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Transmittal Letter

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ENVIRONMENT

From:
Megan E. Kellner

Date:
April 18, 2013

Subject:
Supplemental Investigation Report/Revised SCM C&O Canal/CSXT Brunswick Rail Yard, Brunswick, Maryland CSXT Project # 9415381

ARCADIS Project No.:
MD843.11.06

We are sending you:

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Comments: Rob - Enclosed are four copies of the subject report with a copy on CD for the Brunswick Rail Yard, Brunswick, Maryland. Please contact me with questions.

Thanks, Megan Kellner

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CSX Transportation, Inc.

Supplemental Investigation Report and Revised Site Conceptual Model

C&O Canal/Brunswick Rail Yard,
Brunswick, Maryland
CSXT Project # 9415381

April 18, 2013

ARCADIS

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Supplemental Investigation Report/Revised Site Conceptual Model

C&O Canal/Brunswiweck Rail Yard, Brunswick, Maryland
CSXT Project # 9415381

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Our Ref.:
MD000843.0011.0006

Date:
April 18, 2013

ARCADIS

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List of Acronyms and Abbreviations

%	percent
µg/L	micrograms per liter
ARCADIS	ARCADIS U.S., Inc.
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	below ground surface
BRT	barrier/recovery trench
C&O	Chesapeake and Ohio
CAP	Corrective Action Plan
CIP	Conceptual Investigation Plan
CSXT	CSX Transportation, Inc.
DPE	dual-phase extraction
Eder	Eder Associates
E&E	Ecology and Environment, Inc.
EFR	enhanced fluid recovery
EW	extraction well
FID	flame ionization detector
HDPE	high-density polyethylene
Hg	mercury
LPH	liquid-phase hydrocarbon
LNAPL	light non-aqueous phase liquid
MDE	Maryland Department of the Environment
mg/kg	milligrams per kilogram
mg/L	milligrams per liter

Acronyms and Abbreviations (continued)

msl	mean sea level
MTBE	methyl tertiary butyl ether
MW	monitoring well
NAPL	non-aqueous phase liquid
ND	not detected
NPS	National Park Service
O&M	operation and maintenance
ORO	oil range organics
OVA	organic vapor analyzer
PID	photoionization detector
ppm	parts per million
PVC	polyvinyl chloride
SCM	Site Conceptual Model
SGT	silica gel treatment
SIWP	Supplemental Investigation Work Plan
SVOC	semi-volatile organic compound
the Site	CSXT Brunswick Rail Yard
TPH	total petroleum hydrocarbon
TPH-DRO	diesel range total petroleum hydrocarbons
TPH-GRO	gasoline range total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

1. Introduction

On behalf of CSX Transportation, Inc, (CSXT), ARCADIS U.S., Inc. (ARCADIS) has prepared this Supplemental Investigation Report / Revised Site Conceptual Model (SCM) for the CSXT Brunswick Rail Yard (the Site) in Brunswick, Maryland, as requested by the Maryland Department of the Environment (MDE) in letter correspondence dated September 6, 2012. This Supplemental Investigation Report / Revised SCM has been updated to include data collected since April 30, 2012, during the implementation of the activities detailed in the Revised Supplemental Investigation Work Plan (SIWP) (ARCADIS 2012b), and presents a comprehensive evaluation of the current Site conditions. The Revised SCM will be used to evaluate the current Corrective Action Plan (CAP) Addendum (ARCADIS 2009) and support an amended Consent Order from the MDE as stated in letter correspondences from MDE dated September 6, 2012 (MDE 2012c) and January 15, 2013 (MDE 2013). A CAP Addendum will be developed as needed based on the requirements of the amended Consent Order.

The Revised SCM serves as the primary means to communicate and interpret technical data from both the Site and the National Park Service (NPS) property located adjacent to the Site. The Revised SCM presented herein is a narrative description of groundwater flow and transport at the Site and on NPS Property, including the locations and nature of contaminant sources, and groundwater flow and solute transport. Information from prior versions of the SCM was used to prepare a CAP (ARCADIS, 2008d) as specified in the July 2007 Consent Order. The CAP was submitted to MDE on August 29, 2008, and a CAP Addendum was submitted on March 2, 2009 (ARCADIS, 2009). The CAP addendum was approved by the MDE in letter correspondence dated May 27, 2009.

This document is the fourth revision of the SCM; the original SCM was submitted to MDE on January 30, 2007, the first SCM revision was submitted on February 8, 2008, the second SCM revision was submitted on August 29, 2008, and the third SCM revision was submitted on April 30, 2012. In accordance with the approved CAP Addendum, this Supplemental Investigation Report / Revised SCM includes historical data, as well as data collected since the previous SCM submittal. The remedial investigation activities completed from April 2012 to the present include soil borings and well installations, groundwater sampling, liquid-phase hydrocarbon (LPH) monitoring and recovery, hydraulic testing, and LPH characterization, including LPH stress testing and LPH sampling.

LPH recovery activities are currently conducted at the Site as required by the Consent Order between MDE and CSXT, signed on July 18, 2007 (MDE, 2007). The primary goal, stated in the Consent Order, is to remove liquid non-aqueous phase diesel fuel related to the aboveground storage tank (AST) system, to the extent practicable as determined by the MDE, so there is no threat of migration, taking into consideration future rewatering of the Chesapeake and Ohio (C&O) canal. The Consent Order defines "extent practicable" as a sheen on the groundwater measurable to 1/8th of an inch using an interface probe capable of detecting oil and water to 0.01 feet. ARCADIS, on behalf of CSXT, submitted a CAP Addendum, per the Consent Order (ARCADIS, 2009), on March 2, 2009 and MDE approved it on May 27, 2009 (MDE, 2009). ARCADIS implemented the CAP Addendum in July 2009. The Consent Order specified a deadline for completing the cleanup was no longer than three years from approval of the CAP (Addendum), to be extended as reasonably necessary, by mutual agreement of MDE and CSXT, and documented in an amended Consent Order. The effectiveness of corrective actions implemented at the Site since July 2009 are discussed further below.

1.1 CSXT Site History and Activities

The Site, which has been an active rail yard since 1892, is located adjacent to the C&O Canal in Brunswick, Maryland (Figure 1). The potential source areas for diesel range total petroleum hydrocarbons (TPH-DRO) in groundwater are the former AST system, which included a fuel pumping house and a 500,000-gallon diesel fuel AST, and a current fueling area located near the former roundhouse (Figure 1). A history of previous and recent environmental activities associated with the Site and the C&O Canal is included as Table 1.

Activities conducted by CSXT and their consultants since 1992 include the removal of a 16,000 gallon diesel fuel underground storage tank (UST) adjacent to the fuel pumping house along with approximately 100 cubic yards of petroleum impacted soil. Analysis of soil confirmation sampling from the excavation showed total petroleum hydrocarbon (TPH) concentrations below the current MDE non-residential cleanup level of 620 milligrams per kilogram (mg/kg) (Eder, 1992). In 1994, four monitoring wells, CSXT MW-1, CSXT MW-2, CSXT MW-3, and CSXT MW-4, were installed on-Site. LPH was observed at CSXT MW-2. In 1995, a second set of monitoring wells including CSXT MW-5, CSXT MW-6, CSXT MW-8, and CSXT MW-9 were installed on CSXT property (CSXT MW-5) and NPS property (CSXT MW-6, CSXT MW-8, and CSXT MW-9).

Efforts to recover LPH observed at CSXT MW-2 were initiated in January 1995 and expanded in 1998 to include CSXT MW-1, CSXT MW-4, and CSXT MW-6. A Conceptual Investigation Plan (CIP), dated February 8, 1999, was developed to evaluate any potential threat to surface water and, if necessary, to consider scenarios for adjusting the product recovery program. The CIP also included a remedial alternatives analysis. As part of the ongoing product delineation, eleven piezometers (TP-1 through TP-11) were installed between November 1999 and August 2000 in order to delineate the extent of LPH. A more comprehensive remedial alternatives analysis was presented in a Site Investigation Report for the C&O Canal Rewatering Project, dated December 2000.

As requested by MDE in 2002, a CAP prepared by Gannett Fleming, Inc. was submitted on April 19, 2002. The CAP proposed the installation of a barrier/recovery trench (BRT) with internal collection sumps in order to provide containment of LPH. The CAP was approved by MDE in November 2002, and construction of the BRT subsequently began in October 2003 and was completed in March 2004. The BRT was installed to approximately 15 feet below ground surface (bgs), with a 60 millimeter high-density polyethylene (HDPE) liner placed on the downgradient side of the trench. A geotextile liner was used to line both the trench and the HDPE liner, in order to prevent damage to the HDPE. Five collector sumps (CS-1 through CS-5) were installed in the trench, constructed as 6-inch diameter polyvinyl chloride (PVC) screened wells in vault boxes. The trench was then completed with crushed stone backfill placed on the geotextile liner and around the collector sumps.

Beginning in July 2004, enhanced fluid recovery (EFR) activities were initiated to increase LPH recovery. These activities focused on monitoring wells and extraction wells that historically contained measurable LPH (CSXT MW-2, EW-3, EW-4, and EW-5) and on the collection sumps that are part of the BRT. Approximately 32,466 gallons of total fluids (LPH and water) were recovered using EFR from July 2004 through June 2009.

In September 2006, an automated product recovery pump was installed in CSXT MW-2 as requested by MDE. Recovered LPH, using the automated pump, was collected in a 55-gallon drum and was disposed of in conjunction with EFR events. A total of 54 gallons of product were recovered by the pump from September 2006 through July 2008.

The original SCM, based on previously-collected data, was submitted on January 30, 2007 (ARCADIS 2007a). A revised SCM was submitted on February 11, 2008 (ARCADIS 2008b) after the following work was completed:

- In June 2007, temporary wells TP-1, TP-3, TP-4, TP-5, TP-10, and TP-11 were abandoned, and monitoring wells CSXT MW-4R, CSXT MW-21, CSXT MW-22, CSXT MW-23, CSXT MW-24, CSXT MW-25, CSXT MW-26, and CSXT MW-27 were installed.

- In July/August 2007, a direct-push investigation was conducted, including the installation of 24 borings (GP-20, GP-26 to GP-49) at the Site. All data from the June 2007 well installation event and the July/August 2007 direct-push investigation are included in the Data Package Memorandum dated September 6, 2007 (ARCADIS 2007b).

- In November 2007, monitoring wells CSXT MW-20, CSXT MW-28, CSXT MW-29, CSXT MW-30, CSXT MW-31, CSXT MW-32, CSXT MW-33, CSXT MW-35, CSXT MW-37, CSXT MW-38, CSXT MW-39, CSXT MW-41, CSXT MW-43, CSXT MW-49, CSXT MW-50, CSXT MW-51, and CSXT MW-52 were installed.

Boring logs for all on-Site direct-push borings and monitoring wells installed after 2006 are included in Appendix A.

Additional investigation activities were conducted as presented in the Additional Site Characterization Work Plan / Request for Corrective Action Plan Extension dated March 12, 2008 (ARCADIS, 2008a) and based on comments from the May 30, 2008 letter from MDE approving the work plan (MDE, 2008a). These activities include:

- Installation of direct-push borings with soil and groundwater samples in June 2008. A total of 21 borings (GP-53 to GP-73) were installed on CSXT Property (see Figure 1 for boring locations). Soil samples were collected from each of the borings at the soil interval with the highest screening readings using a Photoionization Detector (PID). Both soil and groundwater samples were collected from each boring with the exception of GP-69; the first three attempted borings at this location hit auger refusal prior to the target depth, therefore soil and groundwater samples were only collected from the fourth attempted boring at this location.

- Installation of three direct-push borings (GP-74 to GP-76) with soil and groundwater samples in June 2008 at the CSXT Property boundary along East Potomac Street (across from the L. S. Fuel Station located at 128 E. Potomac Street). Boring logs are included in Appendix A.

The results of these activities were presented in a revised SCM submitted on August 29, 2008 (ARCADIS, 2008e). Subsequent to the August 2008 SCM revision, several phases of corrective measures were completed at the Site which provided data to further refine the SCM. These activities include a dual-phase extraction (DPE) pilot study, implementation of the CAP, and additional well installations. These activities are further described in the following sections.

1.1.1 2008/2009 Dual-phase Extraction Pilot Study

In 2008/2009, a DPE pilot study was conducted at CSXT MW-41 and EW-2 to evaluate the applicability and effectiveness of this remedial alternative at the Site. Data were collected to estimate LPH recovery rates, groundwater recovery rate, and radius of influence while extracting from CSXT MW-41 and EW-2. Activities associated with the DPE pilot study included:

- A sample of LPH was collected at CSXT MW-49 and CSXT MW-4R in June 2008 to evaluate the physical characteristics of the LPH at the Site, which may affect LPH mobility and recoverability. Samples were analyzed for interfacial tension, viscosity, density, and specific gravity at a range of temperatures.

  The results of the LPH physical characteristics analysis were:

  - Surface tension and interfacial tension results for the LPH were within the ranges expected for diesel fuel.
  - The viscosity of the LPH was relatively high (4.15 to 5.48 centipoise at 70 degrees Fahrenheit) with regard to LPH recovery efficiency. A viscosity greater than 2 centipoise may limit LPH recovery efficiency and mobility. This is particularly true in fine grained soils.
  - The specific gravity of the LPH ranged from 0.87 to 0.88, which is in the high end of the range expected for diesel fuel. The LPH has likely weathered over time and lost some of its lighter fractions, which is common for older releases.

- Six new monitoring wells (CSXT MW-53 to CSXT MW-58) were installed in December 2008, as monitoring points for the DPE pilot study. CSXT MW-53, CSXT MW-54, and CSXT MW-55 were installed within a 15 foot radius of CSXT MW-41. CSXT MW-56, CSXT MW-57, and CSXT MW-58 were installed within a 15 foot radius of EW-2.

Subsequently, in January 2009, DPE pilot testing was conducted at CSXT MW-41 and EW-2, as described in the CAP Addendum. All methodology and data collected during the DPE pilot study are presented in the Corrective Action Plan Addendum, Dual Phase Extraction Pilot Test Results (ARCADIS, 2009), which was submitted to the MDE on March 2, 2009. A summary of the DPE results is presented below.

- The total volume of LPH removed from CSXT MW-41 during both tests was 1.2 gallons. No LPH was recovered from EW-2 during pilot testing.

- The effective hydraulic and vacuum radius of influence was generally less than 10 feet for both pilot test areas.

- Heterogeneities within the subsurface affected the ability to enhance LPH recovery using DPE. The variability in hydraulic and vacuum influence, caused by subsurface heterogeneity, was most evident at the EW-2 pilot test area due to the greater number of measurements from monitoring wells in varying directions and distances.

- Increased vacuum did not greatly change the magnitude of vacuum observed or the extent to which it was observed in surrounding monitoring wells.

- The most effective applied vacuum was approximately 5 inches mercury (Hg) [30 percent (%)].

- Despite the application of up to 15 inches Hg vacuum at the wellhead, the maximum groundwater recovery flow rates were generally less than 0.2 gallons per minute for both pilot test areas. The relatively high viscosity of the LPH limits the mobility of the LPH in the fine grain soils at the Site. This affects the ability to recover product from recovery wells. The potential for migration of LPH from the Site is also limited by these properties.

1.1.2 July 2009 CAP Implementation Activities

The CAP Addendum was approved by the MDE on May 27, 2009. In accordance with the CAP Addendum, the following activities associated with the CAP implementation have been completed:

- Three LPH skimmer pumps and five passive LPH skimmers were installed in July 2009 to facilitate consistent LPH recovery.

- Operation and Maintenance (O&M) visits have been completed on a regular basis, typically bi-weekly at the Site. All wells which contained measurable LPH within the previous six months were gauged on at least a monthly basis. LPH recovery was conducted using a peristaltic pump or absorbent sock as warranted at wells containing measurable LPH where a skimmer pump or absorbent sock was not installed. Quarterly LPH and water level monitoring data are presented in Appendix B.

- Groundwater sampling was completed on a quarterly basis from December 2006 through August 2008. During that time period, all existing CSXT and NPS wells, that did not contain measurable LPH, were sampled. After the August 2008 groundwater sampling was completed, the MDE approved a reduction in the groundwater sampling monitoring well network and groundwater sampling frequency. The current groundwater sampling monitoring well network consists of CSXT MW-3, CSXT MW-6R, CSXT MW-22, CSXT MW-24, CSXT MW-25, CSXT MW-29, CSXT MW-43, CSXT MW-51, NPS MW-1, NPS MW-2, NPS MW-4, NPS MW-5, NPS MW-13, NPS MW-14, and NPS MW-16, which are sampled on a semi-annual basis. Groundwater sampling data collected by ARCADIS are included in Appendix C.

- Three additional QED Environmental Systems ferret skimmer pumps were installed in September 2010.

- MDE correspondence dated January 25, 2012 approved CSXT's proposed installation of eight additional monitoring wells to enhance LPH recovery and further delineate subsurface LPH presence in the area west of the roundhouse and around the two existing MARC Commuter Rail Service 20,000 gallon diesel ASTs, which are located just west of the roundhouse. Seven of the proposed eight wells were installed in March 2012, including CSXT MW-59, CSXT MW-60, CSXT MW-61, CSXT MW-62, CSXT MW-63, CSXT MW-64, and CSXT MW-65. CSXT MW-

66 was not installed due to the presence of shallow refusal during drilling. Details regarding the March 2012 well installation activities are presented in the Combined Well Installation Summary Report / Updated Site Conceptual Model (ARCADIS 2012a).

All LPH and water level monitoring data are presented in Appendix B. A total of 720 gallons of LPH were recovered from July 2009 through March 15, 2013. Skimmer pumps have accounted for 568 gallons of the LPH recovery. Appendix D presents a summary of LPH recovery since CAP implementation in July 2009.

1.2 National Park Service Property History and Activities

Soil investigative activities were conducted on NPS property beginning in approximately 1991 as part of the permitting process to restore and re-water a section of the C&O Canal. Based on the results of the soil sampling conducted by NPS, CSXT conducted initial surface soil sampling in March 1992 and additional soil delineation sampling in July 1993. The March 1992 surface soil sampling results indicated elevated concentrations of TPH in three areas, with concentrations ranging from 509 mg/kg at sample location EA-7 to 4,270 mg/kg at location EA-3. Further delineation conducted in July 1993 focused on the three areas: Area 1 near location EA-3, Area 2 near location EA-5, and Area 3 near locations EA-7 and EA-8. As agreed upon by CSXT and NPS at the time of the investigation, each area would be delineated where soil samples had concentrations of TPH above 400 mg/kg. These areas were not associated with constituent concentrations in groundwater samples. Soil delineation samples collected during the July 1993 event further refined the boundaries of Areas 1, 2, and 3 as described in the investigation report (Eder, 1994).

On behalf of the NPS, in March 1996, Ecology and Environment, Inc. (E&E) prepared a Draft Site Assessment and Characterization Report based on additional sediment and soil sampling. The results of the collection and analysis of subsurface soils within the canal prism indicated there were no polycyclic aromatic hydrocarbon compounds exceeding the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentrations for industrial exposure (E&E, 1996).

In order to evaluate groundwater quality along the C&O Canal, the NPS installed five monitoring wells (NPS MW-1 through NPS MW-5) along the canal in August 1996 (E&E, 1997). The NPS collected four rounds of groundwater samples from these monitoring wells between 1996 and 1999 before installing additional wells (NPS MW-10 through NPS MW-17) in 2001. Only one NPS well, NPS MW-4, ever exhibited

measurable LPH, at thicknesses ranging from 0.01 to 0.65 feet. From December 2002 through January 2006, the NPS collected groundwater samples from the monitoring wells on their property approximately every six months (December 2002, June 2003, January 2004, July 2004, December 2004, July 2005, and January 2006).

Groundwater samples collected from the NPS wells have historically been analyzed for TPH-DRO. All NPS wells have been incorporated into the CSXT sampling program since the fourth quarter of 2006 as requested by MDE. The current sampling program includes seven of the NPS monitoring wells, which are analyzed for TPH-DRO and full-suite volatile organic compounds (VOCs) including fuel oxygenates. Water-level and LPH measurements are collected at all NPS wells on a quarterly basis.

1.2.1 Groundwater Sampling Summary

All existing NPS monitoring wells were sampled during four consecutive quarterly groundwater sampling events in 2007. After the August 2008 groundwater sampling was completed, the MDE approved a reduction in the groundwater sampling monitoring well network and groundwater sampling frequency. The current groundwater sampling monitoring well network consists of CSXT MW-3, CSXT MW-6R, CSXT MW-22, CSXT MW-24, CSXT MW-25, CSXT MW-29, CSXT MW-43, CSXT MW-51, NPS MW-1, NPS MW-2, NPS MW-4, NPS MW-5, NPS MW-13, NPS MW-14, and NPS MW-16, which are sampled on a semi-annual basis.

Historical groundwater analytical results from NPS wells collected by ARCADIS are presented in Appendix C. Groundwater analytical results are discussed further in Section 3.4.

2. Supplemental Investigation Activities

The Revised SIWP identified several investigation activities to meet the following objectives for both on-Site and off-Site data collection and evaluation:

- On-Site objectives
    - Address data gaps related to the delineation of LPH occurrence; and,
    - Further evaluate the efficacy of the current remedial strategy at the Site.
- Off-Site objectives
    - Understand how potential contamination of soil/sediment in and below the canal prism would affect future use of the canal, including re-watering the canal; and,
    - Further evaluate off-Site groundwater quality.

The tasks outlined in Sections 2.1 through 2.6 were completed in accordance with the MDE approved Revised SIWP in support of these objectives. One activity outlined in the Revised SIWP has not yet been completed, the soil and groundwater characterization of the C&O Canal footprint. This activity has not been completed due to access issues caused by standing water within the canal prism footprint. The water level in the canal is being monitored, and this investigation will begin when conditions are acceptable to access the canal footprint. The SCM will be revised or amended at that time, if necessary.

2.1 Redevelopment of Existing Wells

Thirty monitoring wells were identified in the Revised SIWP for redevelopment. A total of twenty-nine monitoring wells were redeveloped in accordance with the Revised SIWP in November 2012 and January 2013. One monitoring well, NPS MW-11, had been identified for redevelopment in the Revised SIWP, but was destroyed and not redeveloped. NPS MW-11 is planned for replacement. Wells that were redeveloped as part of the SIWP implementation activities are listed below.

Wells redeveloped in January 2013
CSXT MW-03, CSXT MW-06R, CSXT MW-08, CSXT MW-09, CSXT MW-20, CSXT MW-21, CSXT MW-22, CSXT MW-24, CSXT MW-25, CSXT MW-29, CSXT MW-35, CSXT MW-37, CSXT MW-41, CSXT MW-43, M CSXT W-49, CSXT MW-51, CSXT MW-56, MW-01(NPS), MW-02(NPS), MW-03(NPS), MW-04(NPS), MW-05(NPS), MW-10(NPS), MW-12(NPS), MW-13(NPS), MW-14(NPS), MW-15(NPS), MW-16(NPS), MW-17(NPS)

2.2 Well Installation

Four new monitoring wells, CSXT MW-67, CSXT MW-68, CSXT MW-69, and CSXT MW-70, were installed and developed in January 2013 in accordance with the approved SIWP and MDE correspondence dated September 6, 2012. Details regarding the installation of these wells, including boring and well completion logs, analytical results from soil samples collected during drilling, and groundwater/LPH gauging data, were presented in the Well Installation Summary Report (ARCADIS 2013) submitted to MDE on March 8, 2013. Table 2 summarizes the well construction details of all Site monitoring wells, including the four new wells. Boring and well construction logs for all monitoring wells are included as Appendix A. Geological cross sections are included as Appendix E. The soil sampling analytical results are summarized in Table 3 and further discussed in section 3.1.12.

Grab soil samples for laboratory analysis were collected from split-spoon samples at the four new well locations. Soil samples were shipped to TestAmerica Laboratories in Savannah, Georgia for analysis of VOCs, semi-volatile organic compounds (SVOCs), TPH-DRO/ oil range organic (ORO), and TPH- gasoline range organic (GRO). Analytical results were presented in the Well Installation Summary Report, and are also included in Table 3 of this report and discussed in section 3.1.12.

2.3 Water Level/ LPH Gauging and Groundwater Sampling

Site wide groundwater elevation measurements were collected on January 11, 2013, prior to the groundwater sampling activities. Groundwater elevation measurements were collected from all accessible monitoring wells, extraction wells, and collection sumps. The January 11, 2013 groundwater elevation data and historical groundwater elevation data and LPH thicknesses are included in Appendix B. A contoured groundwater elevation map showing the January 11, 2013 elevation data is included as Figure 2. Groundwater elevations presented in Appendix B and on Figure 2 have been adjusted to account for LPH (where present) using a density ratio of 0.87. Groundwater flow conditions are discussed further in Section 3.2.

Groundwater sampling was completed at thirty-one monitoring wells between January 14 and February 6, 2013, in accordance with the approved SIWP. Six monitoring wells were not sampled in January/February 2013 as planned in the Revised SIWP; CSXT MW-24 was not accessible, LPH was observed at CSXT MW-60, CSXT MW-62, CSXT MW-63, and CSXT MW-64 at the time of sampling, and NPS MW-11 was destroyed. Monitoring wells that were sampled during the January/February 2013 sampling event are listed below.

Wells sampled in January/February 2013
CSXT MW-03, CSXT MW-06R, CSXT MW-08, CSXT MW-09, CSXT MW-20, CSXT MW-21, CSXT MW-22, CSXT MW-25, CSXT MW-29, CSXT MW-35, CSXT MW-43, CSXT MW-51, CSXT MW-59, CSXT MW-61, CSXT MW-65, CSXT MW-67, CSXT MW-68, CSXT MW-69, CSXT MW-70, MW-01(NPS), MW-02(NPS), MW-03(NPS), MW-04(NPS), MW-05(NPS), MW-10(NPS), MW-12(NPS), MW-13(NPS), MW-14(NPS), MW-15(NPS), MW-16(NPS), MW-17(NPS)

All groundwater samples were collected using three volume purge methodology, and shipped to TestAmerica Laboratories in Savannah, Georgia under routine chain-of-custody for the following analyses:

- TPH-GRO via USEPA method 8015;
- TPH-DRO/ORO with and without silica gel treatment (SGT) via USEPA method 8015;
- Full-suite of VOCs including fuel oxygenates via USEPA method 8260; and
- SVOCs via USEPA method 8270.

The USEPA 8015B method for TPH-DRO encompasses the complex mixture of hydrocarbons in the diesel and heavy oil ranges, including the C-12 to C-28 petroleum hydrocarbons, reported in aggregate as a single TPH-DRO concentration. Samples from environmental media typically include polar organic compounds such as natural organic material and hydrocarbon biodegradation intermediate products in the sample extracts. During sample analysis via gas chromatography, these compounds will co-elute with non-polar petroleum hydrocarbon compounds. These compounds are then reported in the aggregate TPH-DRO results, leading to elevated TPH-DRO results that are not representative of actual petroleum hydrocarbon concentrations present in the samples (Zemo and Foote 2003; Zemo 2006; Lang et al. 2009).

The use of a silica gel cleanup procedure can result in a more representative concentration of petroleum hydrocarbons. The standard silica gel cleanup method is defined in *Test Methods for Evaluating Solid Wastes, SW-846 Method 3630C Modified* (USEPA 1996). Sample extracts are passed through a silica gel column, which attracts polar organic compounds present in the sample, allowing analysis of a sample to be more representative of non-polar petroleum hydrocarbon concentrations. Data reported in Zemo and Foote (2003) confirms this methodology does not remove petroleum hydrocarbon compounds from the sample extract. Therefore, comparison of the data from samples analyzed with and without silica gel cleanup allows a distinction between non-polar compounds associated with petroleum hydrocarbons and polar organic compounds associated with naturally occurring organic carbon or degraded petroleum compounds. This differentiation can provide a better understanding of the nature of groundwater petroleum contamination at the Site and allow for evaluation of how effectively petroleum compounds are naturally degraded in Site groundwater. In addition, understanding the fraction of TPH-DRO concentrations that represents actual petroleum compounds, as opposed to naturally occurring and degradation compounds, allows for a more accurate and relevant comparison to risk-based regulatory standards.

Groundwater sampling field logs and the laboratory analytical report from the January/February 2013 groundwater sampling will be included in the First Quarter 2013 Monitoring Report. A summary of the January/February 2013 analytical results is presented in Table 4 of this report, and historical groundwater analytical data and TPH-DRO trend charts are included in Appendix C. Figure 3 presents the TPH-DRO concentrations from the January/February 2013 groundwater sampling. Groundwater analytical data is discussed further in Section 3.4.

2.4 Hydraulic Testing

Rising head tests (slug tests) were performed at four Site wells (CSXT MW-21, CSXT MW-25, CSXT MW-29, and CSXT MW-35) between January 22 and 24, 2013. Slug testing was conducted in accordance with the procedures identified in the revised SIWP, with water levels recorded via submerged transducers at a 0.25-second frequency. Testing was comprised of three rising head tests per well, using two different size slugs (disposable bailers) with calculated displacements of 1.7 feet and 0.4 feet for a 4-inch casing diameter. Response data (i.e., elapsed time and corresponding changes in water levels) collected during each test were converted to displacement data, plotted as normalized head versus time to identify coincidence of repeat tests and filterpack drainage effects, and analyzed using AQTESOLV for

Windows® (Duffield, 2007) to obtain near-well hydraulic conductivity estimates. Details and estimated hydraulic conductivities for each test are presented in Table 5; normalized displacement plots and AQTESOLV curve matches are presented in Appendix F. Appropriate and applicable analytical solutions available in AQTESOLV were applied following the guidelines presented in *The Design, Performance, and Analysis of Slug Tests* (Butler, 1998).

Normalized test data for each well showed moderate coincidence among repeat tests, especially for tests performed using the same size bailer (tests 1 and 2 for each well). Tests conducted at three wells (CSXT MW-29, CSXT MW-25, and CSXT MW-35) showed the effects of gravity drainage from the well filter pack, consistent with well construction details (all four Site wells are screened across the water table). These tests were analyzed using the Bouwer-and-Rice (1976) solution for wells screened across the water table, with the Butler 6.11b effective casing correction (Butler, 1998). Response data collected at CSXT MW-21 did not indicate significant filterpack drainage effects; tests conducted at this well were analyzed using the Dagan (1978) model for unconfined conditions.

As shown in Table 5, estimated near-well hydraulic conductivities for Site wells ranged from 0.45 feet/day to 200 feet/day; the geometric mean of the average conductivity at each of the four wells is 4.6 feet/day. Estimated hydraulic conductivities for CSXT MW-21 are approximately 2 orders of magnitude greater than those calculated for the other three wells. The test responses observed at CSXT MW-21 did not exhibit the expected “double-straight line” effect for a well known to be screened across the water table, which is used to distinguish the response due to filter pack drainage (generally of much higher conductivity) from the actual aquifer unit response. Because the water levels recovered so quickly it is not possible to determine if this higher conductivity estimate is overly influenced by filter pack drainage. Therefore, the hydraulic conductivity estimates derived from CSXT MW-21 test results may not be representative of the formation. Excluding the test results for CSXT MW-21, average hydraulic conductivity estimates for the other wells ranged from 0.48 feet/day to 2.9 feet/day.

2.5 LPH Characterization

Prior to performing the comprehensive assessment of LPH mobility and migration / recovery potential, additional data was collected to provide a more comprehensive understanding of the physical properties and mobility of LPH at the Site. Recent LPH thicknesses and recovery data were also compiled to present a complete and up-to-date snapshot of current conditions.

2.5.1 LPH Occurrence and Recovery

Measurable LPH was detected on January 11, 2013 at thicknesses ranging from 0.01 feet (CSXT MW-54) to 2.35 feet (CSXT MW-55). These data are presented on Figure 4. Figure 5 presents a composite of LPH thickness data recorded in 2012 and 2013; the maximum thicknesses measured at each well during this period are presented to provide a conservative image of recent Site conditions. Maximum LPH thicknesses measured at each well since 1995 are presented on Figure 6. Comprehensive LPH and water level gauging data collected at the Site since 2009 are included in Appendix B.

Site monitoring wells CSXT MW-39 and CSXT MW-70, which previously had not contained LPH, had measurable thicknesses of LPH detected in the first quarter of 2013. LPH was measured at CSXT MW-39 on January 11, 2013 with a thickness of 0.09 feet, and at CSXT MW-70 on March 1, 2013, with a thickness of 0.08 feet. The occurrence of LPH in both wells was reported to MDE and removed using an absorbent sock. Visual inspection indicated that the LPH in these wells was pink/red, consistent with the coloration seen in off-road diesel fuel. The coloration and location of this LPH indicates a different source, unrelated to the historical diesel releases that have been the focus of previous Site investigations. The source of the LPH identified at CSXT MW-39 and CSXT MW-70 is currently unknown, and a workplan for an investigation to characterize the LPH occurrence is currently being prepared to submit to the MDE.

Current LPH recovery activities at the Site are ongoing, and include operation of skimmer pumps at five Site wells (Figure 3). Removal of LPH at wells by methods other than skimmer pumps is conducted during system O&M events, which occur two to three times monthly. All volumes of product removed are recorded and stored in on-Site containers (i.e., 55 gallon drums). Drums are vacuumed out as needed and the fluids are transported off-Site and properly disposed of by HEPACO/IMS Environmental Services.

Total cumulative recovery by all methods since system implementation in July 2009 through March 1, 2013, is 720 gallons of LPH, with 568 gallons of LPH recovered via the skimmer pumps. More comprehensive LPH recovery data are included in Appendix D.

2.5.2 LPH Fluid Properties

Samples of LPH and groundwater were collected from CSXT MW-41, CSXT MW-56 and CSXT MW-63 on February 5, 2013, and submitted to PTS Laboratories in Santa Fe Springs, California under routine chain-of-custody for the following analyses:

- Viscosity;
- Density;
- Interfacial tension; and
- Specific gravity.

A summary of fluid properties for these samples are presented on Table 6. Table 6 also presents the results of LPH fluid properties analyses conducted in 2008 for samples collected at CSXT MW-49 and CSXT MW-4R. Full laboratory results are included in Appendix G.

2.5.3 Short-term LPH Stress Testing

Short-term LPH stress testing (LPH baildown testing) was performed at six Site monitoring wells (CSXT MW-41, CSXT MW-49, CSXT MW-53, CSXT MW-54, CSXT MW-55, and CSXT MW-56) from January 22 through 25, 2013. LPH recovery was discontinued for a period of two weeks prior to the testing to allow LPH in these wells to equilibrate to static conditions prior to the start of LPH stress testing. Site monitoring well CSXT MW-37 was included in the SIWP scope for baildown testing; however, the product thickness of 0.04 feet, measured on January 23, 2013, is less than the minimum product thickness for LPH baildown testing. Therefore CSXT MW-37 was not tested.

Static depth-to-water and depth to product measurements were recorded prior to the initiation of each test. Removal of LPH was achieved using a peristaltic pump or bailer for each test. Total removed volumes of LPH and water were documented. After removal, the rate of LPH recovery into the well was recorded by manually measuring, with an oil/water interface probe, depth to LPH and depth to water throughout the test, beginning with frequent intervals and reducing frequency as LPH recovery slowed approaching static conditions. Multiple tests were conducted at each well, with the

exception of CSXT MW-41, which did not exhibit sufficient recovery over a period of two days to initiate a second test.

Baildown tests were analyzed using a modified Bouwer and Rice (1976) slug test method by Lundy and Zimmerman (1996) and Huntley (2000). Assumptions for this model include quasi-steady-state recharge to the well with rate dependent drawdown and no storage effects. Also, the ratio of change of LPH drawdown to change in LPH thickness at the well is considered constant allowing the Bouwer Rice method to be applied to a wide range of baildown tests. This method of analysis is presented in the API LPH Transmissivity Spreadsheet Tool (API Tool; API 2012).

Baildown test data were analyzed using the *API LPH Transmissivity Workbook* (API, 2012), which uses test diagnostics and fluid property information to adapt slug test solutions for LPH analysis. LPH transmissivities estimated for each well ranged from approximately 0.12 feet^2/day to 2.44 feet^2/day, with a geometric mean of 0.66 feet^2/day.

Baildown test results and estimates of LPH transmissivity are summarized in Table 7. As shown, several of the tests that were conducted at the Site were not analyzed, due to small initial thicknesses, or test data that did not meet test criteria for the models used to estimate transmissivity. Diagnostic plots and transmissivity analyses are presented in Appendix H.

2.6 LPH Mobility and Recoverability Assessment

A comprehensive LPH assessment uses multiple lines of evidence to determine LPH mobility and the potential for future LPH migration. Immobile LPH is functionally locked in pore spaces, while mobile LPH is capable of moving laterally and vertically within the existing LPH footprint. Migrating LPH moves outside of the existing LPH extent, thereby causing expansion of the footprint. The following lines of evidence were used to assess LPH delineation, mobility, and migration potential at the Site:

- LPH delineation and characterization
- LPH presence in monitoring wells
- LPH pore velocity
- Dissolved-phase plume stability

If it is determined that LPH is vertically and laterally mobile within the subsurface, the recoverability of the LPH is evaluated to determine the practicality of extracting LPH from the subsurface. LPH recoverability is defined as physically removing LPH without reliance on phase change and includes manual removal via a bailer, vacuum truck events, LPH skimming, or dual phase extraction. The following lines of evidence were used to evaluate LPH recoverability.

- LPH transmissivity
- Decline curve analysis

The specific methodologies and results used to assess LPH mobility and LPH recovery at the Site are presented in Appendix I.

3. Site Conceptual Model

The Site is situated south of the city of Brunswick, Maryland. Immediately south of the Site is the C&O Canal, which is on NPS property. The Potomac River is approximately 700 feet south of the Site. Information used to revise the SCM is taken from investigations and remedial efforts conducted between August 2008 and March 2013, including data from boring logs included as Appendix A; well construction information, presented on Table 2 and in Appendix A; historical groundwater analytical results, presented on Appendix C; and LPH occurrence and recovery data included in Appendices B and D.

3.1 Local Geology

Borings on and near the Site indicate geologic conditions that are typical of a piedmont and alluvial hydrogeologic setting. The bedrock units underlying the area include a Pre-Cambrian granodiorite and biotite granite gneiss, part of the South Mountain Anticlinorium and Frederick Valley (Beall and Meyer, 1958). The most common bedrock unit locally is gneissic granodiorite, commonly colored light gray to green and interlayered in places with dark hornblende diorite. This particular unit is generally of low primary porosity and therefore is not a primary source for large water supplies. None of the on-Site borings penetrate the bedrock unit; however, some borings, such as NPS MW-5, indicate the presence of a saprolite layer at least four feet thick. Saprolite is generally very low permeability weathered rock and is commonly found up to thicknesses of 60 feet in this region.

Quaternary alluvium overlies the saprolite and is composed of heterogeneous layers of clay, silt, sand, and gravel. Alluvium is associated with river depositional environments; at the Site and NPS property, this material is associated with the Potomac River and its tributaries. Underlying the Site and NPS Property are two distinct overburden deposits. Directly overlying the saprolite is an orange-brown medium- to coarse-grained sand and gravel unit that has been observed in soil cores. The sand and gravel unit thins south of the Site approaching the Potomac River. Overlying the sand and gravel is a silty clay unit, described as greenish gray or brown and up to 15 feet thick. Although the silty clay is consistently observed in borings across the Site, it appears to be thinner in locations near the former AST (GP-27, GP-30, and GP-44). This unit also thins to the south as it approaches the Potomac River. Various types of fill materials, including sand and cinders, overlie the silty clay unit. The thickness of the fill unit varies from two to ten feet at the Site.

The overburden units are illustrated in a series of geologic cross-sections. Each cross-section prepared is described in the following sections and included as Appendix E. Soil screening data, including PID / flame ionization detector (FID) / organic vapor analyzer (OVA) concentrations recorded during boring (Appendix A), and the results of TPH-DRO analyses of soil samples, are also included on each cross-section. Duplicate or similar PID/FID/OVA results recorded at successive intervals were eliminated to reduce extraneous information on each cross-section. The locations of the cross-sections are shown on Figure E-1, Appendix E.

3.1.1 Section A-A'

This section (Figure E-2, Appendix E) illustrates the continuity of the lower gravelly sand unit on the western portion of the Site and NPS Property. The wells installed on the western area of the Site, including CSXT MW-33, CSXT MW-29 and CSXT MW-20, are screened through the silty clay semi-confining unit and penetrate the sand and gravel. Soil screening concentrations (PID) recorded at CSXT GP-44, CSXT MW-33, and CSXT MW-29 indicate that PID concentrations generally increase with depth at these locations. Measurable LPH was recorded at CSXT MW-33 in 2009; however, free product has not been detected in any of the wells shown on this cross section since that time.

3.1.2 Section B-B'

This section (Figure E-3, Appendix E) illustrates where the BRT cuts across the entire thickness of the silty clay unit, thereby restricting groundwater flow in the unit and flattening hydraulic gradients upgradient of the BRT. Because the BRT is only 15 feet deep and is completed partially in the lower gravelly sand unit, the increased hydraulic head upgradient of the BRT results in underflow of groundwater in the gravelly sand unit. Water-level data on the east side of the BRT also indicates that underflow of groundwater occurs rather than lateral flow around the BRT.

This section also illustrates the continuity of the lower gravelly sand unit across the canal. Taking into account boring log data from NPS MW-1 and GP-42A, which are proximate to CSXT MW-9, CSXT MW-9 is screened across the same elevation as the gravelly sand unit that was observed in the boring logs for NPS MW-1 and GP-42A. Therefore, CSXT MW-9 is considered to be screened across the sand unit, and historical analytical sample data from CSXT MW-9 is valid for comparison with sample data from other wells also screened in the gravelly sand unit. Historically, samples from this well have shown no pattern of reported concentrations of TPH-DRO, which have

always been at least one order of magnitude lower than concentrations in samples from the source area wells. No detections were recorded during PID soil screening of CSXT MW-9, indicating minimal soil contamination at this location. The thickness and continuity of the upper silty clay layer is also evident in this section.

3.1.3 Section C-C'

Similar to Section A-A', this section (Figure E-4, Appendix E) shows the continuity of the upper silty clay and the lower gravelly sand units. The boring log for CSXT MW-51 shows the gravelly sand unit is present at the north boundary of the Site. Boring logs for wells on CSXT property (CSXT MW-22, CSXT MW-5, and CSXT MW-4R) and NPS property (NPS MW-4 and CSXT MW-8) also show the gravelly sand unit. At the south end of the cross-section, the boring log for GP-42A, installed adjacent to CSXT MW-8, indicates the top of the sand unit is located at approximately 213 feet above mean sea level (msl), which is across the screened intervals of monitoring wells CSXT MW-8 and CSXT MW-9.

PID soil screening concentrations for wells within this section indicate minimal contamination at the upgradient and downgradient edges of the Site (represented by CSXT MW-51 and CSXT MW-8/ GP-42A). Soil screening concentrations above 0.0 parts per million (ppm) were not detected at CSXT MW-8/GP-42A. Soil screening concentrations at wells CSXT MW-22 and CSXT MW-4R are relatively low in the unsaturated zone, increase within the saturated portion of the clayey silt and sand, and decrease within the sand and gravel unit.

3.1.4 Section D-D'

Figure E-5, Appendix E demonstrates that NPS monitoring well NPS MW-5 is screened in the sand and gravel unit, making it an acceptable location to collect groundwater samples for TPH-DRO analysis for comparison to other Site monitoring wells also screened in that unit. The section also illustrates the presence of saprolite (weathered bedrock) at the base of the sand (and also the base of unconsolidated water-bearing unit south of the canal) as evidenced at NPS MW-5. Comparing this section to the groundwater elevation contours on Figure 2, NPS MW-4, NPS MW-5, and CSXT MW-43 are downgradient of the wells which consistently exhibit measurable LPH thicknesses; however, LPH has not been observed historically at NPS MW-5 or CSXT MW-43, and LPH has not been detected at NPS MW-4 since October 2007. LPH was detected at monitoring well CSXT MW-41 during the January 11, 2013 Site-wide gauging event, at a thickness of 1.35 feet, which is significantly reduced from the

historical maximum thickness measured at this well (3.06 feet). LPH was also measured at nearby wells CSXT MW-54 (0.01 feet), CSXT MW-55 (2.35 feet), and CSXT MW-53 (0.82 feet) (wells not shown on cross-section). PID soil screening concentrations decrease significantly from the areas with current or historical LPH thicknesses towards the downgradient areas.

3.1.5 Section E-E'

This section (Figure E-6, Appendix E) indicates that the geology present here is consistent with the geology across the Site. The upper silty clay unit was observed at all GP locations (GP-53, GP-54, GP-56, GP-61, GP-63, and GP-66) and at NPS MW-11 and NPS MW-13 in this cross-section. The lower sand and gravel unit is continuous in this section and has a greater amount of gravel as described in the boring logs for NPS MW-11 and NPS MW-13. No LPH has been observed in either of these NPS monitoring wells. The clay and silt unit is relatively thick at this location; PID soil screening data from CSXT GP-56 indicate that the highest soil vapor readings are near the center of this unit.

