Detection Freq. is the detection frequency.

If more than one outlier is found, the number is indicated in parentheses after "Yes."

NDs indicates that there was an insufficient number of detections to determine the distribution.

If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and the distribution was reported as ND, regardless of the findings of SANITAS.

If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.

If the trend was statstically significant but decreasing, then "Decreasing" was indicated.

If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Table 18. Statistical Analysis of VOC Data - Lower Patapsco Aquifer, Closed Sanitary Landfill, Fort Meade, MD

	1,4-Dichlorobenzene	Benzene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	Trichloroethene
MW-7D							
Outliers	No	No	No	No	No	No	No
Distribution	ND	Normal	ND	ND	ND	ND	ND
Detection Freq.	0	9	0	0	0	0	0
Trend	No	No	No	No	No	No	No
MW-2D							
Outliers	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	1	1	0	0	0	2	0
Trend	No	No	No	No	No	No	No
MW-4DR							
Outliers	No	No	No	No	No	No	No
Distribution	ND	ND	Unknown	Lognormal	ND	ND	Normal
Detection Freq.	0	0	9	4	0	1	9
Trend	No	No	Decreasing	Decreasing	No	No	Decreasing
MW-10D							
Outliers	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	Normal	ND	ND
Detection Freq.	0	0	0	0	4	2	0
Trend	No	No	No	No	No	No	No
MW-12D							
Outliers	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	1	0	0	0	0	1	0
Trend	No	No	No	No	No	No	No
MW-13D							
Outliers	No	No	No	No	No	No	No
Distribution	Normal	Normal	ND	Normal	ND	ND	ND
Detection Freq.	9	10	0	10	0	1	3
Trend	Decreasing	Decreasing	No	No	No	No	No
MW-101D							
Outliers	No	No	No	Yes	No	No	No
Distribution	ND	ND	Normal	Normal	Normal	ND	Normal
Detection Freq.	0	1	6	12	12	0	12
Trend	No	No	Decreasing	No	**Increasing**	No	No
MW-108D							
Outliers	No	No	Yes	No	Yes	No	No
Distribution	ND	ND	Normal	ND	Normal	ND	Normal
Detection Freq.	0	0	6	0	12	2	12
Trend	No	No	No	No	No	No	No
MW-109D							
Outliers	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	Normal	ND	Lognormal
Detection Freq.	0	0	0	3	9	1	5
Trend	No	No	No	No	No	No	No
MW-110D							
Outliers	No	No	No	No	No	No	No
Distribution	ND	ND	ND	ND	ND	ND	ND
Detection Freq.	2	0	1	0	3	1	2
Trend	No	No	No	No	No	No	No

Footnotes:

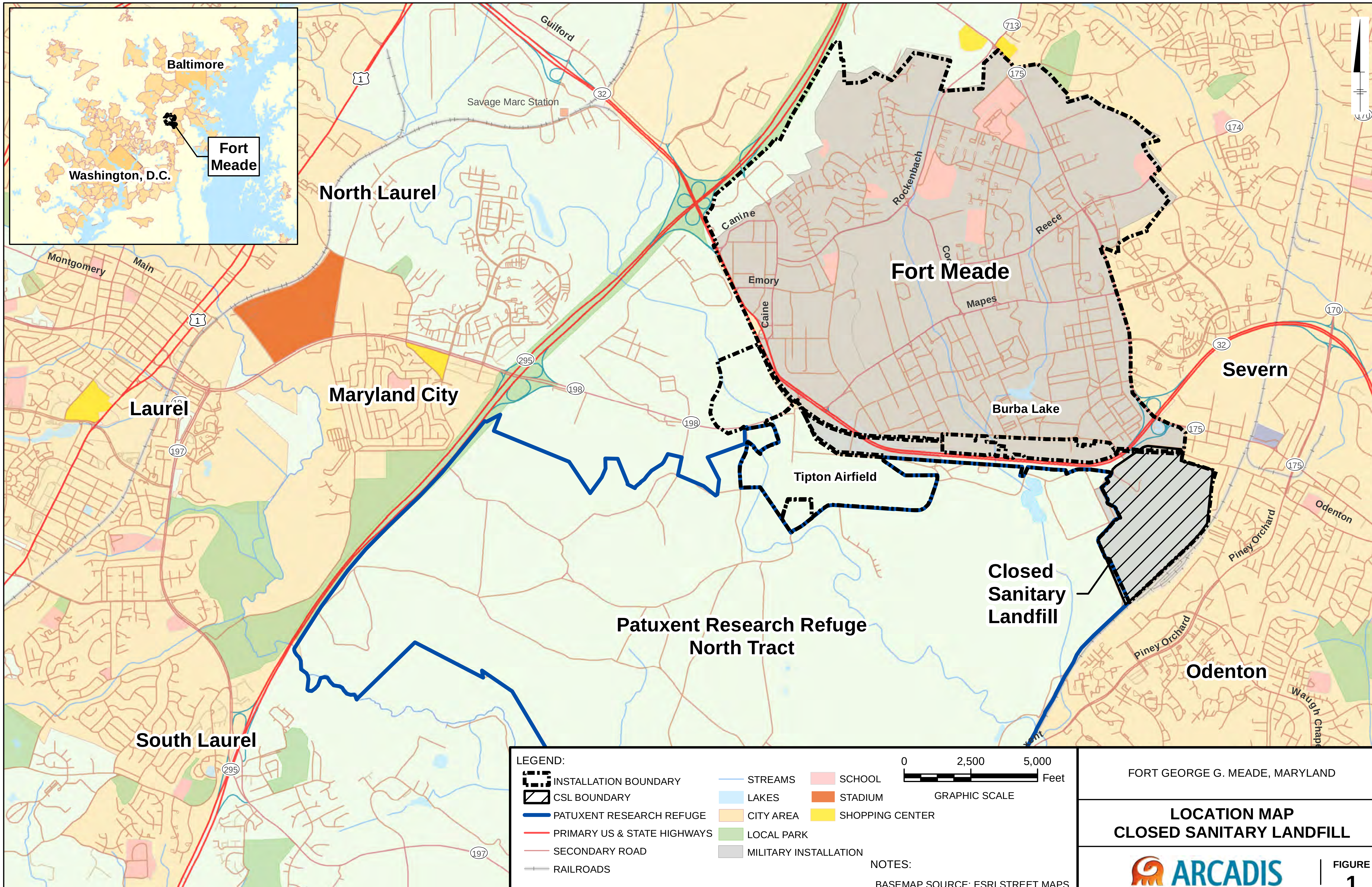
Detection Freq. is the detection frequency.