3.1.6 Section F-F'

This section (Figure E-7, Appendix E) indicates that the geology in the central area (NPS Area 3) is consistent with the typical Site geology. The upper silty clay unit is observed in all borings on the cross-section. Additionally, three wells in the section (CSXT MW-50, NPS MW-17, and NPS MW-14) are screened at least partially in the lower gravelly sand.

Soil screening data and TPH-DRO soil concentrations indicate that levels of soil contamination at this area of the Site are relatively low or not detected.

3.1.7 Section G-G'

This section (Figure E-8, Appendix E) is oriented approximately east to west and shows the consistency of the upper silty clay unit and the sand and gravel unit across the Site to the north of the canal. Groundwater elevations measured in these wells show a relatively flat water table that does not favor an easterly or westerly component to the gradient.

3.1.8 Section H-H'

This section (Figure E-9, Appendix E) illustrates the influence of the former roundhouse foundation on groundwater flow. The clay/silty clay layer found approximately 6-8 feet bgs at most boring locations at the Site has been replaced with fill material in the roundhouse foundation area, as observed in borings at CSXT MW-64 and CSXT MW-65. Large sections of concrete foundation remain in the footprint of the roundhouse, creating a slight mounding effect on groundwater flow within the footprint, and slightly redirecting flow around the roundhouse foundation. South of the roundhouse, the clay/silty clay layer returns to elevation consistent with the local Site lithology.

Well CSXT MW-69, installed in January 2013, confirms the lithology previously assumed for H-H'. The sand and gravel unit consists of a large number of gravel zones at this area. Soil screening results for CSXT MW-69 indicate higher readings in the center of the silt and clay unit, similar to the distribution shown for cross section wells CSXT GP-48, CSXT MW-64, and CSXT MW-38. The TPH-DRO soil sample results for CSXT MW-69 are consistent with those for other nearby wells.

3.1.9 Section I-I'

This section (Figure E-10, Appendix E) indicates that the geology east of the roundhouse is consistent with the typical Site geology. The upper silt and clay unit was observed at all borings encountered in this cross-section. The lower gravelly sand unit is also present in each of the borings. GP-71, the upgradient boring in the section, shows some variability through the semi-confining unit, including a gravel zone at approximately 12-13 feet bgs, interbedded within the silty clay unit.

The geologic units encountered during boring and installation of CSXT MW-70 are consistent with those found at nearby wells; several feet of surficial fill are underlain by layers of silt and clay with some sand and gravels, and then by silty sand grading to coarse sand and gravel. FID soil screening concentrations measured during boring of CSXT MW-70 peak at a depth consistent with the water table as measured on January 11, 2013. The soil sample collected at this approximate depth (15 feet bgs) had a TPH-DRO concentration of 110 milligrams per liter (mg/L). Soil screening results and TPH-DRO concentrations in soil samples indicate elevated readings at locations CSXT MW-70 and GP-69, however concentrations were low or not detected (ND) at locations upgradient and downgradient from the roundhouse.

As previously mentioned, a measurable thickness of LPH was detected in Site monitoring wells CSXT MW-39 and CSXT MW-70, in the first quarter of 2013. LPH was measured at CSXT MW-39 on January 11, 2013 with a thickness of 0.09 feet, and at CSXT MW-70 on March 1, 2013, with a thickness of 0.08 feet. The occurrence of LPH in both wells was reported to MDE and removed using an absorbent sock. Visual inspection indicated that the LPH in these wells was pink/red, consistent with the coloration seen in off-road diesel fuel. The coloration and location of this LPH indicates a different source, unrelated to the historical diesel releases that have been the focus of previous Site investigations. The source of the LPH identified at CSXT MW-39 and CSXT MW-70 is currently unknown, and a work plan for an investigation to characterize the LPH occurrence is currently being prepared to submit to the MDE.

3.1.10 Section J-J'

This section (Figure E-11, Appendix E) is oriented approximately east-to-west and spans the majority of the Site. It illustrates the continuity of the clay and silt semi-confining unit and the underlying sand and gravel zone. As indicated by boring log data for GP-44, CSXT MW-33/GP-27, and CSXT MW-30/GP-30, the thickness of the silts and clays diminishes in thickness considerably at the western edge of the Site; however, it does appear to be continuous at these locations.

Subsurface materials encountered during installation of new Site monitoring wells CSXT MW-67 and CSXT MW-68 are consistent with nearby wells. Soil screening results show a similar distribution as previous borings, with higher concentrations observed towards the center of the silt and clay unit. LPH was not detected in the Site wells shown on this cross-section during the gauging event on January 11, 2013.

Groundwater elevations measured at CSXT MW-68 are significantly higher than other wells on cross-section J-J', and the location of these higher water levels corresponds to the elevations shown on cross-section H-H'. This area of relatively high groundwater elevations is surmised to result from alterations to the native subsurface materials in the vicinity of the constructed roundhouse structure. In addition, the boring logs for CSXT MW-68, CSXT MW-64 (cross-section H-H' and K-K'), and CSXT MW-65 (H-H') include descriptions for stiff or high-plasticity clay layers between 7 and 14 feet bgs; the increased proportion of continuous finer-grained materials may indicate that the general silt-and-clay unit is more confining at this location than at other areas of the Site. Aside from this location, groundwater elevations for the remainder of the east-west cross section reflect the relative similarity of water-level elevations in a direction perpendicular to the primary groundwater flow direction at the Site.

3.1.11 Section K-K'

This section (Figure E-12, Appendix E) is also oriented in an overall east-west direction, and intersects the current location of LPH detections. The geology at this section is consistent with other areas of the Site. LPH is currently observed at wells CSXT MW-56 and CSXT MW-55, and other wells within the immediate vicinity (Figure 4). Soil screening results for these two wells show a slightly different pattern than other areas of the Site; for the majority of Site wells, the highest soil screening concentrations were recorded within the silt and clay semi-confining unit, however CSXT MW-55 and CSXT MW-56 indicate increasing concentrations with depth, with the highest values recorded within the underlying sand and silt. This may be a reflection of the proximity of the water table to the interface between the two geologic units; groundwater elevations measured at CSXT MW-55 on January 11, 2013 indicate that the top of the LPH is located at this approximate interface (232 feet above msl). Historical groundwater elevations measured at CSXT MW-55 since 2009 fluctuate from approximately 228 feet above msl to 235 feet above msl, indicating that the location of LPH varies between the sand and gravel unit and the finer-grained silts and clays. Several monitoring wells containing consistent product thicknesses are located in close proximity to CSXT MW-55, including CSXT MW-41, CSXT MW-53, and CSXT MW-54.

Potential mobility of the LPH within the sand and gravel unit is likely limited by the vertical location of the transition between the silt and clay semi-confining unit and the underlying sands and gravels. A significant decline in the elevation of this interface between the main area of the Site and downgradient locations (NPS property and the C&O Canal) is noted on each of the Site cross-sections oriented north-to-south, with the elevation of the interface interpreted well below water levels at off-Site locations. Differences in the interpreted lithology at CSXT MW-41/GP-41 (D-D') and nearby well CSXT MW-55 (K-K'), and the corresponding vertical locations of LPH at each well indicate significant variability in the elevation of the lithologic transition between the silt and clay unit and the underlying sands and gravels.

CSXT MW-64 exhibits the relatively high groundwater elevations discussed in the description of cross-section J-J'; aside from this well, groundwater elevations are relatively consistent across this east-west cross-section. A slight dip in groundwater elevations is observed at the location of CSXT MW-29.

3.1.12 Soil screening (PID/FID/OVA) and soil sample concentrations

Soil screening (PID/FID/OVA) summary

Soil screening data collected by PID/FID/OVA is generally consistent with the historical LPH extent and locations of dissolved-phase constituents. Wells and borings located upgradient and downgradient of source and LPH areas generally exhibit low or ND soil screening concentrations, as well as low or ND TPH-DRO soil sampling results. Upgradient well CSXT MW-52 exhibited low PID readings and a TPH-DRO soil concentration of 880 mg/kg.

Wells and borings with soil screening concentrations above ND generally indicated low levels of contamination near the surface, with concentrations increasing in the vicinity of the water table, with maximum concentrations observed near the water table or within the clay and silt semi-confining unit. A few Site monitoring wells (CSXT MW-55, CSXT MW-56, and CSXT MW-29/GP-26) show increasing soil screening concentrations through the clay/silt and into the gravel and sand unit. At CSXT MW-55 and CSXT MW-56, this is a reasonable assessment due to the proximity of LPH to the vertical transition between these two units.

Comparison of soil screening data (PID/FID/OVA) to TPH-DRO results from boring soil sample analysis indicates a specific relationship between the two concentrations; in general, wells with moderate TPH-DRO detections also showed moderate PID concentrations, but this relationship is not quantifiable. This may be due to the fact that diesel-range organic compounds are generally larger (outside of the range) of PID-sensitive constituents.

Soil samples collected at wells installed in January 2013

Grab soil samples for laboratory analysis of VOCs and SVOCs were collected from split-spoon samples at the four new well locations. As shown in Table 3, a total of seven VOCs were detected in soil samples collected from soil borings at the locations of CSXT MW-67 through MW-70. 1-methylethyl benzene, cyclohexane, and methycyclohexane were detected in a number of samples; the remainder of the VOC detections were only measured in the sample collected at the location of CSXT MW-70 (Ethylbenzene, Naphthalene, Toluene, and Total Xylenes). Ten SVOCs were detected in soil samples. Fluorene, phenanthrene, and pyrene were detected in soil samples collected from the locations of CSXT MW-67, MW-68, and MW-69. 2,4-dimenthyphenol, acenaphthene, and fluoranthene were also detected at CSXT MW-68. Three constituents, 2-methyl naphthalene, acetophenone, and naphthalene, were detected only in the soil sample from the location of CSXT MW-70. TPH-GRO concentrations in soil at these locations ranged from 21 mg/kg (CSXT MW-68, 11-12 feet bgs) to 130 mg/kg (CSXT MW-70, 14.5-15.5 feet bgs).

TPH-DRO concentrations in soil at these locations ranged from 110 mg/kg (CSXT MW-70, 14.5-15.5 feet bgs) to 13,000 mg/kg (CSXT MW-67, 13.7-14.7 feet bgs). These results are generally consistent with TPH-DRO soil concentrations collected at geoprobe borings in 2008.

3.2 Local Hydrogeology

The current site conceptual model identifies three general hydrogeologic units in the surficial aquifer. These three units correspond to the fill materials and shallow sediments; the fine-grained silts and clays; and the underlying sand and gravel unit, which is partially confined by the silt and clays. The fate and transport of LPH and dissolved-phase TPH-DRO is governed by the shallow groundwater flow dynamics.

3.2.1 Interpreted groundwater flow directions

Groundwater flow regimes in the shallow water table unit, which is saturated in the vicinity of the Potomac River, and the lower sand and gravel water-bearing unit, are dominated by the Potomac River as a local and regional discharge feature. Primary groundwater flux at the Site occurs in the lower sand and gravel unit. Groundwater flow directions inferred from water-level measurements in both units are perpendicular to the canal and toward the Potomac River. The saprolite and deeper bedrock units are of low permeability and therefore, do not significantly interact with shallow unconsolidated deposits.

Local perturbations in groundwater elevation and flow direction are attributed to variations in the thickness of the overburden units, local variability in the composition of the silt and clay semi-confining unit, and the influence observed around the roundhouse foundation. Groundwater flow is typically below the base of the C&O Canal, which has an elevation of approximately 230 to 231 feet msl.

The BRT was installed through the silty clay unit approximately 15 feet below the water table to provide an effective barrier to migration of LPH. The BRT also behaves as a barrier to groundwater flow in the silty clay unit and therefore, produces some increase in water levels upgradient of the BRT. This slight increase in water level creates downward hydraulic gradients to allow groundwater to enter the underlying sand and gravel and flow below the BRT towards the south. The BRT and Site water levels are indicated on cross-sections B-B' and C-C' (Figures E-3 and E-4, Appendix E).

Groundwater flow directions in the eastern portion of the Site and NPS Property are more variable. Groundwater flow from the Site to the NPS property appears to be southeasterly, as shown in Figure 2. Large sections of concrete foundation remain in the footprint of the roundhouse, creating a slight mounding effect on groundwater flow within the footprint, and slightly redirecting flow around the roundhouse foundation. South of the C&O Canal, groundwater flow appears to transition to a southwesterly flow direction.

3.2.2 Hydraulic properties

Hydraulic conductivities estimated from slug tests conducted at four Site wells in January 2013 ranged from 0.45 feet/day to 200 feet/day (Table 5). Test results for three wells, CSXT MW-25, CSXT MW-29, and CSXT MW-35, were relatively consistent with average conductivities of 2.9 feet/day, 0.48 feet/day, and 1.96 feet/day, respectively. The average hydraulic conductivity estimate for CSXT MW-21 is 164 feet/day. As discussed in Section 2.4, the slug test displacement-time data for this well did not show the characteristic break in slope associated with filterpack drainage in wells screened across the water table, which indicates that this estimate is valid only for the filterpack material and may not be representative of the surrounding formation. The geometric mean of hydraulic conductivities measured at each of the four wells is 4.6 feet/day; excluding the results of the slug tests conducted at CSXT MW-21, the geometric mean hydraulic conductivity for the Site is 1.4 feet/day.

3.3 LPH Occurrence and Migration

Based on Site conditions and knowledge of historic operations, two potential source areas for LPH appear to be the former AST system on the western portion of the Site, which included a fuel pump house and a 500,000-gallon diesel fuel AST, as well the current fueling area located north of the former roundhouse. LPH transport in the subsurface from the former AST system has resulted in the observed distribution of LPH and dissolved-phase TPH-DRO in the subsurface of the western portion of the Site. This is observed historically at monitoring wells CSXT MW-2, CSXT MW-4R, and CSXT MW-28. The presence of the dissolved phase (TPH-DRO) in groundwater from the LPH occurs in the northern and central portions of the Site (Figure 3). LPH has typically been measured at elevations corresponding to the upper silty clay semi-confining unit. Figures 4, 5, and 6 illustrate current and historical occurrence of LPH at the Site.i

Occurrence of LPH near and to the southwest of the former AST system has been limited in recent history; the last LPH measured at CSXT MW-02 and CSXT MW-04R occurred in 2011, and LPH has not been measured at a thickness greater than 0.03 feet at CSXT MW-28 during 2012 and 2013. LPH has not been observed in an off-site NPS well since October 2007.

Eleven CSXT wells have had measured LPH thicknesses of over 0.5 feet at least once within the last year (2012 and first quarter of 2013). LPH thicknesses measured in these wells are variable due to ongoing removal of product (skimmer pumps and passive skimmers). Eight additional CSXT wells and three extraction wells have exhibited measurable LPH thicknesses at least once during 2012 and 2013, at thicknesses less than 0.4 feet (Figure 5); LPH occurrence in these wells is not consistent. Four of these CSXT wells and EW-2 exhibited a maximum product thickness of 0.1 feet during 2012 and 2013.

Figure 4 shows the current distribution of LPH from measurements obtained on January 11, 2013. Graphs of select monitoring wells depicting LPH in relation to groundwater and thickness are provided in Appendix B. In general, most of the graphs indicate an overall stability or decrease in apparent LPH thickness. The inverse relationship between groundwater elevations and apparent thickness of LPH in monitoring wells is instrumental in understanding the nature and extent of the LPH (i.e., CSXT MW-49 – Appendix B). However, this is not always apparent due to system operations. During low water table conditions, LPH apparent thicknesses measured in monitoring wells are greater than during high water table conditions. This relationship is the result of vertical variations in lithology and the occurrence of LPH in soil between the high and low water table elevations. During low water table conditions, LPH from a wider range of elevations migrates into the well. However, LPH in soil above the low water table may remain relatively immobile because fine-grained materials, such as those in the upper silty clay unit that inhibit displacement of LPH by precipitation recharge. The LPH distribution is illustrated in profile in cross sections A-A' through K-K' (Appendix E).

The LPH recovery activities initially implemented in 1995 and current corrective measures (BRT and recovery system enhancements) have substantially reduced the amount and extent of measurable LPH at the Site. This is illustrated by comparing Figures 4, 5, and 6. The historical maximum thickness distribution of LPH recorded between 1995 and the present is depicted on Figure 6. Current distribution of LPH is depicted on Figure 4 from measurements obtained on January 11, 2013, and Figure 5 presents maximum thicknesses measured in 2012 and 2013. These figures show a

significant decrease in the lateral extent of LPH in the subsurface, particularly in the area downgradient of the former AST system where LPH recovery activities have been performed since 1995.

All monitoring wells that currently or historically had LPH observations have shown stable and/or decreasing LPH accumulations. Upgradient monitoring wells MW-51 and MW-52 have consistently had no accumulation of LPH. Monitoring wells located directly south or downgradient of the source area, CS-2 through CS-5, MW-6R, MW-8, MW-9, MW-20, MW-43 and all NPS monitoring wells (NPS MW-1 through NPS MW-15) have consistently had no accumulation of LPH. Additionally, monitoring wells crossgradient (CSXT MW-21, CSXT MW-24, CSXT MW-29, and CSXT MW-65) of the observed LPH footprint have consistently had no accumulation of LPH. In general, LPH thicknesses have remained stable or decreased, and were observed at only nine locations on January 11, 2013.

LPH mobility at the pore-scale is dependent upon the presence of a sufficient driving head and hydraulic gradient. Therefore, accumulation of LPH in monitoring wells is not a stand-alone indicator of LPH mobility. The stable and decreasing LPH accumulation in monitoring wells within the footprint of the historic LPH occurrence and the lack of LPH accumulation in downgradient wells, demonstrates that the LPH is not migrating. With the current corrective measures in place the extent of LPH will continue to decrease:

- The BRT prevents future downgradient migration of LPH, though no LPH has been observed in any of the collection sumps since December 2009 (CS-1).
- The enhanced recovery system (skimmer pumps) is continually collecting LPH.
- The use of passive skimmers and periodic (every two to three weeks) removal of LPH from wells with limited thicknesses increases LPH recovery and removal from the historic LPH footprint.

Overall, as more LPH is removed, the amount of recoverable LPH will become negligible as the remaining LPH in the formation approaches residual saturation.

At residual saturation, the LPH will not be mobile in groundwater due to immobilization by capillary forces, but may remain a source of dissolved-phase TPH-DRO. The residual LPH is a relatively immobile source for dissolved-phase contamination,

created by leaching of LPH either by precipitation recharge or by groundwater when the water table elevation rises above the elevation of the residually-saturated soils.

3.4 Dissolved-Phase Concentrations and Migration

Groundwater samples were collected at 31 Site monitoring wells in January and February 2013, and submitted for laboratory analysis for petroleum hydrocarbon-related parameters and constituents (Section 2.3). As stated in an MDE letter correspondence to Mr. Kevin Brandt (NPS) dated August 28, 2012 and the Consent Order (MDE 2007), the cleanup goal for the Site is to recover LPH to the maximum extent practicable as defined by MDE. Based on this cleanup goal, progress towards groundwater cleanup standards has not been evaluated for the Site in the past. However, the following section includes a comparison of the January 2013 groundwater analytical results to the MDE Generic Numeric Cleanup Standards for Groundwater (MDE 2008c) to provide a point of reference. The following evaluation of groundwater concentrations relative to the MDE standards does not suggest that remediation of groundwater to the standards is applicable to the Site, based on previous MDE correspondence and the Consent Order. The data and comparison to the MDE standards are presented in Table 4.

3.4.1 Total Petroleum Hydrocarbon-Diesel Range Organics

The dissolved-phase TPH-DRO concentrations have a limited distribution on and off-Site (Figure 3). The highest concentrations of dissolved phase TPH-DRO were detected in samples collected from wells that are proximate to the former AST system and the current fueling area where measurable LPH has been observed. TPH-DRO exceeded the residential groundwater cleanup standard (0.047 mg/L) at 31 CSXT and NPS wells sampled in January 2013.

The TPH-DRO results following silica gel cleanup, which removes naturally-occurring diesel-range organic compounds and products of petroleum hydrocarbon degradation, indicate that a significant proportion of TPH-DRO detections are due to these constituents. Table 8 presents results of TPH-DRO and TPH-DRO after silica gel cleanup and the corresponding percentages of petroleum hydrocarbons for each sample. Only four NPS wells and thirteen CSXT wells had detected concentrations of TPH-DRO greater than the MDE residential groundwater standard after silica gel cleanup (Table 4). Figure 3 presents concentrations of TPH-DRO and TPH-DRO with silica gel cleanup. Percentages displayed on the figure represent the proportion of TPH-DRO which is due to non-degraded petroleum hydrocarbons.

TPH-DRO concentrations in samples from wells downgradient of the known source areas decrease with increasing distance from the source areas (Figure 3). Dissolved-phase TPH-DRO plume migration in groundwater occurs in the upper silty clay unit and potentially the lower gravelly sand unit, although the migration potential likely varies between the two units.

Where detected, TPH-DRO concentrations are relatively stable or decreasing (Appendix C), indicating that the source of dissolved-phase concentrations is also stable or decreasing. The concentrations measured at NPS wells have been relatively stable with current concentrations ranging between 0.071 J mg/L at NPS MW-3 and 17 mg/L at NPS MW-4. TPH-DRO concentrations in CSXT wells range from 0.036 J mg/L at CSXT MW-20 and 150 mg/L at CSXT MW-59. CSXT MW-59 has contained measurable thicknesses of LPH prior to and post-sample collection on January 15, 2013.

Trend analysis of TPH-DRO analytical results using data collected from July 1994 through January 2013 was performed as part of the LPH Assessment (Appendix I). Results of the Monitoring and Remediation Optimization System Mann-Kendall statistical analysis performed on groundwater sampling data from 33 monitoring wells indicated that monitoring wells located downgradient of the source areas (NPS monitoring wells) exhibit consistent stable to decreasing trends across the Site, with the exception of NPS MW-1, NPS MW-2, and NPS MW-13 where no trend could be defined.

In general, concentrations of TPH-DRO are not increasing at any monitoring well with the exception of CSXT MW-24, and majority of them show stable or decreasing trends. The predominance of steady to decreasing trends demonstrates that the dissolved-phase plume is stable.

3.4.2 Other Constituents

VOCs concentrations were below the MDE cleanup standards at the NPS and CSXT monitoring wells along the C&O Canal in January 2013 (Table 3). Three VOCs were detected in four CSXT wells near the roundhouse at concentrations exceeding the MDE groundwater standards. 1-methylethyl benzene was detected at one well CSXT MW-61 (78 micrograms per liter [µg/L]), slightly above the MDE cleanup standard of 66 µg/L. There was one detection of methylene chloride, a common laboratory chemical, slightly above the MDE cleanup standard of 5 µg/L, at CSXT MW-69 (6.5 µg/L).

Naphthalene was detected at two wells, CSXT MW-68 (6.8 µg/L) and CSXT MW-70 (1.6 µg/L), at concentrations greater than the MDE cleanup standard of 0.65 µg/L.

Methyl tertiary butyl ether (MTBE) and other gasoline-related VOCs were detected at concentrations below MDE cleanup standards at CSXT MW-51. The detections of these constituents at a well located upgradient of known on-Site source indicates a potential off-Site source of gasoline-related compounds detected in CSXT MW-51 and other Site wells.

SVOCs concentrations were also below the MDE cleanup standards in the NPS and CSXT monitoring wells along the C&O Canal. Five SVOCs were detected in groundwater samples collected from four CSXT monitoring wells in the vicinity of the roundhouse (Table 3).

TPH-GRO exceeded the MDE residential groundwater cleanup standard at two NPS wells, NPS MW-4 (0.088 mg/L) and NPS MW-15 (0.053 mg/L), and ten CSXT wells, ranging from 0.05 mg/L at CSXT MW-68 to 0.16 mg/L at CSXT MW-59 and CSXT MW-61.

3.5 LPH Mobility and Recovery Assessment Summary

The LPH Mobility and Recovery Assessment (Appendix I), performed as part of the Supplemental Investigation, synthesized current and historic Site data to evaluate the current status of the historic LPH at the Site, identify any potential for off-site migration, and estimate recovery timeframes. Individual analyses and their results are summarized below:

- Plots of groundwater elevations and LPH thicknesses in Site monitoring wells were generated and analyzed to identify trends in LPH thickness over time. Overall, LPH thicknesses measured in monitoring wells are decreasing, during the period of Site LPH recovery operations. The lack of LPH in offsite and downgradient wells indicates that the LPH is stable or decreasing and that LPH is not migrating.

- LPH pore velocity calculations assess the migration potential of LPH in Site materials at the pore scale. Pore velocities exceed the American Society for Testing and Materials (ASTM) criterion for mobility and indicate that LPH is mobile at the pore scale. Mobility of LPH at the pore scale facilitates successful recovery of product from site extraction and monitoring wells.

- Statistical analysis of dissolved-phase DRO concentrations in monitoring wells over time was performed to assess the mobility of the dissolved phase plume, which in turn, indicates LPH mobility. Monitoring and Remediation Optimization System trend analysis of DRO data at 19 Site wells indicates stable or decreasing DRO concentrations. Thirteen wells did not feature a statistically-significant trend, or had too few data points for analysis; one Site well, CSXT MW-24, showed an increasing trend. Decreasing or stable dissolved plume concentrations indicate that LPH is not migrating at the Site.

Recoverable LPH volume can be estimated based on an evaluation of historical recovery operations at a site using a decline curve analysis to predict the likely remaining LNAPL recovery from the system. The total recoverable LPH volume was estimated at approximately 1,500 gallons and the anticipated remaining recoverable LPH volume is 800 gallons using the decline curve analysis. This remaining recoverable volume is likely an overestimation of actual recovery because recovery decreases to impracticable rates prior to reaching the total recoverable volume. This assessment indicates that the final 70 gallons of LPH would be recovered at approximately 1 gallon per month. An estimated 3 to 6 years of active skimming is anticipated to approach asymptotic recovery.

4. Conclusions and Compliance

The following conclusions summarize the current understanding of the Site conditions and the effectiveness of the current LPH recovery system to meet the Consent Order objectives.

LPH and Dissolved Phase Distribution and Migration

As detailed in Appendix I, LPH is mobile at the pore scale near the source areas, but is not migrating at the plume-scale. Mobile LPH is capable of moving laterally and vertically at the soil media pore scale, meaning the LPH can enter a well, but has insufficient mobility at the pore scale to result in expansion of the LPH footprint. Multiple lines of evidence indicate that the extent of LPH is not expanding, and are summarized as follows.

- In general, LPH accumulations in monitoring wells have decreased. Stable accumulation within the footprint of the LPH and the absence of LPH accumulation in monitoring wells downgradient of the LPH footprint indicates LPH is stable and not migrating.

- Pore velocity potentials calculated using field-derived LPH relative permeability from baildown testing performed in monitoring well MW-41 resulted in pore velocities below the ASTM mobility criterion of 1 x 10-6 cm/s indicating LPH is functionally immobile in the vicinity of this location.

- Dissolved phase concentrations of diesel fuel indicator constituents generally have decreasing trends. These results indicate the dissolved phase plume is stable, which indicates at the site-wide scale, the extent of LPH is also stable.

Although LPH is stable and not migrating, LPH is mobile at the pore scale. Mobile LPH is observed within the existing LPH footprint. These lines of evidence are discussed in Appendix I and summarized below:

- LPH is observed in monitoring wells near the source areas, indicating LPH is mobile at the pore scale adjacent to the monitoring well.

- Pore velocity potentials calculated using field-derived LPH relative permeability from baildown testing performed in monitoring wells MW-53, MW-55 and MW-56

exceeded the ASTM mobility criterion of 1 x 10-6 cm/s. LPH mobility within the existing LPH footprint is minimal, demonstrated by pore velocities ranging from 1.4 x 10-6 to 8.67 x 10-6 cm/s, and the degree the mobility criterion is exceeded.

- Baildown testing and periodic LPH recovery indicates LPH accumulates in monitoring wells after LPH has been removed.

Additional characterization and delineation of LPH extent and the dissolved-phase TPH-DRO plume will be performed during the Canal Prism Investigation, which will be completed as described in the SIWP and when Site conditions permit.

As discussed in Sections 2.4 and 3.2.2, results of the analysis of slug tests performed at four Site monitoring wells in 2013 were inconclusive with regards to differentiating hydraulic conductivity between the silty clay semi-confining unit and the underlying sand and gravel water-bearing zone. The potential for dissolved-phase migration through the silty clay unit will be further evaluated following additional pending site characterization activities, which include the Canal Prism Investigation and replacement of former NPS MW-11 with new well NPS-MW-18. NPS MW-18 will be screened exclusively in the silty clay unit, per NPS request. The results of slug tests to be completed at NPS MW-18 will be used to evaluate the potential for dissolved phase migration through the silty clay unit. Also per NPS request, ARCADIS will attempt to collect groundwater samples representative of the silty clay unit from beneath the canal during the Canal Prism Investigation.

The presence of other constituents on-Site and at the upgradient portion of the Site MTBE and other gasoline-related VOCs are thought to be from a potential off-Site source (Section 3.4.2).

Effectiveness of Corrective Action

Since implementing the CAP Addendum in July 2009, through March 1, 2013, approximately 720 gallons of LPH has been removed from the subsurface. The effectiveness of corrective action activities has been demonstrated based on the following:

- Reduction in LPH distribution in both aerial and vertical extent;

- Increase in recovery of LPH and reduction of source material; and

- Reduced potential for migration.

Decline curve analysis performed using product recovery data estimates that the total recoverable LPH volume is approximately 1,500 gallons and the anticipated remaining recoverable LPH volume is 800 gallons. An additional 3 to 6 years of active skimming is anticipated to approach asymptotic recovery.

Compliance

The Consent Order between the MDE and CSXT dated July 18, 2007 required CSXT to implement a CAP to remove diesel fuel from the subsurface to the extent practicable, as determined by the MDE, within three years of MDE approval of the CAP. The CAP Addendum prepared by ARCADIS, which detailed remedial plans to recover diesel fuel from the subsurface, was approved by MDE on May 27, 2009 and implemented by ARCADIS in July 2009.

As discussed in the CAP Addendum and the current SCM, the heterogeneous lithology at the Site and the relative immobility of the LPH, limit LPH recovery from the subsurface. ARCADIS, on behalf of CSXT, requests that MDE consider extending the 2009 Consent Order for an additional three to six years, allowing CSXT to continue LPH recovery activities through May 2015.

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Tables

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
September 1991	NPS	Investigation	National Park Service (NPS) conducted a soil survey evaluating the presence of petroleum residuals in the C&O canal silt near CSXT property in support of a bid for a rewatering permit. Reportedly, visual identification of petroleum was made in three areas; however, no samples were submitted for analysis of petroleum constituents.
March 1992	CSXT/Eder	Remediation	CSXT/Eder Associates (Eder) provided oversight for removal of a 16,000 gallon diesel underground storage tank (UST) adjacent to the former pump house and 500,000 gallon aboveground storage tank (former AST System). The UST had been previously pumped out and taken out of service in 1974. Approximately 100 cubic yards of impacted soils related to the UST were excavated and properly treated/disposed off-site. Analysis of soil confirmation sampling from the excavation showed total petroleum hydrocarbon (TPH) concentrations below the current MDE non-residential cleanup level of 620 mg/kg.
March 1992	CSXT/Eder	Investigation	CSXT/Eder collected soil samples to characterize soils identified in the 1991 NPS report as petroleum impacted.
July 1993	CSXT/Eder	Investigation	CSXT/Eder conducted a focused sediment/soil boring investigation performed to further investigate the extent of residual petroleum compounds in the C&O Canal in the three primary areas of concern and a small area near Lock #30.
January 20, 1994	MDE	Correspondence	Maryland Department of the Environment (MDE) required that CSXT install four monitoring wells on CSXT property between the C&O Canal and four suspected source areas, including the 500,000 gallon AST, the tank car diesel fuel unloading racks, the diesel fueling pump house, and the roundhouse.
July 1994	CSXT/Eder	Investigation	CSXT/Eder installed four monitoring wells (CSXT MW-1, 2, 3, and 4) to investigate the groundwater quality between the suspected source areas and the C&O Canal. Groundwater samples collected from the four monitoring wells were analyzed for BTEX and TPH-DRO. Liquid-phase hydrocarbons (LPH) were later observed at MW-2. CSXT/Eder recommended installation of two additional monitoring wells downgradient of CSXT MW-1, 2, and 4 on the northern canal tow path.
August 30, 1994	MDE	Correspondence	MDE approves the installation of the two additional wells and requests that CSXT install three additional monitoring wells with at least one installed on the south side of the C&O Canal.

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
November 1994	CSXT/Eder	Investigation	CSXT/Eder conducts a product baildown test at MW-2. Results indicate a very slow LPH recovery rate. Based upon the slow recovery rate, a passive product recovery system was recommended by Eder.
January 1995	CSXT/Eder	Remediation	CSXT/Eder initiated passive free product recovery utilizing a Siphons Without a Pump (SWAP) 4 unit at MW-2.
August-September 1995	CSXT/Eder	Investigation	After coordination with NPS for property access, CSXT/Eder installed additional monitoring wells (CSXT MW-5, 6, 8, and 9) to further evaluate groundwater quality downgradient and in the vicinity of the former AST System. Groundwater samples were collected from CSXT MW-1, 3, 5, 6, 8, & 9 (LPH at CSXT MW-2 and CSXT MW-4). Groundwater samples were analyzed for BTEX, naphthalene, and TPH-DRO.
March 1996	NPS/E&E	Site Assessment and Characterization	On behalf of the NPS, Ecology and Environment, Inc. (E&E) prepared a Draft Site Assessment and Characterization Report based on additional sediment and soil sampling. The results of the collection of subsurface soils within the canal prism indicated that there were no PAH compounds exceeding the EPA Region III Risk-Based Concentrations for industrial exposure.
August – September 1996	NPS/E&E	Investigation	E&E installed five monitoring wells (NPS MW-1, 2, 3, 4, and 5) along the Canal on NPS property to determine if there has been any migration of residual petroleum compounds onto NPS property. Groundwater samples were collected from the five NPS wells and three CSXT wells (MW-6, 8, and 9) by NPS and analyzed for VOCs, SVOCs, and TPH. Dissolved phase total petroleum hydrocarbons (TPH) were detected in seven of the eight samples (all except NPS MW-4). PAH concentrations in groundwater were detected at two monitoring wells (NPS MW-4, and MW-6). These results were reported in the July 1997 Investigation Report (below).

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
July 1997	NPS/E&E	Investigation Report	On behalf of the NPS, E&E prepared and submitted an investigation report including the results of the surface and subsurface soil sampling conducted in August and September 1996 and monitoring well installation and groundwater sampling conducted during the same timeframe. Groundwater sampling results are discussed above. Surface soil analytical results indicated detectable PAH concentrations below screening criteria in all three samples and one TPH concentration above the MDE cleanup standard at NPS-SS-1 collected in the canal. The other TPH concentrations collected from surface soils were below MDE cleanup standards. Results of subsurface soil sampling (10 samples collected from 9 borings) indicated detectable PAH concentrations in 8 of the samples (all below screening criteria) and one TPH concentration (1,000 mg/kg) above the MDE cleanup standard detected in sample NPS-SB-4 collect from 8 to 10 ft below ground surface.
February 1998	CSXT/Eder	Investigation	LPH baildown tests were conducted at two CSXT wells (MW-1 and MW-6). The results of the baildown tests indicated that free product entered both wells at an extremely low rate. The water table rose several feet in November and no product was measured in either well, suggesting a strong association between water table fluctuations and the presence of free product.
1998	CSXT/Eder/ Gannett-Fleming	Remediation	CSXT/Gannett Fleming (purchased Eder) expanded LPH recovery to include MWs 1, 2, 4, and 6.
February 8, 1999	CSXT/Gannett-Fleming	Investigation	CSXT/Gannett Fleming submitted a Conceptual Investigation Plan (CIP) to evaluate any potential threat to surface water and to consider scenarios for adjusting the product recovery program, if necessary. The CIP also included a remedial alternatives analysis.
November 1999 – August 2000	CSXT/Gannett-Fleming	Investigation	Eleven soil borings and temporary piezometers (TP-1 through TP-11) were installed near the area with LPH to delineate the extent of LPH. Two soil samples are collected for geotechnical purposes.
December 2000	CSXT/Gannett-Fleming	Feasibility Report	CSXT/Gannett-Fleming submitted a Site Investigation Report including feasibility of remedial alternatives. The conclusion of the evaluation of remedial alternatives was that a collection trench recovery system located along the CSXT/NPS property line should be considered, carefully evaluating safety and constructability due to rail operations.
2001	NPS/E&E	Investigation	E&E installed eight additional wells NPS MW-10 through NPS MW-17.

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
June 2003	NPS/E&E	Investigation	E&E conducted groundwater sampling of the NPS wells for analysis of TPH-DRO, LPH is observed at NPS-MW-4.
October 2003 – March 2004	CSXT/Gannett-Fleming	Remediation	CSXT/Gannett-Fleming constructs a barrier/recovery trench to stop migration of petroleum to NPS property. The initial design was to approximately 525 ft long and 12-15 feet deep. However, the design was revised after it could not be constructed solely on CSXT property. The design was revised a second time when the trench, running from west to east, could not be extended to a point south of TP-4 because construction would subvert a utility pole. The trench as constructed includes five collector sumps, accumulated LPH is removed via a vacuum truck. CSXT/Gannett Fleming installed barrier/recovery trench (BRT) with 5 internal collection sumps (CS-1 through CS-5).
July 2004	CSXT/Gannett-Fleming	Remediation	CSXT/Gannett-Fleming initiated monthly enhanced fluid recovery (EFR) events at monitoring wells/collector sumps with LPH. CSXT/Gannett Fleming began enhanced fluid recovery (EFR) activities to reduce measurable liquid phase hydrocarbons (LPH) at MW-2, EW-3, EW-4, and EW-5 and BRT collections sumps. EFR activities expanded to include all wells with measurable LPH.
January 2005	CSXT/ARCADIS	Remediation	CSXT/ARCADIS continued with monthly EFR events, Approximately 32,466 gallons of total fluids (LPH and water) were removed from July 2004 through June 2009.
September 2006	CSXT/ARCADIS	Remediation	CSXT/ARCADIS installed an automated LPH recovery pump in MW-2. A total of 54 gallons of LPH were recovered from September 2006 through July 2008.
January 30, 2007	CSXT/ARCADIS	SCM and Work Plan Submittal	CSXT/ARCADIS submitted the *Site Conceptual Model and Supplemental Work Plan* including installation of additional monitoring wells and abandonment of temporary wells.
April 16, 2007	MDE	Correspondence	MDE approved the *Site Conceptual Model and Supplemental Work Plan* dated January 30, 2007.
June 2007	CSXT/ARCADIS	Investigation	CSXT/ARCADIS abandoned 6 temporary wells (TP-1, TP-3, TP-4, TP-5, TP-10, and TP-11) and installed 8 permanent groundwater monitoring wells (MW-4R and MW-21 through MW-27).
July 18, 2007	CSXT/MDE	Consent Order	MDE and CSXT signed the Consent Order.

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
July/August 2007	CSXT/ARCADIS	Investigation	CSXT/ARCADIS installed 24 direct-push borings (GP-20 and GP-26 through GP-49) with soil and groundwater sampling.
October 3, 2007	CSXT/ARCADIS	Work Plan Submittal	CSXT/ARCADIS submitted the *Work Plan for Monitoring Well Installation and Groundwater Sampling*.
November 9, 2007	MDE	Correspondence	MDE approved the *Work Plan for Monitoring Well Installation and Groundwater Sampling* dated October 3, 2007.
November 2007	CSXT/ARCADIS	Investigation	CSXT/ARCADIS installed 17 permanent groundwater monitoring wells (MW-20, MW-28 through MW-33, MW-35, MW-37, MW-38, MW-39, MW-41, MW-43, and MW-49 through MW-52).
February 8, 2008	CSXT/ARCADIS	SCM Submittal	CSXT/ARCADIS submitted the *Revised Site Conceptual Model (SCM)* (second version of the SCM).
March 12, 2008	CSXT/ARCADIS	Work Plan Submittal	CSXT/ARCADIS submitted the *Additional Site Characterization Work Plan*.
May 30, 2008	MDE	Correspondence	MDE approved the *Additional Site Characterization Work Plan* dated March 12, 2008.
June 2008	CSXT/ARCADIS	Investigation	CSXT/ARCADIS installed 24 direct-push borings (GP-53 through GP-76) with soil and groundwater sampling.
August 29, 2008	CSXT/ARCADIS	SCM and CAP Submittal	CSXT/ARCADIS submitted the *Revised SCM* (third version of the SCM) and the *Corrective Action Plan*, including the Dual-Phase Extraction (DPE) pilot test.
October 28, 2008	MDE	Correspondence	MDE approved the DPE pilot test portion of the *Corrective Action Plan*, with modifications.
December 16-18, 2008	CSXT/ARCADIS	Investigation	CSXT/ARCADIS installed 6 permanent groundwater monitoring wells (MW-53 to MW-58) as monitoring points for the DPE pilot test.
January 7 - 13, 2009	CSXT/ARCADIS	Investigation	CSXT/ARCADIS conducted DPE Pilot Test at MW-41 and EW-2.
March 2, 2009	CSXT/ARCADIS	CAP Addendum Submittal	CSXT/ARCADIS submitted the *Corrective Action Plan Addendum* which included the *Dual-Phase Extraction Pilot Test Results*.

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
May 27, 2009	MDE	Consent Order Milestone	MDE approved the *Corrective Action Plan Addendum* dated March 2, 2009, start of three year remedial goal specified in Consent Order.
July 14, 2009	CSXT/ARCADIS	Remediation	CSXT/ARCADIS implemented LPH removal activities in accordance with the *Corrective Action Plan Addendum* dated March 2, 2009. Activities included the installation of 3 LPH skimmer pumps and 5 passive LPH skimmers.
May 2010	CSXT/ARCADIS	Remediation	Approximately 267 gallons of LPH recovered since implementation of LPH removal activities in accordance with the *Corrective Action Plan Addendum* in July 2009.
June 4, 2010	CSXT/ARCADIS	Remediation	CSXT/ARCADIS submitted *Proposed LPH Recovery System Enhancements.*
July 8, 2010	MDE	Correspondence	MDE approved *Proposed LPH Recovery System Enhancements*, dated June 4, 2010.
September 2, 2010	CSXT/ARCADIS	Remediation	CSXT/ARCADIS installed 3 additional LPH skimmer pumps per the *Proposed LPH Recovery System Enhancements*, dated June 4, 2010.
December 15, 2011	CSXT/ARCADIS	Investigation	CSXT/ARCADIS submitted a Proposed Additional Well Installation Letter Work Plan which included the installation of 8 additional monitoring wells (MW-59 through MW-66).
January 25, 2012	MDE	Correspondence	MDE approved the Proposed Additional Well Installation Letter Work Plan and requested the submittal of a Well Installation Summary Report by March 31, 2012 and an Updated SCM by April 30, 2012. CSXT/ARCADIS requested that the documents be combined into one for submittal on April 30, 2012.
March 2012	CSXT/ARCADIS	Investigation	Seven of the 8 proposed monitoring wells (MW-59 through MW-65) were installed and developed. MW-66 could not be installed due to subsurface infrastructure obstructions (i.e. the former roundhouse foundation).
April 30, 2012	CSXT/ARCADIS	Remediation	Approximately 600 gallons of LPH have been recovered since implementation of LPH removal activities in accordance with the *Corrective Action Plan Addendum* in July 2009. A Revised Site Conceptual Model was submitted to MDE.

Table 1
History of Environmental Activities Associated with the Site and the C&O Canal
C&O Canal/Brunswick Rail Yard
Brunswick, Maryland

Date/Year	Company/Agency	Action Type	Description
July 18, 2012	CSXT/ARCADIS	Investigation	The Supplemental Investigation Work Plan (SIWP) was submitted to the MDE. The SIWP outlined investigation activities to support soil characterization of the C&O Canal prism, dissolved phase hydrocarbon fate and transport evaluation (monitoring well development, groundwater sampling, and rising head testing), and further evaluation of liquid phase hydrocarbons (monitoring well installation, LPH characterization, short-term LPH stress testing, and a LPH mobility/recoverability analysis) at the Site.
August 17, 2012	NPS	Correspondence	NPS provided comments to CSXT regarding the SIWP.
September 6, 2012	MDE	Correspondence	MDE conditionally approved the SIWP, provided several modifications were made to the SIWP.
October 12, 2012	CSXT/ARCADIS	Investigation	The SIWP was revised based on the comments provided by the MDE and NPS, and was resubmitted.
November 2012	CSXT/ARCADIS	Investigation	Well redevelopment activities outlined in the SIWP were completed.
January 15, 2013	MDE	Correspondence	MDE conditionally approved the Revised SIWP, provided several modifications were made to the Revised SIWP.
January 2013	CSXT/ARCADIS	Investigation	Well installations, semi-annual and SIWP groundwater sampling, hydraulic testing, and LPH stress testing was completed as outlined in the SIWP.
February 1, 2013	CSXT/ARCADIS	Correspondence	SIWP progress update was provided to the MDE.
March 5, 2013	MDE/CSXT/ARCADIS	Correspondence	MDE correspondence was provided approving the progress schedule CSXT/ARCADIS submitted on February 1, 2013. CSXT/ARCADIS letter was submitted to MDE, documenting the presence of LPH in new well CSXT MW-70.
March 8, 2013	CSXT/ARCADIS	Investigation	A Well Installation Summary Report was submitted to the MDE, documenting well installation activities at four new wells, CSXT MW-67, CSXT MW-68, CSXT MW-69, and CSXT MW-70.
March 15, 2013	CSXT/ARCADIS	Remediation	Approximately 720 gallons of LPH have been recovered since implementation of LPH removal activities in accordance with the *Corrective Action Plan Addendum* in July 2009.
April 19, 2013	CSXT/ARCADIS	Remediation	A Revised Site Conceptual Model was submitted to MDE.