If more than one outlier is found, the number is indicated in parentheses after "Yes."

NDs indicates that there was an insufficient number of detections to determine the distribution.
If the number of detections was 3 or fewer, any "outlier" reported by SANITAS was ignored, and the distribution was reported as ND, regardless of the findings of SANITAS.

If the Mann-Kendall test did not indicate a statistically significant trend, "No" was recorded for trend.
If the trend was statstically significant but decreasing, then "Decreasing" was indicated.
If the trend was statstically significant and increasing, then "**Increasing**" was indicated in **bold font**.

Figures



FORT GEORGE G. MEADE, MARYLAND

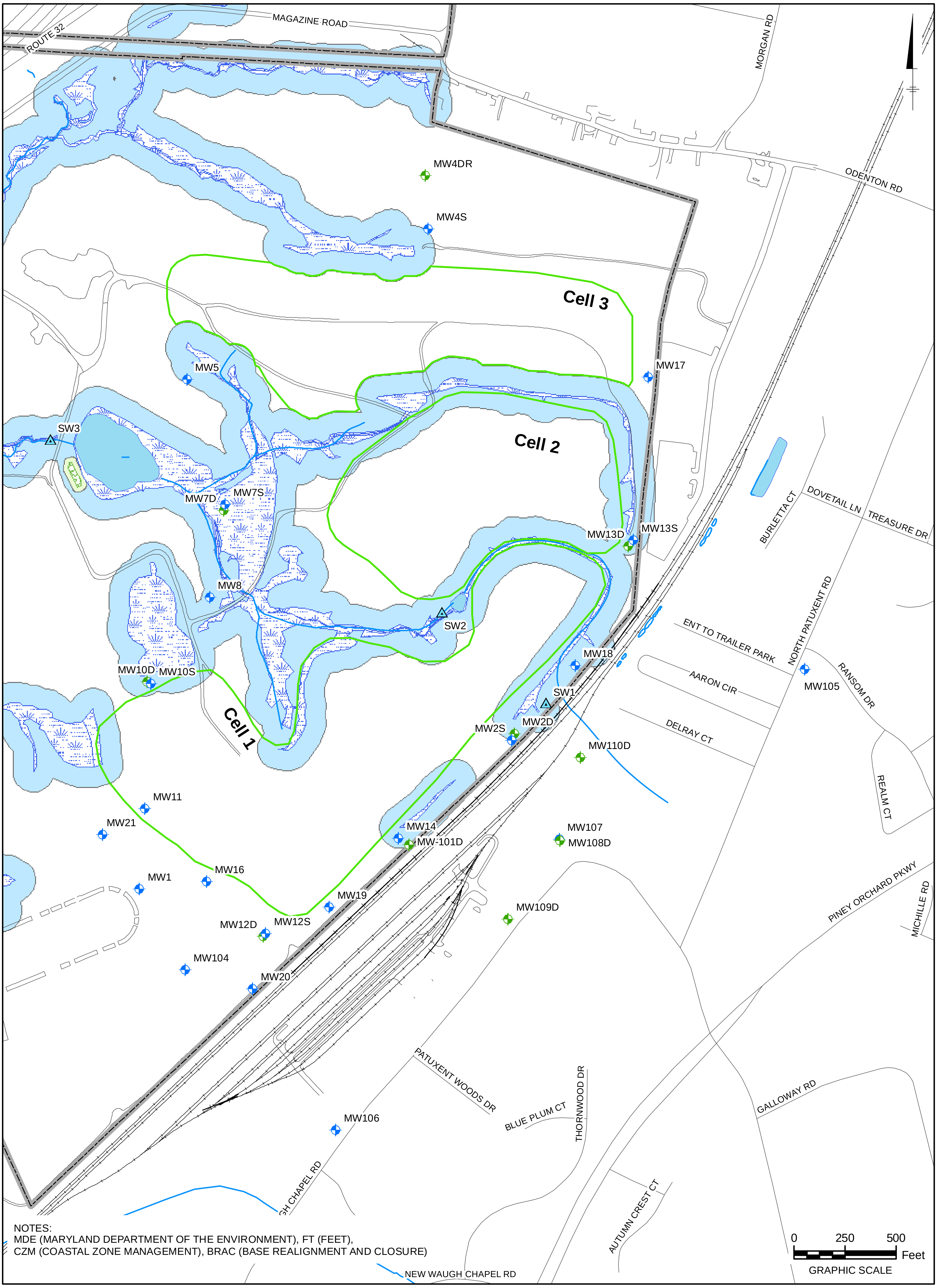
LOCATION MAP
CLOSED SANITARY LANDFILL

ARCADIS

FIGURE 1

CITY: MPLS DIV/GROUP: IM DB: MG LD: KS
FORT MEADE
Document Path: G:\GIS\Projects\Fort_Meade_old\ArcMap\CSL\2014-06\Fig1_CSL_Location_20140624.mxd