Table 2
Well Construction Details
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Installation Date	Easting Coordinates	Northing Coordinates	Well Diameter (inches)	TOC Elevation (feet amsl)	Depth to Screen (feet bgs)	Screen Length (feet)	Top of Screen Elevation (feet amsl)	Bottom of Screen Elevation (feet amsl)	Ground Surface Elevation (feet amsl)
MW-01	6/24/1994	1135842.6	599612.4	4.0	247.20	8.7	20	238.50	218.50	245.00
MW-02	6/24/1994	1135284.8	599482.2	4.0	247.55	6.5	20	241.05	221.05	245.55
MW-03	6/24/1994	1135843.5	599215.7	4.0	248.38	6.0	20	242.38	222.38	246.88
MW-04R	6/12/2007	1135354.4	599450.2	4.0	244.68	5.0	20	239.68	219.68	244.99
MW-05	8/30/1995	1135330.5	599552.3	4.0	245.37	5.5	20	239.87	219.87	245.63
MW-06R	3/29/2004	1135134.6	599418.6	4.0	233.63	5.5	10	228.13	218.13	233.63
MW-08	8/31/1995	1135245.5	599282.0	4.0	235.51	6.5	20	229.06	209.06	234.81
MW-09	8/31/1995	1135100.1	599338.7	4.0	237.54	8.3	20	229.25	209.25	234.97
MW-20	9/27/2007	1135015.9	599454.6	4.0	236.27	2.5	20	233.77	213.77	236.88
MW-21	6/15/2007	1135146.8	599538.4	4.0	244.26	6.0	10	238.26	228.26	244.60
MW-22	6/13/2007	1135365.0	599611.3	4.0	245.65	9.0	10	236.65	226.65	246.00
MW-23	6/18/2007	1135397.5	599425.1	4.0	244.57	4.0	10	240.57	230.57	244.83
MW-24	6/18/2007	1135553.2	599316.0	4.0	244.50	4.0	10	240.50	230.50	244.70
MW-25	6/15/2007	1136105.5	599078.2	4.0	245.36	9.0	10	236.36	226.36	245.65
MW-26	6/13/2007	1135468.6	599370.5	4.0	244.67	10.5	10	234.17	224.17	245.05
MW-27	6/18/2007	1135395.9	599452.5	4.0	244.29	3.0	10	241.29	231.29	244.83
MW-28	11/12/2007	1135229.0	599487.5	4.0	244.23	7.0	20	237.23	217.23	244.50
MW-29	11/13/2007	1135121.4	599534.1	4.0	243.74	3.3	20	240.49	220.49	244.06
MW-30	11/16/2007	1135279.6	599560.5	4.0	245.46	3.8	20	241.71	221.71	245.79
MW-31	11/16/2007	1135330.3	599481.1	4.0	244.79	4.5	20	240.29	220.29	245.18
MW-32	11/16/2007	1135515.9	599590.4	4.0	245.80	4.5	20	241.30	221.30	246.08
MW-33	11/12/2007	1135172.4	599601.8	4.0	244.26	3.0	20	241.26	221.26	244.80
MW-35	11/21/2007	1136064.3	599158.5	4.0	245.80	4.8	20	240.97	220.97	246.14
MW-37	11/20/2007	1135602.6	599409.9	4.0	245.06	5.8	20	239.31	219.31	245.49
MW-38	11/26/2007	1135766.1	599541.3	4.0	246.09	5.0	20	241.09	221.09	246.30
MW-39	11/21/2007	1135853.6	599342.9	4.0	245.65	4.0	20	241.65	221.65	246.00
MW-41	11/19/2007	1135501.5	599471.3	4.0	246.07	2.0	20	244.07	224.07	246.41
MW-43	11/26/2007	1135374.8	599325.8	4.0	238.90	6.3	10	232.57	222.57	239.07
MW-49	11/19/2007	1135604.3	599567.6	4.0	246.02	4.5	20	241.52	221.52	246.39
MW-50	11/14/2007	1136139.9	599301.5	4.0	245.53	4.5	20	241.03	221.03	245.83
MW-51	11/20/2007	1135456.1	599723.6	4.0	249.34	5.0	20	244.34	224.34	249.65
MW-52	11/14/2007	1135614.3	599666.7	4.0	247.00	5.5	15	241.50	226.50	247.22
MW-53	12/17/2008	1135509.7	599484.3	2.0	246.1	10	10	236.32	226.32	246.32
MW-54	12/18/208	1135503.7	599475.7	2.0	245.6	10	10	236.42	226.42	246.42
MW-55	12/17/2008	1135510.5	599464.8	2.0	246.12	10	10	236.30	226.30	246.30
MW-56	12/16/2008	1135387.8	599433.9	2.0	244.63	10	10	234.93	224.93	244.93
MW-57	12/16/2008	1135396.2	599433.8	2.0	244.78	8	10	236.93	226.93	244.93
MW-58	12/16/2008	1135393.9	599421.3	2.0	244.42	10	10	234.78	224.78	244.78
MW-59	3/16/2012	1135569.5	599580.5	4.0	246.07	5	20	241.07	221.07	246.33
MW-60	3/16/2012	1135514.6	599537.4	4.0	245.57	5	20	240.57	220.57	246.02
MW-61	3/15/2012	1135534.7	599525	4.0	245.63	5	20	240.63	220.63	246.07
MW-62	3/14/2012	1135556.1	599498	4.0	246.08	5	20	241.57	221.57	246.57
MW-63	3/14/2012	1135557.2	599451.1	4.0	246.25	5	20	241.60	221.60	246.6
MW-64	3/14/2012	1135610.1	599450.7	4.0	245.45	5	20	241.01	221.01	246.01
MW-65	3/13/2012	1135632.4	599467.6	4.0	245.54	5	20	240.98	220.98	245.98
MW-67	1/7/2013	1135451.6	599539.8	4.0	245.83	5	20	241.27	221.27	246.27
MW-68	1/8/2013	1135646.4	599523.3	4.0	244.98	5	20	240.97	220.97	245.97
MW-69	1/9/2013	1135620.6	599364.7	4.0	245.09	5	20	240.82	220.82	245.82
MW-70	1/9/2013	1135904.4	599399.4	4.0	245.57	5	20	241.07	221.07	246.07
MW-01(NPS)	8/29/1996	1135189.6	599332.9	4.0	234.94	10.0	10	224.94	214.94	235.27
MW-02(NPS)	8/30/1996	1135731.2	599137.7	4.0	237.19	12.5	10	224.69	214.69	237.5
MW-03(NPS)	8/27/1996	1135790.7	599023.3	4.0	234.50	14.0	10	220.50	210.50	234.8
MW-04(NPS)	9/3/1996	1135307.1	599362.9	4.0	238.66	4.0	10	234.66	224.66	238.92
MW-05(NPS)	8/28/1996	1135385.6	599247.1	4.0	235.69	15.0	10	220.69	210.69	236.08
MW-10(NPS)	11/27/2001	1135580.2	599215.1	2.0	237.73	5.8	15	231.93	216.93	235.72
MW-11(NPS)	11/27/2001	1135662.2	599160.3	2.0	234.40	10.8	10	223.60	213.60	234.84
MW-12(NPS)	11/28/2001	1135803.6	599097.4	2.0	242.61	16.8	10	225.81	215.81	240.36
MW-13(NPS)	11/28/2001	1135662.0	599097.0	2.0	234.72	14.3	10	220.42	210.42	235.26
MW-14(NPS)	11/29/2001	1136003.6	598904.9	2.0	234.74	7.3	20	227.44	207.44	235.18
MW-15(NPS)	11/30/2001	1136110.0	598850.5	2.0	234.38	7.8	15	226.58	211.58	234.83
MW-16(NPS)	12/3/2001	1135475.5	599269.4	2.0	240.09	6.8	15	233.29	218.29	237.44
MW-17(NPS)	12/3/2001	1136002.9	598994.5	2.0	242.71	15.8	15	226.91	211.91	240.07
EW-1	11/7/2003	1135420.3	599457.7	6.0	243.50	9	15	234.50	219.50	243.50
EW-2	11/4/2003	1135388.4	599433.9	6.0	243.30	13	10	230.3	220.30	243.30
EW-3	11/5/2003	1135421.3	599408.4	6.0	242.70	10.5	10	232.2	222.20	242.70
EW-4	11/6/2003	1135346.6	599430.3	6.0	243.20	10	15	233.2	218.20	243.20
EW-5	11/6/2003	1135403.3	599403.8	6.0	243.60	10	15	233.6	218.60	243.60
EW-6	11/6/2003	1135456.9	599371.5	6.0	242.40	10	15	232.4	217.40	242.40
EW-7	11/5/2003	1135513.3	599341.3	6.0	243.20	10	15	233.2	218.20	243.20

Notes:

Coordinates are Maryland State Plane Coordinates, NAD 83

feet amsl = feet above mean sea level

feet bgs = feet below ground surface

Groundwater elevations are adjusted for LPH thicknesses with a density correction of 0.87.

NG = not gauged

Table 3
January 2013 Soil Sampling Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Analysis	Constituent[2]	Units	Location ID	CSXT MW-67	CSXT MW-67	CSXT MW-68	CSXT MW-68	CSXT MW-69	CSXT MW-69	CSXT MW-70
			Sample Date	1/7/2013	1/7/2013	1/8/2013	1/8/2013	1/8/2013	1/8/2013	1/9/2013
			Sample Interval (ft bgs)	8 - 8.5	14.2 - 14.7	11.5 - 12	13.5 - 14	15.5 - 16	16.5 - 17	14.5 - 15
			Secondary Sample Interval (ft bgs)[1]	8 - 9	13.7 - 14.7	11 - 12	13 - 14	15 - 16	16 - 17	14.5 - 15.5
VOCs USEPA Method SW8260B	Benzene, 1-methylethyl	ug/kg		**420**	**1300**	< 220 U	**280**	**47 J**	**44 J**	**420**
	Cyclohexane	ug/kg		**86 J**	**170 J**	< 220 U	< 240 U	< 230 U	< 290 U	**150 J**
	Ethylbenzene	ug/kg		< 220 U	< 240 U	< 220 U	< 240 U	< 230 U	< 290 U	**1300**
	Methylcyclohexane	ug/kg		**620**	**1200**	**540**	**510**	< 230 U	< 290 U	**920**
	Naphthalene	ug/kg		< 220 U	< 240 U	< 220 U	< 240 U	< 230 U	< 290 U	**850**
	Toluene	ug/kg		< 220 U	< 240 U	< 220 U	< 240 U	< 230 U	< 290 U	**760**
	Xylenes, Total	ug/kg		< 450 U	< 470 U	< 440 U	< 480 U	< 470 U	< 580 U	**6100**
SVOCs USEPA Method SW8270D	2,4-Dimethylphenol	ug/kg		< 3800 U	< 3900 U	< 400 U	**360 J**	< 460 U	< 400 U	< 400 U
	2-Methyl naphthalene	ug/kg		< 3800 U	< 3900 U	< 400 U	< 400 U	< 460 U	< 400 U	**150 J**
	Acenaphthene	ug/kg		< 3800 U	< 3900 U	< 400 U	**1500**	< 460 U	< 400 U	< 400 U
	Acetophenone	ug/kg		< 3800 U	< 3900 U	< 400 U	< 400 U	< 460 U	< 400 U	**160 J**
	Fluoranthene	ug/kg		< 3800 U	< 3900 U	**78 J**	**140 J**	< 460 U	< 400 U	< 400 U
	Fluorene	ug/kg		**1300 J**	**5900**	**780**	**1800**	< 460 U	**920**	< 400 U
	Naphthalene	ug/kg		< 3800 U	< 3900 U	< 400 U	< 400 U	< 460 U	< 400 U	**77 J**
	N-Nitrosodiphenylamine	ug/kg		< 3800 U	< 3900 U	**4500**	< 400 U	< 460 U	< 400 U	< 400 U
	Phenanthrene	ug/kg		**3700 J**	**17000**	**2100**	**4600**	**110 J**	**2300**	< 400 U
	Pyrene	ug/kg		< 3800 U	**580 J**	**130 J**	**230 J**	< 460 U	**80 J**	< 400 U
TPH-DRO USEPA Method SW8015B	DRO [C10-C28]	mg/kg		**2300**	**13000**	**2400**	**3800**	**540**	**1600**	**110**
TPH-GRO USEPA Method SW8015B	GRO [C6-C10]	mg/kg		**38**	**55**	**21**	**71**	**25**	**36**	**130**

Notes:

1. Sampling interval was expanded to a one-foot interval of split-spoon samples to allow collection of larger volume for SVOC and TPH-DRO analyses.
2. Constituents which were not detected at concentrations above reporting limits are not displayed. For a full list of analytes, refer to Appendix C.

J - Value estimated.
U - Analyte was analyzed for but not detected. Value listed represents the reporting limit concentration.
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
TPH-DRO - Total Petroleum Hydrocarbons, Diesel Range Organics
TPH-GRO - Total Petroleum Hydrocarbons, Gasoline Range Organics

Table 4
January 2013 Groundwater Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Constituent	MDE Groundwater Standards	Units	Location ID: CSXT MW-03 Sample ID: CSXT MW03 (011413) Sample Date: 1/14/2013	CSXT MW-03 DUP-01 (011413) 1/14/2013	CSXT MW-06R CSXT MW06R (011613) 1/16/2013	CSXT MW-08 CSXT MW08 (011513) 1/15/2013	CSXT MW-09 CSXT MW09 (011513) 1/15/2013	CSXT MW-20 CSXT MW20 (011613) 1/16/2013	CSXT MW-21 CSXT MW21 (011713) 1/17/2013	CSXT MW-22 CSXT MW22 (011513) 1/15/2013
VOCs (ug/L)										
1,1-Dichloroethane	90	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Acetone	550	ug/l	< 25 U	< 25 U	**15 J**	< 25 U	< 25 U	< 25 U	< 25 U	**14 J**
Benzene	5	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene, 1-methylethyl	66	ug/l	< 1 U	< 1 U	**6.6**	< 1 U	< 1 U	< 1 U	< 1 U	**0.75 J**
Bromomethane	0.85	ug/l	< 1 U	< 1 U	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Carbon Disulfide	100	ug/l	< 1 U	< 1 U	**0.50 J**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	10	ug/l	< 1 U	< 1 U	**NA**	< 1 U	< 1 U	**NA**	< 1 U	< 1 U
Chloroform	80	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cyclohexane	NS	ug/l	< 1 U	< 1 U	**5.4**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Diisopropy Ether	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene	700	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethyl-t-butyl ether (ETBE)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl tert-butyl ether	20	ug/l	< 1 U	< 1 U	< 1 U	**5.6**	**1.3**	< 1 U	< 1 U	< 1 U
Methylcyclohexane	NS	ug/l	< 1 U	< 1 U	**7.5**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylene Chloride	5	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Naphthalene	0.65	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tert-Amyl Methyl Ether (TAME)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tert-Butyl Alcohol	NS	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Toluene	1000	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	0.44	ug/l	< 5 U	< 5 U	**NA**	< 5 U	< 5 U	**NA**	< 5 U	< 5 U
Xylenes, Total	100	ug/l	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
SVOCs (ug/L)										
2-Methyl naphthalene	2.4	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	**1.8 J**	**1.8 J**
2-Methylphenol	180	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	**0.97 J**
Acenaphthene	37	ug/l	< 10 U	< 10 U	**5.6 J**	< 9.9 U	< 10 U	< 9.7 U	< 10 U	**3.4 J**
Acenaphthylene	37	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
Acetophenone	NS	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	**1.5 J**
Anthracene	18	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
Caprolactam	NS	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
Dibenzofuran	3.7	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
Diethyl phthalate	2900	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
Fluoranthene	150	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
Fluorene	24	ug/l	< 10 U	< 10 U	**9.0 J**	< 9.9 U	< 10 U	< 9.7 U	**1.0 J**	< 9.6 U
m & p Cresol	180	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	**8.6 J**
Naphthalene	0.65	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	**1.0 J**	< 9.6 U
Phenanthrene	180	ug/l	< 10 U	< 10 U	**1.5 J**	< 9.9 U	< 10 U	< 9.7 U	< 10 U	**3.6 J**
Pyrene	18	ug/l	< 10 U	< 10 U	< 9.9 U	< 9.9 U	< 10 U	< 9.7 U	< 10 U	< 9.6 U
TPH (mg/L)										
Diesel Range Organics [C10-C28] (SGT)	0.047	mg/l	**0.029 J***	< 0.098 U	**7.4 ***	< 0.1 U	< 0.098 U	< 0.1 U	**0.22**	**0.7**
Diesel Range Organics [C10-C28]	0.047	mg/l	**0.049 J***	**0.058 J***	**7.7 ***	**0.039 J**	**0.15**	**0.036 J***	**0.6 ***	**4.1**
Gasoline Range Organics (GRO)-C6-C10	0.047	mg/l	< 0.05 U	**0.012 J**	**0.13**	< 0.05 U	< 0.05 U	**0.065**	< 0.05 U	**0.019 J**
ORO C24-C40		mg/l	**0.045 J**	**0.062 J**	**0.063 JB**	< 0.1 U	**0.04 J**	**0.032 JB**	**0.042 JB**	**0.091 J**

Notes:

TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
mg/L - milligrams per liter
ug/L - micrograms per liter

<1U - Concentration is less than the reporting limit
NA - Not Analyzed
J,* - Concentration is estimated
B - Constituent was detected in a laboratory method blank
Cells exceeding the standard in Column C are shaded gray

Table 4
January 2013 Groundwater Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Constituent	MDE Groundwater Standards	Units	Location ID: CSXT MW-25 Sample ID: CSXT MW25 (011413) Sample Date: 1/14/2013	CSXT MW-29 MW-29 (012413) 1/24/2013	CSXT MW-35 CSXT MW-35 (020613) 2/6/2013	CSXT MW-43 CSXT MW43 (011613) 1/16/2013	CSXT MW-51 CSXT MW51 (011413) 1/14/2013	CSXT MW-59 CSXT MW59 (011413) 1/14/2013	CSXT MW-61 CSXT MW61 (011413) 1/14/2013	CSXT MW-65 CSXT MW65 (011713) 1/17/2013
VOCs (ug/L)										
1,1-Dichloroethane	90	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	< 1 U	< 1 U	**0.79 J**
Acetone	550	ug/l	< 25 U	< 25 U	< 25	< 25 U	< 25 U	**4.1 J**	< 25 U	**7.1 J**
Benzene	5	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene, 1-methylethyl	66	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	**78**	**13**	**13**
Bromomethane	0.85	ug/l	< 1 U	**NA**	**NA**	**NA**	< 1 U	< 1 U	< 1 U	**NA**
Carbon Disulfide	100	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	**0.79 J**	< 1 U	< 1 U
Chlorobenzene	10	ug/l	< 1 U	< 1 U	< 1	**NA**	< 1 U	< 1 U	< 1 U	< 1 U
Chloroform	80	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cyclohexane	NS	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	**4.7**	< 1 U	< 1 U
Diisopropy Ether	NS	ug/l	< 1 U	< 1 U	< 1	< 1 U	**1.1**	< 1 U	< 1 U	< 1 U
Ethylbenzene	700	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethyl-t-butyl ether (ETBE)	NS	ug/l	< 1 U	< 1 U	< 1	< 1 U	**1.2**	< 1 U	< 1 U	< 1 U
Methyl tert-butyl ether	20	ug/l	< 1 U	**3.8**	< 1	< 1 U	**12**	< 1 U	< 1 U	< 1 U
Methylcyclohexane	NS	ug/l	< 1 U	**0.71 J**	< 1	< 1 U	< 1 U	**68**	**6.9**	**1.1**
Methylene Chloride	5	ug/l	< 5 U	< 5 U	< 5	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Naphthalene	0.65	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tert-Amyl Methyl Ether (TAME)	NS	ug/l	< 1 U	< 1 U	< 1	< 1 U	**0.65 J**	< 1 U	< 1 U	< 1 U
Tert-Butyl Alcohol	NS	ug/l	< 5 U	< 5 U	< 5	< 5 U	**53**	< 5 U	< 5 U	< 5 U
Toluene	1000	ug/l	< 1 U	< 1 U	< 1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	0.44	ug/l	< 5 U	< 5 U	< 5	**NA**	< 5 U	< 5 U	< 5 U	< 5 U
Xylenes, Total	100	ug/l	< 10 U	< 10 U	< 10	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
SVOCs (ug/L)										
2-Methyl naphthalene	2.4	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	**110**	< 10 U
2-Methylphenol	180	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	< 9.6 U	< 10 U
Acenaphthene	37	ug/l	< 10 U	**5.8 J**	< 11	< 10 U	< 9.5 U	**66**	**14**	**6.1 J**
Acenaphthylene	37	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	< 9.6 U	< 10 U
Acetophenone	NS	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	< 9.6 U	< 10 U
Anthracene	18	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	**190**	< 9.6 U	< 10 U
Caprolactam	NS	ug/l	**6.4 J**	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	< 9.6 U	< 10 U
Dibenzofuran	3.7	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	**35 J**	< 9.6 U	**3.5 J**
Diethyl phthalate	2900	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	< 9.6 U	< 10 U
Fluoranthene	150	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	**1.4 J**	< 10 U
Fluorene	24	ug/l	< 10 U	**4.9 J**	< 11	< 10 U	< 9.5 U	**97**	**21**	**7.9 J**
m & p Cresol	180	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	**2.8 J**	< 10 U
Naphthalene	0.65	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	< 9.6 U	< 10 U
Phenanthrene	180	ug/l	< 10 U	< 9.6 U	< 11	< 10 U	< 9.5 U	< 51 U	**45**	**4.0 J**
Pyrene	18	ug/l	< 10 U	**0.60 J**	< 11	< 10 U	< 9.5 U	**9.8 J**	**2.6 J**	< 10 U
TPH (mg/L)										
Diesel Range Organics [C10-C28] (SGT)	0.047	mg/l	**0.041 J***	**26 B**	**0.65**	**0.36**	< 0.095 U	**0.7 ***	**20 ***	**0.93**
Diesel Range Organics [C10-C28]	0.047	mg/l	**1.2 ***	**18 B**	**0.69**	**0.98 ***	**0.12 ***	**150 ***	**100 ***	**4 ***
Gasoline Range Organics (GRO)-C6-C10	0.047	mg/l	**0.023 J**	**0.025 J**	< 0.05 U	< 0.05 U	**0.029 J**	**0.16**	**0.16**	**0.092**
ORO C24-C40		mg/l	**0.1**	**0.23 B**	**0.22**	**0.15 B**	**0.028 J**	**1.4**	**0.85**	**0.27 B**

Notes:

TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
mg/L - milligrams per liter
ug/L - micrograms per liter

<1U - Concentration is less than the reporting limit
NA - Not Analyzed
J - Concentration is estimated
B - Constituent was detected in a laboratory method blank
Cells exceeding the standard in Column C are shaded gray

Table 4
January 2013 Groundwater Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Constituent	MDE Groundwater Standards	Units	Location ID: CSXT MW-67 Sample ID: CSXT MW67 (011513) Sample Date: 1/15/2013	CSXT MW-68 CSXT MW68 (011713) 1/17/2013	CSXT MW-69 CSXT MW69 (011713) 1/17/2013	CSXT MW-70 CSXT MW70 (011713) 1/17/2013	CSXT MW-70 DUP 02 (011713) 1/17/2013	NPS MW-01 NPS MW01 (011513) 1/15/2013	NPS MW-02 NPS MW02 (011613) 1/16/2013	NPS MW-03 NPS MW03 (011513) 1/15/2013
VOCs (ug/L)										
1,1-Dichloroethane	90	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Acetone	550	ug/l	**14 J**	< 25 U	**5.7 J**	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
Benzene	5	ug/l	< 1 U	< 1 U	< 1 U	**0.53 J**	0.51 J	< 1 U	< 1 U	< 1 U
Benzene, 1-methylethyl	66	ug/l	**10**	**2.8**	**1.2**	**0.61 J**	0.82 J	< 1 U	< 1 U	< 1 U
Bromomethane	0.85	ug/l	**NA**	**NA**	**NA**	**NA**	NA	**NA**	**NA**	**NA**
Carbon Disulfide	100	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	10	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**NA**	< 1 U
Chloroform	80	ug/l	**0.97 J**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cyclohexane	NS	ug/l	**1.9**	< 1 U	< 1 U	**0.75 J**	< 1 U	< 1 U	< 1 U	< 1 U
Diisopropy Ether	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene	700	ug/l	< 1 U	< 1 U	< 1 U	**2.5**	2.7	< 1 U	< 1 U	< 1 U
Ethyl-t-butyl ether (ETBE)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl tert-butyl ether	20	ug/l	**2.1**	< 1 U	< 1 U	< 1 U	< 1 U	**1.9**	< 1 U	< 1 U
Methylcyclohexane	NS	ug/l	**3.6**	< 1 U	**1.1**	**1.2**	1.4	< 1 U	< 1 U	< 1 U
Methylene Chloride	5	ug/l	< 5 U	< 5 U	**6.5**	< 5 U	< 5 U	< 5 U	**2.6 J**	< 5 U
Naphthalene	0.65	ug/l	< 1 U	**6.8**	< 1 U	**1.6**	< 1 U	< 1 U	< 1 U	< 1 U
tert-Amyl Methyl Ether (TAME)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tert-Butyl Alcohol	NS	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Toluene	1000	ug/l	< 1 U	< 1 U	< 1 U	**1.0**	0.91 J	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	0.44	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**NA**	< 5 U
Xylenes, Total	100	ug/l	< 10 U	< 10 U	< 10 U	**13**	13	< 10 U	< 10 U	< 10 U
SVOCs (ug/L)										
2-Methyl naphthalene	2.4	ug/l	**11**	**6.4 J**	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
2-Methylphenol	180	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Acenaphthene	37	ug/l	**9.8 J**	**6.0 J**	**4.5 J**	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Acenaphthylene	37	ug/l	< 11 U	< 11 U	**2.0 J**	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Acetophenone	NS	ug/l	**4.1 J**	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Anthracene	18	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Caprolactam	NS	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Dibenzofuran	3.7	ug/l	**6.3 J**	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Diethyl phthalate	2900	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	**2.0 J**	< 10 U	< 11 U
Fluoranthene	150	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Fluorene	24	ug/l	**14**	**8.0 J**	**3.4 J**	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
m & p Cresol	180	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Naphthalene	0.65	ug/l	< 11 U	< 11 U	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Phenanthrene	180	ug/l	**20**	**15**	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
Pyrene	18	ug/l	**0.70 J**	**1.2 J**	< 11 U	< 10 U	< 9.5 U	< 10 U	< 10 U	< 11 U
TPH (mg/L)										
Diesel Range Organics [C10-C28] (SGT)	0.047	mg/l	**2.6**	**3.6**	**0.93**	**0.044 J**	**0.05 J**	< 0.097 U	**0.035 J**	< 0.1 U
Diesel Range Organics [C10-C28]	0.047	mg/l	**5.6**	**6 ***	**2.3 ***	**0.46 ***	**0.48 ***	**0.13**	**0.28 ***	**0.071 J**
Gasoline Range Organics (GRO)-C6-C10	0.047	mg/l	**0.086**	**0.05**	**0.063**	**0.091**	**0.11**	< 0.05 U	< 0.05 U	< 0.05 U
ORO C24-C40		mg/l	**0.12**	**0.19 B**	**0.17 B**	**0.034 JB**	**0.042 JB**	**0.042 J**	**0.061 JB**	**0.047 J**

Notes:

TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
mg/L - milligrams per liter
ug/L - micrograms per liter

<1U - Concentration is less than the reporting limit
NA - Not Analyzed
J - Constituent was detected in a laboratory method blank
Cells exceeding the standard in Column C are shaded gray

Table 4
January 2013 Groundwater Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Constituent	MDE Groundwater Standards	Location ID: / Sample ID: / Sample Date: / Units	NPS MW-04 NPS MW04 (011613) 1/16/2013	NPS MW-05 NPS MW05 (011513) 1/15/2013	NPS MW-10 NPS MW10 (011613) 1/16/2013	NPS MW-12 NPS MW12 (011613) 1/16/2013	NPS MW-13 NPS MW13 (011513) 1/15/2013	NPS MW-14 NPS MW14 (011513) 1/15/2013	NPS MW-15 NPS MW15 (011513) 1/15/2013	NPS MW-16 NPS MW16 (011613) 1/16/2013	NPS MW-17 NPS MW17 (011613) 1/16/2013
VOCs (ug/L)											
1,1-Dichloroethane	90	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Acetone	550	ug/l	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
Benzene	5	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benzene, 1-methylethyl	66	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane	0.85	ug/l	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Carbon Disulfide	100	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	10	ug/l	**NA**	< 1 U	**NA**	**NA**	< 1 U	< 1 U	< 1 U	**NA**	**NA**
Chloroform	80	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cyclohexane	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Diisopropy Ether	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene	700	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethyl-t-butyl ether (ETBE)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl tert-butyl ether	20	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylcyclohexane	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylene Chloride	5	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**2.8 J**	< 5 U	< 5 U
Naphthalene	0.65	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tert-Amyl Methyl Ether (TAME)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tert-Butyl Alcohol	NS	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Toluene	1000	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	0.44	ug/l	**NA**	< 5 U	**NA**	**NA**	< 5 U	< 5 U	< 5 U	**NA**	**NA**
Xylenes, Total	100	ug/l	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
SVOCs (ug/L)											
2-Methyl naphthalene	2.4	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
2-Methylphenol	180	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Acenaphthene	37	ug/l	**6.2 J**	< 11 U	< 10 U	< 10 U	< 11 U	**1.2 J**	**3.8 J**	< 9.8 U	< 9.9 U
Acenaphthylene	37	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Acetophenone	NS	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Anthracene	18	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Caprolactam	NS	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Dibenzofuran	3.7	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Diethyl phthalate	2900	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Fluoranthene	150	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Fluorene	24	ug/l	**7.0 J**	< 11 U	< 10 U	< 10 U	< 11 U	**1.2 J**	< 10 U	< 9.8 U	< 9.9 U
m & p Cresol	180	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Naphthalene	0.65	ug/l	< 10 U	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Phenanthrene	180	ug/l	**7.9 J**	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
Pyrene	18	ug/l	**1.2 J**	< 11 U	< 10 U	< 10 U	< 11 U	< 11 U	< 10 U	< 9.8 U	< 9.9 U
TPH (mg/L)											
Diesel Range Organics [C10-C28] (SGT)	0.047	mg/l	**17 ***	0.039 J	0.034 J	**0.067 J**	< 0.1 U	**0.068 J**	**0.21**	**0.029 J**	**0.028 J**
Diesel Range Organics [C10-C28]	0.047	mg/l	**17 ***	**0.16**	**0.32 ***	**0.26 ***	**0.21**	**0.7**	**0.49**	**0.28 ***	**0.1 ***
Gasoline Range Organics (GRO)-C6-C10	0.047	mg/l	**0.088**	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.03 J**	**0.053**	< 0.05 U	< 0.05 U
ORO C24-C40		mg/l	**0.32 B**	**0.051 J**	**0.095 JB**	**0.059 JB**	**0.061 J**	**0.12**	**0.047 J**	**0.079 JB**	**0.045 JB**

Notes:

TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
mg/L - milligrams per liter
ug/L - micrograms per liter

<1U - Concentration is less than the reporting limit
NA - Not Analyzed
J - Concentration is estimated
B - Constituent was detected in a laboratory method blank
Cells exceeding the standard in Column C are shaded gray

Table 4
January 2013 Groundwater Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Constituent	MDE Groundwater Standards	Location ID: / Sample ID: / Sample Date: / Units	QAQC TB-1 (010713) 1/7/2013	QAQC TB (010813) 1/8/2013	QAQC TB (010913) 1/9/2013	QAQC TB-01 (011413) 1/14/2013	QAQC TB01 (011513) 1/15/2013	QAQC TB 01 (011613) 1/16/2013	QAQC TB01 (011713) 1/17/2013	QAQC TB-01 (012413) 1/24/2013	QAQC TB-001 (020613) 2/6/2013
VOCs (ug/L)											
1,1-Dichloroethane	90	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Acetone	550	ug/l	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25
Benzene	5	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Benzene, 1-methylethyl	66	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Bromomethane	0.85	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	NA
Carbon Disulfide	100	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Chlorobenzene	10	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	< 1 U	< 1 U	< 1
Chloroform	80	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Cyclohexane	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Diisopropy Ether	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Ethylbenzene	700	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Ethyl-t-butyl ether (ETBE)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Methyl tert-butyl ether	20	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Methylcyclohexane	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Methylene Chloride	5	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5
Naphthalene	0.65	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
tert-Amyl Methyl Ether (TAME)	NS	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
Tert-Butyl Alcohol	NS	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5
Toluene	1000	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1
trans-1,3-Dichloropropene	0.44	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	NA	< 5 U	< 5 U	< 5
Xylenes, Total	100	ug/l	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10
SVOCs (ug/L)											
2-Methyl naphthalene	2.4	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	180	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	37	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	37	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	18	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	3.7	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	2900	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	150	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	24	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
m & p Cresol	180	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.65	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	180	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	18	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (mg/L)											
Diesel Range Organics [C10-C28] (SGT)	0.047	mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics [C10-C28]	0.047	mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)-C6-C10	0.047	mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA
ORO C24-C40		mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
mg/L - milligrams per liter
ug/L - micrograms per liter

<1U - Concentration is less than the reporting limit
NA - Not Analyzed
J - Concentration is estimated
B - Constituent was detected in a laboratory method blank
Cells exceeding the standard in Column C are shaded gray

Table 5
Slug Testing Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Date of Test	Pre-test static water column (feet)	Test Number	Calculated Initial Displacement (Ho*, feet)	Measured Initial Displacement (Ho, feet)	Estimated Hydraulic Conductivity (K, feet/day)	Solution
MW-21	1/24/2013	4.08	1	1.7	1.51	145	Dagan (1978)
			2	1.7	1.86	146	Dagan (1978)
			3	0.4	0.39	200	Dagan (1978)
MW-25	1/22/2013	5.66	1	1.7	1.75	2.58	Bouwer-Rice (1976) with Butler (6.11) casing correction
			2	1.7	1.67	2.93	Bouwer-Rice (1976) with Butler (6.11) casing correction
			3	0.4	0.41	3.09	Bouwer-Rice (1976) with Butler (6.11) casing correction
MW-29	1/23/2013	10.19	1	1.7	1.62	0.45	Bouwer-Rice (1976) with Butler (6.11) casing correction
			2	1.7	1.69	0.45	Bouwer-Rice (1976) with Butler (6.11) casing correction
			3	0.4	0.45	0.55	Bouwer-Rice (1976) with Butler (6.11) casing correction
MW-35	1/22/2013	10.47	1	1.7	1.57	1.85	Bouwer-Rice (1976) with Butler (6.11) casing correction
			2	1.7	1.66	1.86	Bouwer-Rice (1976) with Butler (6.11) casing correction
			3	0.4	0.36	2.16	Bouwer-Rice (1976) with Butler (6.11) casing correction

Table 6
LPH Analytical Data Summary
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Parameter	Units	MW-41 (2013)	MW-56 (2013)	MW-63 (2013)	MW-49 (2008)	MW-4R (2008)
LPH Density	g/cm^3	0.874	0.870	0.872	0.881	0.869
LPH Viscosity	g/cm-s	0.043	0.041	0.045	0.055	0.042
Groundwater Density	g/cm^3	0.998	0.998	0.998	0.998	0.999
Groundwater Viscosity	g/cm-s	0.010	0.010	0.010	0.010	0.010
Air-Groundwater Interfacial (Surface) Tension	Dyne/cm	63.7	62.9	63.0	59.7	64.5
Air-LPH Interfacial Tension	Dyne/cm	29.4	29.0	28.8	30.2	29.6
LPH-Water Interfacial Tension	Dyne/cm	18.1	20.8	17.7	11.4	18.0

Notes:
All analyses performed at 70 - 71.6 degrees Fahrenheit. Interfacial Tension measurements for 2008 samples were performed at 75 degrees Fahrenheit.
LPH = liquid phase hydrocarbon

Table 7
LPH Baildown Test Results
C & O Canal/Brunswick Rail Yard, Brunswick, Maryland

Test Well ID	Date	Initial LPH Thickness (feet)	Test Duration (minutes)	Final LNAPL Thickness (feet)	LPH Transmissivity ($feet^2$/day)	LPH Hydraulic Conductivity (feet/day)	Average LPH Transmissivity ($feet^2$/day)
					Bouwer & Rice		
MW-41	1/23/2013	1.87	2559	0.93	0.12	0.06	0.12
MW-49	1/24/2013	0.53	1345	0.22	NA[1]	NA	NA
	1/25/2013	0.22	153	0.16	NA[2]	NA	
MW-53	1/23/2013	1.42	1392	1.34	**2.44**	1.72	2.05
	1/24/2013	1.34	1510	1.2	**1.65**	1.23	
MW-54	1/23/2013	0.39	238	0.3	NA[3]	NA	NA
	1/23/2013	0.3	1578	0.52	NA[3]	NA	
MW-55	1/22/2013	1.9	1003	1.7	**1.50**	0.79	1.22
	1/23/2013	1.7	182	1.48	**0.93**	0.55	
	1/23/2013	1.48	385	1.32	NA[3]	NA	
MW-56	1/24/2013	3.15	1394	1.95	**0.90**	0.29	0.64
	1/25/2013	1.95	165	0.62	0.37	0.19	
					Average (Geometric Mean) LPH Transmissivity:		**0.66**

Acronyms and Abbreviations:

Bold Exceeds 0.1 to 0.8 ft^2/day lower criterion range to produce sufficient LNAPL recoverability (ITRC 2009a).

Bouwer & Rice = Bouwer & Rice modified slug test analysis method

LNAPL = light non-aqueous phase liquid

NA = not analyzed for the following reasons:

1. Filter pack drainage dominated recovery period
2. LPH discharge to the monitoring well was too limited to quantify with testing methods
3. Fluid levels during the test fluctuated and poor LNAPL discharge to the monitoring well

Table 8
TPH-DRO Comparison
C and O Canal/Brunswick Rail Yard, Brunswick, MD

Sample ID	TPH-DRO w/o Silica Gel Cleanup (mg/L)	TPH-DRO w/ Silica Gel Cleanup (Non-Polar Compounds) (mg/L)	Percent TPH-DRO Represented by Non-Polar Compounds
CSXT MW-03	0.049 J*	0.029 J*	59%
CSXT MW-03 (duplicate sample)	0.058 J*	< 0.098 U	NA
CSXT MW-06R	7.7 *	7.4 *	96%
CSXT MW-08	0.039 J	< 0.1 U	NA
CSXT MW-09	0.15	< 0.098 U	NA
CSXT MW-20	0.036 J*	< 0.1 U	NA
CSXT MW-21	0.6 *	0.2	37%
CSXT MW-22	4.1	0.7	17%
CSXT MW-25	1.2 *	0.041 J*	3%
CSXT MW-29	18 B	26 B	144%
CSXT MW-35	0.69	0.65	94%
CSXT MW-43	0.98 *	0.4	37%
CSXT MW-51	0.12 *	< 0.095 U	NA
CSXT MW-59	150 *	0.7 *	0%
CSXT MW-61	100 *	20 *	20%
CSXT MW-65	4 *	0.93	23%
CSXT MW-67	5.6	2.6	46%
CSXT MW-68	6 *	3.6	60%
CSXT MW-69	2.3 *	0.93	40%
CSXT MW-70	0.46 *	0.044 J	10%
CSXT MW-70 (duplicate sample)	0.48 *	0.05 J	10%
NPS MW-01	0.13	< 0.097 U	NA
NPS MW-02	0.28 *	0.035 J	13%
NPS MW-03	0.071 J	< 0.1 U	NA
NPS MW-04	17 *	17 *	100%
NPS MW-05	0.16	0.039 J	24%
NPS MW-10	0.32 *	0.034 J	11%
NPS MW-12	0.26 *	0.067 J	26%
NPS MW-13	0.21	< 0.1 U	NA
NPS MW-14	0.7	0.068 J	10%
NPS MW-15	0.49	0.21	43%
NPS MW-16	0.28 *	0.029 J	10%
NPS MW-17	0.1 *	0.028 J	28%

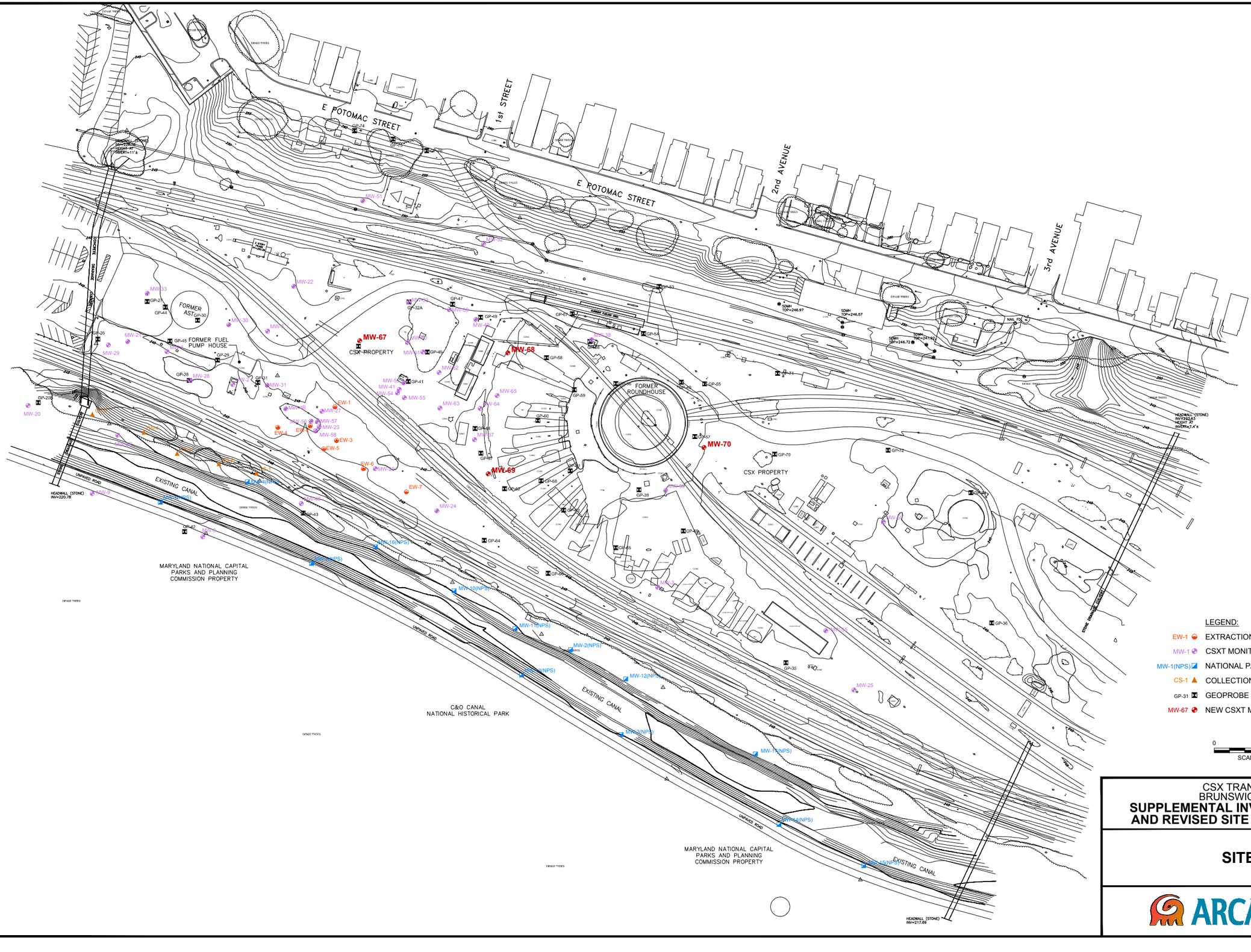
Notes:

TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
mg/L - milligrams per liter
ug/L - micrograms per liter

<1U - Concentration is less than the reporting limit
NA - Not Analyzed
J - Concentration is estimated
B - Constituent was detected in a laboratory method blank
* - LCS or LCSD exceeds laboratory control limits