CITY: MPLS DIV/GROUP: IM DB: MG LD: RK
FORT MEADE
Document Path: Z:\GISPROJECTS_ENV\Fort_Meade\ArcMap\CSL\2014-06\CSL_Area_20140624.mxd



NOTES:
MDE (MARYLAND DEPARTMENT OF THE ENVIRONMENT), FT (FEET),
CZM (COASTAL ZONE MANAGEMENT), BRAC (BASE REALIGNMENT AND CLOSURE)

LEGEND:
- UPPER AQUIFER WELL
- LOWER AQUIFER WELL
- SURFACE WATER LOCATION
- ROAD
- RAILROAD
- APPROXIMATE CELL BOUNDARIES
- DEMOLISHED STRUCTURES
- EXISTING STRUCTURES
- STREAM
- SURFACE WATER
- INSTALLATION BOUNDARY
- ISOLATED WETLAND (MDE)
- ISOLATED WETLAND BOUNDARY (25 FT MDE)
- JURISDICTIONAL WETLANDS & WATERS OF THE UNITED STATES
- CZM RIPARIAN & WETLAND BUFFER (100 FT BRAC)

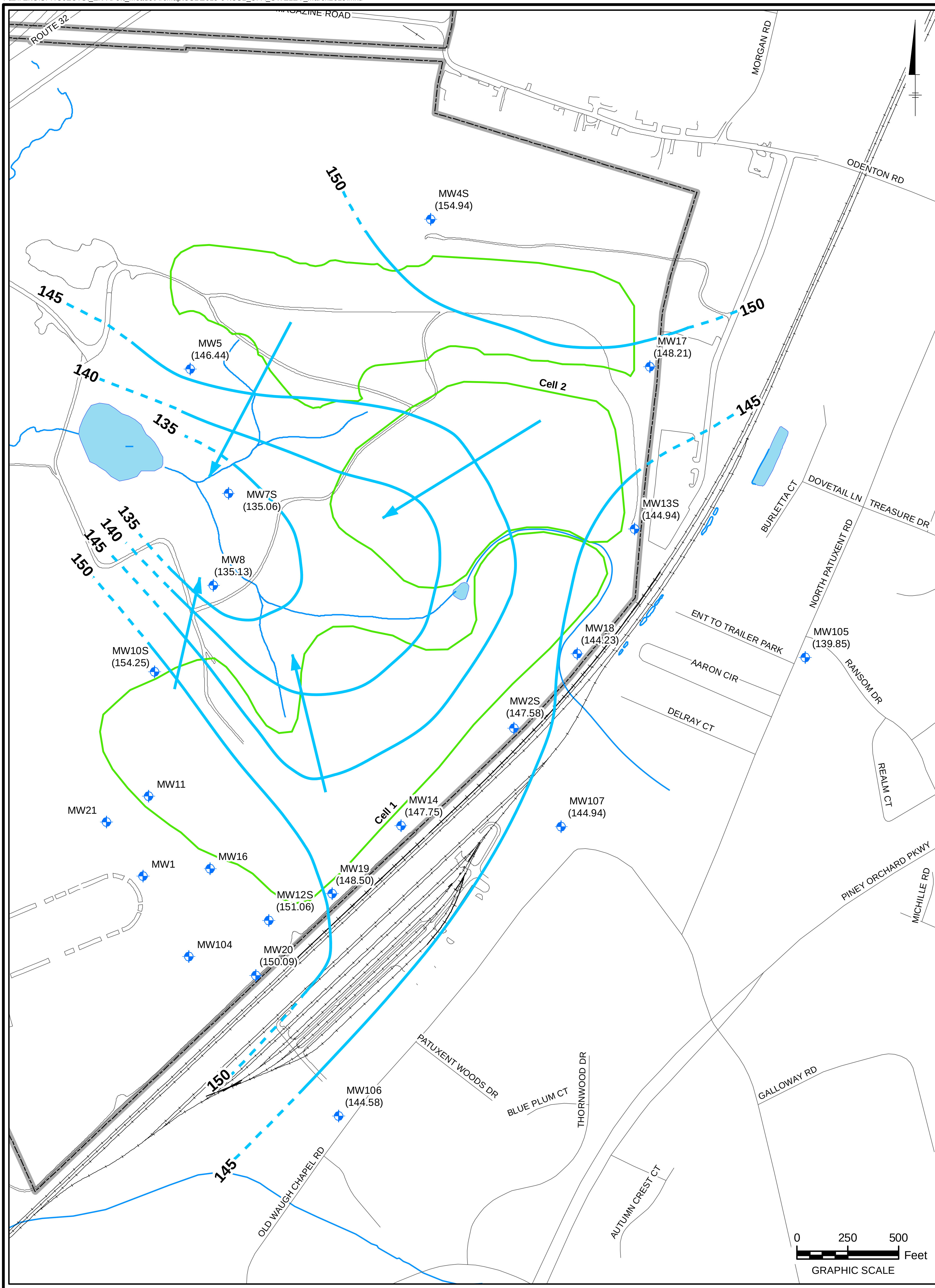
FORT GEORGE G. MEADE, MARYLAND

SITE MAP
CLOSED SANITARY LANDFILL

ARCADIS

FIGURE
2

CITY: MPLS DIV/GROUP: IM DB: MG LD: RK
FORT MEADE
Path: Z:\GISPROJECTS_ENV\Fort_Meade\ArcMap\CSL\2015-04\CSL_UPA_GWELEV_March2015.mxd



LEGEND:

- UPPER AQUIFER WELL
- CURB
- APPROXIMATE CELL BOUNDARIES
- ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- RAILROAD
- STREAM
- SURFACE WATER
- INSTALLATION BOUNDARY

NOTE:
ELEVATIONS PROVIDED IN FT AMSL
(FEET ABOVE MEAN SEA LEVEL)

CLOSED SANITARY LANDFILL
FORT GEORGE G. MEADE, MARYLAND

GROUNDWATER ELEVATIONS
UPPER PATAPSCO AQUIFER - MARCH 2015
CLOSED SANITARY LANDFILL

ARCADIS

FIGURE
3

CITY: MPLS DIV/GROUP: IM DB: MG LD: RK
FORT MEADE
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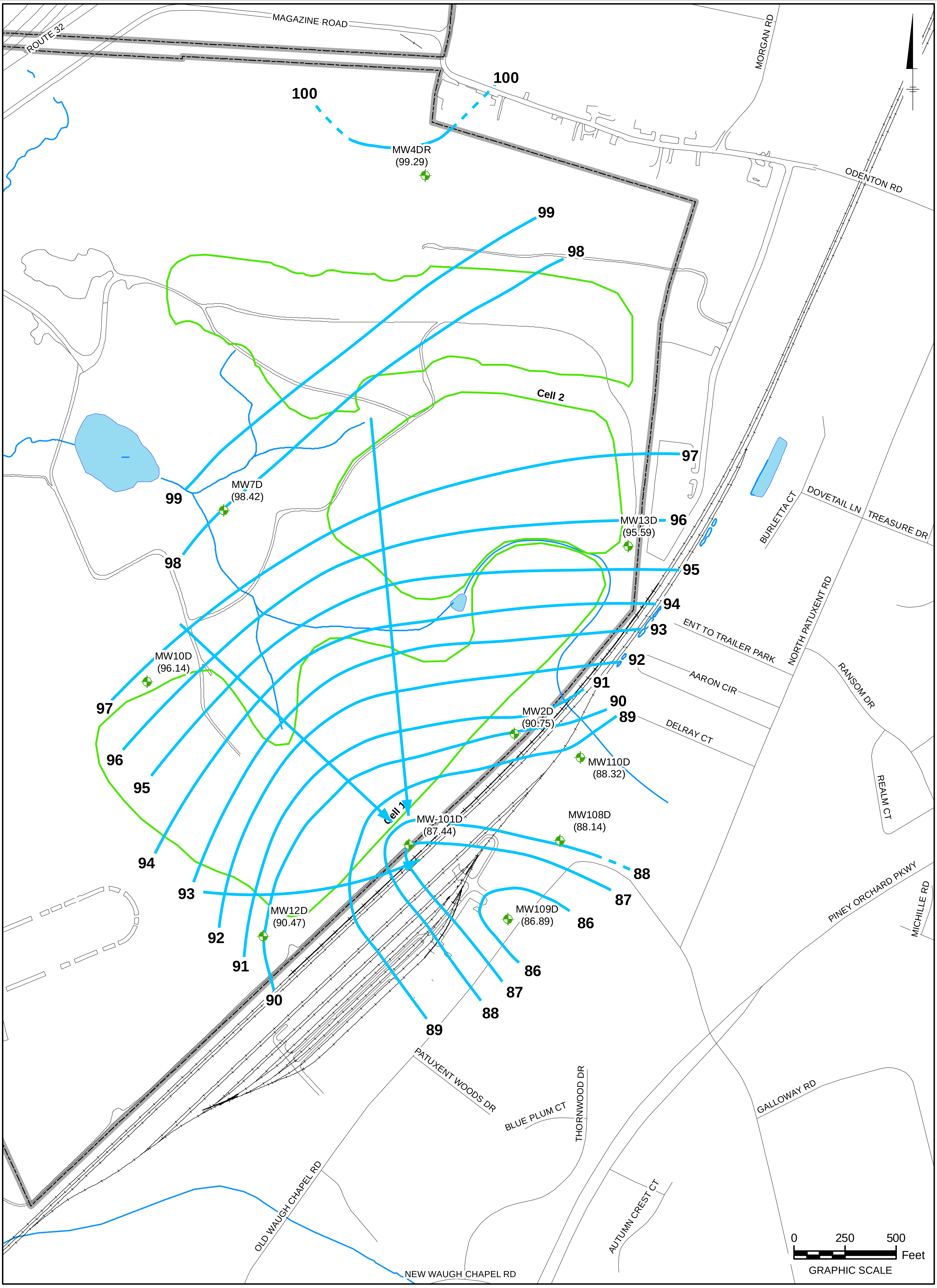

LEGEND:

- LOWER AQUIFER WELL
- CURB
- APPROXIMATE CELL BOUNDARIES
- ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- RAILROAD
- STREAM
- SURFACE WATER
- INSTALLATION BOUNDARY

NOTE:
ELEVATIONS PROVIDED IN FT AMSL
(FEET ABOVE MEAN SEA LEVEL)