ARCADIS

Figures



CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SITE PLAN

ARCADIS

FIGURE
1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\MD000843\0011\00006\MD843_11_6 F01.dwg LAYOUT: 1 SAVED: 4/8/2013 12:00 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: TOPO.CTB PLOTTED: 4/18/2013 10:37 AM BY: SANCHEZ, ADRIAN
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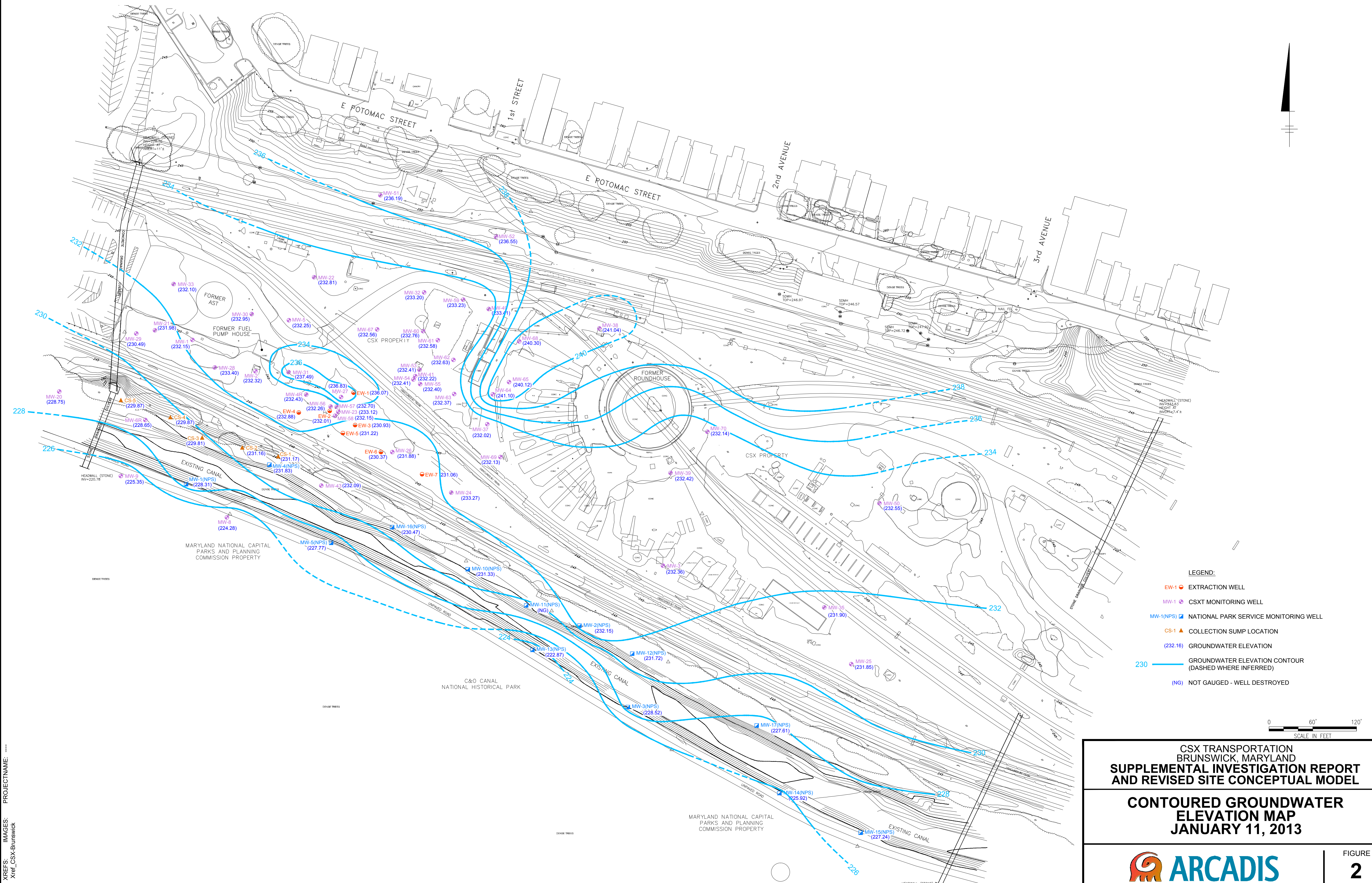
Xref_CSX-Brunswick



CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

CONTOURED GROUNDWATER ELEVATION MAP JANUARY 11, 2013

ARCADIS

FIGURE 2

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 F02.dwg LAYOUT: 2 SAVED: 4/16/2013 10:50 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: TOPO.CTB PLOTTED: 4/18/2013 10:14 AM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
Xref_CSX-Brunswick

E POTOMAC STREET

1st STREET

E POTOMAC STREET

2nd AVENUE

3rd AVENUE

FORMER AST

FORMER FUEL PUMP HOUSE

FORMER ROUNDHOUSE

CSX PROPERTY

CSX PROPERTY

MARYLAND NATIONAL CAPITAL PARKS AND PLANNING COMMISSION PROPERTY

C&O CANAL NATIONAL HISTORICAL PARK

MARYLAND NATIONAL CAPITAL PARKS AND PLANNING COMMISSION PROPERTY

EXISTING CANAL

UNPAVED ROAD

CONCRETE DRAINAGE DITCH

STONE DRAINAGE DITCH

HEADWALL (STONE) INV=225.78

HEADWALL (STONE) INV=233.61 HEIGHT AT INVERT=7.4'±

SDMH TOP=246.97

SDMH TOP=246.57

SDMH TOP=246.73

SDMH TOP=247.02

MW-51 0.12 * < 0.095 U (-)

MW-52 (-)

MW-22 4.1 0.7 17%

MW-33 (-)

MW-30 (-)

MW-3 (-)

MW-29 18 B 26.8 144%

MW-21 0.6 * 0.2 37%

MW-1 (-)

MW-28 (-)

MW-2 (-)

MW-31 (-)

MW-4R (-)

MW-56 (-)

MW-27 (-)

MW-57 (-)

MW-23 (-)

MW-58 (-)

EW-1 (-)

EW-2 (-)

EW-3 (-)

EW-4 (-)

EW-5 (-)

EW-6 (-)

EW-7 (-)

MW-26 (-)

MW-24 (-)

MW-20 0.036 J * < 0.1 U (-)

CS-4 (-)

MW-6R 7.7 * 7.4 96%

CS-3 (-)

CS-2 (-)

CS-1 (-)

MW-4(NPS) 17 * 17 100%

MW-1(NPS) 0.13 < 0.097 U (-)

MW-9 0.15 < 0.098 U (-)

MW-8 0.039 J < 0.1 U (-)

MW-43 0.98 * 0.4 37%

MW-16(NPS) 0.28 * 0.029 J 10%

MW-5(NPS) 0.16 0.039 J 24%

MW-10(NPS) 0.32 * 0.034 J 11%

MW-11(NPS) 0.1 U (-)

MW-2(NPS) 0.28 * 0.035 J 13%

MW-13(NPS) 0.21 < 0.1 U (-)

MW-12(NPS) 0.26 * 0.067 J 26%

MW-3(NPS) 0.071 J < 0.1 U (-)

MW-17(NPS) 0.1 * 0.028 J 28%

MW-14(NPS) 0.7 0.068 J 10%

MW-15(NPS) 0.49 0.21 43%

MW-59 150 * 0.7 * 0.5%

MW-49 (-)

MW-32 (-)

MW-67 5.6 2.6 46%

MW-60 (-)

MW-61 100 * 20 * 20%

MW-62 (-)

MW-5 (-)

MW-5 (-)

MW-55 (-)

MW-41 (-)

MW-63 (-)

MW-64 (-)

MW-65 4 * 0.93 23%

MW-68 6 * 3.6 60%

MW-38 (-)

MW-37 (-)

MW-69 2.3 * 0.93 40%

MW-39 (-)

MW-70 0.46 * 0.044 J 10%

MW-50 (-)

MW-35 0.69 0.65 94%

MW-25 1.2 * 0.041 J 3%

MW-3 0.049 J * 0.029 J 59%

LEGEND:

EW-1 EXTRACTION WELL

MW-1 CSXT MONITORING WELL

MW-1(NPS) NATIONAL PARK SERVICE MONITORING WELL

CS-1 COLLECTION SUMP LOCATION

0.21 TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION - JANUARY 2013 (mg/L)

0.65 TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION WITH SILICA GEL TREATMENT (SGT) - JANUARY 2013 (mg/L)

13% PERCENT TPH-DRO REPRESENTED BY NON-POLAR COMPOUNDS (%)

(-) NOT SAMPLED

<0.01 U NOT DETECTED ABOVE LABORATORY DETECTION LIMIT

J, * CONCENTRATION IS ESTIMATED

0 60' 120'

SCALE IN FEET

CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

TPH-DRO CONCENTRATION IN MILLIGRAMS PER LITER (mg/L) IN GROUNDWATER JANUARY 2013

ARCADIS

FIGURE 3

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* PAGESETUP: ---- PLOTSTYLETABLE: TOPO.CTB PLOTTED: 4/18/2013 10:28 AM BY: SANCHEZ, ADRIAN
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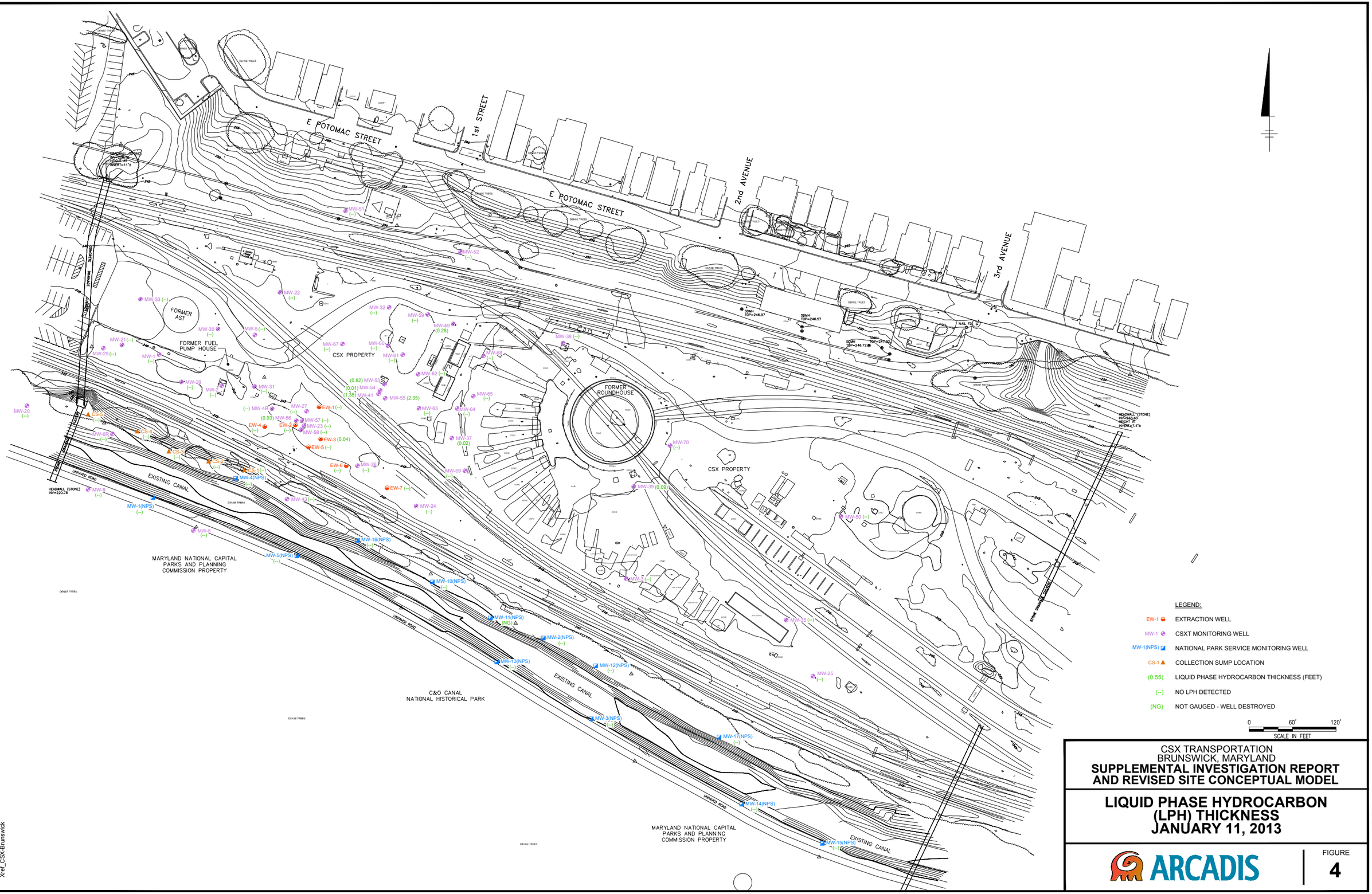

CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

LIQUID PHASE HYDROCARBON (LPH) THICKNESS JANUARY 11, 2013

ARCADIS

FIGURE **4**

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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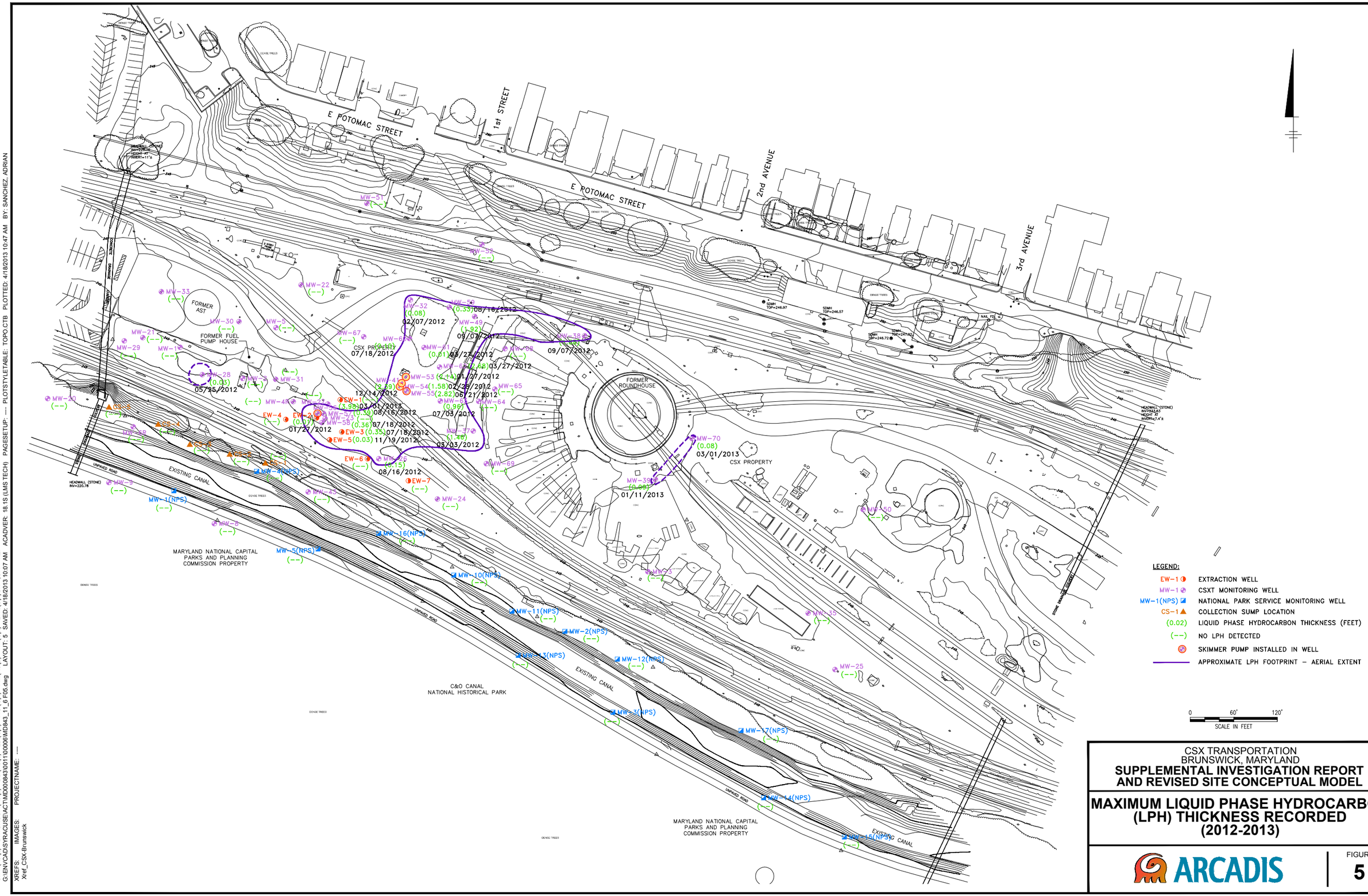
XREFS: IMAGES: PROJECTNAME: ----
Xref_CSX-Brunswick



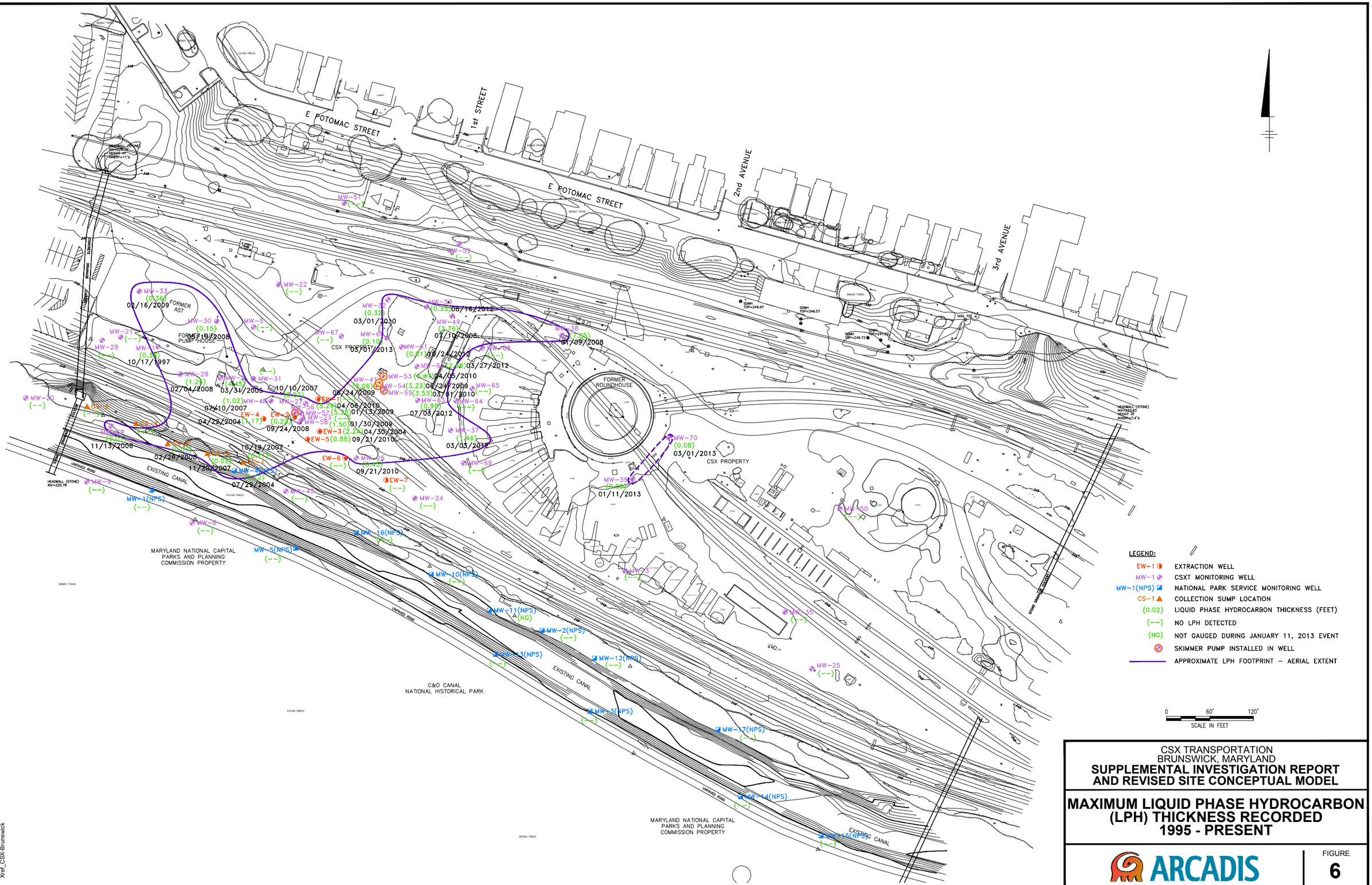
CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

MAXIMUM LIQUID PHASE HYDROCARBON (LPH) THICKNESS RECORDED (2012-2013)

ARCADIS

FIGURE 5



CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

MAXIMUM LIQUID PHASE HYDROCARBON (LPH) THICKNESS RECORDED 1995 - PRESENT

ARCADIS

FIGURE 6

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTMD00084300111\00006\MD843_11_6 F06.dwg LAYOUT: 6 SAVED: 4/8/2013 4:37 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: TOPO.CTB PLOTTED: 4/18/2013 10:16 AM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
Xref_CSX-Brunswick

Appendix A

Boring and Well Construction Logs

Sample Log

Well/Boring GP-20 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/26/2007 (1122) **Drilling Completed** 7/26/2007 (1138)

Total Depth Drilled 16 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 16-17.5 feet

Length and Diameter of Sampling Device 4',1.5" **Type of Sampling Device** Encore **Time:** 1250

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3.5	1125	0-3.5 fill, light brown, gravel and clay	0
				3.5-4 fill, drak gray, organic material	0
4	8	3	1130	4-5 no recovery	0
				5-6.5 fill, dark gray, organic material	0
				6.5-8 light brown, clayey gravel, dry	0
8	12	4	1134	8-9.5 light brown, silty clay	0
				9.5-12 light brown, clay	0
12	16	4	1138	12-12.5 light brown, clay	0
				12.5-13 dark gray, organic material	0
				13-14 light brown, sand, gravel, clay, moist	0
				14-16 light brown, sand, gravel, clay, wet	0
				refusal @ 16'	

Sample Log

Well/Boring GP-20B Project Name and No. MD000843.0005.00003

Site Location CSXT Brunswick Rail yard Drilling Started 7/26/2007 (1223) Drilling Completed 7/26/2007 (1245)

Total Depth Drilled 19 feet Hole Diameter 2 1/2 inches Sampling Interval 17-19 feet

Length and Diameter of Sampling Device 4',1.5" Time 1250 Type of Sampling Device Encore

Drilling Method Geoprobe Drilling Fluid Used none

Drilling Contractor SGS Environmental Driller Mike Kroury Helper George Martin

Prepared By Josh Wilson Hammer Weight _____ Hammer Drop _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	4	1225	0-4 light brown, fill, gravel and sand	0
4	8	3	1230	4-5 no recovery	0
				5-6 fill, dark gray, organic material	0
				6-6.5 sitly clay	0
				6.5-8 light brown, gravelly silt fill	0
8	12	4	1236	8-9 fill light brown, gravelly silt fill	0
				9-12 light brown, clayey silt	0
12	16	4	1240	12-14 light brown, clayey silt	0
				14-15 light brown, clay	0
				15-15.5 light brown, clay, moist	0
				15.5-16 light brown, gravelly clay (50% clay) moist	0
16	19	1	1245	16-18 no recovery	0
				18-18.8 light brown, clayey sandy gravel, saturated	0
				18.8-19 dry cobble	
				refusal @ 19'	

Sample Log

Well/Boring GP-26 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (1425) **Drilling Completed** 7/31/2007 (1530)

Total Depth Drilled 24 feet **Hole Diameter** 2.5 inches **Sampling Interval** 19-20 feet

Length and Diameter of Sampling Device 4', 1.5" **Time** 1540 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	14:31	0-1 no recovery	
				1-3.3 fill, silt and gravel, dark grey	0.7
				3.3-4 sandy clay and gravel, light brown	1.0
4	8	3	14:42	4-5 no recovery	
				5-5.7 sandy clay, stiff, orangish brown	1.3
				5.7-7.2 sand (well sorted) and gravel (50%), light brown	1.6
				7.2-8 silty sand and gravel (25%) light brown	1.6
8	12	3	14:50	8-9 no recovery	
				9-11 silty sand and gravel (25%), light brown	1.9
				11-11.5 silt and gravel (10%), loose, dry, light brown	2.0
				11.5-12 silty sand, moist, light brown	1.8
12	16	4	14:59	12-14 sandy clay, loose, moist, light brown	2.8
				14-16 sandy clay and gravel (25%), moist, stiff, light brown	4.9
16	20	3	15:09	16-17 no recovery	
				17-18 sandy clay and gravel (25%), moist, stiff, light brown	9.7

Sample Log (Cont.d)

Well/Boring GP26 **Project Name and No.** CSX Brunswick/MD000843.05.03

Prepared By JW

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
16	20	3	15:21	18-19 Silt and gravel (10%), soft, moist, olive grey	53.7
				19-20 sandy silt and gravel (25%), moist, olive grey	59.7
20	24	3.5	15:30	20-20.5 no recovery	
				20.5 - 21 sandy clay, light brown	47.2
				21 - 22.5 sand and gravel (50%)/saturated, olive grey	17.7
				22.5 - 24 sandy silt, moist, olive grey	3.2
				refusal @ 24'	

Sample Log

Well/Boring GP-27 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (1550) **Drilling Completed** 7/31/2007 (1625)

Total Depth Drilled 20 feet **Hole Diameter** 2.5 inches **Sampling Interval** 15-16 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1630 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3.5	15:53	0-0.5 no recovery	
				0.5-4.0 fill, silt and gravel, dark grey	0.0
4	8	3.5	15:59	4-4.5 no recovery	
				4.5-8 silty sand and gravel (25%), light brown	0.0
8	12	2.5	16:06	8-9.5 no recovery	
				9.5-11 fill, silt and gravel, dark grey	0.1
				11-12 silty sand, loose, light brown	0.6
12	16	2	16:14	12-14 no recovery	
				14-14.5 gravel and sand, well sorted, wet dark grey, odor	17.6
				14.5-15 gravel, loose, wet, well sorted, dark grey, odor	38.4
				15-16 silty clay, moist, soft, olive grey	7.1
16	20	2	16:25	16-18 no recovery	
				18-19.3 sand, (well sorted) and gravel (50%), some clay, saturated, olive gray	105.0
				19.3-20 sand (poorly sorted) and gravel (10%), tight, moist	120.0
				refusal @ 20'	

Sample Log

Well/Boring GP-28 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (1323) **Drilling Completed** 7/31/2007 (1348)

Total Depth Drilled 16 feet **Hole Diameter** 2.5 inches **Sampling Interval** 11.5-12 feet

Length and Diameter of Sampling Device 4', 1.5" **Time** 1410 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	13:26	0-1.5 no recovery	
				1.5-2.5 fill, silt and gravel, dark grey	0.0
				2.5-4.0 clayey sand and gravel (25% gravel), light brown	0.3
4	8	3	13:31	4-5 no recovery	
				5-7.4 clayey sand & gravel (25% gravel), light brown	0.1
				7.4-8 clayey silt, moist, olive grey	117.0
8	12	4	13:38	8-9 clayey silt, moist,soft, olive grey	110.0
				9-10.3 silty clay, stiff, dry, light brown	20.1
				10.3-10.9 sand, clay and gravel, light brown, dry	6.1
				10.9-11.5 clayey silt, light brown	3.7
				11.5-12 clayey silt and gravel (25%), light brown	2.3
12	16	4	13:48	12-12.4 sand and gravel (50%)	37.4
				12.4-14.3 clay, sand and gravel (25%), saturated, light brown	20.4
				14.3-15.8 sandy clay, stiff, moist	120.7
				15.8-16 weathered rock, green	71.1

Sample Log

Well/Boring GP-29 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (1155) **Drilling Completed** 7/31/2007 (1241)

Total Depth Drilled 20 feet **Hole Diameter** 2.5 inches **Sampling Interval** 17.4-18 feet

Length and Diameter of Sampling Device 4', 1.5" **Time** 1250 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper**

Prepared By Josh Wilson **Hammer Weight** **Hammer Drop** inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	12:00	0-1 no recovery	
				1-4 fill, gravel and silt, dark grey	2.9
4	8	2	12:07	4-6 no recovery	
				6-8, fill, gravel and silt, dark grey and lght brown	5.0
8	12	2.5	12:16	8-9.5 no recovery	
				9.5-10.5 silty clay and gravel (25% gravel), light brown	4.4
				10.5-11.5 silty clay, light brown	30.1
				11.5-12 silty clay and gravel (50% gravel), light brown	33.4
12	16	4	12:24	12-13 silty clay and gravel (50% gravel), light brown, dry	112.0
				13-16 clayey silt, soft, light brown, moist, odor	161.0
16	20	3	12:41	16-17 no recovery	
				17-17.4 clayey silt, soft, light brown, moist, odor	31.7
				17.4-18 sand and gravel(50%), moist, dark grey	78.8
				18-19.5 sand and gravel (25%), saturated, light brown, sheen	125.0
				19.5-20 sand and gravel (poorly sorted) (75%), moist, light brown	30.1

Sample Log

Well/Boring GP-30 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 8/1/2007 (0825) **Drilling Completed** 8/1/2007 (0915)

Total Depth Drilled 22 feet **Hole Diameter** 2.5 inches **Sampling Interval** 15-16 feet

Time 0930

Length and Diameter of Sampling Device 4', 1.5" **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	08:30	0-1.5 no recovery	
				1.5-4 fill, silt and gravel, light grey	0.0
4	8	2.5	08:40	4-5.5 no recovery	
				5.5-8 fill, silt and gravel, dark grey, dry	0.0
8	12	2.5	08:47	8-9.5 no recovery	
				9.5-12 fill, silt and gravel, moist	0.0
12	16	3.5	08:53	12-12.5 no recovery	
				12.5-13 fill, silt and gravel, dark grey	
				13-14 clayey silt, wet, dark grey, odor	64.9
				14-16 clayey silt, moist, olive grey, odor	98.7
16	20	3	09:04	16-17 no recovery	
				17-18.3 sand (well sorted) and gravel (10%) & clay, saturated, dark grey	58.2
				18.3-18.6 sand (poorly sorted), moist, olive grey	108.0
				18.6-19.8 sand (well sorted) and gravel (25%), olive grey, moist	114.0
				19.8-20 gravel (75%) and sand, light brown, dry	44.7

Sample Log (Cont.d)

Well/Boring GP-30 **Project Name and No.** CSX Brunswick / MD000843.0005.0003

Prepared By Josh Wilson

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
20	22	2	09:15	20-21 silty sand and gravel (25%0, olive grey, moist	19.1
				21-21.5 sand, well sorted, moist, olive grey	69.1
				21.5-22 sand, well sorted, gravel (25%), light brown, moist	33.1
				refusal at 22'	

Sample Log

Well/Boring GP-31 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (1305) **Drilling Completed** 7/31/2007 (1315)

Total Depth Drilled 8 feet **Hole Diameter** ____ inches **Sampling Interval** ____ feet

Length and Diameter of Sampling Device 4', 1.5" **Type of Sampling Device** ____

Drilling Method Geoprobe **Drilling Fluid Used** ____

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** ____

Prepared By Josh Wilson **Hammer Weight** ____ **Hammer Drop** ____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2	13:10	0-2 no recovery	
				2-4 fill, gravel	
4	8	2	13:15	4-6 no recovery	
				6-8 fill, silt and gravel, boring is collapsing, filling to 1'	
				*attempt twice more, 1 10' S, 1 10' E, same result	

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Sample Log

Well/Boring GP-32 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/30/2007 (0950) **Drilling Completed** 7/30/2007 (1003)

Total Depth Drilled 10 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** _____ feet

Length and Diameter of Sampling Device 4',1.5" **Type of Sampling Device** _____

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	954	0-1.5 no recovery	
				1.5-4 fill, gravel and silt, dark gray	4.6
4	8	3.5	958	4-4.5 no recovery	
				4.5-6.5 clay, light gray, moist, soft	34.8
				6.5-8 clay, light brown and gray, stiff	22.1
8	10	2	1083	8-9.5 clay, light brown an dgray, stiff	54.2
				9.5-10 gravelly clay (50% gravel), dark gray	31.1
				refusal @ 10'	

Sample Log

Well/Boring GP-32A **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/30/2007 (1010) **Drilling Completed** 7/30/2007 (1050)

Total Depth Drilled 19 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 13-14 feet

Length and Diameter of Sampling Device 4',1.5" **Time** 1120 (sample labeled as GP32) **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	1014	0-1 no recovery	
				1-4 fill, gravel and silt, dark gray	1.1
4	8	3.5	1017	4-4.5 no recovery	
				4.5-5 fill, gravel and silt, dark gray	146
				5-6.5 clay, light gray, soft, moist	33.8
				6.5-8 clay, light brown and gray, stiff	16.1
8	12	4	1023	8-10 clay, light brown and gray, stiff	54.3
				10-10.7 sandy clay, light brown	56.8
				10.7-11 sandy clay and gravel (50% gravel), light brown	79.4
				11-11.3 sand, poorly sorted, saturated, light brown	76.1
				11.3-12 sandy clay, light brown, stiff	119
12	16	4	1031	12-14 sandy clay and gravel (50% gravel), light brown, stiff, moist	83.4
				14-15 sand, poorly sorted, light brown, saturated	72.3
				15-16 sandy clay, light brown, stiff, moist	110
16	19	3	1047	16-17 silty sandy gravel, light brown, moist	121
				17-19 silty clay and gravel (50% gravel), light brown, moist/ (refusal @19')	47.9

Sample Log

Well/Boring GP-34 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/30/2007 (1654) **Drilling Completed** 7/30/2007 (1728)

Total Depth Drilled 24 feet **Hole Diameter** 2.5 inches **Sampling Interval** 18.5-19 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1735 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** none

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	16:56	0-1.5 no recovery	
				1.5-4 fill, silt and gravel, dark grey	0.0
4	8	2.5	16:58	4-5.5 no recovery	
				5.5-8 fill, silt and gravel, dark grey	0.0
8	12	2.5	17:07	8-9.5 no recovery	
				9.5-11 fill, silt and gravel, dark grey	0.0
				11-12 sand and gravel (25% gravel), light brown	0.0
12	16	2.5	17:12	12-13.5 no recovery	
				13.5-16 sand and gravel (25% gravel), light brown	0.0
16	20	1.5	17:19	16-18.5 no recovery	
				18.5-19 silty clay,light brown, stiff, moist	0.0
				19-19.7 sand, poorly sorted, saturated, light brown	0.0
				19.7-20 sand and gravel (50% gravel), light brown, moist	0.0
20	24	3	17:28	20-21 no recovery	
				21-24 sand and gravel (50% gravel), light brown, dry	

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Sample Log

Well/Boring GP-35 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/30/2007 (1340) **Drilling Completed** 7/30/2007 (1416)

Total Depth Drilled 20 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 15-16 feet

Length and Diameter of Sampling Device 4',1.5" **Time** 1530 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	1343	0-1 no recovery	0
				1.5 fill, gravel and silt, dark gray	0.5
				1.5-3.5 clay and gravel, stiff, light brown	2.8
				3.5-4 sand and gravel, well sorted, moist, gray	6
4	8	2.5	1348	4-5.5 no recovery	
				5.5-6 sand and gravel, sell sorted, moist gray	46.8
				6-8 silty clay, stiff, olive gray	4.3
8	12	3	1359	8-9 no recovery	
				9-9.5 silty clay, stiff, olive gray	8.5
				9.5-10.5 silty sand, moist, olive gray	1.1
				10.5-12 clayey silt, some gravel, olive gray, stiff	1.8
12	16	3.5	1408	12.5-16 silty, clay, light brown, stiff	1.6
16	20	4	1416	16-18 sand, some gravel, well sorted, saturated, gray	25.8
				18-19.5 clay,light brown, stiff	1.8
				19.5-20 sand, some gravel, light brown, poorly sorted	2.4

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Sample Log

Well/Boring GP-36 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/30/2007 (1552) **Drilling Completed** 7/30/2007 (1628)

Total Depth Drilled 20 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 17-18 feet

Length and Diameter of Sampling Device 4',1.5" **Time** 1635 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	1554	1.5-4 silt and gravel, dark gray	0
4	8	2.5	1558	5.8-8 silt and gravel, dark gray	0
8	12	2.5	1605	8-10.5 fill, silt and gravel, dark gray	0
				10.5 12 no recovery	
12	16	3	1610	12-13 no recovery	
				13-14.5 fill, silt and gravel, dark gray	0
				14.5-16 sandy clay, light brown, wet	0
16	20	3	1628	16-17 no recovery	
				17-18 clayey silt, some gravel (10% gravel), moist, light brown	0
				18-19.5 sand, poorly sorted, light brown, saturated	0
				19.5-20 sand and gravel (50% gravel), light brown, moist	0

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Sample Log

Well/Boring GP-37 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/27/2007 (1100) **Drilling Completed** 7/27/2007 (1145)

Total Depth Drilled 24 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 21-22.5 feet

Length and Diameter of Sampling Device 4',1.5" **Type of Sampling Device** Time: 1150 Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	1103	0-2 fill, organic material, dark gray	0
				2-3 clayey silt, light brown	0
				3-4 no recovery	
4	8	3	1110	4-4.5 clayey silt, light brown	1.7
				4.5-7 silt, olive gray, moist	4.3
				7-8 no recovery	
8	12	3.5	1115	8-10.5 silt, olive gray, moist	22.8
				10.5-11.5 clayey silt, light brown	23.1
				11.5-12 no recovery	
12	16	4	1125	12-16 clayey silt, olive gray, moist	36.1
16	20	4	1132	16-17 clayey silt, olive gray, moist	7.5
				17-17.5 clayey silty gravel, olive gray, moist (50% gravel)	48.3
				17.5-18.5 clayey silty gravel, olive gray, saturated (50% gravel)	24.8
				18.5-20 clayey silt, olive gray, moist	4.7
20	24	3	1142	20-22 silty sandy gravel (25% gravel), light brown, moist	3.1
				22-22.5 sand, poorly sorted, olive gray, moist	9.9

Sample Log (Cont.d)

Well/Boring GP37 **Project Name and No.** MD000843.0005.00003

Prepared By Josh Wilson

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
20	24			22.5-23 sand, poorly sorted, olive gray, saturated	1.8
				23-24 no recovery	

Sample Log

Well/Boring GP-38 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (0838) **Drilling Completed** 7/31/2007 (0936)

Total Depth Drilled 23.5 feet **Hole Diameter** 2.5 inches **Sampling Interval** 16-17 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 0945 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	08:42	0.-1.5 no recovery	
				1.5-4 fill, gravel and silt, dark grey	342.0
4	8	3	08:55	4-5 no recovery	
				5-7 silty clay, soft, wet, olive grey, odor	35.5
				7-8 silty clay, stiff, olive grey, odor	42.3
8	12	4	09:04	8-12 silty clay, stiff, olive grey	73.1
12	16	4	09:15	12-13 silty clay, some gravel, soft, moist, olive gray	52.1
				13-14 silty clay and gravel (10%), (50% gravel) stiff, moist light brown	38.2
				14-16 silty sandy clay, moist, light brown	61.4
16	20	4	09:24	16-17 silty clay, soft, moist, lgiht brown	42.5
				17-17.8 sand and gravel (10%), saturated, light brown	46.8
				17.8-18.5 silt (poorly sorted), stiff, dry, greenish brown	12.1
				18.5-19.5 clayey sand and gravel (25% gravel) moist, light brown	9.4
				19.5-20 sand and gravel, (50% gravel), light brown	3.4
20	23.5	3.5	09:36	20-23.5 sand and gravel (50%) gravel), light brown (refusal at 23.5)	5.6

Sample Log

Well/Boring GP-39 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/30/2007 (1245) **Drilling Completed** 7/30/2007 (1313)

Total Depth Drilled 14 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** _____ feet

Length and Diameter of Sampling Device 4',1.5" **Type of Sampling Device** _____

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2	1248	2-4 fill, gravel and silt, dark gray	0
4	8	1	1253	7-8 silty clay, light brown, moist	0
8	12	4	1303	8-9 silty clay, light brown, stiff	0
				9-11 clay, light brown, stiff	0
				11-12 silty sandy clay, stiff, light brown	0
12	14	2	1313	12-12.5 sandy clay, light brown, stiff	0
				12.5-14 sandy clay, moist, soft, light brown	0
				refusal @ 14'	

Sample Log

Well/Boring GP-40 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 7/31/2007 (1005) **Drilling Completed** 7/31/2007 (1108)

Total Depth Drilled 24 feet **Hole Diameter** 2.5 inches **Sampling Interval** 16-16.8 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1105 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2	10:10	0-2 no recovery	
				2-4 fill, silt and gravel, dark grey	1.5
4	8	2	10:15	4-6 no recovery	
				6-8 silty clay, soft, light brown	2.1
8	12	4	10:24	8-9 silty clay, soft, light brown	1.6
				9-11 clayey silt, stiff, light brown	3.4
				11-12 silty clay, soft, light brown	1.6
12	16	4	10:35	12-13 silty clay, soft, light	1.6
				13-14.5 clayey silt, moist, light brown	9.6
				14.5-16 sandy clayey silt, stiff, light brown, dry	2.5
16	20	4	10:48	16-16.8 sandy clayey silt, stiff, light brown	8.0
				16.8-17.4 sand and gravel (75% gravel), saturated, light brown	1.9
				17.4-18.5 sandy clay, stiff, dry, light brown	1.4
				18.5-20 sand and gravel (50% gravel) light brown, dry	1.1
20	24	2.5	11:08	20-21.5 no recovery	

Sample Log (Cont.d)

Well/Boring GP40 **Project Name and No.** CSX Brunswick / MD000843.05.03

Prepared By Josh Wilson

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				21.5-24 sand (well sorted) and gravel (50%), moist, light brown	3.7

Sample Log

Well/Boring GP-41 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/30/2007 (0820) **Drilling Completed** 7/30/2007 (0905)

Total Depth Drilled 23.8 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 16-17.5 feet

Length and Diameter of Sampling Device 4',1.5" **Time** 0910 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	823	0-1 no recovery	
				1-3 fill, gravel and silt, dark gray	3.1
				3-4 gravelly clay, light brown, 25% gravel	18.5
4	8	4	832	4-8 silty clay, light brown, odor	19.3
8	12	4	836	8-8.5 silty clay, light brown	2.1
				8.5-9 fill, organic material, dark gray	3.8
				9-10.5 silty clay, some gravel, light brown, odor	86.1
				10.5-12 silty clay, light brown, moist, odor	121
12	16	4	843	12-16 silty clay, light brown, moist	(12-15) 81.3
					(15-16) 127
16	20	4	851	16-17.5 silty clay, light brown, moist	63.1
				17.5-19.5 silty sand, light brown, saturated, sheen	78.4
				19.5-20 silty sand, light brown, moist	58.4
20	23.8	3	902	20-22 silty sand, light brown, saturated	33.8
				22-23.8 sand and gravel (sand poorly sorted) 25% gravel, light brown, moist	40.9

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Sample Log

Well/Boring GP-42 10'W **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/26/2007 (0900) **Drilling Completed** 7/26/2007 (1005)

Total Depth Drilled 22 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 15-16 feet

Length and Diameter of Sampling Device 4',1.5" **Type of Sampling Device** Encore **Time:** 0950

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3.5	908	0-1 fill, gravel and silt	0
				1-4 brownish gray, silt	0
4	8	4	913	4-8 light brown, clay	0
8	12	4	920	8-12 light brown, clay	
12	16	4	930	12-16 light brown, clay	
16	20	0	935	no reocovery	
20	22	2	945	20-21 light brown, clayey gravel (75% clay)	0
				21-22 light brown, clayey gravel (50% clay)	0
				refusal @ 22'	

Sample Log

Well/Boring GP-42A 5'W **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/26/2007 (1030) **Drilling Completed** 7/26/2007 (1055)

Total Depth Drilled 22 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** _____ feet

Length and Diameter of Sampling Device 4',1.5" **Type of Sampling Device** _____

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	1030	0-1 fill, gravel and silt	
				1-4 brownish gray, silt	
4	8	4	1035	4-7.5 light brownish gray	
				7.5-8 brownish gray, clay w/some gravel	
8	12	4	1040	8-9 light brown, clayey gravel	
				9-12 light brown, clay	
12	16	3.5	1045	12-13 light brown, clayey gravel, well graded	
				13-15 light brown, clay	
				15-16 light brown, clay, soft, moist	
16	20	4	1050	16-18 light brown, clay, soft ,moist	
				18-20 light brown, clay, soft, very moist	
20	22	2	1055	20-21.5 light brown, clay, soft, moist	
				21.5-22 brownish gray, medium to fine sands, moist	
				refusal @ 22'	

ARCADIS

Sample Log

Well/Boring GP-43 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 7/26/2007 (1350) **Drilling Completed** 7/26/2007 (1435)

Total Depth Drilled 24 feet **Hole Diameter** 2 1/2 inches **Sampling Interval** 14-15 feet

Length and Diameter of Sampling Device 4',1.5" **Time** 1440 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** ____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	1355	0-4 fill, dark gray, organic material, silt	0
4	8	3	1400	4-7 fill, light brown, organic material	0
				7-8 no recovery	0
8	12	3.5	1405	8-10.5 fill, dark gray, organic material	0
				10.5-12 brownish gray, clayey silt, odor	2.5
12	16	2.5	1410	12-13 brownish gray, clayey silt, odor	11.3
				13-14 brownish gray, gravelly clay (25% clay, large cobbles)	13.4
				14-15 light brown, gravelly clayey silt, (25% gravel, smaller, odor)	34.7
				15-16 no recovery	
16	20	3.5	1420	16-17.5 light brown, clayey sand, saturated	0.6
				17.5-19 light brown, gravelly sandy silt, well graded moist	0.3
				19-20 light brown, gravelly sandy clay, well graded moist	0.2
20	24	3.5	1435	20-24 light brown, gravelly sandy clay, well graded moist	0.2

Sample Log

Well/Boring GP-44 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 8/1/2007 **Drilling Completed** 8/1/2007

Total Depth Drilled 18 feet **Hole Diameter** _____ inches **Sampling Interval** 15.5-16 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1105 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	09:55	0-1 no recovery	
				1-4 fill, silt and gravel, light grey	2.5
4	8	3	10:09	4-5 no recovery	
				5-8 fill, silt and gravel, light grey	3.0
8	12	2.5	10:23	8-9.5 no recovery	
				9.5-12 fill, silt and gravel, light grey to dark grey	14.7
12	16	3	10:37	12-13 no recovery	
				13-13.5 fill, silt and gravel, dark grey	39.4
				13.5-14.2 silty sand and gravel (10%), olive grey, wet	82.4
				14.2-14.5 sand and gravel, well sorted, wet, dark grey	21.3
				14.5-14.8 silty sand and gravel (10%), olive grey, wet	137.0
				14.8-15.2 silty clay, firm, moist, olive grey	114.0
				15.2-15.8 sandy silt, soft, moist, olive grey	108.0
				15.8-16 clayey sandy silt, soft, moist, olive grey	101.0

Sample Log

Well/Boring GP-45 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 8/1/2007 (1150) **Drilling Completed** 8/1/2007 (1222)

Total Depth Drilled 19.5 feet **Hole Diameter** 2.5 inches **Sampling Interval** 15-16 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1230 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	11:53	0-1.5 no recovery	
				1.5-4 fill, silt and gravel, dark grey	0.8
4	8	2.5	11:59	4-5.5 no recovery	
				5.5-7 clayey silt, soft, light brown	1.1
				7-8 clayey silt and gravel (10%), loose, light brown	0.0
8	12	2.5	12:07	8-9.5 no recovery	
				9.5-10.2 clayey silt and gravel (10%), loose, light brown	1.3
				10.2-11.4 silty clay, soft, moist, light brown	1.2
				11.4-12 silty clay, firm, moist, olive grey	0.8
12	16	4	12:14	12-13.7 clayey silt, firm, dry, olive grey	0.8
				13.7-16 silty sandy clay and gravel (10%), soft, moist, olive grey	33.8
16	19	2.5	12:22	16-17 no recovery	
				17-17.8 sand (well sorted) and gravel (25%), saturated, olive grey, odor	113.0
				17.8-19.5 sand (poorly sorted) and gravel (50%), stiff, moist, olive grey	199.0
				refusal @ 19.5	

Sample Log

Well/Boring GP-46 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 8/1/2007 (1242) **Drilling Completed** 8/1/2007 (1320)

Total Depth Drilled 19.5 feet **Hole Diameter** 2.5 inches **Sampling Interval** 15.5-16.5 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1325 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	12:45	0-1 no recovery	
				1-4 fill, silt and gravel	143.0
4	8	3		4-5 no recovery	
				5-5.8 clay, firm, light brown	52.2
				5.8-8 silty clay, firm, light brown	116.0
8	12	4		8-12 silty clay, firm, light brown	127.0
12	16	4		12-13 silty clay, soft, light brown	157.0
				13-14 silty sandy clay, soft, light brown	98.6
				14-15.5 sandy clay, firm, light brown	148.0
				15.5-16 sand (poorly sorted), firm, moist, light brown	189.0
16	19.5	3.5		16-16.5 sandy clay, firm, moist, light brown	124.0
				16.5-17.3 sand (well sorted) and gravel (25%), saturated, light brown	149.0
				17.3-19.3 sand (poorly sorted), firm, moist, light brown	145.0
				19.3-19.5 sand (poorly sorted) and gravel (50%), dry, light brown	166.0
				refusal at 19.5'	

Sample Log

Well/Boring GP-47 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 8/1/2007 (1355) **Drilling Completed** 8/1/2007 (1452)

Total Depth Drilled 18 feet **Hole Diameter** 2.5 inches **Sampling Interval** 15-16 feet

Length and Diameter of Sampling Device 4', 1.5" **Type of Sampling Device** Time: 1500 Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	2.5	13:58	0-1.5 no recovery	
				1.5-4 fill, silt and gravel, dark grey	87.9
4	8	2.5	14:04	4-5.5 no recovery	
				5.5-5.8 fill, silt and gravel, dark grey	134.0
				5.8-6 sand (well sorted), gravel (25%), wet, dark grey	170.0
				6-6.4 sand (poorly sorted), wet, dark grey	144.0
				6.4-8 clay, firm, moist, olive grey	48.9
8	12	4	14:14	8-8.5 sand (well sorted) and gravel (25%), wet, dark grey	120.0
				8.5-10 clay, firm, moist, light brown	122.0
				10-11 sand (poorly sorted), tight, olive grey	45.4
				11-12 clay, firm, moist, light brown	23.2
12	16	4	14:42	12-13 sand (well sorted) and gravel (25%), saturated, dark grey	106.0
				13-16 silty clay, firm, moist, olive grey	62.3
16	18	2	14:52	16-16.8 sand (well sorted) and gravel (25%), saturated, free product, olive gr	127.0
				16.8-17.8 sand (poorly sorted) tight, moist, olive grey	134.0
				17.8-18 sand and gravel (50%), moist, olive grey (refusal at 18)	111.0

Sample Log

Well/Boring GP-48 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 8/1/2007 (1520) **Drilling Completed** 8/1/2007

Total Depth Drilled 20 feet **Hole Diameter** ____ inches **Sampling Interval** 17.5-18.5 feet

Length and Diameter of Sampling Device 4', 1.5" **Time:** 1625 **Type of Sampling Device** Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** ____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3.5	15:23	0-0.5 no recovery	
				0.5-2 fill, silt and gravel, dark grey	11.9
				2-4 silty clay, dry, firm, light brown	21.7
4	8	4	15:31	4-6 silty clay, dry, firm, light brown	4.4
				6-8 clayey silt, soft, moist, olive grey	8.8
8	12	4	15:38	8-12 clayey silt, soft, moist, olive grey	88.7
12	16	4	15:44	12-16 clayey silt, soft, moist, olive grey	146.0
16	20	3.5	15:49	16-16.5 no recovery	
				16.5-17.5 clayey silt, soft, moist, olive grey	81.3
				17.5-18.5 sandy silt, gravel (10%), soft, moist, olive grey	111.0
				18.5-18.8 sand (poorly sorted) and gravel (50%), saturated, olive grey	99.2
				18.8-20 silty sand, soft, moist, olive grey	75.3
20	22.5	2.5	16:03	20-20.5 sandy clay, soft, moist, olive grey	76.8
				20.5-21 sand, poorly sorted, wet, olive grey	33.1
				21-22.5 sand (well sorted) and gravel (50%), moist, light brown (refusal at 22.5)	10.2

Sample Log

Well/Boring GP-49 **Project Name and No.** CSX Transportation - Brunswick / MD000843.0005.0003

Site Location Brunswick, MD **Drilling Started** 9/1/2007 (1625) **Drilling Completed** 8/1/2007

Total Depth Drilled 19 feet **Hole Diameter** _____ inches **Sampling Interval** 15-16 feet

Length and Diameter of Sampling Device 4', 1.5" **Type of Sampling Device** Time: 1705 Encore

Drilling Method Geoprobe **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** _____

Prepared By Josh Wilson **Hammer Weight** _____ **Hammer Drop** _____ inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	4	3	14:31	0-1 no recovery	
				1-4 fill, silt and gravel, dark grey	67.4
4	8	2.5	14:38	4-5.5 no recovery	
				5.5-6.5 sand (well sorted) and gravel (25%), wet, loose, dark grey	164.0
				6.5-8 clay, firm, light brown	53.2
8	12	4	14:45	8-9.5 silty clay, firm, light brown, dry	71.8
				9.5-12 silty clay, soft, moist, light brown	89.2
12	16	0:00	14:53	12-12.8 silty clay, firm, dry, light brown	74.3
				12.8-13.2 sand (well sorted) and gravel (25%) moist, dark grey	92.9
				13.2-16 silty clay, soft, moist, olive grey	106.8
16	19	3	15:03	16-17 sand (well sorted) gravel (25%) with some clay, saturated, sheen, olive	80.9
				17-18 silty sand, poorly sorted, moist olive grey	117.0
				18-19 sand (well sorted) and gravel (50%), light brown, moist	61.4
				refusal at 19'	

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Sample/Core Log

Boring/Well GP-53 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/5/2008 7:55 Drilling Completed 6/5/2008 8:40

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 16-17 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0-6" - peat and gravel (2-5 mm), moist
			0	6-24" - fill
			0	24-36" - orange brown clay with some silt, moist, stiff
4	8	48	0	0-48"-orange brown clay with some silt and gravel (>1mm), moist, stiff
				*PID head space reading - 0.0ppm (5 ft bgs)
8	12	48	0	0-48" - orange brown clay with some silt and gravel, moist, stiff
				*PID head space reading - 0.0ppm
12	16	48	0	0-48"- orange brown clay with some silt and gravel, moist, stiff
16	20	36		0-12" -orange brown clay with some silt and gravel, moist, stiff
				12-36"- brown fine sand with clay, wet, dense,
				*hit refusal @ 18ft
				END BORING

ARCADIS

Sample/Core Log

Boring/Well: GP-54 | Project/No.: MD000843.0006.0002 | Page ____ of ____

Site Location: Brunswick, MD | Drilling Started: 6/4/2008 2:10 | Drilling Completed: 6/4/2008 2:45

Total Depth Drilled: 18 Feet | Hole Diameter: 2 inches | Type of Sample/ Coring Device: ____

Length and Diameter of Coring Device: 4 ft / 2 in | Sampling Interval: 8-9 feet

Land-Surface Elev.: N/A feet ☐ Surveyed ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Geoprobe

Drilling Contractor: SGS Environmental | Driller: Mike K | Helper: Brian B

Prepared By: Sandra Grabowski | Hammer Weight: ____ | Hammer Drop: ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	16	0	0-16"-fill, moist
			0	0-24" fill, moist
			0	24-27"- SAND and GRAVEL, moist, med loose
			0	27-36" - olive grey, clay with gravel (1-3mm) med loose,
			0	36-48" - SAND and GRAVEL, wet (1-5mm)
				*PID head space reading - 0.0ppm
8	12	48	0	0-12" - olive grey to orange brown clay, with some fill, dense, moist
				12-48" - olive grey to orange brown clay, with some fill, dense, moist

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Sample/Core Log

Boring/Well GP-55 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/4/2008 1:30 Drilling Completed 6/4/2008 2:00

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 15-16 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0-36" - fill (black) dry
4	8	30	0	0-18" - fill (black) dry
			0	18-30" - brown to olive grey CLAY, stiff, moist
			0	*PID head space reading - 0.0ppm (5 ft bgs)
8	12	48	0	0-18" -brown to olive grey CLAY, stiff, moist
				18-20" - brown to olive grey clay with gravel, stiff, moist
				20-48"- brown to olive grey CLAY, stiff, moist
				*PID head space reading - 0.0ppm (10 ft bgs)
12	16	48	0	0-12" - brown to olive grey clay with fill material , stiff, moist
				12-48" - orange brown silty clay, stiff with some gravel (2-3mm) moist
				*PID head space reading - 0.0ppm (15 ft bgs)
16	20	36	0	0-6" - range brown silty clay, with some gravel (2-3mm), stiff wet
				6-12" - SAND and GRAVEL, loose, wet
				12-36" -clayey stiff sand with gravel, wet (2-5mm)
				*refusal at 18ft
				END BORING

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Sample/Core Log

Boring/Well GP-56 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/5/2008 3:30 Drilling Completed 6/5/2008 2:00

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 11-12 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0-18" fill
				18-36"- orange brown CLAY, dry, stiff
4	8	42	269, 487, 404	0-6" - clay with sand and gravel, wet
				6-12" - brick
				12-42" - olive grey silty CLAY, med soft, odor, moist
				*PID head space reading - 890 ppm
8	12	48	100, 79, 382, 1495	0-48" - brown to olive grey clayey SILT, wet, dense odor
				*PID head space reading - 1117 ppm (10 ft bgs)
12	16	48	679, 716, 793, 410	0-36" - brown to olive grey clayey SILT, wet, dense odor
				36-48" - clay with gravel, wet, odor,brown
				*PID head space reading - 1077ppm (15 ft bgs)
16	20	36	214, 56.1, 13.2	0-24" - loose clayey silt with gravel, wet, odor
				24-36" - brown clayey sand with some gravel

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Sample/Core Log

Boring/Well GP-57 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/4/2008 11:25 Drilling Completed 6/4/2008 12:05

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 12-13 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	24	0	0-24" - black fill, dry to slightly moist
4	8	42	0	0-6" black fill, dry to slightly moist
			0	6-36" - brown clay with some gravel (2-6mm) moist med loose
			0	36-42" - brown silty CLAY, moist med loose
				*PID head space reading - 0.0ppm (5 ft bgs)
4	8	48	292, 302, 471, 269	0-12" - brown silty CLAY, moist med loose
				12-48" - brown to olive grey silty CLAY, odor, moist, little gravel
				*PID head space reading - 228ppm (10 ft bgs)
12	16	48	718, 680, 326, 106	0-36" - brown to olive grey silty CLAY, odor, moist, little gravel(1-4 mm)
				36-40" - silt with gravel wet,
				*PID head space reading - 232ppm (13 ft bgs)
16	20	48	0.0, 0.0, 18	sand with gravel (1-3mm), brown, wet (sheen) slight odor
				*PID head space reading - (20 ft bgs)
20	24	36		0-36" sand gravel (1-3mm), wet, slight odor, sheen on water
				END BORING

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Sample/Core Log

Boring/Well GP-58 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/3/2008 12:30 Drilling Completed 6/3/2008 1:45

Total Depth Drilled 24 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 15-16 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	12	0	0-6" - concrete
				6-12" - fill, dry
4	8	36	3, 7,	0-12" - gravel and fill, moist
			241, 270	12-36" - olive CLAY with gravel and little silt, moist med soft, slight odor
				*PID head space reading - 340ppm (5 ft bgs)
8	12	48	204, 343, 204, 733	0-18" - orange brown silty clay with some fill, stiff
				18-48" - olive grey/brown clayey SILT, moist, stiff, odor
				*PID head space reading - 1599ppm (10 ft bgs)
12	16	48	272, 739, 1043, 1229	0-24" - moist olivegrey clay with silt med loose, odor
				24-40" - olive grey clayey SILT, moist stiff odor
				*PID head space reading - 3338ppm (15 ft bgs)
16	20	36	594, 817, 340	0-30" - live grey clayey SILT, moist stiff odor
				30-36" - silt with sand and some gravel (1-3mm) wet, odor
				*refusal at 20ft bgs
				END BORING

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Sample/Core Log

Boring/Well GP-59 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/3/2008 10:50 Drilling Completed 6/3/2008 11:40

Total Depth Drilled 24 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 15-16 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	48	0	0-18" - fill dry
			0	18-36" - orange brown clayey SILT, stiff, dry
			0	36-48" - olive brown CLAY, stiff, dry
4	8	48	0	0-42" - olive brown CLAY, stiff, dry (moist 6-36)
			0	42-48"- brown silty clay, stiff, moist
				*PID head space reading - 9.8ppm (5 ft bgs)
8	12	40	0, 38.6, 67.8, 303	0-36" - brown clay with some silt; gravel med soft, moist
				36-48" - brown clayey silt with little gravel, slight odor,moist
				*PID head space reading - 28.5ppm (10 ft bgs)
12	16	48	162, 317, 645, 1209	0-12" - brown clay with silt, moist med loose
				12-48" - brown clayey SILT, wet, med soft, odor
				*PID head space reading - 51.4ppm (15 ft bgs)
16	20	42	371, 509, 671, 737	0-6" - brown CLAY, med soft, moist
				6-42" - SAND and GRAVEL loose, wet slime
				12-42" - sandy SILT, wet, olive brown, med loose, odor
				*PID head space reading - 231ppm (20 ft bgs)
20	24	48	15, 76, 144, 241	0-24" - sandy silt, with gravel wet, olive brown, med loose, odor
				24-48" - SAND and GRAVEL (1-5mm), loose, wet, slight odor
				END BORING

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Sample/Core Log

Boring/Well: GP-60 | Project/No.: MD000843.0006.0002 | Page ____ of ____

Site Location: Brunswick, MD | Drilling Started: 6/3/2008 9:30 | Drilling Completed: 6/3/2008 10:40

Total Depth Drilled: 24 Feet | Hole Diameter: 2 inches | Type of Sample/ Coring Device: ____

Length and Diameter of Coring Device: 4 ft / 2 in | Sampling Interval: 14-15 feet

Land-Surface Elev.: N/A feet | ☐ Surveyed | ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Geoprobe

Drilling Contractor: SGS Environmental | Driller: Mike K | Helper: Brian B

Prepared By: Sandra Grabowski | Hammer Weight: ____ | Hammer Drop: ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	18	0	0-6" - concrete
			0	6-18" - black fill, dry
4	8	36	0.0, 0.0, 13.3, 69.5	0-3" - black fill, dry
				3-12" - orange brown clay with some silt and fill, moist, med loose
				12-24" - brown silty clay with some sand and gravel, wet, loose
				24-36" - brown silty clay, stiff, moist
				*PID head space reading - 5.3ppm (5 ft bgs)
8	12	48	0, 25.4, 284, 193	0-6" - sand and gravel with some clay, wet, med loose, slight odor
				6-24" - brown CLAY, possible strong odor, wet, med loose
				24-48" - brown silty, clay, odor, stiff, moist
				*PID head space reading - 217ppm (10 ft bgs)
12	16		47, 333, 195	0-6" - sand and gravel with some clay, wet, med loose, odor
				6-36" - clayey SILT, brown to olive grey, med loose, wet, strong odor
				*PID head space reading - 380ppm (15 ft bgs)
16	20	36	678, 866, 47.2	0-6" - SAND and GRAVEL, wet, med loose
				6-30" - clayey SILT with some sand, wet, med loose, oilve grey, odor
				*PID head space reading - 587ppm (20 ft bgs)
				30-36" - silty SAND with some gravel, olivegrey, odor, wet
20	24	2	-	0-24" - sand with gravel, some clay, wet, slight odor, med loose
				END BORING

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Sample/Core Log

Boring/Well GP-61 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/2/2008 1:20 Drilling Completed 6/2/2008 2:30

Total Depth Drilled ____ Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 13-14 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	24	0	0-6" - concrete
				6-8' - fill, sand (black to brown) dry
				8-24' - brown clay with gravel, dry
4	8	24	0	0-4" - fill
				4-24" - brown silty, clay with little gravel, med loose
				*PID head space reading - 4.3ppm (5 ft bgs)
8	12	48	0	0-24" - brown silty clay with some gravel stiff, wet
				24-36" - brown silty clay with some sand and gravel
				*PID head space reading - 0.0ppm (6 ft bgs)
				36-42" -clayey sand,look wet, some gravel
				42-48" - silty clay, med loose, wet, brown
12	16	48	266, 458, 14.4	0-24" -olive grey silty CLAY, odor, wet, med soft
				24-36" - brown sand, med to loose grey, wet, little gravel
16	20	48	26.9	0-12" - brown sandy silt, wet med loose
				12-48" - sandy gravel, brown, wet,
				*PID head space reading - 90.4ppm (15 ft bgs)
20	24	24		0-24" - sandy gravel, brown, wet,

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Sample/Core Log

Boring/Well GP-62 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/2/2008 12:20 Drilling Completed 6/2/2008 1:10

Total Depth Drilled ____ Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval ____ feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	48	0	0-12"- gravel and concrete
				12-13" - red brick
				13-36" - black cinders and fill
				railroad tie ~ 2ft bgs
				36-48" - brown silt with some sand gravel (1mm), dry
4	8	24	0	0-18" - brown silt with some sand gravel (1mm), dry
				18-20" - black fill, wet
				20-22" - concrete
				22-24" - brown clay with some silt,stiff, dry
				*PID head space reading - 11.2ppm (5 ft bgs)
8	12	30	4.3, 101, 41.6	0-12 dark grey CLAY, loose, moist
				12-30 brown silty CLAY, moist, stiff, odor
				*PID head space reading - 97.1ppm (10 ft bgs)
12	16	48	65,101, 237, 642	0-6" - dark grey CLAY, loose,moist, odor
				6-48" - olive grey to brown silty CLAY, med loose,moist, odor
				*PID head space reading - 1310ppm (15 ft bgs)
16	20	48	64.7, 104, 237, 141	0-24" - olive grey to brown silty CLAY, med loose,moist, odor
				24-48" - olive grey clayey SILT, wet, odor, stiff
				*PID head space reading - 817ppm (20 ft bgs)
20	24	24	29.5, 22.1	brown sand with some gravel (1-3 mm) wet, med loose
				END BORING

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Sample/Core Log

Boring/Well: GP-63 | Project/No.: MD000843.0006.0002 | Page: ____ of ____

Site Location: Brunswick, MD | Drilling Started: 6/2/2008 11:20 | Drilling Completed: 6/2/2008 12:00

Total Depth Drilled: 24 Feet | Hole Diameter: 2 inches | Type of Sample/ Coring Device: ____

Length and Diameter of Coring Device: 4 ft / 2 in | Sampling Interval: ____ feet

Land-Surface Elev.: N/A feet | ☐ Surveyed | ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Geoprobe

Drilling Contractor: SGS Environmental | Driller: Mike K | Helper: Brian B

Prepared By: Sandra Grabowski | Hammer Weight: ____ | Hammer Drop: ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	48	0	0-6" - concrete
				6-48" - light brown silty clay with little gravel and fill material, dry to slightly moist
4	8	30	0	0-8" - light brown silty clay with little gravel and fill material, dry to slightly moist
				8-30" - olive grey CLAY, moist, med soft
				*PID head space reading - 4.7ppm (15 ft bgs)
8	12	36	0	0-8" - brown CLAY, soft, slightly moist, some silty
				8-16" - concrete
				16-30" - olive grey CLAY, some silty,med soft, slightly moist
				30-36" - dark brown clayey SILT,med stiff, slightly moist
				*PID head space reading - 5.1ppm (10 ft bgs)
12	16	48	0	0-24" - dark brown clayey SILT,med stiff, slightly moist
				24-30" - olive grey brown CLAY, soft, moist
				30-42" - clay and gravel, loose,
				42-48" - moist clay
				*PID head space reading - 4.4ppm (15 ft bgs)
16	20	48	0	0-48" - brown clayey SILT, little gravel, wet, loose/soft
				*PID head space reading - 5.1ppm (20 ft bgs)
20	24	48	0	0-12" - brown to olivegrey silty clay med loose, moist to wet
				12-42" - brown sand and gravel, wet, dense, medium gravel (~1mm)
				42-48" - brown sand and gravel, wet, dense, larger gravel (2-3mm)
				END BORING

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Sample/Core Log

Boring/Well GP-64 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/4/2008 9:45 Drilling Completed 6/4/2008 10:25

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 15-16 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0-36" - fill (black cinders, dry)
4	8	12	0	0-12" - fill (black cinders, dry)
				*PID head space reading - 0.0ppm (5 ft bgs)
8	12	12	0	0-12 fill (black cinders, dry), moist
				*PID head space reading - 0.0ppm (10 ft bgs)
12	16	20	0, 37.3	0-6" - fill (black cinders, dry)
				6-20' - brown to olive grey CLAY, moist, loose, odor
				*PID head space reading - 62.7ppm (10 ft bgs)
16	20	24	12.5, 13.7, 10.1	0-12" - brown to olive grey CLAY, moist, loose, odor
				12-24" - brown silty clay with gravel, wet, med loose
				refusal at 19ft bgs
				END BORING

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Sample/Core Log

Boring/Well GP-65 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/5/2008 10:40 Drilling Completed 6/5/2008 11:30

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 16-17 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	38	0	0-9" - concrete and brick
				9-12" - grey, fine to medium SAND
				12-20" - dark grey silty CLAY, stiff, dry
				20-38' - brown clay with some gravel (0-2mm) slight moist, stiff
4	8	34	0	0-16" - brown clay with some gravel (0-2mm) slight moist, stiff
				16-34" - olive grey CLAY, moist, med loose
				*PID head space reading - 0.0ppm (5 ft bgs)
8	12	48	0	0-24" - olive grey CLAY, moist, med loose
				24-46" - brown clay with some gravel, stiff,moist
				46-48" - brown clay with some gravel and silt, stiff,moist
				*PID head space reading - 0.0ppm (10 ft bgs)
12	16	48	0	0-48" - brown clay with some gravel and silt, stiff, moist
				*PID head space reading - 0.0ppm (15 ft bgs)
16	20	36	0	0-12" - brown clay with some gravel and silt, stiff, moist
				12-36' - brown clayey sand, wet, gravel (1-4 mm)
				refusal at ~19.5 ft
				END BORING

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Sample/Core Log

Boring/Well GP-66 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/5/2008 8:50 Drilling Completed 6/5/2008 9:30

Total Depth Drilled 19 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 16-17 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0-36" - fill (black cinders, dry)
4	8	36	0	0-36" - fill (black cinders, dry to slightly moist)
				*PID head space reading - 0.0ppm
8	12	24	0	0-12" - fill, moist, some clay
				12-24" - fill, gravel, black, wet
				*PID head space reading - 0.0ppm
12	16	48	0	0-12" - gravel fill, black, wet
				12-24" - olive grey to dark grey CLAY, stiff, wet
				24-48" - brown clay with some sand and gravel (1-3mm), moist
16	20	36	131, 74.1	0-18" - GRAVEL and SAND, odor, wet
				18-36" - brown clayey SILT, stiff, wet, some sand
				refusal at ~19.5 ft
				END BORING

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Sample/Core Log

Boring/Well GP-67 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/5/2008 12:20 Drilling Completed 6/5/2008 1:15

Total Depth Drilled ____ Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval ____ feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	217, 598, 1165, 65	0-12" - concrete, asphalt, fill
				12-36" - black fill, moist, odor
4	8	24	718, 937, 342	0-18" - dark grey CLAY with fill material, wet, odor, med loose
				18-24' - brown to olive brown CLAY with silty sand, loose, wet
				*PID head space reading -1264ppm (5ft bgs)
8	12	48	633, 533, 656, 665	0-24" - brown to olive brown CLAY with silty sand, loose, wet
				24-48" - dark grey CLAY with silt, moist to wet, dense
				*PID head space reading -394ppm (10ft bgs)
12	16	48	1227, 617, 1136, 372	0-48" - dark grey CLAY with silt, wet, odor
				*PID head space reading -860ppm (15ft bgs)
16	20	12	212	0-12" dark grey CLAY with gravel, wet, odor
				refusal at 19 ft (large cobbles)
				END BORING

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Sample/Core Log

Boring/Well GP-68 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/2/2008 1:15 Drilling Completed 6/2/2008 2:00

Total Depth Drilled 24 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 4 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	-	0-6" - concrete
			8.1	6-30" - brown clay with some silty sand , stiff, dry, some fill
			6.1	30-36" - black fill, wet
4	8	36	0	0-6'"- brown to olive grey clay with some silt and gravel (1-3mm), slightly moist
			5.6	6-32" - olive grey to brown clay, stiff slightly moist
			4.1	32-36" - olivegrey silty clay, stiff, slightly moist
				*PID head space reading - 43.4ppm (5 ft bgs)
8	12	24	4.1, 0	0-24" - olive grey clay with some silt and gravel (<1mm), slightly moist, med loose
			126, 344	olive grey to brown clay with little silt, stiff, slight odor, dry
				*PID head space reading - 10.3ppm (10 ft bgs)
12	16	48	115, 404, 668, 1061	0-12" - brown silt clay with little gravel (~1mm), moist, stiff
				12-48" - brown clayey silt, stiff, moist
				*PID head space reading - 596ppm (15 ft bgs)
16	20	48	91.4, 49.2, 42.8, 39.1	0-12" - olive grey clayey silt, wet
				12-24" - olive grey clayey silt, wet, very loose
				24-48" - olive grey silt with some clay and gravel, wet, loose
				*PID head space reading - 400ppm (20 ft bgs)
20	24	48	0	0-6" - olive grey silt with some clay and gravel, wet, loose
				6-48" - sand and gravel, very loose, wet,
				END BORING

ARCADIS

Sample/Core Log

Boring/Well GP-69 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/3/2008 2:10 Drilling Completed 6/3/2008 2:45

Total Depth Drilled ____ Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 12-13 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	30	0	0-30" - fill, black cinders, dry
4	8	24	0	0-20" - fill, black cinders (moist 17-20")
			0	20-24" - brown CLAY, med soft, moist
.				*PID head space reading - 0.0ppm (5 ft bgs)
8	12	48	0	0-12" - brown to dark grey CLAY, med soft
			0	12-36" - brown CLAY, stiff
			0	36-48"- brown CLAY with some silt
				*PID head space reading - 5.4ppm (10 ft bgs)
12	16	16	102, 11, 3.4, 5.1	0-12" - brown to grey clayey SILT,wet, odor, stiff
				12-16" - brown clayey SILT, little gravel, moist, slight odor
				*PID head space reading - 3.7ppm (15 ft bgs)
16	20	0	N/A	no recovery (wet)
20	224	36	0	0-18" - SAND and GRAVEl, wet, dark grey
				18-36" - sand with little gravel
				END BORING

ARCADIS

Sample/Core Log

Boring/Well GP-69a Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/2/2008 10:20 Drilling Completed 6/2/2008 10:40

Total Depth Drilled 9 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 4 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	-	0-4" -concrete
			2.3	4-30" - black fill, gravel and cinders, dry
				30-36" - concrete
4	8	24		0-2" - concrete
			14	2-16" - orange brown clay, med loose,moist, with cinder fill
			0	16-24" - black cinder, wet
				*PID head space reading - 7.2ppm (~5 ft bgs)
8	12	6	0	0-6" - dark grey to black, wet fill, gravel with some sand
				*PID head space reading - 7.2ppm (8 ft bgs)
				refusal at 9ft

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Sample/Core Log

Boring/Well GP-70 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/4/2008 10:40 Drilling Completed 6/4/2008 11:15

Total Depth Drilled ____ Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 13-14 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0 -18 - FILL; black cinders, gravel
			0	18 - 36" - brown clayey SILT, stiff, dry
4	8	42	0	0 - 22" - brown clayey SILT, stiff, dry
				22 - 42" - brown clayey SILT, stiff, moist
				*PID head space reading - 0.0ppm (5 ft bgs)
8	12	42	0	0 - 6" - brown clayey SILT, stiff, moist
				6 - 36" - olive grey silty CLAY, medium soft, moist, some gravel (~2-3mm)
			96	36 - 42" - olive grey to dark grey clayey SILT, moist, medium loose, odor
				*PID head space reading - 0.0ppm (10 ft bgs)
12	16	48	310, 1595, 1776, 984	0 - 6" - brown to olive grey silty CLAY, moist, medium loose
				6 - 24" - dark grey silty CLAY, medium loose, moist to wet, strong odor
				24 - 48" - dark brown to olive grey clayey SILT, wet, medium loose, odor
				*PID head space reading - 5402ppm (15 ft bgs)
16	20	48	264, 173, 1108, 205	0 - 42" - dark brown to olive grey clayey SILT with some gravel (2-5mm), wet, odor
				42 - 48" - olive grey SAND and GRAVEL (1-5mm), wet
				*PID head space reading - 680ppm (20 ft bgs)
20	24	24	182, 14	0 - 24" - brown SAND and GRAVEL (1-5mm), loose, wet
				END BORING
				TP PVC set at 20 ft bgs (15 ft screen)

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Sample/Core Log

Boring/Well GP-71 Project/No. MD000843.0006.0002 Page ____ of ____

Site Location Brunswick, MD Drilling Started 6/4/2008 12:40 Drilling Completed 6/4/2008 1:20

Total Depth Drilled 18 Feet Hole Diameter 2 inches Type of Sample/ Coring Device ____

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 10-11 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	24	0	0 - 18" - FILL; black cinders, gravel
			0	18 - 24" - brown CLAY, medium soft, dry to slightly moist
4	8	36	0	0 - 30" - brown CLAY with gravel (1-11mm) and some fill material (brick 24"), moist to we
				30 - 36" - olive grey CLAY, soft, most to wet
				*PID head space reading - 0.0ppm
8	12	48	0	0 - 36" - brown to grey brown CLAY, very stiff , moist
				36 - 48" - olive grey silty CLAY, loose, wet
				*PID head space reading - 0.0ppm (10 ft bgs)
12	16	48	0	0 - 12" - SAND and GRAVEL, wet
				12 - 48" - orange brown silty CLAY with some gravel (2-5 mm), wet
				*PID head space reading - 0.0ppm (15 ft bgs)
16	20	36	0	0 - 6" - SAND and GRAVEL
				6 - 18" - sandy CLAY, brown, loose, wet, some gravel
				18 - 36" -sandy CLAY, brown, soft, medium loose to stiff
				refusal at 18 ft bgs
				END BORING

ARCADIS

Sample/Core Log

Boring/Well: GP-72 | Project/No.: MD000843.0006.0002 | Page: 1 of 1

Site Location: Brunswick, MD | Drilling Started: 6/4/2008 9:45 | Drilling Completed: 6/4/2008 10:30

Total Depth Drilled: 24 Feet | Hole Diameter: 2 inches | Type of Sample/ Coring Device:

Length and Diameter of Coring Device: 4 ft / 2 in | Sampling Interval: 12.5-13.5 feet

Land-Surface Elev.: N/A feet | ☐ Surveyed | ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Geoprobe

Drilling Contractor: SGS Environmental | Driller: Mike K | Helper: Brian B

Prepared By: Sandra Grabowski | Hammer Weight: | Hammer Drop: ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0 - 36" - FILL, black
4	8	24	0	0 - 24" - FILL, black
				*PID head space reading - 0.0ppm (5 ft bgs)
8	12	24	0	0 - 24" - FILL, black with some gravel, dry
				*PID head space reading - 0.0ppm (10 ft bgs)
12	16	48	0	0 - 6" - FILL
				6 - 42" - brown silty CLAY, medium loose, moist to wet
				42 - 48" - SAND and GRAVEL (1-2mm) with clay, brown , wet
				*PID head space reading - 0.0ppm (15 ft bgs)
16	20	48	0	0 - 6" - silty CLAY with gravel and some sand (1-3mm), brown, moist
				6 -12" - GRAVEL with sand and some clay (3-5mm)
				12 - 30" - brown silty CLAY, wet, med loose
				30 - 48" - SAND and GRAVEL (0-2mm), wet, black
				*PID head space reading - 0.0ppm (20 ft bgs)
20	24	36	0	0 - 36" - SAND and GRAVEL (1-2mm) brown, wet
				END BORING

ARCADIS

Sample/Core Log

Boring/Well GP-73 Project/No. MD000843.0006.0002 Page 1 of 1

Site Location Brunswick, MD Drilling Started 6/6/2008 7:55 Drilling Completed 6/6/2008 8:25

Total Depth Drilled 20 Feet Hole Diameter 2 inches Type of Sample/ Coring Device

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 11-12 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Sandra Grabowski Hammer Weight Hammer Drop ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	42	0	0 - 6" - gravel
				6 - 26" - fill (black, dry)
				26 - 42" - brown CLAY, stiff, dry
4	8	48	0	0 - 48" - brown CLAY, stiff, dry, odor
				*PID head space reading - 5.8ppm (5 ft bgs)
8	12	48	429, 365, 432, 515	0 - 24" - brown CLAY, stiff, dry, odor
				24 - 48" - brown CLAY with silt, stiff, moist, odor
				*PID head space reading - 347ppm (10 ft bgs)
12	16	48	382, 302, 319, 341	0 - 16" - brown CLAY with silt, stiff, moist, odor
				16-48" brown silty CLAY, soft, wet, odor
				*PID head space reading - 546ppm (15 ft bgs)
16	20	0	N/A	no recovery
				END BORING

ARCADIS

Sample/Core Log

Boring/Well GP-74 Project/No. MD000843.0007.0001 Page 1 of 1

Site Location Brunswick, MD Drilling Started 6/27/08 08:00am Drilling Completed 6/27/08 9:15am

Total Depth Drilled 26 Feet Hole Diameter 2 inches Type of Sample/ Coring Device

Length and Diameter of Coring Device 4 ft / 2 in Sampling Interval 23-24 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Josh Wilson Hammer Weight Hammer Drop ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	42	0	0-6" - no recovery
			0	6-12" - topsoil, brown, dry, loose
			0	12-18" - organic fill, gray, dry, loose
			0	18-48" - silty clay, moist, light brown, stiff
4	8	48	0	0-48" -silty clay, light brown, stiff
8	12	48	0	0-48" - silty clay, light brown, stiff
12	16	48	0	0-48" - silty clay, light brown, trace sands, stiff
16	20	48	0	0-12" - silty clay, light brown, stiff
			0	12-16" - silt and gravel (25%), dark brown, dry
			1.5	16-48" - sandy silty clay, light brown, moist
20	24	42		0-6" - no recovery
			0.0 (6-36") 17.4 (36-48")	6-48" - sandy silty clay, light brown, moist
24	26	24	626	0-7" - sand, light brown, wet, poorly sorted, strong odor
			2.5	7-18" - sandy clay, grayish brown, stiff, moist, slight odor
			2.4	18-24" - silty sandy clay, (25% cobbles), light brown, dry, slight odor

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Sample/Core Log

Boring/Well GP-75 Project/No. MD000843.0007.0001 Page 1 of 1

Site Location Brunswick, MD Drilling Started 6/27/08 9:40am Drilling Completed 6/27/08 13:55pm

Total Depth Drilled 26 Feet Hole Diameter 2 inches Type of Sample/ Coring Device

Length and Diameter of Coring Device 4 ft / 1.5 in Sampling Interval 24-24.5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Geoprobe

Drilling Contractor SGS Environmental Driller Mike K Helper Brian B

Prepared By Josh Wilson Hammer Weight Hammer Drop ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	48	0	0-18" - topsoil, grayish brown, loose dry
			0	18-30" - organic fill, cinders, grayish brown, loose dry
			0	30-48" - silty clay, light brown, stiff, dry
4	8	48	0	0-48" -silty clay, light brown, stiff, dry
8	12	48	0	0-48" - silty clay, light brown, stiff, dry
12	16	48	0	0-48" - silty clay, light brown, stiff, dry
16	20	48	0	0-48" - silty clay, trace sands, light brown, stiff, dry
20	23	36	0	0-36" - silty clay, trace sands, light brown, stiff, dry
				geoprobe can't drive any deeper
				using a pt tip, were able to drive to 26'. No sample 23-24'
24	26	24	0	0-6" - sandy clay, light brown, moist, odor
			0	6-14.4" - sand, poorly sorted, gray, wet, odor
			0	14.4-24" - sandy clay and cobble (10%), grayish brown, dry, odor

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Sample/Core Log

Boring/Well GP-76 Project/No. MD000843.0007.0001 Page 1 of 1

Site Location Brunswick, MD

Drilling Started 6/27/08 10:20am

Drilling Completed 6/27/08 11:45am

Total Depth Drilled 27 Feet

Hole Diameter 2 inches

Type of Sample/ Coring Device

Length and Diameter of Coring Device 4 ft / 1.5 in

Sampling Interval 24-24.5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated

Datum N/A

Drilling Fluid Used N/A

Drilling Method Geoprobe

Drilling Contractor SGS Environmental

Driller Mike K

Helper Brian B

Prepared By Josh Wilson

Hammer Weight

Hammer Drop ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	4	36	0	0-12" - no recovery
			0	12-36" - top soil, light brown
4	8	48	0	0-12" - silty clay, light brown, stiff
			0	12-24" - concrete
			0	24-48" - silty clay, light brown, stiff, dry
8	12	48	0	0-48" - silty clay, light brown, stiff, dry
12	16	48	0	0-48" - silty clay, light brown, stiff, dry
16	20	48	0	0-48" - silty clay, trace sands, light brown, stiff, dry
20	24	48		0-30" - silty clay, trace sand, light brown,moist
				30-48" - silty clay, some sand, light brown, moist
24	27	36	0	0-6" - clayey sand, poorly sorted, light brown, wet
			0	6-26.4" - sandy clay, stiff, light brown moist
			0	26.4-33.6" - clay, light brown, stiff
				33.6-36" - sandy silt and cobble (10%), light brown, stiff, dry

BORING REPORT	EDER ASSOCIATES Locust Valley, NY; Madison, WI; Ann Arbor MI; Augusta, GA; Jacksonville, FL; Tampa, FL; Trenton, NJ	SHEET 1 OF 2

DATE STARTED: 6/23/94	DATE FINISHED: 6/23/94	BORING NO. MW-1
CLIENT: CSXT		PROJECT NO.: 560-44.3
PROJECT NAME & LOCATION: C&O Canal, Brunswick, MD		PREPARED BY: H. Ernst
DRILLING CONTRACTOR: ADT	LOGGED BY: H. Ernst	DRILLER: T. Brown

EQUIPMENT:	CASING:	SOIL SAMPLER: S/SPOON		CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE:		Stainless Steel			H.S.A.			Mobile B-59 Hollow Stem Auger
SIZE:		2" x 24"			6 1/2" ID			
HAMMER WT/FALL		140 lb 30 inch		BIT: Carbide tooth				

SURFACE ELEVATION: SURFACE CONDITIONS: Soil and gravel

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND NO.	SAMPLE DEPTH (FROM-TO)	MOISTURE CONTENT	RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ ELEV. USCS Class	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
0		SS-1	0-2	dry	40%	4,5,5,4	SP	Black, fine to medium sand, some gravel, cinders
		SS-2	2-4	dry	40%	5,5,4,5	SM	Orange-brown, clayey silt, little fine sand, trace gravel
5		SS-3	4-6	dry	50%	5,5,7,9	SM	Same as above
		SS-4	6-8	dry	40%	5,4,3,4	SM	Orange-brown, clayey silt, little fine sand
		SS-5	8-10	moist	50%	4,3,3,4	SP	Same as above, grading into black fine sand, cinders
10		SS-6	10-12	wet	70%	2,2,3,3	CL	Orange-brown and grey, silty clay, little sand
		SS-7	12-14	wet	80%	5,11,13,16	CL	Greenish grey, silty clay, trace fine sand
15		SS-8	14-16	wet	80%	16,45,30,51	CL	Same as above, two 1" gravel layers, odor
		SS-9	16-18	moist	70%	24,44,64,100/45"	CL	Same as above, clay and broken cobbles lowest 0.5', odor, sheen
20		SS-10	18-20	wet. sat.	40%	39,65,93,70	SM	Greenish-grey sand & silt, broken cobbles, sheen with odor
		SS-11	20-22	wet	40%	70,70,55,70	SM	Greenish-grey silt, little sand and gravel
25								USCS - Unified soil classification system

PROJECT NAME: C&O Canal, Brunswick, MD BORING NO.: MW-1 PROJECT NO. 560-44.3

BELOW GRADE	OVA READINGS	TYPE AND NO.	DEPTH (FROM-TO)	MOISTURE CONTENT	RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ ELEV.	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=0-30% AND=35-50%
		SS-12	25.5-27.5	wet	50%	93,93,36/1"	SP	Orange-brown, medium to fine sand, some gravel

BORING REPORT	EDER ASSOCIATES Locust Valley, NY; Madison, WI; Ann Arbor MI; Augusta, GA; Jacksonville, FL; Tampa, FL; Trenton, NJ	SHEET 1 OF 1

DATE STARTED: 6/23/94	DATE FINISHED: 6/23/94	BORING NO. MW-2
CLIENT: CSXT		PROJECT NO.: 560-44.3
PROJECT NAME & LOCATION: C&O Canal, Brunswick, MD		PREPARED BY: H. Ernst
DRILLING CONTRACTOR: ADT	LOGGED BY: H. Ernst	DRILLER: T. Brown

EQUIPMENT:	CASING:	SOIL SAMPLER: S/SPOON		CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE:		Stainless Steel			H.S.A.			Mobile B-59 Hollow Stem Auger
SIZE:		2" x 24"			6 1/2" ID			
HAMMER WT/FALL		140 lb 30 inch		BIT: Carbide tooth				

SURFACE ELEVATION: SURFACE CONDITIONS: Soil and gravel

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND NO.	SAMPLE DEPTH (FROM-TO)	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ ELEV. USCS Class	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
0		SS-1	0-2	dry	50%	4,5,3,2	SM	Upper 0.5: black, medium to fine sand and cinders Lower 0.4" orange-brown clayey silt, little fine sand
5		SS-2	5-7	moist	50%	2,2,2,3	SM	Greenish-grey, clayey silt, little fine sand, trace gravel, odor
10		SS-3	10-12	moist	40%	3,5,24,14	CL	Greenish-grey, silty clay, trace fine sand, slight odor
15	150 ppm	SS-4	15-17	wet	20%	12,12,82,44	SM	Grey clayey silt, little sand, odor, product
20		SS-5	20-22	wet	80%	24,34,24,15	SP	Grey medium to fine sand, little silt and gravel, odor
25								USCS - Unified soil classification system

BORING REPORT	EDER ASSOCIATES Locust Valley, NY; Madison, WI; Ann Arbor MI; Augusta, GA; Jacksonville, FL; Tampa, FL; Trenton, NJ	SHEET 1 OF 1

DATE STARTED: 6/24/94	DATE FINISHED: 6/24/94	BORING NO. MW-3
CLIENT: CSXT		PROJECT NO.: 560-44.3
PROJECT NAME & LOCATION: C&O Canal, Brunswick, MD		PREPARED BY: H. Ernst
DRILLING CONTRACTOR: ADT	LOGGED BY: H. Ernst	DRILLER: T. Brown

EQUIPMENT:	CASING:	SOIL SAMPLER: S/SPOON		CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE:		Stainless Steel			H.S.A.			Mobile B-59 Hollow Stem Auger
SIZE:		2" x 24"			6 1/2" ID			
HAMMER WT/FALL		140 lb 30 inch		BIT: Carbide tooth				

SURFACE ELEVATION: SURFACE CONDITIONS: Gravel and cinders

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND NO.	SAMPLE DEPTH (FROM-TO)	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ ELEV. USCS Class	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
0		SS-1	0-2	dry	20%	6,5,9,12	SM	Black, medium to fine sand and silt, cinders
5								
10		SS-2	5-7	dry	40%	4,4,4,4	CL	Grey silty clay, little fine sand
15		SS-3	10-12	moist	40%	3,1,3,3	CL	Same as above
20		SS-4	15-17	wet	80%	7,12,15,19	SM	Red-brown clayey silt, little fine sand
25		SS-5	20-22	wet	10%	23,26,36,56	SM	Same as above, pushed cobble USCS - Unified soil classification system

ARCADIS

Sample Log

Well/Boring MW-4R **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/12/2007 **Drilling Completed** 6/12/2007

Total Depth Drilled 25 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 16-18 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Andrew McDonald **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	2	0.6	1,1,1,1	Gravel fill	2.3
2	4	0.6	1,1,1,1	Darkgray, very soft, clayey silts, dry, (ML)	1.8
4	6	0.6	1,1,1,1	Darkgray, very soft, clayey silts, dry, (ML)	0.7
6	8	0.6	1,4,3,2	Yellowish orange, soft, clayey sand, moist, (SC)	1.8
8	10	2	4,3,2,6	Yellowish orange, soft, clayey sand, moist, (SC)	0
10	12	0	6,4,3,7	No recovery broken spoon	0
12	14	2	4,4,4,4	Olivegray, soft, clayey silt, moist, (ML)	33.3
14	16	2	4,4,4,6	(14-15.5) Same as above	44.7
				(15.5-16) Greenish gray, medium stiff, silty sand, wet, (SM)	
16	17	2	2,2,14,11	Same as Above	49.3
17	18			Greenish gray, silty gravel, stiff, wet, (GM)	43.8
18	20	1	14,13,2,1	Greenish gray, silty sand, stiff, wet, (SM)	9.2
20	22	1	2,4,15,33	Olivegray, hard, silty sand, wet, (SM)	3.7
22	24	1.5	5,11,36,55	Olivegray, hard, silty sand, wet, (SM)	1.7
24	25	1	37,41	Same as Above	1

ORING REPORT

EDER ASSOCIATES
Locust Valley, NY; Madison, WI; Ann Arbor MI;
Augusta, GA; Jacksonville, FL; Tampa, FL; Trenton, NJ

SHEET 1 OF 2

TE STARTED: 8/28/95 | DATE FINISHED: 8/30/95 | BORING NO.: MW-5

CLIENT: CSX Transportation | PROJECT NO.: 560-44.5

JECT NAME & LOCATION: C & O Canal, Brunswick, Maryland | PREPARED BY: Herb Ernst

DRILLING CONTRACTOR: Froehling & Robertson | LOGGED BY: Herb Ernst | DRILLER: Nate Lazaro, Tim Jackson

EQUIPMENT:	CASING:	SOIL SAMPLER:		CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE:		Split-Spoon			H.S.A.			CME
E:		2" x 24"			3 1/4" & 6 1/4" I.D.			Truck-Mounted
HAMMER		140 lb.		BIT: Carbide Tooth				Hollow Stem Auger
/FALL		30"						

URFACE ELEVATION: | SURFACE CONDITIONS:

TER LEVEL AT | FT. AFTER | HRS. | FT. AFTER | HRS.