CLOSED SANITARY LANDFILL
FORT GEORGE G. MEADE, MARYLAND

GROUNDWATER ELEVATIONS
LOWER PATAPSCO AQUIFER - MARCH 2015
CLOSED SANITARY LANDFILL

ARCADIS

FIGURE
4

CITY: MPLS DIV/GROUP: IM DB: MG LD: RK
FORT MEADE
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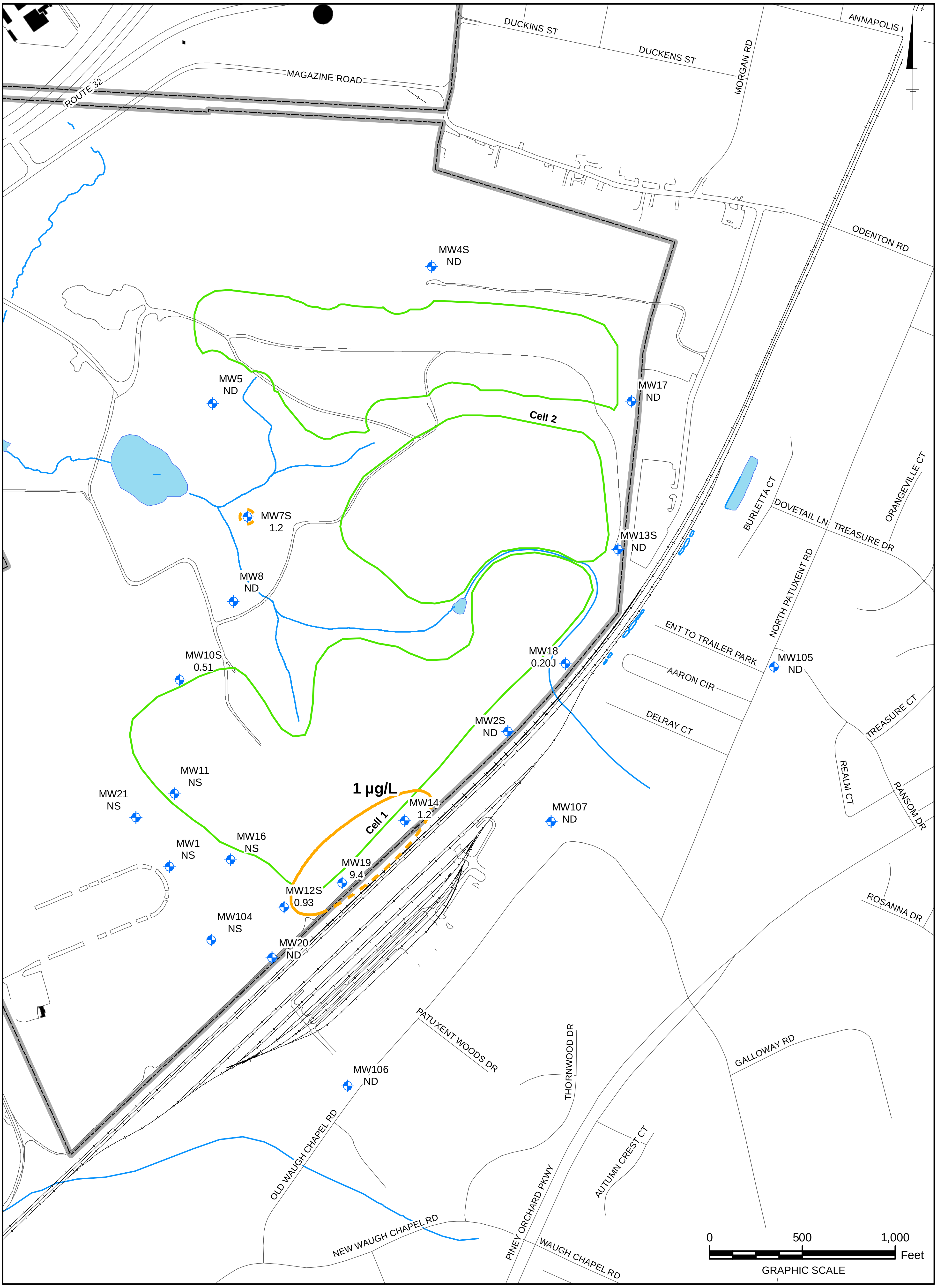


LEGEND:

- UPPER AQUIFER WELL
- CURB
- APPROXIMATE CELL BOUNDARIES
- BENZENE CONTOUR
- RAILROAD
- STREAM
- SURFACE WATER
- INSTALLATION BOUNDARY

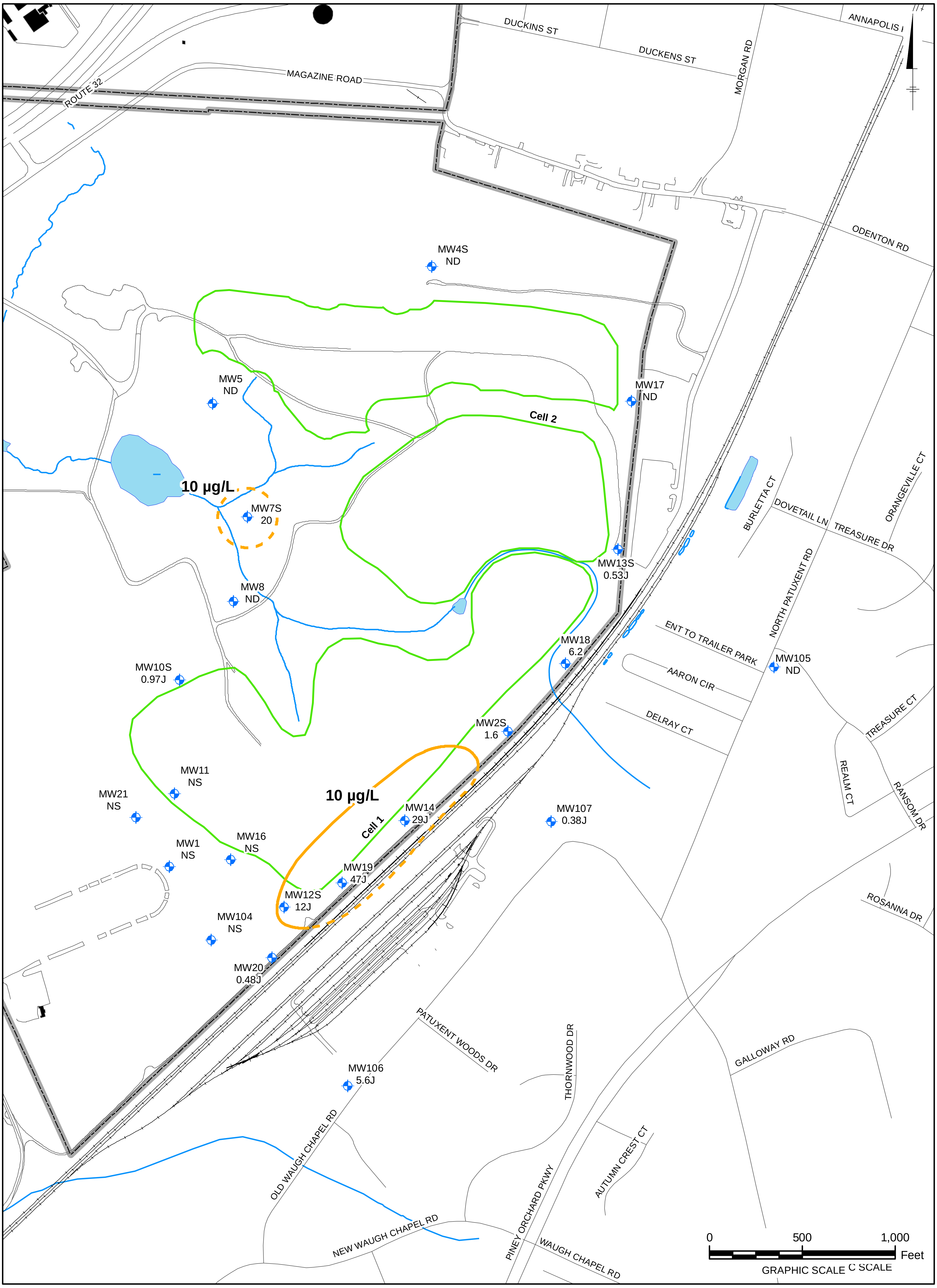
NOTE:
ND = NOT DETECTED
NS = NOT SAMPLED
J=ESTIMATED CONCENTRATION
µg/L=MICROGRAMS PER LITER

CLOSED SANITARY LANDFILL
FORT GEORGE G. MEADE, MARYLAND

BENZENE DETECTIONS (µg/L)
UPPER PATAPSCO AQUIFER - MARCH 2015
CLOSED SANITARY LANDFILL

ARCADIS

FIGURE
5



LEGEND:

- UPPER AQUIFER WELL
- CURB
- APPROXIMATE CELL BOUNDARIES
- ARSENIC CONTOUR
- RAILROAD
- STREAM
- SURFACE WATER
- INSTALLATION BOUNDARY