DEPTH BELOW GRADE	PID READINGS (ppm)	SAMPLE TYPE AND NO.	SAMPLE DEPTH (FROM-TO)	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ELEV. USCS CLASS	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
0			0-2	dry	0.5	17,15,9,6	SM	upper 0.2': gravel bed
								lower 0.3': SAND, fine to coarse,
								little silt, black
5								
			5-7	dry	1.2	2,2,3,1	ML	CLAYEY SILT, trace fine black
								sand, grey-brown, no odor
10								
			10-12	dry	1.5	5,4,4,5	ML	CLAYEY SILT, some fine
								sand, trace gravel, grey-brown
15								
			15-17	moist/wet	1.5	2,2,4,3	SM	CLAYEY SILT & SAND, fine,
								grey-brown, black staining, odor
20			19.5-21.5	wet	1.3	15,14,17,12	SM	same as above, some coarse
								gravel in lowest 0.4'
25								

OJECT NAME: CSXT Brunswick BORING NO. MW-5 **PROJECT NO. 560-44.5** **SHEET 2 OF 2**

BELOW GRADE	OVA READINGS	TYPE AND NO.	DEPTH (FROM-TO)	MOISTURE CONTENT	RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ELEV. USCS CLASS	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=0-30% AND=35-50%
			24.5-26.5	wet	0.5	38,50/3"	SP	SAND, medium to fine, some quartz cobbles, light brown
30			28-30	wet	0.4	15,18,12,10	SP	SAND, medium to fine, some gravel, little silt
								Bottom of Boring - 30 feet
35								
40								
45								
50								
55								
60								

RING REPORT

EDER ASSOCIATES
Locust Valley, NY; Madison, WI; Ann Arbor MI; Augusta, GA; Jacksonville, FL; Tampa, FL; Trenton, NJ

SHEET 1 OF 1

STARTED: 8/31/95	DATE FINISHED: 8/31/95	BORING NO.: MW-8	
LIENT: CSX Transportation		PROJECT NO.: 560-44.5	
CT NAME & LOCATION: C & O Canal, Brunswick, Maryland		PREPARED BY: Herb Ernst	
RILLING CONTRACTOR: Froehling & Robertson	LOGGED BY: Herb Ernst	DRILLER: Nate Lazaro, Tim Jackson	

EQUIPMENT:	CASING:	SOIL SAMPLER:		CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
		Split-Spoon			H.S.A.			CME Truck-Mounted Hollow Stem Auger
		2" x 24"			6 1/4" I.D.			
AMMER		140 lb.		BIT: Carbide Tooth				
ALL		30"						

RFACE ELEVATION: SURFACE CONDITIONS:

R LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	PID READINGS (ppm)	SAMPLE TYPE AND NO.	SAMPLE DEPTH (FROM-TO)	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ELEV. USCS CLASS	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
0	0		0-2	dry	1	2,2,4,4	ML	SILT, some fine sand, organics, black
5	0		5-7	dry	1.2	5,7,10,11	SM	SAND & SILT, fine, brown
10	0		10-12	dry	0.2	6,5,5,7	ML	CLAYEY SILT, trace silt, reddish brown
15	0		15-17	wet	1.5	1,2,2,3	CL	SILTY CLAY, trace fine sand, reddish brown
20								
25								Bottom of Boring - 25 feet

BORING REPORT	EDER ASSOCIATES Locust Valley, NY; Madison, WI; Ann Arbor MI; Augusta, GA; Jacksonville, FL; Tampa, FL; Trenton, NJ	SHEET 1 OF 1

DATE STARTED: 8/31/95	DATE FINISHED: 8/31/95	BORING NO.: MW-9
CLIENT: CSX Transportation		PROJECT NO.: 560-44.5
PROJECT NAME & LOCATION: C & O Canal, Brunswick, Maryland		PREPARED BY: Herb Ernst
DRILLING CONTRACTOR: Froehling & Robertson	LOGGED BY: Herb Ernst	DRILLER: Nate Lazaro, Tim Jackson

		SOIL SAMPLER:		CORE		MON. WELL (MW)		DRILL RIG
EQUIPMENT:	CASING:			BARREL	AUGER	PIPE	CAP	AND METHOD
TYPE:		Split-Spoon			H.S.A.			CME
SIZE:		2" x 24"			6 1/4" I.D.			Truck-Mounted
HAMMER WT/FALL		140 lb. 30"		BIT: Carbide Tooth				Hollow Stem Auger

SURFACE ELEVATION: SURFACE CONDITIONS:

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	PID READINGS (ppm)	SAMPLE TYPE AND NO.	SAMPLE DEPTH (FROM-TO)	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH/ELEV. USCS CLASS	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
0	0		0-2	dry	0.5	5,7,2,8	SM	upper 0.3': SILT&SAND, fine, some organics, dark brown
							SP	lower 0.2: SAND, medium to fine, little gravel, light brown
5								
	0		5-7	dry	0.2	4,4,13,15	SP	SAND & GRAVEL, fine to coarse, light brown
10								
	0		10-12	dry	0.2	15,8,5,4	GP	SAND & GRAVEL, coarse, broken cobbles, brown
15								
	0		14-15.5	wet	0.8	26,24,50/4"	CL	SILTY CLAY, trace sand, grey, no odor
20								
25								Bottom of Boring - 25 feet

Sample Log

Well/Boring MW-21 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/15/2007 (1145) **Drilling Completed** 6/15/2007 (1350)

Total Depth Drilled 18 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 12-13 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon **Time:** 0945

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
2	4	1	3,5,5,4	(2-2.25) black cinders	NR
				(2.25-4) yellowish orange, stiff, clayey silt w/ some sand & gravel, dry, (ML)	
4	6	0.8	4,4,4,3	(4-4.5) black cinders	NR
				(4.5-6) yellowish orange, soft, sandy silt, dry (ML)	
6	8	1.2	3,3,2,3	Yellowish orange, stiff, clayey silt, w/some sand & gravel, moist, (ML)	NR
8	10	2	2,3,2,3	(8-9) yellowish orange, sandy clay, w/gravel, slightly moist (ML)	NR
				(9-10) yellowish orange, sandy silt, w/black cinders, dry, (ML)	
10	12	1	2,2,1,2	black, sandy silt, moderatly stiff, moist, *black cinders	NR
12	14	1.6	6,3,3,1	(12-13.3) black, sandy silt, moderatly stiff, moist, *black cinders	NR
				(13.3-14) olive grey, sandy silt (30% gravel), wet (ML)	
14	16	1	11,22,6,11	(14-15) olive grey, clayey silt w/ some gravel, wet (ML)	NR
				(15-16) olive grey, clayey silt, moderatly stiff, moist (ML)	
16	18	1.5	29,10,14,36	(16-17.5) olive grey, clayey silt w/gravel (25%), wet (ML)	NR
				(17.5-18) olive grey, sandy silt, moist (ML)	

Sample Log

Well/Boring MW-21 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/15/2007 (1145) **Drilling Completed** 6/15/2007 (1350)

Total Depth Drilled 18 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 12-13 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon **Time:** 0945

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
2	4	1	3,5,5,4	(2-2.25) black cinders	NR
				(2.25-4) yellowish orange, stiff, clayey silt w/ some sand & gravel, dry, (ML)	
4	6	0.8	4,4,4,3	(4-4.5) black cinders	NR
				(4.5-6) yellowish orange, soft, sandy silt, dry (ML)	
6	8	1.2	3,3,2,3	Yellowish orange, stiff, clayey silt, w/some sand & gravel, moist, (ML)	NR
8	10	2	2,3,2,3	(8-9) yellowish orange, sandy clay, w/gravel, slightly moist (ML)	NR
				(9-10) yellowish orange, sandy silt, w/black cinders, dry, (ML)	
10	12	1	2,2,1,2	black, sandy silt, moderatly stiff, moist, *black cinders	NR
12	14	1.6	6,3,3,1	(12-13.3) black, sandy silt, moderatly stiff, moist, *black cinders	NR
				(13.3-14) olive grey, sandy silt (30% gravel), wet (ML)	
14	16	1	11,22,6,11	(14-15) olive grey, clayey silt w/ some gravel, wet (ML)	NR
				(15-16) olive grey, clayey silt, moderatly stiff, moist (ML)	
16	18	1.5	29,10,14,36	(16-17.5) olive grey, clayey silt w/gravel (25%), wet (ML)	NR
				(17.5-18) olive grey, sandy silt, moist (ML)	

Sample Log

Well/Boring MW-23 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/18/2007 (0905) **Drilling Completed** 6/18/2007 (1030)

Total Depth Drilled 16 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 8-9 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
2	4	1.5	2,3,4,3	Olive gray, soft, clayey silt, dry, (ML)	11.6
4	6	0.8	4,4,7,6	olive gray, soft, clayey silt, dry, (ML)	5.9
6	8	1.5	5,7,3,5	same as above w/ some cinders top 6 inches	10.2
8	10	2	5,8,2,1	(8-9.5) olive gray, stiff, clayey silt, slightly moist (ML)	5.8
				(9.5-10) olive gray,s tiff, clayey silt, wet (ML)	
10	12	1.5	7,10,9,10	(10-10.5) same as above	0
				(10.5-12) olive gray, stiff, clayey silt, dry, (ML)	
12	14	2	11,14,10,15	same as above	1.5
14	16	1	1,2,4,7	(14-14.5) same as above w/cobble 1-3cm (ML)	7.9
				(14.5-16) olive gray, gravely, sandy silt, moist	

Sample Log

Well/Boring MW-24 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/18/2007 (1320) **Drilling Completed** 6/18/2007 (1530)

Total Depth Drilled 14 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 12-14 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
2	4	1	4,6,10,8	(2-2.5) black cinders	0
				(2.5-4) light brown, stiff, clayey silt, dry (ML)	
				(3.5-4) cobbles 5-20 mm	
4	6	1	3,8,9,5	(4-4.5) black, clayey silt, stiff, dry (ML)	0
				(4.5-6) light brown, stiff, clayey silt, dry (ML); atz cobble 1-3 cm	
6	8	1.2	4,5,6,4	same as above w/ some cinders at top	0
8	10	1.5	6,7,10,7	(8-8.5) black, clayey silt w/ cinders bits, dry (ML)	0.1
				(8.5-10) light brown, stiff, clayey silt, dry (ML)	
10	12	0.4	50/5	same as above	0
12	14	1.3	5,9,11,9	(12-12.5) light brown, stiff, clayey silt, dry (ML)	6.3
				(12.5-14) olive gray, stiff, clay silt, dry (ML)	
				[small amount of the sand at bottom few inches]	

ARCADIS

Sample Log

Well/Boring MW-25 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/15/2007 (0815) **Drilling Completed** 6/15/2007 (1035)

Total Depth Drilled 19 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 10-12 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
2	4	1.5	1,1,2,3	(2-2.75) black, soft, crumby, dry	NR
				(2.75-4) yellowish orange, hard, clayey silt, dry (ML)	
4	6	1.25	4,4,5,3	same as above	NR
6	8	0.5	2,3,3,3	(top 3") black cinders	NR
				(3"-6") yellowish orange, stiff, clayey silt, dry (ML)	
8	10	1.5	3,3,5,6	yellowish orange, stiff, clayey silt, slightly moist (ML)	NR
				w/ black cinders from [2-6] inches	
10	12	1.5	1,2,3,5	(10-10.3) same as above	NR
				(10.3-12) olive gray, stiff, clayey silt, dry (ML)	
12	14	1.5	3,6,9,11	(12-12.5) black cinders	NR
				(12.5-14) olive gray, stiff, clayey silt, dry (ML)	
14	16	2	5,3,9,7	(14-14.5) yellowish orange, stiff, clayey silt, dry (ML) w/ cinders	NR
				(14.5-15) olive gray, stiff, clayey cilt, dry (moist 7-14 inch) (ML)	
16	18	1.8	5,6,11,10	olive gray, stiff, clayey silt, moist (ML)	NR
				[very small amount of sand from (17.5-18)]	

ARCADIS

Sample Log

Well/Boring MW-26 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/13/2007 (1225) **Drilling Completed** 6/13/2007 (1540)

Total Depth Drilled 21 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 13-14 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
5	7	1	1,2,2,3	olive gray, clayey silt, stiff, dry (ML)	NR
7	9	1.5	2,3,3,7	(7-7.5) dark gray, crumbly, clayey silt, dry (ML)	
				(7.5-9) light brown, stiff, clayey silt, dry (ML)	NR
9	11	1.3	9,4,5,3	(top 2") olive gray, soft, clayey silt, moist (ML)	NR
				(9.2-11) olive gray, stiff, clayey silt, dry (ML)	
11	13	1	9,7,7,6	(11-11.5) olive gray, soft, clayey silt, dry (ML)	NR
				(11.5-12) olive gray, stiff, clayey silt, dry (ML)	
13	15	1.3	5,7,7,4	olive gray, stiff, clayey silt, dry (ML)	NR
15	17	2	6,6,12,11	(15-16.5) olive gray, stiff, clayey silt, dry (ML)	
				(16.5-17) olive gray, stiff, sandy silt, moist (ML)	NR
17	19	0.5	18,25	olive gray, soft(loose), silty gravel, moist (GM)	
19	21	1.5	28,24,50/5	(19-19.5) same as above	NR
				(19.5-21) olive gray, silty gravel (cobbles 1-3 cm) (GM)	
21	23	2	10,23,50/3	olive gray, gravely sand, wet, cobbles @ 22' (SP)	NR

ARCADIS

Sample Log

Well/Boring MW-27 **Project Name and No.** MD000843.0005.00003

Site Location CSXT Brunswick Rail yard **Drilling Started** 6/18/2007 (1125) **Drilling Completed** 6/18/2007 (1240)

Total Depth Drilled 14 feet **Hole Diameter** 6 1/4 inches **Sampling Interval** 11-12 feet

Length and Diameter of Sampling Device 2', 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** None

Drilling Contractor SGS Environmental **Driller** Mike Kroury **Helper** George Martin

Prepared By Sandra Grabowski **Hammer Weight** _____ **Hammer Drop** 48 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
2	4	1.75	1,1,2,3	light brown, stiff, clayey silt, dry (ML)	0
				(2-2.5) black cinders	
4	6	0.5	3,4,7,3	same as above w/ black cinders thoughout	0
6	8	1	5,4,3,2	same as above	0
8	10	1.5	1,1,4,6	(8-8.5) black, gravely silt, wet (GM)	0
				(8.5-10) olive gray, stiff, clayey silt, moist (ML)	
10	12	2	3,4,4,5	black cinders	0
				olive gray, stiff, clayey silt, dry (ML)	
12	14	2	4,5,6,4	(12-13) same as above	0
				(13-14) olive gray, stiff, sandy silt, moist (ML)	

ARCADIS

Sample/Core Log

Well/Boring MW-28 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/12/07 0815 **Drilling Completed** 11/12/07 1215

Total Depth Drilled 27 **feet** **Hole Diameter** 6 **inches** **Sampling Interval** 2 **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By RK **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 23' rough drilling at 16' - 17'	
23	25	2	27, 37, 33, 42	23-23.5 CLAY olive gray moist with some dry sand	0.0
				23.5-24 CLAY silty with trace gravel olive gray	0.0
				24-24.5 GRAVEL fragments beige and white	0.0
				24.5-25 SILT clayey orange brown with trace red gravel	0.0
27	28	1	27 50/4 in	27-28 GRAVEL brown wet poorly sorted with sand and silt	0.0
				End of boring	

ARCADIS

Sample/Core Log

Well/Boring MW-29 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/13/07 1400 **Drilling Completed** 11/12/07 1500

Total Depth Drilled 24 **feet** **Hole Diameter** 6 **inches** **Sampling Interval** _____ **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By RK **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 23'	
23	25	1.5	2 32 30 28	23-23.5 CLAY silty orange brown moist	0.0
				23.5-23.8 GRAVEL and SAND poorly sorted light brown semi-dry	0.0
				23.8-24.5 GRAVEL sandy moist with some silt, olive brown, slight odor	0.0
				End of boring (25')	
				Well set at 24' due to formation heave	

ARCADIS

Sample/Core Log

Well/Boring MW-30 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/16/07 0850 **Drilling Completed** 11/16/07 1045

Total Depth Drilled 27 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 25' (hit gravel ~19 ft)	
25	27	0.5	50/3	25-25.5 olive grey, sandy SILT with some gravel, wet	7.7
				*hit refusal first 0.5 ft	
				End of boring (25')	
				Well set at 24'	

ARCADIS

Sample/Core Log

Well/Boring MW-31 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/16/07 1145 **Drilling Completed** 11/16/07 1225

Total Depth Drilled 25 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 25' (hit gravel ~17 ft)	
25	**27**		**5, 19, 33, 18**	**silty SAND and GRAVEL, wet, light brown**	**0.5**
				End of Boring	

ARCADIS

Sample/Core Log

Well/Boring MW-32 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/16/07 1430 **Drilling Completed** 11/16/07 1520

Total Depth Drilled 25 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 22'	
20	22	1.85	6, 11, 22, 21	20-20.5 olive grey, silty CLAY, stiff, moist	3.1
				20.5-21.5 olive grey, sandy SILT with gravel (50%), wet	5.3
					0.0
				End of boring	
				hit refusal ~25ft, well set at 25'	

ARCADIS

Sample/Core Log

Well/Boring MW-33 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/12/07 0815 **Drilling Completed** 11/12/07

Total Depth Drilled 23 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 20'	
20	**22**	**2**	**50, 30, 43, 17**	**dark brown sandy CLAY with some gravel (30%)**	**0.0**
				End of boring	

ARCADIS

Sample/Core Log

Well/Boring MW-35 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/21/07 1230 **Drilling Completed** 11/21/07 1310

Total Depth Drilled 25 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 20'	
				~2' augered through an old railroad tie, wood in recovery	
20	**22**	**0.5**	**11,17,11, 14**	**light brown poorly sorted SAND and GRAVEL, wet**	**0.1**
				well set at 25'	
				End of boring	

ARCADIS

Sample/Core Log

Well/Boring MW-37 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/20/07 0915 **Drilling Completed** 11/20/07 1010

Total Depth Drilled 25 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 20' (hit some gravel ~15 ft)	
20	22	1.5	5, 6, 8, 10	20-20.5 light brown silty SAND, well sortedl wet	
				20.5-21.5 light brown SAND and GRAVEL, wet	
				End of boring	

ARCADIS

Sample/Core Log

Well/Boring MW-38 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/26/07 1305 **Drilling Completed** 11/26/07 1415

Total Depth Drilled 26 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 23'	
23	25	2	12, 16, 50/5	23-24.5 olive grey, CLAY, wet (from bottom of boring)	
				24.5-25 light brown, clayey SILT with gravel (25%), wet	
25	27	2	23, 37, 33, 14	25-26.5 olive grey, CLAY, wet (from bottom of boring)	
				26.5-27 SAND and GRAVEL with large qtz. cobbles, wet, odor	
				End of boring	

ARCADIS

Sample Log

Well/Boring MW-39 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/21/07 0850 **Drilling Completed** 11/21/07 0945

Total Depth Drilled 24 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 22'	
22	**24**	**1.5**	**2, 5, 15, 35**	**light brown silty SAND, well sorted, with gravel (35%), wet****	**0.1**
				hit auger refusal ~24 feet	
				End of boring	
				****Note:*** **added water (~50 gals) during augering**	

ARCADIS

Sample/Core Log

Well/Boring MW-41 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/19/07 1255 **Drilling Completed** 11/19/07 1344

Total Depth Drilled _____ **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 22'	
22	**24**		**8, 14, 24, 26**	**light brown, poorly sorted SAND, with gravel (25%), wet****	**1.9**
				End of boring	
				*****Note:*** **added water (~50 gals) during augering**	

ARCADIS

Sample/Core Log

Well/Boring MW-43 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/26/07 1010 **Drilling Completed** 11/26/07 1100

Total Depth Drilled 16 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 13'	
13	15	0.5	5, 12, 12, 18	olive grey, poorly sorted SAND and GRAVEL (50%) wet, with large cobbles	0.6
				and some clay	
				hit auger refusal ~16'	
				End of boring	

ARCADIS

Sample/Core Log

Well/Boring MW-49 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/19/07 0920 **Drilling Completed** 11/19/07 1005

Total Depth Drilled 25 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** N/A **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				auger to 23'	
23	**25**	**1**	**20, 16, 18, 26**	**olive grey and light brown, sandy SILT with gravel (30%) wet**	**0.9**
				End of boring	

Sample/Core Log

Well/Boring MW-50 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/14/07 1350 **Drilling Completed** 11/14/07 1505

Total Depth Drilled 24 **feet** **Hole Diameter** 6 3/8 **inches** **Sampling Interval** 2 **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	2	1.2	5, 4, 5, 5	0-0.5 light brown clayey SILT, stiff, dry	0.0
				0.5-1.2 fill /black cinders	
2	4	1	3, 1, 1, 1	2-2.2 light brown, sandy SILT, soft, dry	0.0
				2.2-3 black cinders	
4	6	1.2	4, 3, 4, 3	black cinders	0.0
6	8	0.5	1, 1, 1, 2	black cinders	0.0
8	10	1	2, 1, 2, 3	black cinders with some sandy gravel	0.0
10	12	1.5	3, 4, 5, 5	10-10.5 black cinders	0.0
				10.5-11.5 olive grey sandy SILT with some clay, moderally stiff, dry	11.5
12	14	2	6, 4, 5, 5	12-12.5 cinders	0.0
				12.5-13.7 olive grey, sandy SILT, moderate stiff, moist	11.5
				13.7-14 orangish brown, sandy SILT, soft, moist	0.3
14	16		4, 2, 2, 3	14-14.5 cinders	0.0
				14.5-15 orangish brown, sandy SILT, soft, moist	0.0
				15-16 orangish brown, sandy SILT, wet	0.0

Sample/Core Log (Cont.d)

Well/Boring MW-50 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Prepared By SG

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
16	18	1	37, 8, 5, 9	same as above with gravel (50%)	0.0
18	20	2	8, 10, 14, 25	same as above with gravel (25%)	0.0
20	22	2	17, 23, 22, 21	same as above with gravel (~50%)	0.0
22	24	2		same as above	0.0
				End of boring	

Sample/Core Log

Well/Boring MW-51 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/20/07 1255 **Drilling Completed** 11/20/07 1455

Total Depth Drilled 25 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** 2 **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
3	5	1.75	5, 3, 4, 5	orangish brown clayey SILT, stiff, dry with some gravel	NR
5	7	1.75	10, 15, 8, 9	same as above	NR
7	9	1.5	9, 12, 17, 26	orangish brown clayey SILT, very stiff, moist	NR
9	11	0.5	8, 12, 10, 13	same as above; hit cobble at 11 ft	NR
11	13	2	7, 6, 6, 10	11-13 same as above	NR
				12-13 orangish brown clayey SILT with some gravel and sand	NR
13	15	1.5	3, 4, 11, 6	13-14 orangish brown clayey SILT, stiff, moist	NR
				14-14.5 sandy SILT with gravel, wet, brown	NR
15	17	1	1, 2, 12, 5	15-15.7 orangish brown clayey SILT, stiff, wet	NR
				15.7-16 olive grey silty SAND, well sorted, moist, with some gravel (10%)	NR
17	19	2	12, 4, 4, 6	17-17.8 orangish brown clayey SILT, moist, stiff	0.2
				17.8-19 grey silty SAND, well sorted, moist	NR
19	21	1	1, 7, 6, 11	19-19.5 orangish borwn, clayey SILT, medium stiff, wet	0.4
				19.5-20 olive grey, wet, poorly sorted SAND and GRAVEL (50%), wet	0.7
21	23	1.5	15, 26, 20, 28	21-21.5 orangish brown, clayey SILTwith some sand, stiff, wet	0.2

Sample/Core Log (Cont.d)

Well/Boring MW-51 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Prepared By SG

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				21.5-22.5 poorly sorted SAND and GRAVEL with some clay, stiff	**0.2**
23	**25**	**1.8**	**12, 11, 20, 50/2**	**same as above**	**0.2**
				End of boring	

Sample/Core Log

Well/Boring MW-52 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Site Location CSXT Brunswick, MD **Drilling Started** 11/14/07 0900 **Drilling Completed** 11/14/07 1100

Total Depth Drilled 22 **feet** **Hole Diameter** 6 5/8 **inches** **Sampling Interval** 2 **feet**

Length and Diameter of Sampling Device 2 ft/ 2 in **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** N/A

Drilling Contractor SGS **Driller** Mike K **Helper** George M

Prepared By SG **Hammer Weight** N/A **Hammer Drop** N/A **inches**

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
0	2	1	5, 8, 10, 6	cinders with light brown silty clay and gravel (30%) dry	0.6
2	4	2	19, 4, 3	2-2.5 black cinder	
				2.5-3 light brown, silty CLAY, very stiff, dry	0.3
				3-4 light brown, silty CLAY, stiff, slightly moist	0.2
4	6	2	4, 4, 4, 5	light brown, silty CLAY, stiff, dry	0.0
6	8	2	8, 10, 12, 13	6-6.5 olive gray, silty CLAY, soft, moist	0.0
				6.5-8 orangish brown, clayey SILT, stiff, dry	0.0
8	10	2	4, 4, 4, 3	8-8.5 olive gray, silty CLAY, stiff moist	
				8.5-8.8 orangish brown, clayey SILT, stiff	0.3
				8.8-10 light brown, silty CLAY, stiff, moist	
10	12	2	4, 4, 5, 4	10-11.8 light brown, silty CLAY, stiff, moist	0.3
				11.8-12 olive gray, sandy SILT, wet	
12	14	2	5, 10, 32, 20	12-13 olive gray, sandy SILT, wet	2.2
				13-14 light brown, silty SAND and GRAVEL (50%), wet	4.6
14	16	1.3	wt. of hammer/12, 5, 5	14-15 olive gray, clayey SILT, soft, wet	2.4

Sample/Core Log (Cont.d)

Well/Boring MW-52 **Project Name and No.** CSXT Brunswick/ MD 843.06.01

Prepared By SG

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)
				15-16 olive gray clayey SILT with sand and gravel (50%)	9.1
16	18	0.2	5, 10, 11, 6	olive gray sandy SILT with gravel (25%)	3.7
18	20	0.3	50/2	olive gray sandy SILT with gravel (25%) (qtz cobbles)	3.8
20	22	0.6	48, 50/3	olive gray sandy SILT with gravel (25%) (qtz cobbles)	5.4
				*hit auger refusal at 22'	
				End of boring	

ARCADIS

Sample/Core Log

Boring/Well MW-55 Project/No. MD000843.0006.00001 Page 1 of ___

Site

Location CSXT Brunswick Raily Yard

Drilling Started 12/17/08 0840 Drilling Completed 12/17/08 0920

Total Depth Drilled 20 Feet Hole Diameter 8 inches Type of Sample/ Coring Device HSA, split spoon

Length and Diameter of Coring Device 2', 2"

Sampling Interval ___ feet

Land-Surface Elev. N/A feet ___ Surveyed ___ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method HSA

Drilling Contractor SAS Driller Mike K Helper Brian

Prepared By GH Hammer Weight 140 Hammer Drop 6 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet) 10	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0	2	18	2.7	12-10-7-4	FILL, dark brown/black, silt, some gravel, med stiff, dry
2	4	24	5.3	4-3-3-3	CLAY with little sand, orange, trace gravel, soft, dry to slightly moist
6	8	20	3.2	3-2-4-3	CLAY, med brown, soft, moist, med plasticity
8	10	24	5.7	2-3-3-3	CLAY, with trace silt, soft, med brown, trace gravel, low to med plasticity, moist
10	12	24	86.2	2-3-4-3	CLAY with some sand, soft med red/brown low plasticity, moist trace gravel
12	14	24	125	7-7-9-11	CLAY with little sand, med stiff low to med. plasticity, dry to moist
14	16	24	179	8-to-9-5	SAND and SILT with trace clay, med red/brown, fine grained, moist to wet, slight odor
16	18	24	286	2-2-2-2	SAND and SILT with some clay, soft wet, fine grained, med brown, green, odor

ARCADIS

Sample/Core Log (Cont.d)

Boring/Well MW-55

Prepared by GH

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
18	20	2.4	245	1-2-3-2	SAND with some silt, fine grained
					med brown/gray, wet, soft, high
					dilatancy, strong odor, sheen
					END BORING
					Note: 2-4 - no recovery

ARCADIS

Sample/Core Log

Boring/Well MW-56 Project/No. MD000843.0006.00001 Page 1 of 2

Site Location CSXT Brunswick Raily Yard

Drilling Started 12/16/08 1000 Drilling Completed 12/16/08 1110

Total Depth Drilled 20 Feet Hole Diameter 8.0 inches Type of Sample/ Coring Device Split Spoon

Length and Diameter of Coring Device 2' x 1.25"

Sampling Interval _____ feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Split spoon Auger

Drilling Contractor SGS Driller Mike K Helper Brian

Prepared By GH, SC Hammer Weight 140 Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet) in	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
0	2	18	0.2	7-4-5-5	SAND and SILT, dark brown/black,
2	4			~~6-8-35-22~~	most likely fill, ~~MMM~~ stiff
2	4	—	0.1	10, 8, 35, 12	CLAY, red/orange, med plastic, wet, very stiff
4	6	0		2,4,5,6	very stiff, cobbles at 4 ft
6	8	~~0~~		2,3,2,2	stiff
* from 4-8 ft					CLAY with little silt, med brown,
sample from soil					med plastic, wet, med stiff
cuttings					odor
8	18	20	0.3	NOH -	CLAY, med brown, highly
				4-6-10	plastic, med wet, med stiff,
					odor
10	12	24	0.2	8-9-9-9	SAA with weathered rock
				17-10-11-10	fragments
12	14	24	51.4	17-10-11-10	CLAY with some sand, med
					brown/gray, med plastic, med
					wet, very stiff, strong odor,
					sheen.

~~Sh~~ 9-11

ARCADIS

Sample/Core Log (Cont.d)

Boring/Well: MW-56

Prepared by: GH, JC

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet) in	PID Reading (ppm)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
14	16	20	55.7	8-6-9-11	SAND and SILT, med brown/gray moist to wet, stiff, odor, sheen, few ~~redbrown~~ gravels
~~16~~	~~20~~				
18	20	22	158	6-9-11-14	SAND with some SILT, fine grained, med brown, moist to wet, med. dilatancy, sheen, odor, gravel
					TD = 20'
16	18	22	79.8		~~END BORING~~
					SAND with some silt med brown moist to wet, odor, sheen
					END BORING

ARCADIS

Sample/Core Log

Boring/Well MW-59 Project/No. CSXT Brunswick Drilling, MD000843.0010.00001 Page 1 of 1

Site Location CSXT, Brunswick, MD Drilling Started 3/15/2012 11:13 Drilling Completed 3/15/2012 12:05

Total Depth Drilled 25 Feet Hole Diameter 6.625 inches Type of Sample/ Coring Device Split Spoon

Length and Diameter of Coring Device 2' by 2" Sampling Interval N/A feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Hollow Stem

Drilling Contractor Drill Tech Driller Bob Atkinson Helper Tom & Gric

Prepared By Justin Radford/Sandy Kamas Hammer Weight 140 lb Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	1.5	0.9	0-1.5 Fill, Black cinder, Grey, Ashy, Gravel, Sand, Dry
				1.5 - 2.0 No Recovery, Dry
2	4	0.7	0	2.0 - 2.2 Fill, Gray, Gravel, Sandy Ash, Dry
			0	2.2 - 2.4 Fill, Red Brick Fragment, Dry
			0.4	2.4 - 2.7 Fill, Black Cinder w/some coal, Dry
				2.7 - 4.0 No Recovery, Dry
4	6	0.8	0	4.0 - 4.4 Fill, Black cinder/coal & coal dust, sand & gravel, Dry, Black
			0	4.4 - 4.8 Fill, Red Brick Frag, Moist
				4.8 -6.0 No Recovery, Dry
6	8	2	6	6.0 - 6.1 Fill, Black cinder, sand, gravel, Moist
			20.2-36.8	6.1 - 7.7 Clay, High Plastic, Moist, Med Stiff, Slight Odor, Dk Grey 10YR 4/1
				7.7 - 8.0 No Recovery, Dry
8	10	2	8.2	8.0 - 8.1 Fill, SAA, Black Cinder
			74.9	8.1 - 8.7 Clay, H Plastic, Moist, Soft, DK Grey 10YR 4/1, Slight Odor
			40.2	8.7 - 10.0 Clay, Med Plastic, Moist, Stiff, Slight Odor, Brown 7.5YR 4/3
10	12	1.4	31.7	10.0 - 11.2 SAA, Clay, Low Plastic, Moist, Stiff, Brown
			72.3	11.2 - 11.4 Silty Clay, High Plastic, Moist, Soft, DK GY 10YR 4/1
				11.4 - 12.0 No Recovery, Dry
12	14	2	11.2-59.1	12.0 - 14.0 Silty Clay, Non Plastic, Moist, Soft w/some brick, DK GY, slight Odor
14	16	1.3	22.8	14-15.3 Clay-SiltyClay,LowPlastic,Moist,Med Stiff, soft w/15% Med subAng Pebble
				Slight odor
				15.3 - 16.0 No Recovery, Dry
16	18	1.1	39.6-59.4	16.0 - 16.4 Silty w/some Clay, Wet, Saturated, brown, sheen, slight odor
				16.4 - 17.1 Silty w/Clay, Moist-Wet, Brown w/med Pebble, Slight Odor

				17.1 - 18.0 No Recovery, Dry
18	20	1	34.5-42.4	18.0 - 18.5 SiltyClay, Moist-Wet, Non Plastic, slight Odor, Brown 10YR 4/3
				18.5 - 18.7 Sandy Green Schist, Breaks along planes, Greenish Grey
				18.7 - 19.0 Med-Sml, Fill, Gravel, PRLY SRTD, Quarry Gry Limestone
				19.0 - 20.0 No Recovery, Dry
20	22	0.8	16.9-36.8	20.0 - 20.4 SAA, SiltyClay, slight odor, Moist, Brown 10YR 4/3
				20.4 - 20.8 Red Brick, Sml-Med Gravel&Fine Sand, Red Brown
				20.8 - 22.0 No Recovery, Dry
22	24	1.4	3.4-5.9	22.0 - 23.4 VF-course Sand, silty Clay & sml-med SubAng Pebbles, PRLY SRTED
				w/Brick Fragments <5%, Brown-Greenish Gray
				23.4 - 24.0 No Recovery, Wet w/Sheen, Slight Odor
24	25	--	--	Augered down to 25' due to Split Spoon Refusal

ARCADIS

Sample/Core Log

Boring/Well: MW-60 | Project/No.: CSXT Brunswick Drilling, MD000843.0010.00001 | Page 1 of 1

Site Location: CSXT, Brunswick, MD | Drilling Started: 3/15/2012 9:00 | Drilling Completed: 3/15/2012 10:10

Total Depth Drilled: 25 Feet | Hole Diameter: 6.625 inches | Type of Sample/ Coring Device: Split Spoon

Length and Diameter of Coring Device: 2' by 2" | Sampling Interval: N/A feet

Land-Surface Elev.: N/A feet ☐ Surveyed ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Hollow Stem

Drilling Contractor: Drill Tech | Driller: Bob Atkinson | Helper: Tom & Gric

Prepared By: Justin Radford/Sandy Kamas | Hammer Weight: 140 lb | Hammer Drop: 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	1.4	0	0-1.4 Fill, Black cinder, sand, gravel, Dry, Black to Brown
				1.4 - 2.0 No Recovery, Dry
2	4	1.5	13.6	2.0-2.4 Clay, low plastic, moist, Med Stiff w/sml pebbles, yellowish brn 10YR 4/4
			13.6	2.4 - 3.5 Fill, SAA
				3.5 - 4.0 No Recovery, Dry
4	6	1.5	6.3	4.0 - 4.4 Fill, SAA except all black and moist
			28.8	4.4 - 5.5 Clay, SAA except soft and brown, 10YR 4/3
				5.5 -6.0 No Recovery, Dry
6	8	2	20.3-59.9	6.0 - 8.0 Clay, High Plastic, Moist, Med Stiff, Slight Odor
				w/trace sml Sub Ang Pebbles, Brn 10YR 4/3
8	10	1.35	36.4-53.7	8.0 - 8.7 SiltyClay, non Plastic, Saturated, very soft, high odor, Dk grey, 10YR 5/1
				8.7 - 9.35 Clay, Med Plastic, Moist, Med Stiff, High Odor, Brown, 10YR 4/3
				9.35 - 10.0 No Recovery, Dry
10	12	0.6	5.6	10.0 - 10.6 Clay w/some fill & sub ang. Pebbles, soft, Moist, Brn 10YR 4/3
				10.6 - 12.0 No Recovery, Dry, Slight Odor
12	14	0.9	12.5-63.2	12.0 - 12.9 Clay, High Plastic, Moist, Soft, Dk Brown 10YR 3/3, Moderate Odor
				12.9 - 14.0 No Recovery, Dry
14	16	0.8	22.8	14.0-14.8 Clay, SAA, MedPlastic w/sml SubRnd Pebbles, v. soft, slight odor,moist
				14.8 - 16.0 No Recovery, Damp
16	18	1	47.9	16.0 - 17.0 SiltyClay, Non Plastic w/sml-med sub rnd pebbles, saturated, very soft
				slight odor, brown 10YR 4/3
				17.0 - 18.0 No Recovery, Damp to Wet
18	20	1	52.7-69.8	18.0 - 19.0 SAA, Silty Clay, Med Plastic w/40-45% med subRnd Pebbles, Moist,
				Soft, slight odor, brown 10YR 4/3
				19.0 - 20.0 No Recovery Damp to Wet

20	22	1	38.3-57.9	20.0 - 20.6 SAA, SiltyClay w/little 30% Med Round Pebbles
				20.6-21.0 Silt-F Sand w/some sml-med subAng Pebble,Moist,Slt Odor,grn red brn
				21.1 - 22.0 No Recovery, Dry
22	24	0.2	27.4	22.0 - 22.2 SiltyClay-F Sand, Saturated, wet w/40-50% sml-med subAng Pebble
				Brown 10YR 4/3
				22.2 - 24.0 No Recovery, Wet, Slight Odor
24	25	--	--	Augered down to 25' due to Split Spoon Refusal

ARCADIS

Sample/Core Log

Boring/Well: MW-61 | Project/No.: CSXT Brunswick Drilling, MD000843.0010.00001 | Page 1 of 1

Site Location: CSXT, Brunswick, MD | Drilling Started: 3/14/2012 14:55 | Drilling Completed: 3/15/2012 7:20

Total Depth Drilled: 25 Feet | Hole Diameter: 6.625 inches | Type of Sample/Coring Device: Split Spoon

Length and Diameter of Coring Device: 2' by 2" | Sampling Interval: N/A feet

Land-Surface Elev.: N/A feet ☐ Surveyed ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Hollow Stem

Drilling Contractor: Drill Tech | Driller: Bob Atkinson | Helper: Tom & Gric

Prepared By: Justin Radford/Sandy Kamas | Hammer Weight: 140 lb | Hammer Drop: 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	1.8	0	0.0 - 0.6 Gravel/Road Bed/Silt
				0.6 - 1.8 Fill, Black cinders, silt, sand, some clay and gravel
				1.8 - 2.0 No Recovery, Dry
2	4	0.9	0	2.0 -2.9 SAA
				2.9 - 4.0 No Recovery, Dry
4	6	0.8	0.6	4.0 - 4.6 Fill, Black cinders, silt, sand, Gravel
			12.2	4.6 - 4.8 Clay, Med Plastic, Moist, Slight Odor, Med Stiff, 10YR 4/3
				4.8 -6.0 No Recovery, Dry
6	8	2	15.0-59.4	6.0 - 8.0 Clay, Med Plastic, Moist, Slight Odor, Med Stiff, 10YR 4/3
				Trace Med Sub Rounded Pebbles and Track Black Cinder
8	10	2	18.6-123.6	8.0 - 10.0 SAA, Slt Odor w/trace Med Pebbles&trace blk cinders, 10YR 4/3 Brown
10	12	1	50.8	10.0 - 10.5 Fill, Black cinder, Brick fragments, gravel, sand
			29.9	10.5 - 11.0 SAA, Clay, Low Plastic, Stiff, Moist, 10YR 4/3
				11.0 - 12.0 No Recovery, Dry
12	14	2	21.3-71.4	12.0 - 14.0 Clay, Med Plastic, Soft, Moist, Brown
14	16	1.6	52.6-86.3	14.0 - 15.6 Silty Clay-Silt w/vf sand, moist, soft, moderate odor, 10YR 4/2
				15.6 - 16.0 No Recovery, Dry
16	18	2	94.3-108.0	16.0 - 17.5 SAA, Silty Clay, moderate odor, very soft, wet, 10YR 4/2
				17.6 - 18.0 Green Sandy Schist, Breaks easily along planes
18	20	0.7	75.1	18-18.7 Silt w/vf sand&30% med-lge Pebbles,wet,10YR 4/2 Dk greyish brn,slt odor
				18.7 - 20.0 No Recovery, Wet
20	22	0.1	9.8-20.7	20.0 - 20.1 SAA w/white ss, slight odor
				20.1 - 22.0 No Recovery, Wet
22	24	1	35.5	22.0 - 22.6 SAA, silty clay/sand, saturated, slight odor, Sheen, Brown
				22.6 - 24.0 Green Sandy Schist w/sub angular med pebbles

ARCADIS

Sample/Core Log

Boring/Well: MW-62 | Project/No.: CSXT Brunswick Drilling, MD000843.0010.00001 | Page 1 of 1

Site Location: CSXT, Brunswick, MD | Drilling Started: 3/14/2012 12:04 | Drilling Completed: 3/14/2012 13:30

Total Depth Drilled: 25 Feet | Hole Diameter: 6.625 inches | Type of Sample/ Coring Device: Split Spoon

Length and Diameter of Coring Device: 2' by 2" | Sampling Interval: N/A feet

Land-Surface Elev.: N/A feet | ☐ Surveyed | ☐ Estimated | Datum: N/A

Drilling Fluid Used: N/A | Drilling Method: Hollow Stem

Drilling Contractor: Drill Tech | Driller: Bob Atkinson | Helper: Tom & Gric

Prepared By: Justin Radford/Sandy Kamas | Hammer Weight: 140 lb | Hammer Drop: 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	1.6	0	0-1.6 Fill, Black cinder, Ashy white cinder w/some red dry brick chips
				1.6 - 2.0 No Recovery, Dry
2	4	1	0	2.0 -3.0 Fill, SAA Except no Trace of Brick Chips
				3.0 - 4.0 No Recovery, Dry
4	6	0		4.0 -6.0 No Recovery, Dry
6	8	0.55	0	6.0 - 6.25 Fill, Black cinder, Dry, Black
			5.4	6.25 - 6.55 Clay, High Plastic, Moist, 10YR 4/3 Brown
				6.55 - 8.0 No Recovery, Dry
8	10	1.15	13.8-28.7	8.0 - 9.15 Clay, High Plastic, Moist, Slight Odor, 10YR 4/3 Brown
				9.15 - 10.0 No Recovery, Dry
10	12	1	0.4	10.0 - 10.6 Fill, Moist, Black cinder (possible coal), Black
			55.6	10.6 - 11.0 Silty Clay, Low Plastic, Moist, Slight Odor, 10YR 3/2
				11.0 - 12.0 No Recovery, Dry
12	14	0.3	27.5	12.0-12.3 Clay, High Plastic, Moist, Odor, 10YR 3/3
				12.3 - 14.0 No Recovery, Dry
14	16	1.3	0.6	14.0 - 14.4 Fill, Black cinder, Moist, Black
			111.3	14.4 - 15.3 Clay, High Plastic, Moist, Soft, 10YR 3/3
				15.3 - 16.0 No Recovery, Dry
16	18	1	20.6-128.3	16.0-17.0 SiltyClay,Med Plastic, Moist,Soft w/trace sml SubAng Pebbles, 10YR 3/3
				17.0 - 18.0 No Recovery, Wet
18	20	2	17.8-73.4	18.0 - 20.0 Silty Clay, Very Fine-Fine Sandy mix, Saturated, very Soft
				w/trace sml SubAng Pebbles, mod. odor, slight sheen,10YR 4/2 Dk greyish brn
20	22	1.1	15.4-28.3	20.0 - 21.1 Clay w/40% sml-med Sub Rounded Pebbles
				w/silt to vf sand, wet, slight odor 10YR 4/2

				21.1 - 22.0 No Recovery, Wet
22	24	1.4	5.9	22.0 - 23.0 Med-Coarse Sand w/15% Med Sub Rounded Pebbles, Moist
				Moderately sorted, very slight odor, 10YR 6/4 yellowish brown
			2.6	23.0-23.4 SiltyClay-VF Sand w/Trace med Sub Rounded Pebbles, Moist, 10YR 3/3
				23.4 - 24.0 No Recovery, Wet
24	25	--	--	No split spoon sample collected. Drill auger to 25' and set well

ARCADIS

Sample/Core Log

Boring/Well MW-63 Project/No. CSXT Brunswick Drilling, MD000843.0010.00001 Page 1 of 1

Site Location CSXT, Brunswick, MD Drilling Started 3/14/2012 9:04 Drilling Completed 3/15/2012 10:55

Total Depth Drilled 25 Feet Hole Diameter 6.625 inches Type of Sample/ Coring Device Split Spoon

Length and Diameter of Coring Device 2' by 2" Sampling Interval N/A feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Hollow Stem

Drilling Contractor Drill Tech Driller Bob Atkinson Helper Tom & Gric

Prepared By Justin Radford/Sandy Kamas Hammer Weight 140 lb Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	1.6	0	0-1.6 Fill, Black cinder w/white-grey ash, dry, black w/light gret
				1.6 - 2.0 No Recovery, Dry
2	4	1.75	0	2.0 -2.75 Fill, SAA
			0	2.75 - 3.75 Clay, Low Plastic, Moist, Med Stiff, 10YR 4/6 Dark Yellow Brown
				3.75 - 4.0 No Recovery, Dry
4	6	0.75	0	4.0 - 4.75 Fill, Black cinder Fill w/some SAA, Trace Clay Mixed In
				4.75 -6.0 No Recovery, Dry
6	8	1.6	0	6.0 - 7.6 Clay, Low Plastic, Moist, Soft w/Trace black fill, 10YR 3/2
				7.6 - 8.0 No Recovery, Dry
8	10	1.2	0.0-7.3	8.0 - 9.2 Clay, SAA w/Trace Med Subangular Pebbles
				9.2 - 10.0 No Recovery, Dry
10	12	1	2.8-10.8	10.0 - 11.0 Clay, Low Plastic, Moist, Slight Stiff, 10YR 4/3 Brown
				11.0 - 12.0 No Recovery, Dry
12	14	1	11.8-43.7	12.0-13.0 Clay, SAA w/some Trace Black cinder fill@top of spoon, moderate odor
				13.0 - 14.0 No Recovery, Dry, sample has odor
14	16	1.4	33.4-92.6	14.0 - 14.4 Fill, Black Cinder, top of spoon
				14.4-15.4 SiltyClay, Non Plastic, Very Moist, Mod. Odor, 10YR 4/2 DK Grey-Brown
				15.4 - 16.0 No Recovery
16	18	2	59.5-87.9	16.0-18.0 SiltyClay, SAA, Very Moist, Mod-High Odor, 10YR 4/2 Dark Grey-Brown
18	20	2	6.4-27.4	18.0 - 20.0 Silty Clay, Saturated, Sheen, Wet, Slight Odor, 10YR 4/2
20	22	0.6	6.1	20.0 - 20.6 Silty Clay, Wet, Soft w/some sml-med Pebbles 10YR 4/2
				20.6 - 22.0 No Recovery, Damp
22	24	2	0.6	22-24 FineSand,Wet w/15% sml-med SubAngPebbles,10YR 4/4 Dk yellowish brn
24	25	1	0.6	24.0 - 24.5 Fine-Med Sand w/30% Med sub round Pebble, 10YR 4/2
			0.6	24.5-25 VeryFineSand w/45-50% Large-Med rounded Pebbles,qtzite/SS,10YR 4/2

				with very slight odor, (sand&stone in sample) seem to simulate river bed

ARCADIS

Sample/Core Log

Boring/Well MW-64 Project/No. CSXT Brunswick Drilling, MD000843.0010.00001 Page 1 of 1

Site Location CSXT, Brunswick, MD Drilling Started 3/13/2012 14:25 Drilling Completed 3/13/2012 16:00

Total Depth Drilled 24 Feet Hole Diameter 6.625 inches Type of Sample/ Coring Device Split Spoon

Length and Diameter of Coring Device 2' by 2" Sampling Interval N/A feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Hollow Stem

Drilling Contractor Drill Tech Driller Bob Atkinson Helper Tom & Gric

Prepared By Justin Radford/Sandy Kamas Hammer Weight 140 lb Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	0.8	0	0-0.8 Fill, Black cinder, dry and black
				0.8 - 2.0 No Recovery, Dry
2	4	1.1	0	2.0 -3.1 Fill, Black cinder w/some brick, dry, black, dark red
				3.1 - 4.0 No Recovery, Dry
4	6	0		4.0 -6.0 No Recovery, Dry
6	8	2	0	6.0 - 6.2 Fill, Black cinder, wet, black
			0	6.2 - 8.0 Clay, High Plastic, Moist, Med Stiff, 10YR 3/2
8	10	2	0.4	8.0 - 9.1 Silty Clay, Saturdated, wet, very soft, 10YR 3/2
			0.5	9.1 - 10.0 Clay, Med Plastic, Moist, stiff, 10YR 3/2 and Yellowish
10	12	1.3	1.2-3.7	10.0 - 10.3 Clay/Black Coal Dust, Moist-Dry, stiff, Black
				10.3 - 11.3 Clay, Med Plastic, Moist, Stiff, 10YR 3/2
				11.3 - 12.0 No Recovery,Wet
12	14	0.8	0.7	12 - 12.8 Clay, High Plastic, Moist, Soft 10YR 4/2
				12.8 - 14.0 No Recovery, Dry
14	16	1.5	0.8-13.8	14.0 - 15.5 Silty Clay, High Plastic, Wet, Very Soft, 10YR 3/2
				15.5 - 16.0 No Recovery
16	18	2	3.0-4.9	16.0-18.0 SiltyClay, High Plastic,Wet,Very Soft-Soft, 10YR 3/2 (sheen&slight odor)
18	20	1.4	0.8-1.1	18.0 - 18.8 Silty Clay, Saturated, Sheen, Wet, Very Soft, Odor, 10YR 4/2
				18.8-19.4 SiltyClay&Small-Med Subangular Pebbles, Moist, Slight Odor, 10YR 4/2
				19.4 - 20.0 No Recovery, Dry
20	22	1.35	0.4	20.0 - 21.35 Silty Clay&Small-Med Sub Round Pebbles, Wet, 10YR 3/3
				21.35 - 22.0 No Recovery, Wet
22	24	1.6	0.2	22.0 - 22.5 Med Sand, Well Sorted, Moist, 10YR 4/4
			0.2	22.5 - 23.6 Med Sand & 20-30% Large Sub Round Pebbles, 10YR 4/4
				23.6 - 24.0 No Recovery, Wet

				**Refusal, Had to auger down from 24' to 25'

ARCADIS

Sample/Core Log

Boring/Well MW-65 Project/No. CSXT Brunswick Drilling, MD000843.0010.00001 Page 1 of 1

Site Location CSXT, Brunswick, MD Drilling Started 3/13/12 11:55am Drilling Completed 3/13/2012 13:00

Total Depth Drilled 25 Feet Hole Diameter 6.625 inches Type of Sample/ Coring Device Split Spoon

Length and Diameter of Coring Device 2' by 2" Sampling Interval N/A feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used N/A Drilling Method Hollow Stem

Drilling Contractor Drill Tech Driller Bob Atkinson Helper Tom & Gric

Prepared By Justin Radford/Sandy Kamas Hammer Weight 140 lb Hammer Drop 30 ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (inches)	PID Reading (ppm)	Sample/Core Description
0	2	1.5	0	0-0.6 Fill, Black cinder, silt, sand, dry, black/dark grey
			0	0.6 - 1.0 Fill, Sand/Gravel, Ashy, dry, light grey
			0	1.0 - 1.5 Fill, black cinder, silt, dry, black
				1.5 - 2.0 No Recovery, Dry
2	4	1	0	2.0 -3.0 Fill, Black cinder, silt, dry, black, some grey
				3.0 - 4.0 No Recovery, Dry
4	6	0.4	0	4.0 -4.4 Fill, SAA
				4.4 - 6.0 No Recovery
6	8	1.35	7.2	6.0 - 7.0 Fill SAA, Wet and Slight Odor
			5.4	7.0 - 7.35 Clay, High Plastic, Moist. Soft, Dark Reddish Brown, Slight Odor
				7.35 - 8.0 No Recovery
8	10	2	8	8.0 - 8.5 Fill, SAA, wet and Slight Odor
			11	8.5 - 10.0 Clay, High Plastic, Moist, Soft, Slight Odor, Dark Olive
10	12	1.7	2.6	10.0 - 11.7 Clay, High Plastic, Moist, Soft, Slight Odor, Dark Olive Brown
				11.7 - 12.0 No Recovery
12	14	2	2.8	12 - 14 Clay, Medium Plastic, Moist, Soft, Slight Odor Light Brown
14	16	1.1	0.4	14 - 15.1 Silty Clay, Medium Plastic, Moist, Odor, Dark Grey Brown 10YR 3/2
				15.1 - 16.0 No Recovery
16	18	2	0.8	16.0-16.9 Silty Clay, Saturated, Wet, Very Soft, Slight Odor, 10YR 3/2
			0.8	16.9-18.0 SiltyClay, High Plastic, Moist, Soft, Dk Grey Brown 10YR 3/2
18	20	2	1.8	18.0 - 20.0 Silty Clay, Saturated, Wet, Sheen, Slight Odor, Dk GreyBrown 10YR 3/2
20	22	0.7	4.4	20.0 - 20.3 SAA, No Sheen, No Odor, 10YR 3/2
			3.4	20.3 - 20.7 Med-Large Pebble, Subangular 50%, Silt, Dry, 10YR 5/4
				20.7 - 22.0 No Recovery, Dry

22	24	1.5	0.4	22.0-22.7 SiltyClay, Saturated w/20% AngularMedPebble, Wet, No Odor, 10YR 3/2
			0.4	22.7 - 23.5 Silty Clay, Med Plastic, 30-40% AngularMedPebble, Moist 10YR 3/2
				23.5 - 24.0 No Recovery
24	25	1	0.3	24.0 - 24.3 Coarse Sand, Moist, Well Sorted, Sub Round, Light Brown
			0.3	24.3 - 24.7 Med-Fine Sand, Moist, Well Sorted, Sub Round, Brown
			0.3	24.7 - 25.0 Silty Clay w/Med-Large Sub Angular Pebbles, Light Brown

Sample Log

Well/Borin MW-67 **Project Name and No.** CSXT Brunswick / MD000843.0011.00002

Site Location Brunswick, MD **Drilling Started** 1/7/2013 (1015) **Drilling Completed** 1/7/13 (1320)

Total Depth Drilled 25 feet **Hole Diameter** 10 inches **Sampling Interval** continuous feet

Length and Diameter of Sampling Device 2' / 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** –

Drilling Contractor DTCI **Driller** Brian Van Doren **Helper** Eric Mitchell

Prepared By S. Kamas / K. Moran **Hammer Weight** 140 lb **Hammer Drop** 30 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)	FID (ppm)
0	2	1.3/2	11, 11, 8, 5	0-1.3: black cinders / gravel, FILL, dry, loose	0.0, 0.0	0.0, 0.0
2	4	1.1/2	4, 4, 4, 5	2.0-3.1: black cinders / gravel, FILL, dry, loose	2.0, 4.4	12.3
4	6	2.0/2	3, 3, 3, 4	4.0-6.0: brown clay, some silt, little gravel, med to high plasticity, slightly moist. Medium stiff, 10 YR 4/2 (dark grayish brown), slight odor	0.3, 10.0, 1.5, 1.0	350, 41, 62
6	8	1.2/2	3, 3, 4, 4	6.0-6.3: SAA	0.4, 0.8, 0.5	307
				6.3-7.2: SAA w/ color change to 10 YR 4/3 (brown)		
8	10	1.3/2	1, 2, 3, 4	8.0-9.3: SAA, moist, odor	10.7, 9.1, 80.9	832, 180, 140
10	12	1.9/2	3, 3, 6, 6	10.0-11.9: SAA, more moisture @ 11.0, gravels from 10.6-10.8 (dry), strong odor 11.0-11.9	17.2, 104.1, 54.1	404, 404, 156
12	14	1.2/2	1, 2, 1, 2	12.0-13.2: SAA, very moist, some gravels @ 13.1	17.5, 57.4, 60.1	145, 118, 287
14	16	1.4/2	2, 2, 4, 5	14.0-14.7: SAA with some gravel	71.8, 37.5, 31.4	109, 148, 48
				14.7-15.4: sandy silt with some clay and gravels (same color), saturated, water table at 14.9		
16	18	1.9/2	2, 2, 3.5	16.0-17.9: SAA, saturated	45.3, 19.6, 30.7	0.8, 29.6, 16.9
18	20	1.3/2	4, 9, 13, 22	18.0-18.5: SAA, saturated	21.6, 27.4	0.7, 62
				18.5-19.3: gravel zone, matrix SAA, saturated		

Sample Log (Continued)

Well/ Boring MW-67 **Project Name and No.** CSXT Brunswick / MD000843

Prepared By SK / KEM

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)	FID (ppm)
20	22	1.1/2	9, 13, 21, 23	20.0-21.1: silty-sand with gravel, same color, saturated	23.8, 12.5	332, 42
22	24	0.4/2	21, 50/3	slough no recovery. Suspected gravel zone	–	–
24	26	1.2/2	, 19, 29, 50/	24.0-25.2: sand with some silt, clay, gravels, same color, saturated	2.8, 2.9	0.0, 0.0
				END BORING		
	Notes: Soil samples collected from intervals:			(14.2-14.7, 1230)		
				(13.7-14.7, 1230)		
				(8.0-8.5, 1325)		
				(8.0-9.0, 1325)		

Sample Log

Well/Boring MW-68 **Project Name and No.** CSX Brunswick / MD000843.0011.00002

Site Location Brunswick, MD **Drilling Started** 1/8/2013 (0855) **Drilling Completed** 1/8/2013 (1130)

Total Depth Drilled 25 feet **Hole Diameter** 10 inches **Sampling Interval** contiuous feet

Length and Diameter of Sampling Device 2' / 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** –

Drilling Contractor DTCI **Driller** Brian Van Doren **Helper** Eric Mitchell

Prepared By K. Moran **Hammer Weight** 140 lb **Hammer Drop** 30 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)	FID (ppm)
1	3	2.0/2	2, 21, 1, 11	0-1.0 concrete - used jackhammer to penetrate	0.6, 0.4, 0.2	
				1.0-3.0 black FILL, cinders, gravel		
3	5	1.3/2	1, 1, 1, 2	3.0-3.9 cinders, black: FILL	2.6, 2.3	
				3.9-4.3: coarse sand & small gravels, light gray		
5	7	0.9/2	1, 1, 1, 1	5.0-5.6: clay with little sand and silt, dark brown	5.4, 5.6	
				5.6-5.9: coarse sand, angular, saturated. Water and sample are black with odor		
7	9	2.0/2		7.0-7.8: sand and gravels, black saturated w/ odor, no sheen to liquid	33.6, 19.8, 21.4	78, 79, 91
9	11	0.3/2	3, 3, 3, 4	slough no recovery		
11	13	2.0/2	3, 4, 4, 4	11.0-12.2: silty clay, brown, wet	17.4, 34.5, 89.2	148, 125, 88
				12.2-12.7: coarse sand with silt and clay, little gravel, wet		
				12.7-13.0: silty clay with little sand, brown		
13	15	1.5/2	2, 2, 2, 3	13.0-14.5: sandy silt, brown, saturated	85, 46.4, 19.6	97, 130, 114
				13.6-13.8: stiff red-brown clay, water table @14.0		
15	17	20/2	2, 2, 4, 6	15.0-16.8: sandy silt, brown	128.2, 69.2, 97	137, 140, 130
				16.8- 17.0: silty sand, brown		

Sample Log (Continued)

Well/ Boring MW-68 **Project Name and No.** CSX Brunswick / MD000843.0011.00002

Prepared By K. Moran

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	PID (ppm)	FID (ppm)
17	19	1.5/2	3, 4, 7, 9	17.0-18.1: SAA, saturated	41.5, 122.0, 65.9	79, 98
				18.1-19.5: silty sand with gravels, saturated, brown		
19	21	1.0/2	4, 6, 8, 8	19.0-20.0: SAA, saturated, gravels @ 19.6-19.7	28.5, 100.7	105, 98
21	23	2.0/2	12, 17, 19, 22	21.0-23.0: brown sandy silt, with gravel (some friable), saturated	11.1, 8.5, 6.7	86, 98, 76
23	25	1.1/2	9, 21, 17, 16	23.0-24.1: sandy silt, brown with gravels, saturated	3.7, 5.1	85, 76
				END BORING		
Notes: Soil samples collected from intervals:				(11.5-12.0)		
				(13.5-14.0)		
				(11-12)		
				(13-14)		
FID screening conducted at 1100. Values should be considered qualitative due to high ambient concentration (75 ppm) and out-of-range ambient calibration due to highbackground concentration						

Sample Log

Well/Boring MW-69 **Project Name and No.** CSX Brunswick / MD000843.0011.00002

Site Location Brunswick, MD **Drilling Started** 1/8/2013 (1240) **Drilling Completed** 1/9/2013 (0800)

Total Depth Drilled 24 feet **Hole Diameter** 10 inches **Sampling Interval** continuous feet

Length and Diameter of Sampling Device 2' / 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** –

Drilling Contractor DTCI **Driller** Brian Van Dorn **Helper** Eric Mitchell

Prepared By Katie Moran **Hammer Weight** 140 lb **Hammer Drop** 30 inches

From	To	Sample Depth (feet below land surface) (feet)	Sample Recovery inches	Time/Hydraulic Pressure or Blows per 6	Sample Description	PID (ppm)	FID (ppm)
0	2	1.5/2	7, 5, 3, 3	0.0-1.5: black cinders with grey and white gravel, FILL, some brick		0.7, 0.8	
				Thin layer of brown sand at 1.3			
2	4	1.0/2	2, 1, 1, 1	2.0-3.0: Black cinders with gravel, FILL		0.6, 0.7	
				Driller reports obtruction at 4'. Auger through obstruction.			
4	6	0.8/2	50/3	4.0-4.6: SAA, FILL. Small piece wood @ 4.6		0.5	
				4.6-4.8: grey & blue sand & gravel, possibly weathered cobble/boulder or concrete			
				Auger through obstruction at 4.8'			
Obstruction at 6' bgs. Offset well location by 5' and resume logging.							
5	7	0.8/2	1, 2, 1, 2	5.0-5.8: clay, dark brown, with little sand. Moist from 5.5-5.8, odor			10
7	9	1.2/2	2, 2, 2, 2	7.0-7.8: silty clay, dark brown, with little sand, soft and wet. Odor			12.3, 14.9
				7.8-8.2: stiff dark brown silty clay. Odor			
9	11	1.6/2	1, 2, 2, 5	SAA, odor. Large gravel (single) at 9.5			11.2, 25, 11
11	13	1.8/2	1, 2, 1, 5	11.0-12.8: dark brown stiff clay, little sand, moist			9.7, 26.9, 10.1
13	15	1.7/2		13.0-14.7: SAA, moist, with thin sand lenses @ 13.5, 14.3, 14.6			8.1, 8.9, 9.7

Sample Log (Continued)

Well/Boring MW-69 **Project Name and No.** CSX Brunswick

Prepared By K. Moran

From	To	Sample Depth (feet below land surface) (feet)	Sample Recovery inches	Time/Hydraulic Pressure or Blows per 6	Sample Description	PID (ppm)	FID (ppm)
15	17	2.0/2	2, 2, 4, 6	15.0-16.8: dark brown sandy silt, moist/wet			18, 97, 34
				16.8-17.0: sand and gravel with some silt, saturated			
				Interpreted water table at 16.8			
17	19	2.0/2	3, 6, 6, 8	17.0-19.0: silt w/ fine sand, dark brown, wet. Sand & gravel zone:17.1-17.4			4.5, 14.1, 10
19	21	1.1/2	4, 6, 8, 13	19.0-19.4: stiff dark brown clay			9.4, 13, 7.8
				19.4-20.1: dark brown, sandy-silt w/ gravels, saturated			
21	23	2.0/2	8, 17, 22, 26	21.0-23.0: SAA w/ few gravels from 21.2-21.6. saturated			7.0, 6.9, 5.8
23	25	2.0/2	17, 21, 26, 29	23.0-25.0: silty sand w/ gravels, dark brown, saturated			7.2, 7.3, 8.7
Notes: PID and FID readings alternate due to malfunction of PID after relocation of borehole and discarding samples from first boring.							
	FID screening of samples conducted at 1550. Ambient PID reading: 0.5 ppm.						
Soil Samples collected at intervals:				(15.5-16.0)			
				(16.5-17.0)			
				(15-16)			
				(16-17)			

ARCADIS

Sample Log

Well/Boring MW-70 **Project Name and No.** CSX Brunswick / MD000843.0011.00002

Site Location Brunswick, MD **Drilling Started** 1/9/2013 (0942) **Drilling Completed** 1/9/2013 (1130)

Total Depth Drilled 25 feet **Hole Diameter** 10 inches **Sampling Interval** continuous

Length and Diameter of Sampling Device 2' / 2" **Type of Sampling Device** split spoon

Drilling Method HSA **Drilling Fluid Used** –

Drilling Contractor DTCI **Driller** Brian Van Doren **Helper** Eric Mitchell

Prepared By K. Moran **Hammer Weight** 140 lb **Hammer Drop** 30 inches

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	FID (ppm)
0	2	1.7/2	7, 5, 4, 4	0.0-1.3: grey and black cinders, sand, gravel: FILL	30, 27, 26
				1.3-1.7: SAA w/ some red-brown clay	
2	4	1.5/2	3, 3, 2, 2	2.0-2.4: SAA	
				2.4-3.5: red-brown clay, moist, with little silt, sand, gravel	30, 29.4, 29
				Thin gravel zone @ 3.1	
4	6	1.4/2	2, 2, 2, 2	4.0-5.4: stiff clay, red-brown, w/ some sand & little gravel	28.9, 28.2, 27.2
6	8	2.0/2	4, 5, 6, 6	6.0-8.0: red-brown sandy-silt w/ some clay & gravel. Moist, little odor	28.5, 27.6, 27.5
				Thin gravel zone @ 7.5	
8	10	0.7/2	3, 3, 4, 5	8.0-8.7: SAA	25.0, 25.0
10	12	0.4/2	5, 6, 6, 5	10.0-10.4: brown silt with some fine sand and clay, vey moist	28.4
12	14	0.4/2	4, 3, 3, 5	12.0-12.4: SAA with few gravels. Saturated	62.2
14	16	1.6/2	1, 1, 1, 2	14.0-15.6: SAA, with odor. Saturated.	96, 114, 40.9
				Gravel zone @ 15.0-15.4	
				Interpreted water table at 15' bgs	

Sample Log (Continued)

Well/Boring MW-70 **Project Name and No.** CSX Brunswick / MD000843.0011.00002

Prepared By K. Moran

Sample Depth (feet below land surface) From	To	Sample Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample Description	FID (ppm)
16	18	1.4/2	2, 2, 4, 4	16.0-17.0: brown silt with little clay and fine sand	37, 58, 25
				17.0-17.4: brown sandy silt with little gravel, strong odor	
18	20	1.5/2	8, 13, 21, 27	18.0-18.4: SAA	
				18.4-19.5: brown sand and gravel with some silt. Saturated, odor.	55, 26, 24.5
20	22	2.0/2	13, 17, 23, 27	20.0-22.0: brown silty sand & gravel, little gravel 20.0-20.6, 21.5-21.8	21.4, 22.9, 24.1
22	24	0.3/2	51/2	22.0-22.3: brown silty sand, coarse-grained	21.5
24	26	1.2/2	27, 17, 16, 16	24.0-24.4: brown coarse sand with silt	15.6, 18.4
				24.4-25.0: brown coarse sand and gravel	
				25.0-25.2: fine sand with some silt, red-brown	
Notes: No PID reading taken due to equipment malfunction. FID screening of samples conducted at 1120.					
	Ambient FID at start: 35 ppm; at end: 21.0 ppm				
	Soil Samples collected at intervals: (14.5-15.0)				
				(14.5-15.5)	

C&O Canal

Boring: MPS-MW-1

Page: 1 of 4

Date: 8/29/96
Start/Finish: 0936

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
		ROAD FILL, GRAVEL SAND, CLAY LT BROWN S BROWN @ 1' BGS, DRY	T: 0836 R: —		4¼" ID HSA 2"X2' SPLIT SPOONS DRIVEN W/ 140 LB HAMMER W/ 30" FREE FTL "D & R" IN FEET
2		FILL AS ABOVE	T: 0854 R: .2	11,13 9,7	
4		BROWN MOIST SILTY CLAY MOD PLASTIC, DENSE ≈ 1 ppm	T: 0857 R: 1.3	3,4,6 5,	DRILLING NOTES AUGER TO 2' DRIVE SS 2-4 AUGER TO 4 DRSS 4-6 AUGER TO 6
6		BROWN CLAY AS ABOVE 21 ppm	T: 0906 R: 1.7	5,5,6 6	
8		8.9 CLAY ~~AS ABOVE~~ BROWN MORE SILT PLASTIC MOIST 9-10 DK GREY CLAYEY SILT MOIST ~~MOIST~~	T: 0910 R: 2.0	1,2,2	
10		~~CLAY~~ (GREY) AS ABOVE VRY MOIST ~~SILT~~	T: 0913 R: 2.0	1,1,1,3	
12		SILT AS ABOVE 12-13.5 VRY MOIST 13.5-15 BROWN SILTY CLAY VRY MOIST	T: 0917 R: 2.0	2,2,4,6	
14	▽	14-14.5 GREY BROWN CLAYEY SILT VRY MOIST H_2O @ ≈ 14? 14.5-16 - BROWN SILTY CLAY MOD ~~STIFF~~ PLASTIC ~~WET~~ VRY MOIST	T: 0927 R: 1.7	3,6,10,12	
16		16-17.2 CLAY AS ABOVE 17.2-18.0 LT BROWN CLAYEY SILTY SND SND FNGR VRY MOIST	T: 0932 R: 2.0		SAMPLE COLLECTED
18			T: R:		

Project: C & O CANAL

Boring: NPS MW1

Page

Date: 8/29

Start/Finish:

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
	▽	~~ENG~~ 18-19.2 FN GR SND AS ABOVE WET	T: 0936		
20		19.2-20 ~~WEATHERED ROCK~~ SILTY SAND W/GRAVEL, CLAY GRAVEL SUB ANGULAR — SUB ROUNDED OVA 6 PPM 19.2-20	R:		
		BROWN SILTY SND W/GRAVEL REFUSAL @ 20.5	T: 0945	50/3	
22			R: .3		
			T:		DRILLING NOTES
24			R:		DR SS 18-20
			T:		AUGER TO 20
26			R:		H2O ≈ 18'
			T:		REFUSAL 20.5
28			R:		
10			T:		
			R:		
12			T:		
			R:		
14			T:		
			R:		
16			T:		SAMPLE COLLECTED
			R:		
18			T:		
			R:		

11:FORMS/BC047-07/14/95-D1

BORING LOG GENERAL DATA

Project: C&O CANAL Boring: NPS-MW1 Page: 3 of 4

Driller & Company: TERRY / HARDIN - HUBER

Geologist/Logger & Company: W GRAF / E&E Signature: Walter Graf

Date Boring Started: 8/29/96 Completed: 8/29/96

Water Levels (from Ground Surface) Drilling Rig: MOBILE B-57

First Encountered: ≈18

While Drilling: Date: 8/27

Date:

At Boring Completion: ≈15 STILL RISING Date:

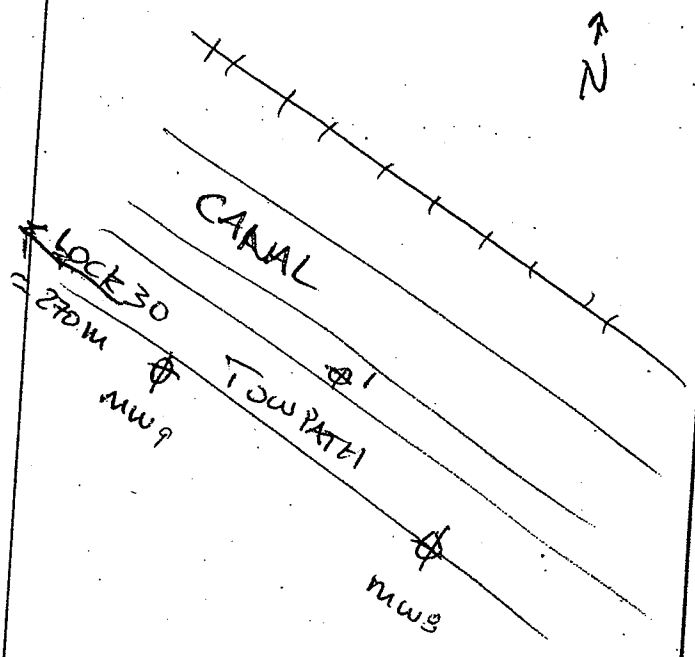
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
8/29	0836	0950	0	20.5					
	1040	1130	0						

Abbreviations:

Abbr.	Meaning

Location Sketch:



€O CANAL

Boring: NPS MW2

Page: 1 of 4

Date: 8/29/96
Start/Finish: 1520/1640

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
		BLACK DRY CINDERS W/DEBRIS	T: 1530 R:		4¼" HSA. 2"x2' SPLIT SPOONS DRIVEN W/A 140 LB HAMMER W/30" FREEFALL. "D" & "R" IN FEET
2		CINDERS AS ABOVE TO 3.8 3.8-4.0 GREY-BROWN SILTY SAND W/GRAVEL MOIST OVA = 12 ppm	T: 1535 R: 1.0	2,23, 14	
4		4-5.0 SILTY SND AS ABOVE 5.0-6.0 BROWN SILTY CLAY STIFF MOIST OVA @ background	T: 1538 R: 1.0	6,8,7,6	DRILLING NOTES AUGER TO 2' DR SS 2-4 AUGER TO 4
6		6-7 dark brown clayey silt MOIST 7-8 brown moist silty clay. mod stiff OVA @ background	T: 1547 R: 1.0	2,3,4,4	DR SS 4-6 AUGER TO 6 DR SS 6-8
8		CLAY AS ABOVE OVA @ background	T: 1552 R: 1.7	2,3,3,7	AUGER TO 8 DR SS 8-10 AUGER TO 10
10		10-10.5 CLAY AS ABOVE 10.5 12 BROWN/GREY SILTY CLAY MOD PLASTIC, MOIST MOTTLED SLIGHTLY OVA @ background	T: 1559 R: ~~1551~~ 1.7	6,8,12,12	DR SS 10-12 AUGER TO 12 DR SS 12-14 AUGER TO 14
12		BROWN/GREY SLIGHTLY MOTTLED SILTY CLAY STIFF MOIST OVA - 2 ppm	T: 1601 R: 1.8	3,6, 10,12	DR SS 14-16 AUGER TO 16 DR SS 16-18 ▽ H_2O @ 17 AUGER TO 18
14		DARK BROWN SILTY CLAY OVA - 1 ppm	T: 1604 R: 1.7	3,5,10,14	
16	▽	CLAY AS ABOVE OVA @ background	T: 1620 R: 2.0	6,12,15,32	SAMPLE COLLECTED
18			T: R:		

Project: VU 8000 C&O Canal

Boring: NPS-MW-2

Page: 2

Date: 8/29/96
Start/Finish:

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
18		Silty clay with gravel from 18 to 18.5 ft.	T: 1623	5, 30, 50/5"	
		18.5 - 20 → gravelly silty sand SUBANGULAR-SUBROUNDED TO 2" SAND - CS/MD/FN 10%50%40%	R: 1.0		
20		OVA: 3 ppm			
		GRAVELLY SILTY SND W/CLAY WET SND CS/MD/FN 10/30/60	T: 1629	22, 27	
			R: 0.8	29, 31	
22		OVA = 0 ppm			DRILLING NOTES
		22-22.3 - SND AS ABOVE	T: 1636	33, 5/5	DR SS 18-20
		22.3-24 SNDY GRAVEL · GRAVEL WEATHERED TAN & RED SND & SLT	R: 0.5		AUGER TO 20
24		WET OVA 20 ppm			DR SS 20-22
			T:		AUGER TO 22
			R:		DR SS 22-23
8					AUGER TO 23
			T:		REFUSAL @ 23'
			R:		
10					
			T:		
			R:		
12					
			T:		
			R:		
14					
			T:		
			R:		
16					
			T:		SAMPLE COLLECTED
			R:		VOC BNA TPH 12-14'
18			T:		GRAIN SIZE 20-22
			R:		

C&O CANAL

Boring: NPS MW3

Page: 1 of 4

Date: 8/27/96
Start/Finish: 1125

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
		DK BROWN CLAYEY SILTY SND W/GRAVEL MOIST	T: R:		4½ HSA TO 24, 10¼ HSA 0-20 2"X2' SPLIT SAMPLERS SPLIT SPOONS DRIVEN W/140LB HAMMER W/30" FREEFALL DEPTH & "R" IN FEET
2		DK BROWN SNDY CLAY W/GRAVEL 2.2,5 2.5-4.0 BROWN STIFF SILTY CLAY MINOR GRAVEL MOIST	T: 1134 R: 1.0	6,9,9,9	
4		BROWN SILTY CLAY MOIST	T: 1140 R: 1.2	5,5,8,8	DRILLING NOTES AUGER TO 2 DR SS 2-4 AUGER TO 4 DR SS 4-6
6		CLAY MOIST AS ABOVE	T: 1145 R: 1.3	6,5,5,7	AUGER TO 6 DR SS 6-8 AUGER TO 8
8		BROWN MOIST CLAY W/MINOR SILT PLASTIC	T: 1149 R: 1.5	4,4,5,8	DR SS 8-10 AUGER TO 10 DR. SS 10-12 AUGER TO 12
10		CLAY AS ABOVE	T: 1154 R: 1.1	4,5,7,9	DR SS 12-14 AUGER TO 14 DR SS ~~10~~ 14-16
12		CLAY AS ABOVE	T: 1201 R: 2.0	3,5,9,11	AUGER TO 16 DR SS 16-18 AUGER TO 18
14		CLAY AS ABOVE	T: 1211 R: 2.0	2,4,6,8	
16		OVA = 1 ppm 16-17 CLAY AS ABOVE 17-17.5 - SILTY CLAY VRY MOIST, BROWN	T: 1220 R: 2.0	5,4,5,6	SAMPLE COLLECTED
18		17.5-18.0 BROWN CLAY MINOR SILT PLASTIC OVA = 0.5 ppm	T: R:		

Project:

Boring: NPS MW 3

Page:

Date: 8/27/96
Start/Finish:

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
18	▼	BROWN W/GREY SILTY CLAY WET PLASTIC	T: 1225	2,3,3,5	H_2O @ ~16' DR SS 18-20
			R: 2.0		
20		OVA - @ background			
		BROWN/GREY MOTTLED SILTY CLAY WET, PLASTIC	T: 1232	3,3,5,5	
			R: 2.0		
22		OVA = 0 ppm			DRILLING NOTES
		DR GREY SANDY SILT 22-23	T: 1247		H_2O @ ~18
		23-24 GREY WET SILTY SND W/GRAVEL GRAVEL WEATHERED			DR SS 19-20
24		OVA = 0 PPM	R: 1.2	7,23,33, 21	AUGER TO 20
					DR SS 20-22
			T:		AUGER TO 22
					DR SS 22-24
26			R:		AUGER TO 24
					WAIT 1 HOUR
			T:		H_2O @ 8' BGS
					WILL AUGER TO
28			R:		16' W/ 18 1/4" ID HSA
					28
			T:		
12			R:		
			T:		
14			R:		
			T:		
16			R:		
					SAMPLE COLLECTED
			T:		VOC BNA TPH
18			R:		16-20 18
			T:		
			R:		

BORING LOG GENERAL DATA

Project: C&O CANAL Boring: NPS MW3 Page: 3 of 4

Driller & Company:

Geologist/Logger & Company: W. GRAF / EEE Signature: Walter Graf

Date Boring Started: 8/27/96 Completed: 8/27/96

Water Levels (from Ground Surface) Drilling Rig:

First Encountered: ~~18~~ 18.0 Date: 8/27/96

While Drilling: 18.0 Date:

At Boring Completion: 8.0 Date: 8/27/96

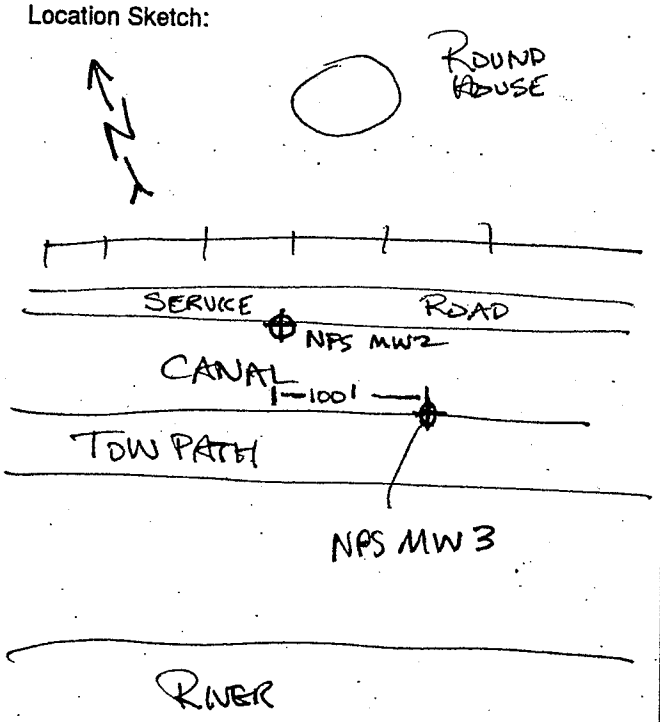
Drilling Shifts:

Date	Time		Depth of Drilling Per Shift		Date	Time		Depth of Drilling Per Shift	
	Start	End	Start	End		Start	End	Start	End
8/27	1125	1247	0	24					
	1430	1602	0	25					

Abbreviations:

Abbr.	Meaning

Location Sketch:



C&O CANAL

Boring: NPS MW4

Page: 1 OF 3

Date: 9/3/96
Start/Finish: 0950/1030

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
		BLACK DRY CINDERS/ASH W/DEBRIS	T: — R: —		
2		CINDERS AS ABOVE	T: 0950 R: 0.5	2,1,2,1	
4		OVA - 0 ppm CINDERS AS ABOVE	T: 0959 R: 0.2	1,2,2,1	DRILLING NOTES AUGER TO 2 DR SS 2-4 AUGER TO 4 DR SS 4-6
6		BROWN CLAYEY SILT MOIST, MOD PLASTIC	T: 1002 R: 1.8	3,7 19,9	AUGER TO 6 DR SS 6-8
8		OVA 20 - 90 ppm BROWN & GREY CLAYEY SILT MOIST MOD PLASTIC, ODOR	T: 1006 R: 1.0	10,8,8, 18	AUGER TO 8 DR SS 8-10 AUGER TO 10
10		OVA 140 ppm SILT AS ABOVE, ODOR	T: 1010 R: 1.7	99,14, 16	DR SS 10-12 AUGER TO 12 DR SS 12-14, LITTLE RECOVERY SPOON BOUNCING
12		OVA 180 ppm GREY CLAYEY SILT MOIST ODOR	T: 1018 R: .1	—	AUGER TO 14 DR SS 14-16, LITTLE RECOVERY REFUSAL @ 15'
14	▽	OVA 60 ppm GRAVELLY, SILTY CLAYEY SND WET @ 14	T: 1020 R: 0.3	16,36 50/2	1045 SWL @ 1049 hrs ~~TD~~ 955 @ 1051
16		OVA ~ 30 ppm	T: R:		SAMPLE COLLECTED VOC BNA TPH 8-10 FINGERPRINT
18		AUGER - 15' DRUMS = 1 SPLIT SPOONS - 7	T: R:		GRAIN SIZE 14-16

YU 8000 CEO Canal
National Parks

Boring: NPS-MW5

Page: 1 OF 4

Date: 8/28/96
Start/Finish: 1000 hrs /

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
2		Silty sand w/ gravel	T: 1000	13,11, 11,12	4¼ HSA
			R: 0.2		2" X 2' SPLIT SPOONS DRIVEN W/ 140 LB HAMMER W/ 30" FREE FALL
4		OVA = 0			
		Brown silty clay w/ roots SLIGHT MOISTURE, STIFF	T: 1015	8,9,8,7	D & R IN FEET
			R: 1.7		
6					DRILLING NOTES
		CLAY AS ABOVE	T: 1031	8,9	AUGER TO 2
			R: 1.7	8,10	DR SS 2-4
8					AUGER TO 4
		CLAY AS ABOVE, MOISTURE INCREASE @ 9.5'			DR SS 4-6
			T: 1037	7, 11,	AUGER TO 6
			R: 1.7	11, 12	DR SS 6-8
10					AUGER TO 8
		10-11 CLAY AS ABOVE			DR SS 8-10
		11-12 BROWN SILTY CLAY INCREASING SILT, MOIST, PLASTIC MOD	T: 1043	5,5	AUGER TO 10
			R: 1.9	6,6	DR SS 10-12
12					AUGER TO 12
		~~CLA~~ BROWN SILTY CLAY, PLASTIC MOIST			DR SS 12-14
			T: 1047	3,4,5,8	AUGER TO 14
14 12			R: 1.9		DR SS 14-16
					AUGER TO 16
		CLAY AS ABOVE	T: 1054	4,4	DR SS-16-18
			R: 1.7	8,11	AUGER TO 18
16 14					DR SS 18-20
		CLAY AS ABOVE	T: 1100	9,8	
			R: 2.0	11,11	
18 16					
		CLAY AS ABOVE			SAMPLE COLLECTED
			T: 1106	12,9,	
20 18			R: 2.0	11,11	
			T:		
			R:		

Project: C&O CANAL

Boring: NPS MW5

Page:

Date:
Start/Finish:

Depth/ Elevation (ft.)	Water Level	Soil/Rock Description	Time and Recovery	Blow Count	Drilling Data
20		20-20.3 - CLAY AS ABOVE 20.3-20.8 BROWN CLAYEY SILTY FNGR SND WET WATER @ ~20' 20.8-22 GREY W/ BROWN MOTTLED SILTY CLAYEY SND WET, ROCK @ 22'	T: 1113 R: 1.3	4,6 50/5	
22		22-23 ~~CLAY~~ GRAVELLY SNDY CLAY WET GRAVEL SUB ANGULAR 23-24 GREEN BLACK MOTTLED SILTY CLAY MINOR END (WEATHERED) LAMINATED OVA 10 PPM WET	T: 1123 R: 1.1	26,33 50/3	
24		HEAVILY WEATHERED MATERIAL AS ABOVE SAPROLITE OVA 6PPM	T: 1130 R: 0.5	27, REF	DRILLING NOTES AUGER TO 20 DR SS 20-22 ~~REFUSAL~~ ENCOUNTERED ROCK @ 22'
26		(WEATHERED MATERIAL) SAPROLITE MOIST TO DRY SLIGHTLY OVA = 0 PPM	T: 1140 R: 0.5	30 REF/3	AUGER TO 22 DR SS 22-24 AUGER TO 24 DR SS 24-26 AUGER TO 26 DR SS 26-28 AUGER TO 27
28			T: R:		
10			T: R:		TD 27'
12			T: R:		
14			T: R:		
16			T: R:		SAMPLE COLLECTED 20-22 VOC BNA TPH GRAINSIZE 22-24
18			T: R:		

DRILLING LOG FOR MW-10 (NPS)

Project Name Chesepeake and Ohio Canal

Site Location C&O Canal National Historic Park, Brunswick Md

Date Started/Finished 11/26/01 - 11/27/01

Drilling Company BADGER DRILLING

Driller's Name JIM DAVIS

Geologist's Name HUSSEIN ALDIS

Geologist's Signature Hussein Aldis

Rig Type (s) CME 750

Drilling Method (s) Hollow Stem Auger

Bit Size (s) 8-INCH Auger Size (s) 7.5" O.D

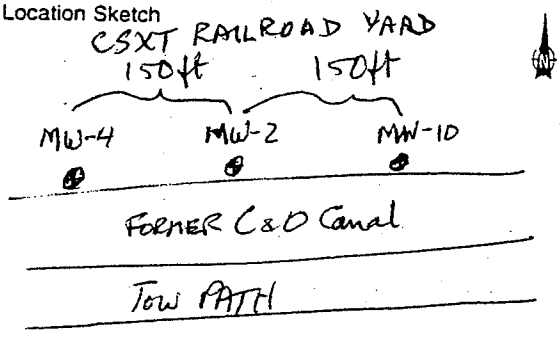
Auger/Split Spoon Refusal N/A

Total Depth of Borehole Is 21 ft bgs

Total Depth of Corehole Is N/A

Water Level (TOIC)		
Date	Time	Level(Feet)
11/27/01	0800	6FT bgs
04/12/01	1504	5.9 btoc

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1			SL,S							0-2 feet black "topsoil" organic rich fill.
2										
3			GR,S							2-4ft ? GRAVEL
4										
5			CL,SL							Clay, dk brn, silty, soft
6		2 3	SL,S,GR			95%				5" Silt, sandy, some gravel, black
7		3 4	CL,SL							18" CLAY, SILTY, TAN, FIRM
8		5 7	CL,SL			100%				CL, SILTY, TAN, FIRM
9		10 12								BECOMING SFT. WET 8.5-9.0
10		6 7	CL,SL			100%				CLAY, AS ABOVE
11		11 14								FIRM, DRY
12		7 7	CL,SL			100%				CLAY, AS ABOVE
13		11 14								BECOMING WETTER
14		3 5	CL,SL			75%				CLAY, AS ABOVE
15		8 14								DRY

Depth(feet)	Sample Number	Blows on Sampler		Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
				CL, SL								
16		40	32	GR, S				60%				GRAVEL AND SAND WITH COBBLES, ANGULAR
17		50/5.5"										
18						AUGERED						
19	MW-10 18'-20'	26	75/6"	GR. S				50%				GR/S as above
20						AUGERED						
21				TD 21'								TD 21 FT
22				MW-10								MW-10
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33												
34												
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36												
37												
38												
39												
40												
41												
42												
43												
44												

DRILLING LOG FOR MW-11 (NPS)

Project Name: Chesapeake and Ohio Canal

Site Location: C&O CANAL NATIONAL HISTORIC PARK, BRUNSWICK, MD.