NOTE:
ND = NOT DETECTED
NS = NOT SAMPLED
J=ESTIMATED CONCENTRATION
µg/L=MICROGRAMS PER LITER

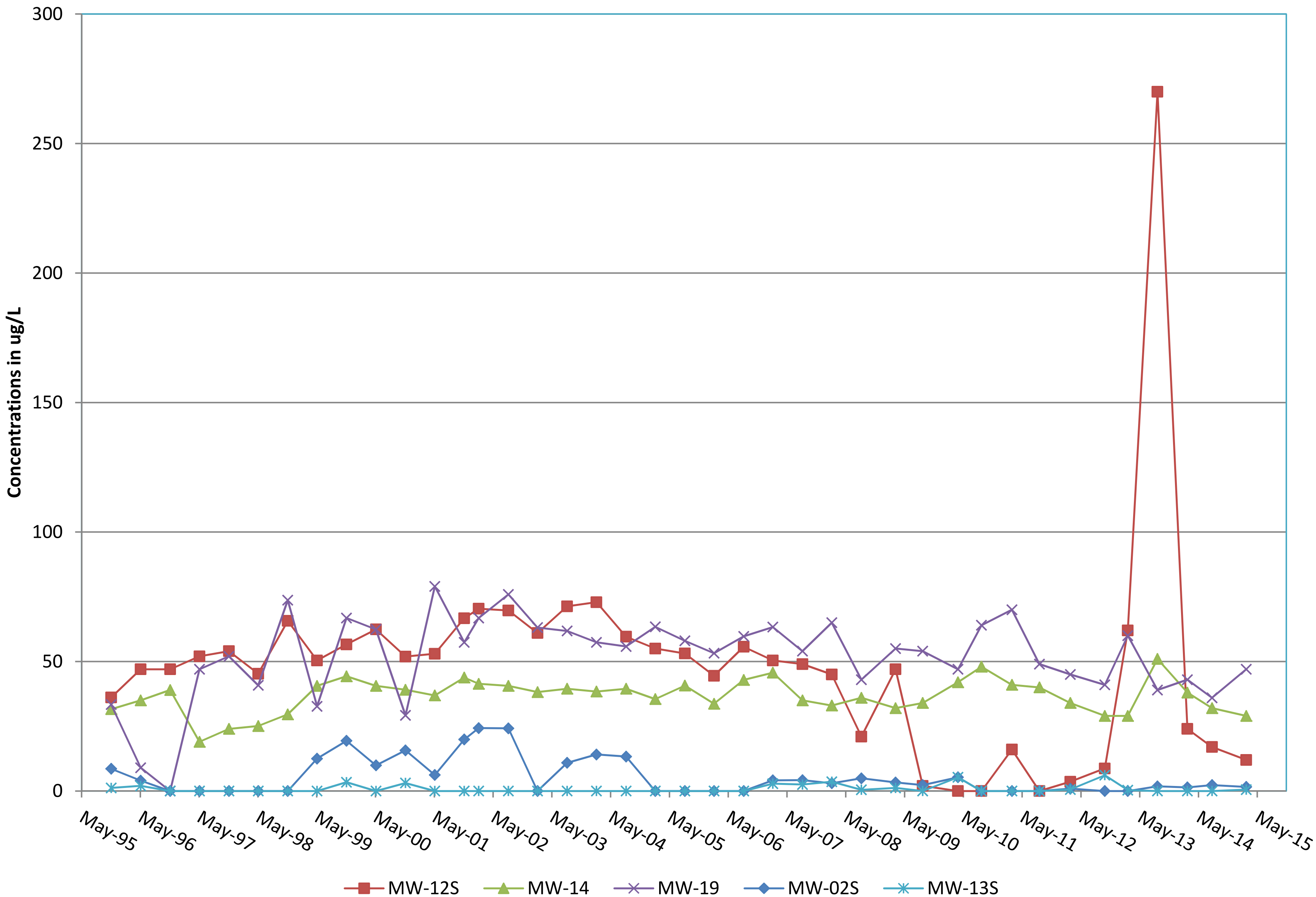
CLOSED SANITARY LANDFILL
FORT GEORGE G. MEADE, MARYLAND

ARSENIC CONCENTRATIONS (µg/L)
UPPER PATAPSCO AQUIFER - MARCH 2015
CLOSED SANITARY LANDFILL

ARCADIS

FIGURE
6

Figure 7
Historical Arsenic Concentrations in the Upper Patapsco Aquifer



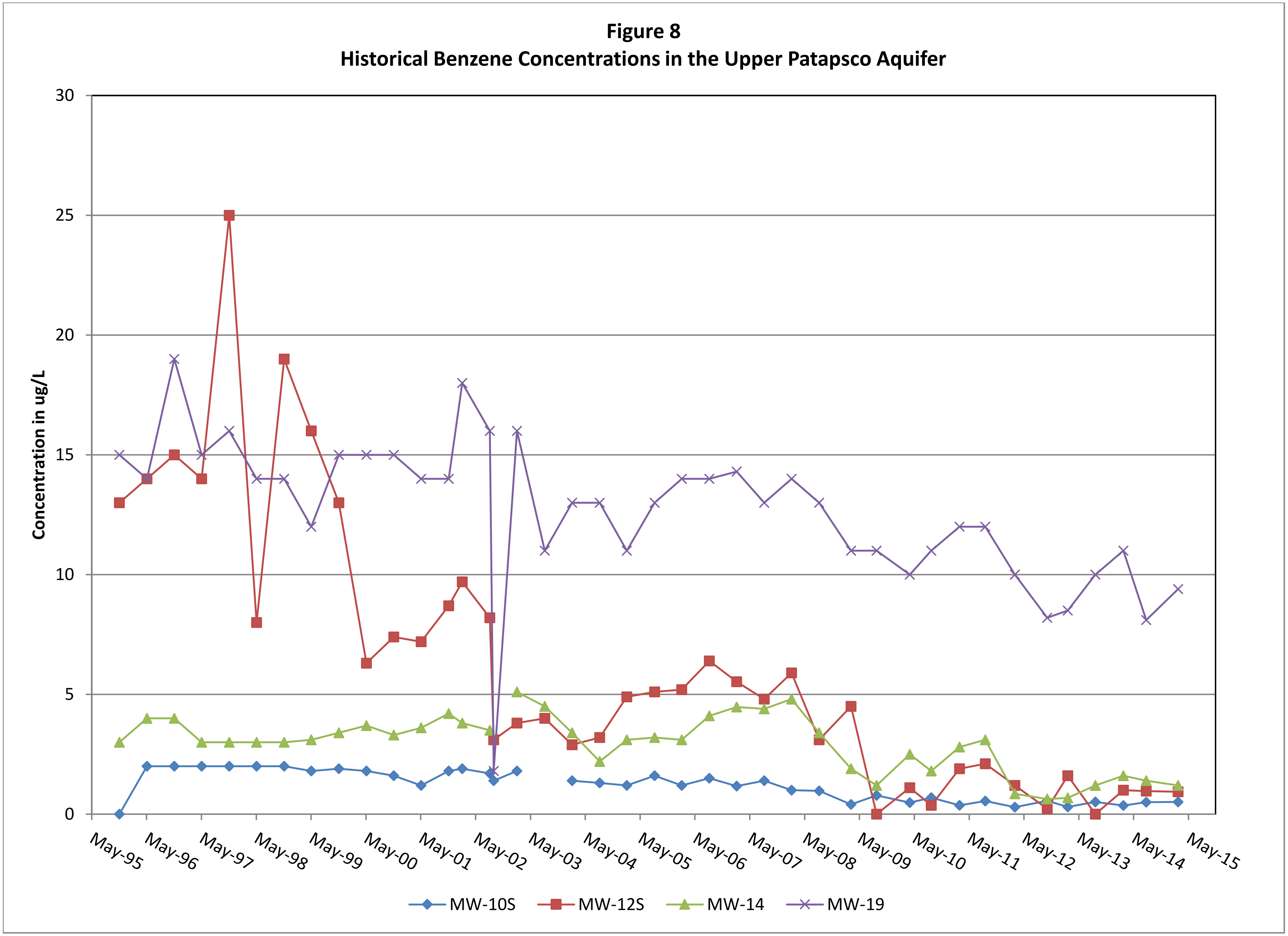
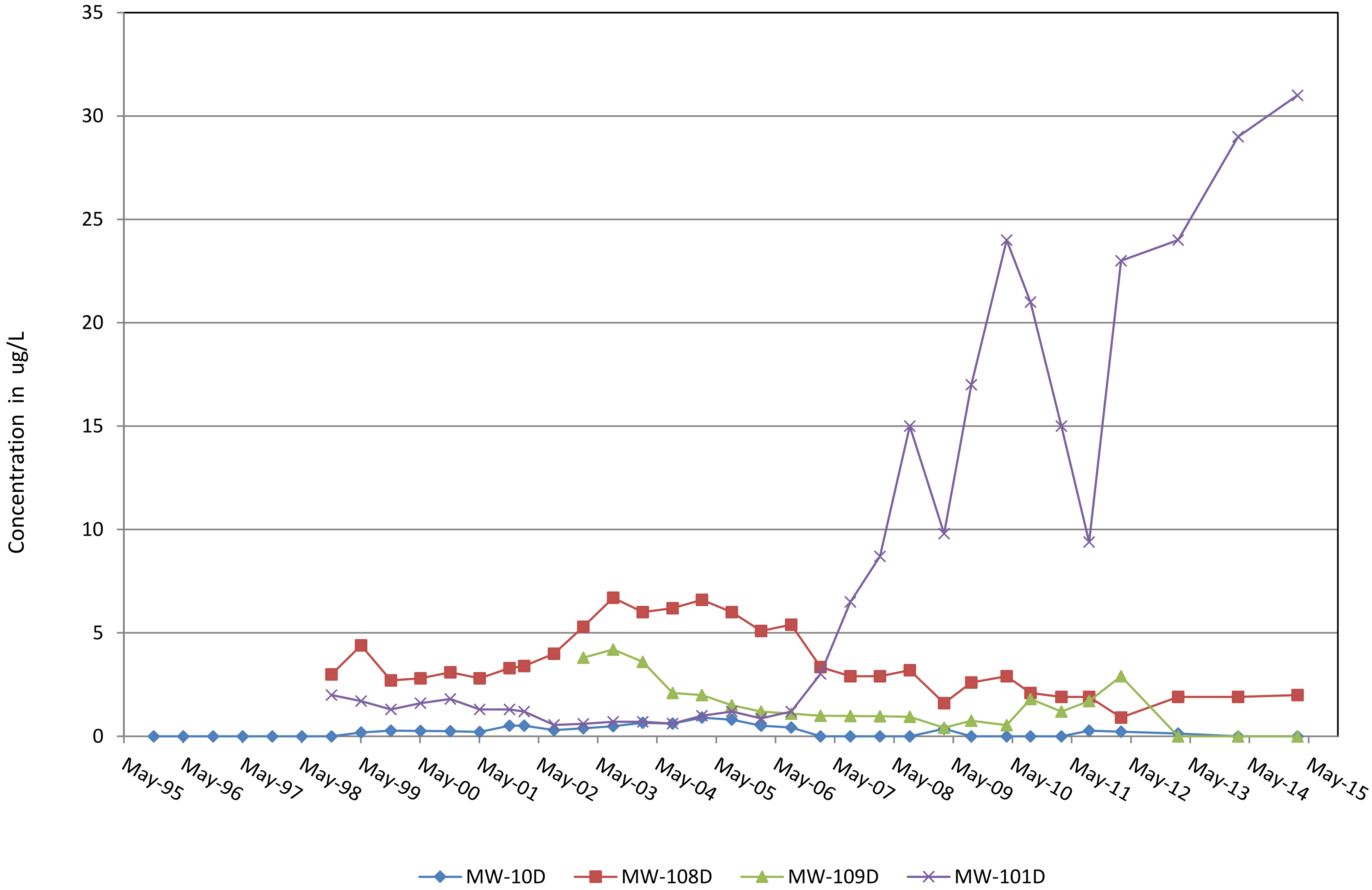


Figure 8
Historical Benzene Concentrations in the Upper Patapsco Aquifer
Concentration in ug/L
30
25
20
15
10
5
0
May-95
May-96
May-97
May-98
May-99
May-00
May-01
May-02
May-03
May-04
May-05
May-06
May-07
May-08
May-09
May-10
May-11
May-12
May-13
May-14
May-15
MW-10S
MW-12S
MW-14
MW-19

Figure 9
Historical Tetrachloroethene Concentrations in the Lower Patapsco Aquifer



Appendix A

Purge and Sample Records,
Chain of Custody Forms

Appendix B

Aquifer Characteristics and Flow Regime Data

Appendix D

Data Validation Reports

(Provided on CD)

Appendix E

Analytical Results

(Provided on CD)

Appendix F

Descriptive Statistics of Cumulative Data

(Provided on CD)

Appendix G

Statistical Analysis of Groundwater Data

(Provided on CD)

Appendix H

Complete CSL Monitoring Results, 1994-2015

(Provided on CD)