Date Started/Finished: 11/27/01 - 11/27/01

Drilling Company: BADGER DRILLING

Driller's Name: JIM DAVIS

Geologist's Name: HUSSEIN ALDIS

Geologist's Signature: Hussein Aldis

Rig Type (s): CME 750

Drilling Method (s): Hollow Stem Auger

Bit Size (s): 8-INCH Auger Size (s): 7.5" O.D.

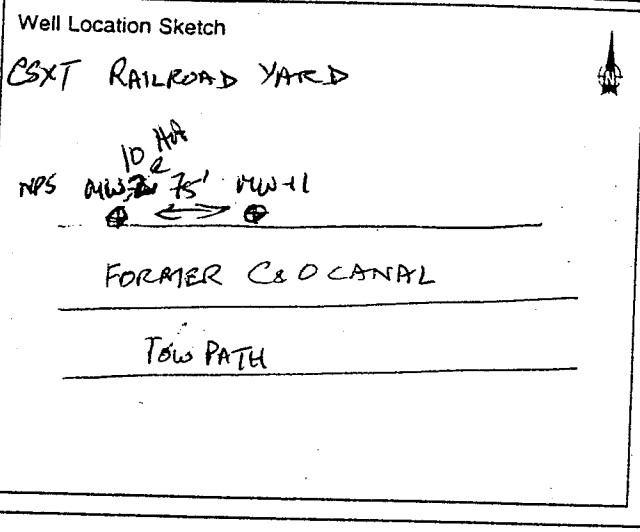
Auger/Split Spoon Refusal: N/A

Total Depth of Borehole Is: 21 FEET bgs

Total Depth of Corehole Is: N/A.

Water Level (TOIC)		
Date	Time	Level(Feet)
12/04/01	1429	~ 6.5 ft bgs.
12/06/01	1091	5.19 ft btoc

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1										Black loam "topsoil" to 4 ft bgs? Fill?
2										
3										
4										
5		3 2	SL, S, some GR			95%				BLACK dry loam 10" w SAND AND some GR
6		3 3	CL							CL. TAN-LT BRN PLASTIC SOFT, GRADING TO FIRM
7		3 4	CL			95%				CL AS ABOVE
8		7 8								
9		5 7	CL			100%				
10		10 15								
11		4 7	CL			100%				CL, AS ABOVE GRAD TO FIRM / STIFF
12		7 14								
13		5 7	CL			100%				CL LT-BROWN MOD SOFT to STIFF, PLASTIC
14		9 15								
15		2 3	CL			100%				CL AS ABOVE WET

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
		7 9					100%				CLAY AS ABOVE
16		16 35	GR. S WITH SOME COBBLES				45%				HIT GRAVEL/ COBBLES @ 16FT.
17		52									
18			GR, S WITH COBBLES								AUGERED TO 21' GRAVEL & COBBLES
19											
20			TD 21FT								TD 21'FT.
21											MW-11
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											

DRILLING LOG FOR MW-12 (NPS)

Project Name: Chesapeake and Ohio Canal

Site Location: CHESAPEAKE AND OHIO CANAL NATIONAL HISTORIC PARK, BRUNSWICK MD.

Date Started/Finished: 11/27/01 - 11/28/01

Drilling Company: BADGER DRILLING

Driller's Name: JIM DAVIC

Geologist's Name: HUSSEIN ADDIS

Geologist's Signature: Hussein Addis

Rig Type (s): CME 750

Drilling Method (s): HOLLOW STEM AUGER

Bit Size (s): 8-INCH Auger Size (s): 7.5" O.D.

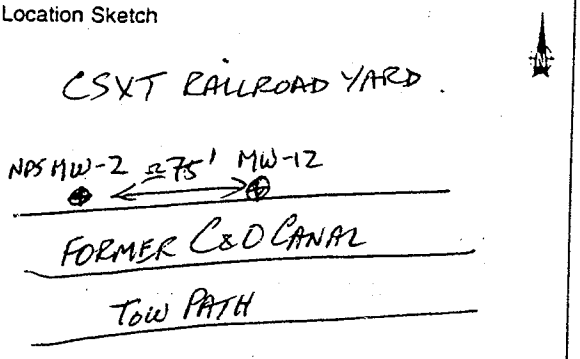
Auger/Split Spoon Refusal: N/A.

Total Depth of Borehole Is: 27'

Total Depth of Corehole Is: N/A.

Water Level (TOIC)		
Date	Time	Level(Feet)

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1										SOFT BLACK SOIL-LIKE FILL
2										
3										
4										
5										
6										
7										
8										
9		8 8	CL.			45%				CLAY, BRN-TAN, STIFF DRY, SLIGHTLY PASTIC.
10		8 8								
11		6 5	CL			65%				CL. AS ABOVE LT. BRN
12		7 10								
13		5 6	CL			85%				CL AS ABOVE, DAMP
14		9 17								
15		7 7	CL			100%				

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
16		12 14	CL				100%				CL, AS ABOVE
17		4 7	CL				90%				
18		9 13									
19		7 10	CL				15%				CL AS ABOVE ROCK BLOCKING SPOON
20		11 11									
21		4 6	CL				30%				CL, AS ABOVE
22		9 16									
23	MW-12 22-24	7 8	CL				25%				
24		5 23	SAND								S, M-C, BRN WET AUGERED 24-26.5
25											
26			T.D. 26.5								
27			MW-12								TD 26.5 MW-12
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											

DRILLING LOG FOR MW-13 (NPS)

Project Name: Chesapeake and Ohio Canal

Site Location: C&O Canal National Historic Park, Brunswick, Md.

Date Started/Finished: 11/28/01 - 11/28/01

Drilling Company: BADGER DRILLING

Driller's Name: JIM DAVIS

Geologist's Name: HUSSEIN ALDIS

Geologist's Signature: Hussein Aldis

Rig Type (s): CME 750

Drilling Method (s): Hollow Stem Auger

Bit Size (s): 8-INCH Auger Size (s): 7.5" O.D.

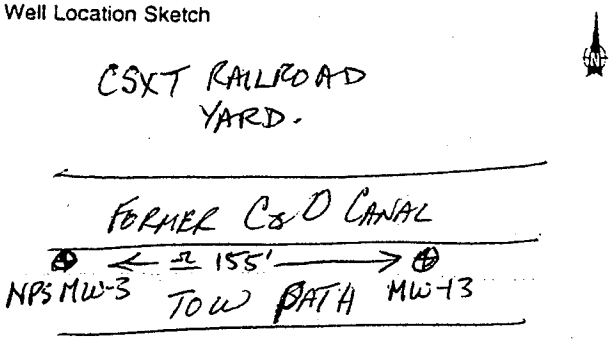
Auger/Split Spoon Refusal: NA. N/A 25 FH

Total Depth of Borehole Is: 25 FEET

Total Depth of Corehole Is: N/A.

Water Level (TOIC)		
Date	Time	Level(Feet)
12/05/01	1010	12.11 ft btoc

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1										Augered to 10ft.
2										
3										
4										
5										
6										
7										
8										
9										
10										
11		3 4 5 7	CL.			100%				CLAY, LT. BRN, PLASTIC, FIRM
12										
13		3 5 7 10	CL, SL			100%				CL, LT-BRN, SILTY, STIFF
14										
15		2 3	CL, SL			90%				CL, SL AS ABOVE

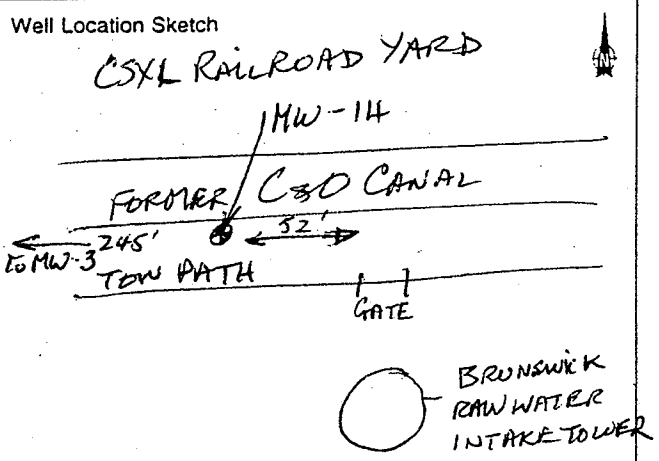
Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
16		5 7									
17		4 4	CL, SL				90-100%				CL AS ABOVE SILTY
18		5 7									
19		2 3	CL				100%				CLAY, LGT-BRN PLASTIC, WET
20		4 6									
21	MW-13	2 2	CL				80%				CLAY AS ABOVE 18-INCHES
22	20-22	2 3	S, SL								S, V-F, SL GRAY
23		20 18	GR, SL, S W/COBBLES/				42%				
24		20 26	CL								
25			TD 25FT								AUGERED
26			MW-13								TD 25FT AUGER REFUSAL
27											MW-13
28											(FLOWING
29											SAND AT BASE)
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											

DRILLING LOG FOR MW-14 (NPS)

Project Name: Chesapeake and Ohio Canal
Site Location: C&O Canal National Historic Park, Brunswick, Md.
Date Started/Finished: 11/29/01 - 11/29/01
Drilling Company: BADGER DRILLING
Driller's Name: JIM DAVIS
Geologist's Name: HUSSEIN ALDIS
Geologist's Signature: Hussein Aldis
Rig Type (s): CME 750
Drilling Method (s): Hollow Stem Auger
Bit Size (s): 8-INCH Auger Size (s): 7.5" O.D.
Auger/Split Spoon Refusal: N/A
Total Depth of Borehole Is: 27.5 FT bgs
Total Depth of Corehole Is: N/A

Water Level (TOIC)		
Date	Time	Level(Feet)
12/05/01	0904	12.0 ft btoc

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1										Augered to 10 feet
2										INITIALLY SILT LOAM BROWN, DAMP, BECOMING DRIER
3										
4										
5										
6										
7										
8										APPROX 8FT BGS' CL, SL PLASTIC, SHELL OF PETROLEUM HYDROCARBONS
9										
10	MW-14 10'-12'	2 2	SL,CL,S			80%				SL, CL with S-F, (4-INCHES)
11		4 5	CL, SL							CL, SL, LT-BRN, SOFT PLASTIC SHELL OF? DIESEL?
12		3 2	CL, SL			85%				CLAY, Silty, Lt-BRN SOFT, PLASTIC, WET
13		3 5								
14		3 4	CL			90%				YIELDING WATER
15										

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
16		4 6					90%				CL, Silty,
17		4 5					100%				lt-BRN, PLASTIC, WET
18		8 9									
19		3 4					80%				AS ABOVE
20		5 10									
21		4 5					100%				
22		8 11									
23											GR, S-C ANGULAR, YELLOW
24											
25											Augered to 27.5 ft.
26											GRAVEL
27			TD 27.5 FT								AND SAND TD 27.5 FT
28			MW-14								MW-14
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											

DRILLING LOG FOR MW-15 (NPS)

Project Name Chesapeake and Ohio Canal

Site Location C&O Canal National Historic Park, Brunswick Md.

Date Started/Finished 11/30/01 - 11/30/01

Drilling Company BADGER DRILLING

Driller's Name JIM DAVIS

Geologist's Name HUSSEIN ALDIS

Geologist's Signature Hussein Aldis

Rig Type (s) CME 75D

Drilling Method (s) Hollow Stem Auger

Bit Size (s) 8-INCH Auger Size (s) 7.5" O.D.

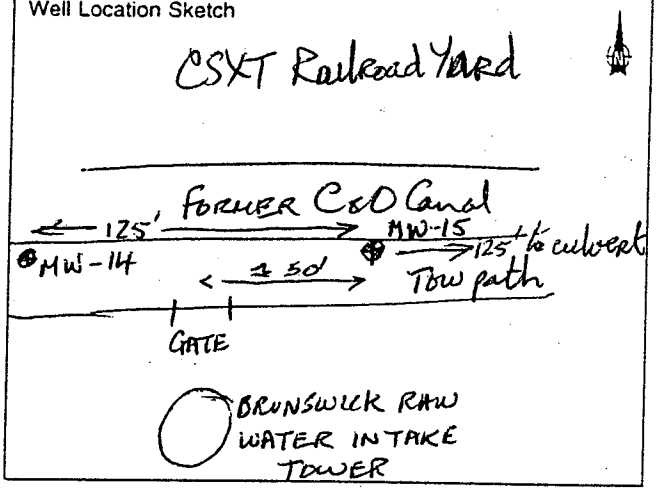
Auger/Split Spoon Refusal N/A

Total Depth of Borehole Is 24 FT bgs

Total Depth of Corehole Is N/A

Water Level (TOIC)		
Date	Time	Level(Feet)
12/05/01	0815	12.24 ft btoc

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1										Augered to 8' bgs hit something hard at 7' bgs
2										
3										
4										
5										
6										
7										
8										
9		2 2	CL, SL			65%				CLAY, SILTY RED-BROWN stiff, plastic, smell of diesel.
10		4 5								
11		3 3				100%				CL, GREY SILTY SLIGHT SMELL OF DIESEL
12		3 3								
13		1 2				100%				CL, GREY-BROWN, silty, wet
14		2 2								
15		2 2				100%				CL, SL, YLW-BROWN SOFT, WET

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
16			CL, SL								CLAY AS ABOVE
17		0 4	CL, SL				100%				
18		4 4									AS ABOVE
19		4 4	CL, SL								CL, RED-BROWN SILTY, SOFT, WET.
20		5 8									
21	MW-15, 21.5'-22'	5 6	CL, SL				100%				CL, SL, CARBONACEOUS, SOFT and wet
22		7 12									
23			GR w COBBLES								GRAVEL w. COBBLES INCREASED to
24											
25			TD 24ft bgs.								24' T.D.
26			MW-15								MW-15
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											

DRILLING LOG FOR MW-16 (NPS)

Project Name: Chesapeake & Ohio Canal

Site Location: C&O Canal National Historic Park Brunswick Md.

Date Started/Finished: 12/03/01 - 12/03/01

Drilling Company: BADGER DRILLING

Driller's Name: JIM DAVIS

Geologist's Name: HUSSEIN ALDIS

Geologist's Signature: Hussein Aldis

Rig Type (s): CME 750

Drilling Method (s): Hollow Stem Auger

Bit Size (s): 8-INCH Auger Size (s): 7.5" O.D.

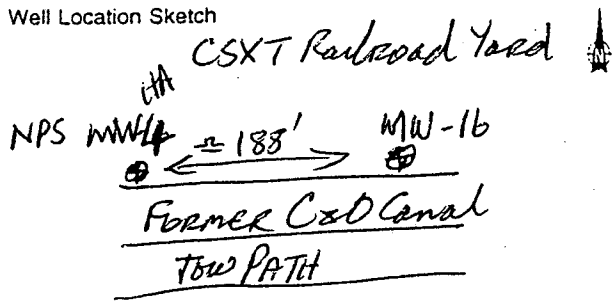
Auger/Split Spoon Refusal: N/A

Total Depth of Borehole Is: 22 FT BGS

Total Depth of Corehole Is: N/A

Water Level (TOIC)		
Date	Time	Level(Feet)
12/06/01	0942	11.32 btoc

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler		Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1											Auger to 6' bgs. Black loam w gravel (fill).
2											
3											
4											
5											
6		3	2	4" SL,S,CL w. gravel			75%				Loam, clayey, dark grey dry w. gravel
7		2	2	14" CL,SL							Clay silty yLw-BRN wet soft plastic
8											
9		4	6	CL,SL			100%				CLAY, SILTY STIFF RD-BRN, YLY-BRN DAR
10		8	11								
11	MW-16 10'-12'	5	6				100%				CLAY, SILTY, BRN STIFF WET
12		12	12								
13		50/1"					<20%				CL, SILTY W. ROCK FRAGS.
14		7	19				15'-17'				CL, SILTY, SANDY W. ROCK
15		9	19				60%				FRAGS, GR YLW-BRN

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
16		12 24	CL SL				66%				CL, SILTY YELLOW-BRN/GRY/SD
17		32 50/4"	GRS/SL CL								Refusal at 16'10"
			CL some GR								
18											Auger to 22' bgs
19											
20											Sand and gravel/silty clayey
21											
22			TD 22' bgs								TD 22ft bgs
23			MW-16								MW-16
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
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36											
37											
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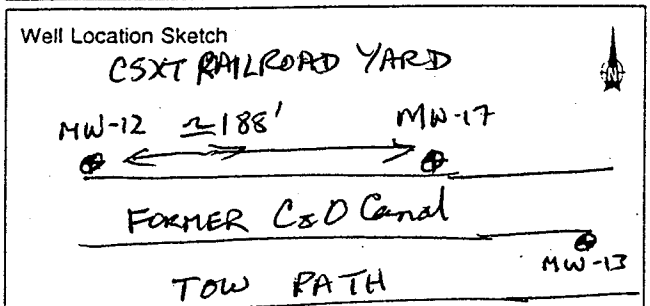
41											
42											
43											
44											

DRILLING LOG FOR MW-17 (NPS)

Project Name: Chesapeake and Ohio Canal
Site Location: C&O Canal Nat. Historical Park Brunswick Md.
Date Started/Finished: 12/03/01 - 12/03/01
Drilling Company: BADGER DRILLING
Driller's Name: JIM DAVIS
Geologist's Name: HUSSEIN ALDIS
Geologist's Signature: Hussein Aldis
Rig Type (s): CME 750
Drilling Method (s): Hollow Stem Auger
Bit Size (s): 8-INCH Auger Size (s): 7.5" O.D.
Auger/Split Spoon Refusal: N/A
Total Depth of Borehole Is: 31 FT bgs
Total Depth of Corehole Is: N/A

Water Level (TOIC)		
Date	Time	Level(Feet)
12/04/01	1057	15.5' bgs

Well Location Sketch



Depth(Feet)	Sample Number	Blows on Sampler	Soil Components Rock Profile CL SL S GR	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
1										Auger to 6' soft organic rich fill with gravel, wood, Rock
2										
3										
4										
5										
6		7 8	SL, CL							Silt, clayey BRN, firm
7		7 7				33%				
8		4 3	CL, SL							CLAY, SILTY, BRN-YEL
9		3 3				50%				PLASTIC
10		2 3								CL AS ABOVE
11		3 5				75%				
12										
13		4 5				100%				
14		6 8								
15		4 6				100%				CL AS ABOVE, STIFF

Depth(feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile	Penetration Times	Run Number	Core Recovery	RQD	Fracture Sketch	HNu/OVA (ppm)	Comments
16		7 7	CL, SL				100%				CLAY AS ABOVE
17		6 7									
18		9 11					100%				
19		4 5									
20		7 10					100%				
21		6 6									
22		9 12					100%				
23		4 5									CL, AS ABOVE, SOFTER
24		6 7					100%				
25		5 4									
26		7 32	S W GR				80%				S, GRY, vf-m W GR
27		42 28	GR, S				17%				
28		28 39									
29			GR, S								Auger to 31' bgs. GRAVEL & SAND
30											
31			TD 31 ft bgs								TD 31 ft bgs
32			MW-17								MW-17
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											

eder associates

MONITORING WELL CONSTRUCTION INFORMATION

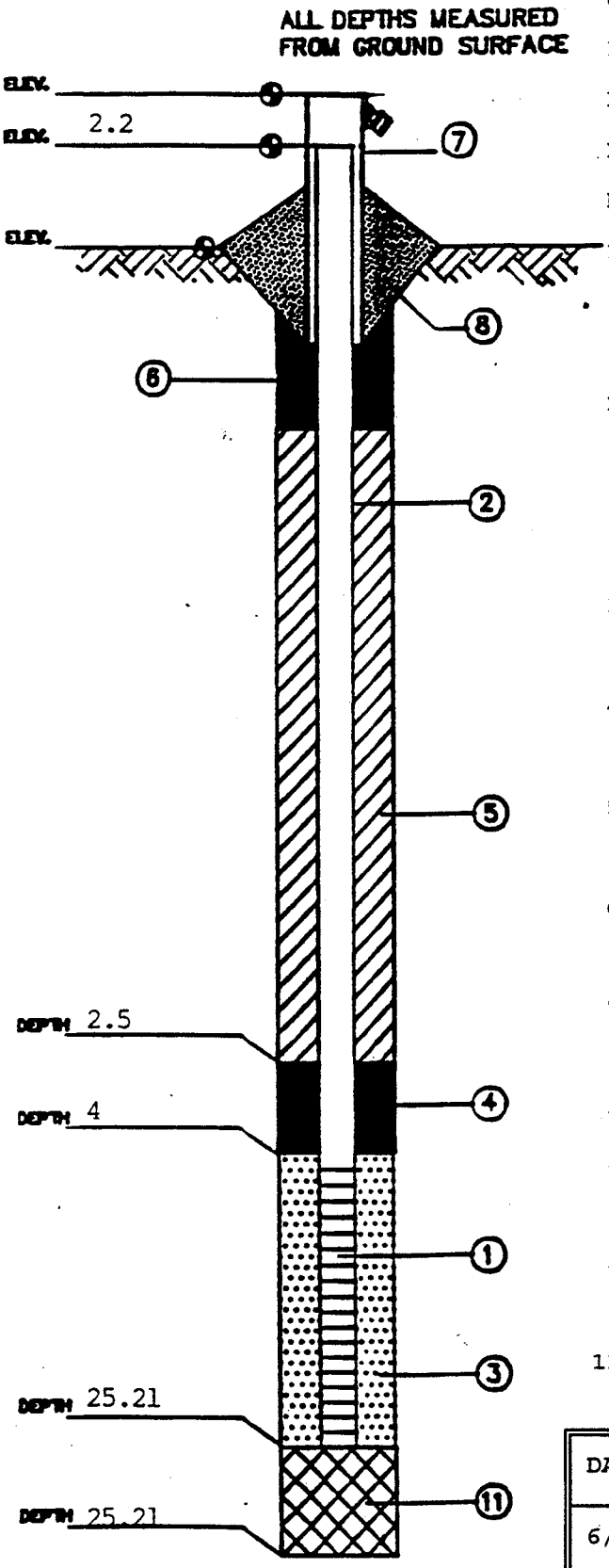
JOB No. 560-44.3 CLIENT CSXT

LOCATION C&O Canal, Brunswick, MD

DATE 6/24/94 WELL No. MW-1

HYDROGEOLOGIST H. Ernst

DRILLING CONTRACTOR ADT



1.) SCREEN TYPE Schedule 40 PVC

SLOTTED LENGTH 20 ft.

SLOT SIZE .020

2.) SOLID PIPE TYPE Schedule 40 PVC

SOLID PIPE LENGTH 27 ft.

PIPE & SCREEN DIA. 4 In.

JOINT TYPE-SLIP/GLUED _____ THREADED ✓

3.) TYPE OF BACKFILL AROUND SCREEN

#2 Gravel

4.) TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite pellets - hydrated

5.) TYPE OF BACKFILL Cement-bentonite grou

HOW INSTALLED _____

6.) TYPE OF SURFACE SEAL (IF INSTALLED)

None

7.) PROTECTIVE CASING - YES ✓ NO _____

LOCKING CAP YES ✓ NO _____

8.) CONCRETE SEAL - YES ✓ NO _____

9.) DRILLING METHOD Hollow stem auger

10.) ADDITIVES USED (IF ANY) _____

11.) TYPE OF BACKFILL _____

WATER LEVEL CHECKS*

DATE	TIME	DEPTH TO WATER	REMARKS
6/24/94	1750	16.27	Total depth 27.41'

* FROM TOP OF WELL CASING

C06180

eder associates

MONITORING WELL CONSTRUCTION INFORMATION

JOB No. 560-44.3 CLIENT CSXT

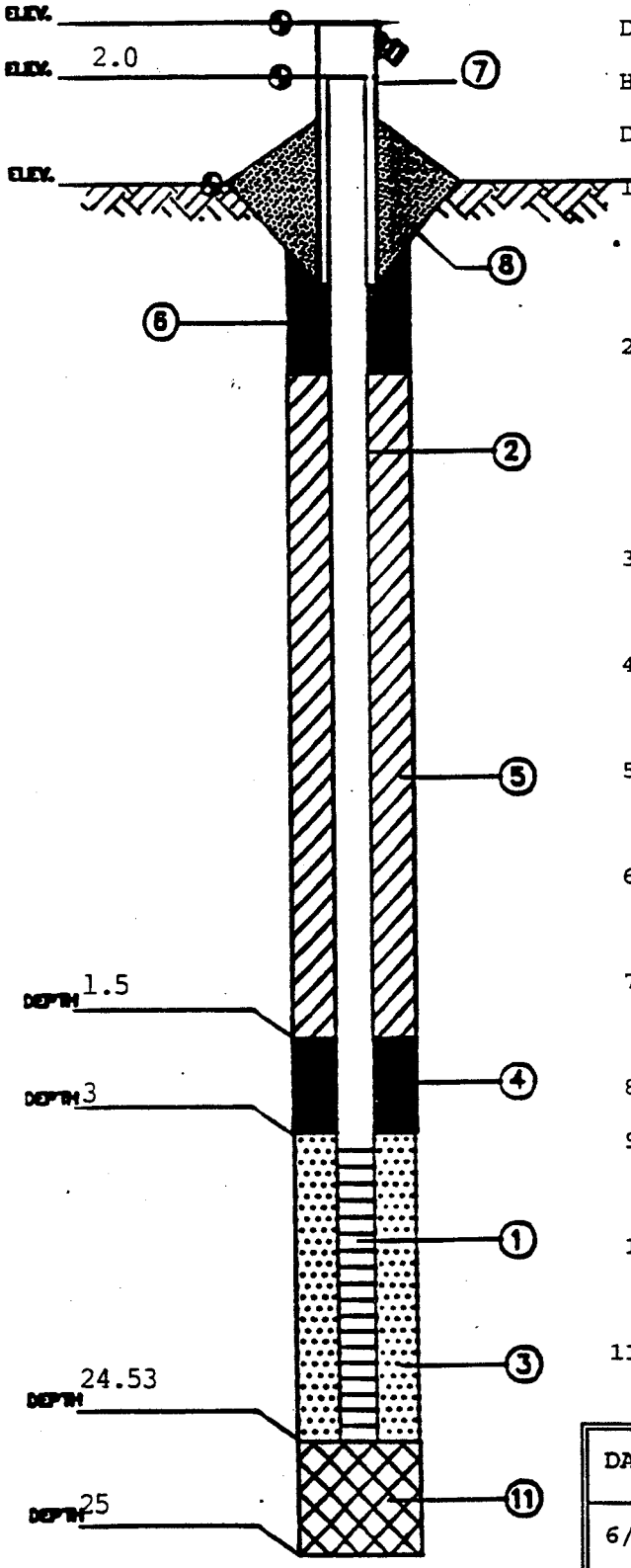
LOCATION C&O Canal, Brunswick, MD

DATE 6/23/94 WELL No. MW-2

HYDROGEOLOGIST H. Ernst

DRILLING CONTRACTOR ADT

ALL DEPTHS MEASURED FROM GROUND SURFACE



1.) SCREEN TYPE Schedule 40 PVC

SLOTTED LENGTH 20 ft.

SLOT SIZE .020

2.) SOLID PIPE TYPE Schedule 40 PVC

SOLID PIPE LENGTH 7 ft.

PIPE & SCREEN DIA. 4 In.

JOINT TYPE-SLIP/GLUED _____ THREADED ✓

3.) TYPE OF BACKFILL AROUND SCREEN

#2 Gravel

4.) TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite pellets

5.) TYPE OF BACKFILL Cement-bentonite grout

HOW INSTALLED

6.) TYPE OF SURFACE SEAL (IF INSTALLED)

None

7.) PROTECTIVE CASING - YES ✓ NO _____

LOCKING CAP YES ✓ NO _____

8.) CONCRETE SEAL - YES ✓ NO _____

9.) DRILLING METHOD Hollow stem auger

10.) ADDITIVES USED (IF ANY) None

11.) TYPE OF BACKFILL

WATER LEVEL CHECKS*

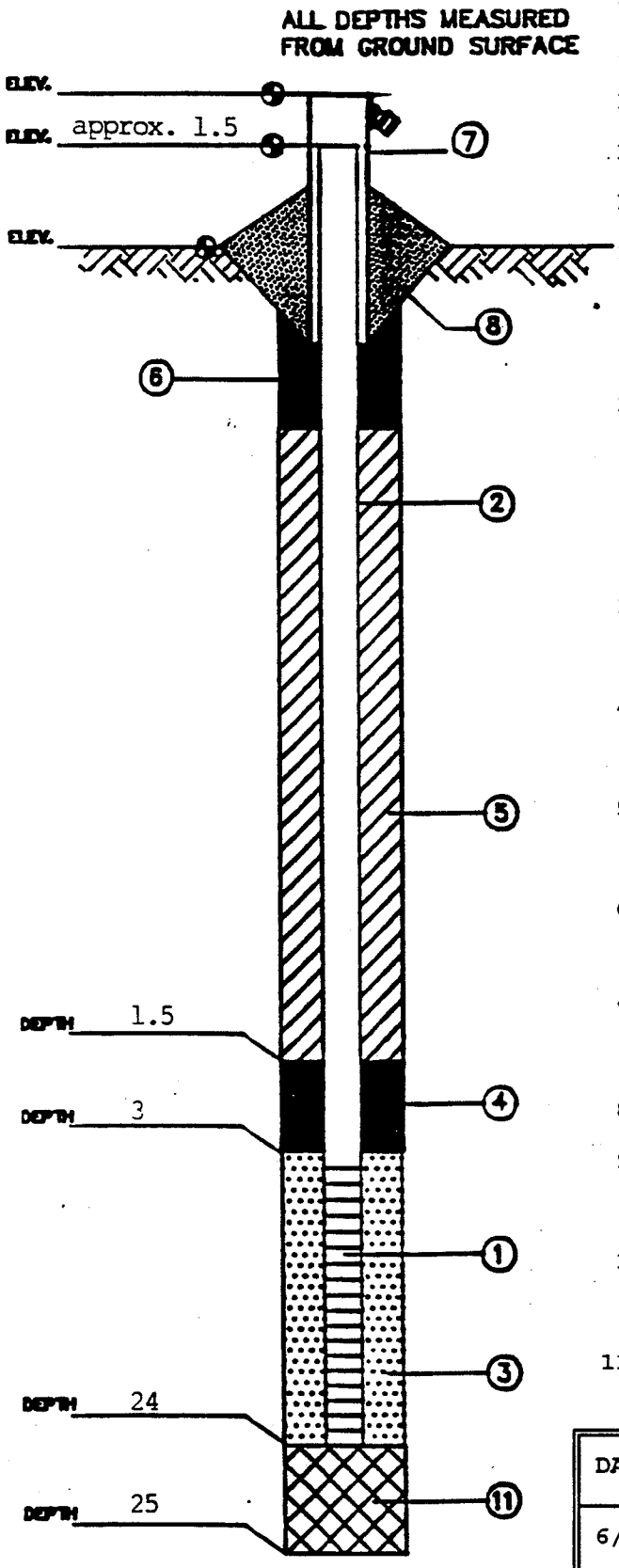
DATE	TIME	DEPTH TO WATER	REMARKS
6/24/94	1755	16.16	Total depth 26.53'

* FROM TOP OF WELL CASING

C04189

eder associates

MONITORING WELL CONSTRUCTION INFORMATION



JOB No. 560-44.3 CLIENT CSXT

LOCATION C&O Canal, Brunswick, MD

DATE 6/24/94 WELL No. MW-3

HYDROGEOLOGIST H. Ernst

DRILLING CONTRACTOR ADT

1.) SCREEN TYPE Schedule 40 PVC

SLOTTED LENGTH 20 ft.

SLOT SIZE .020

2.) SOLID PIPE TYPE Schedule 40 PVC

SOLID PIPE LENGTH 6 ft.

PIPE & SCREEN DIA. 4 In.

JOINT TYPE-SLIP/GLUED _____ THREADED ✓

3.) TYPE OF BACKFILL AROUND SCREEN

#2 Gravel

4.) TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite pellets

5.) TYPE OF BACKFILL Cement-bentonite grout

HOW INSTALLED _____

6.) TYPE OF SURFACE SEAL (IF INSTALLED)

None

7.) PROTECTIVE CASING - YES ✓ NO _____

LOCKING CAP YES ✓ NO _____

8.) CONCRETE SEAL - YES ✓ NO _____

9.) DRILLING METHOD Hollow stem auger

10.) ADDITIVES USED (IF ANY) _____

11.) TYPE OF BACKFILL _____

WATER LEVEL CHECKS*

DATE	TIME	DEPTH TO WATER	REMARKS
6/24/94	1717	16.54	Total depth 25.48'

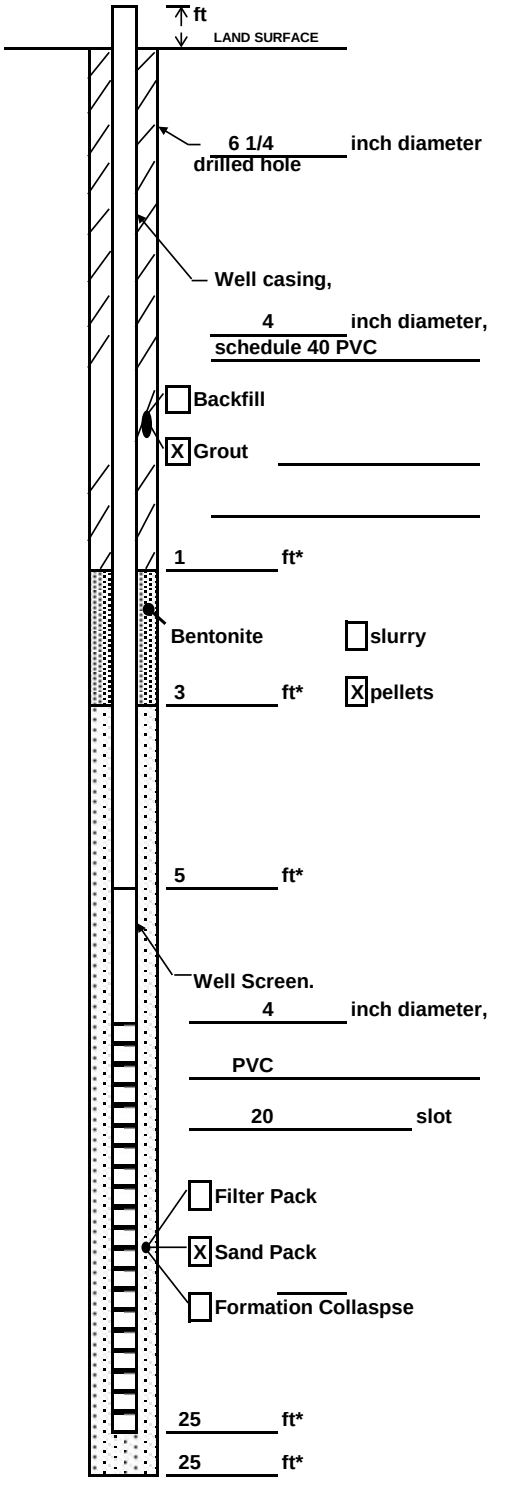
* FROM TOP OF WELL CASING

C04180

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-4R **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0650

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/12/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/19/07 - submersive pump

Fluid Loss During Drilling N/A gallons

Water Removed During Development 15 gallons

Static Depth to Water 14.10 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.2 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose _____

Remarks _____

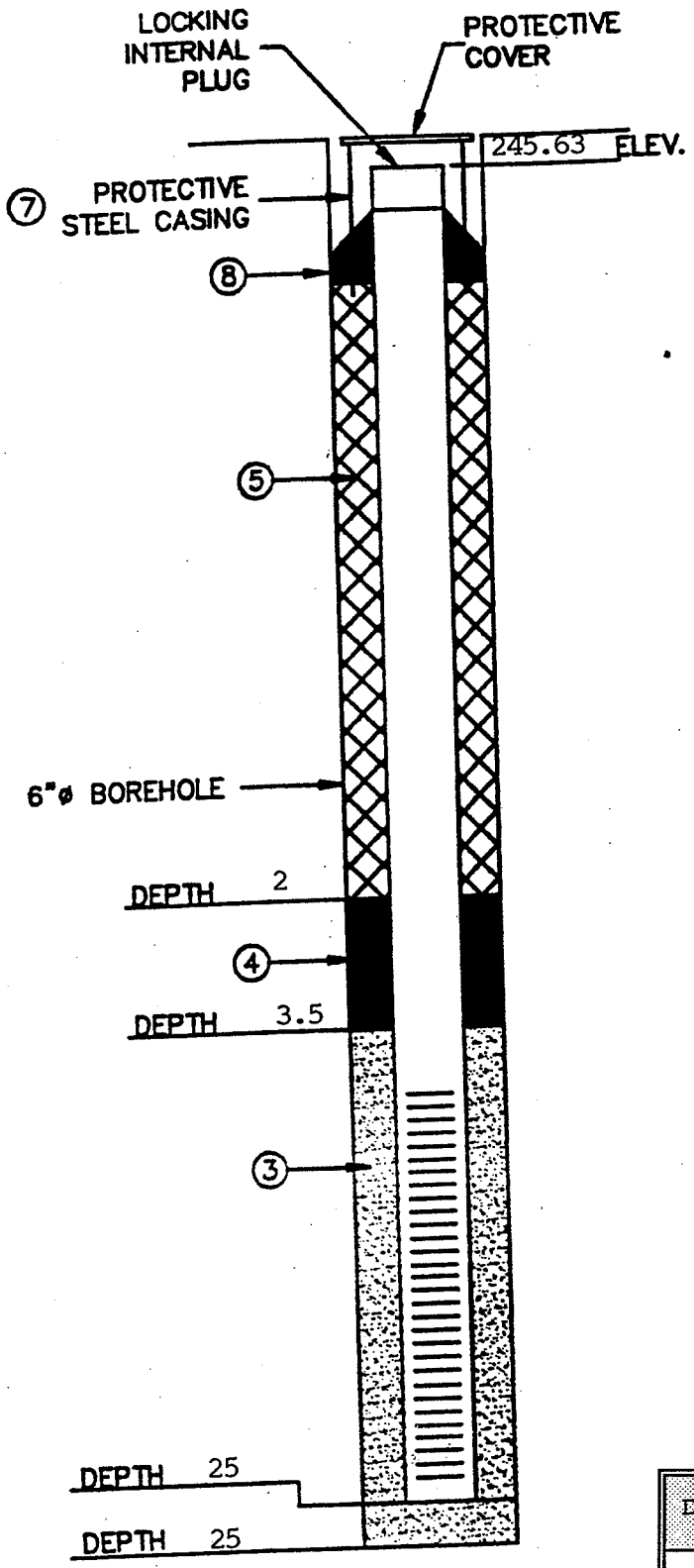
* Depth Below Land Surface

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

eder associates

MONITORING WELL CONSTRUCTION INFORMATION



JOB No. 560-44.5 CLIENT CSXT

LOCATION C&O Canal, Brunswick, MD

DATE 8/30/95 WELL No. MW-5

HYDROGEOLOGIST H. Ernst

DRILLING CONTRACTOR F&R Drilling

1.) SCREEN TYPE Schedule 40 PVC

SLOTTED LENGTH 20 ft.

SLOT SIZE .020 inches

2.) SOLID PIPE TYPE Schedule 40 PVC

SOLID PIPE LENGTH 5 ft.

PIPE & SCREEN DIA. 4 In.

JOINT TYPE-SLIP/GLUED _____ THREADED ✓

3.) TYPE OF BACKFILL AROUND SCREEN

#2 gravel

4.) TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite pellets

5.) TYPE OF BACKFILL Cement-bentonite grout

HOW INSTALLED _____

6.) TYPE OF SURFACE SEAL (IF INSTALLED)

None

7.) PROTECTIVE CASING - YES ✓ NO _____
LOCKING CAP YES ✓ NO _____

8.) CONCRETE SEAL - YES ✓ NO _____

9.) DRILLING METHOD Hollow Stem Auger

10.) ADDITIVES USED (IF ANY) Potable Water

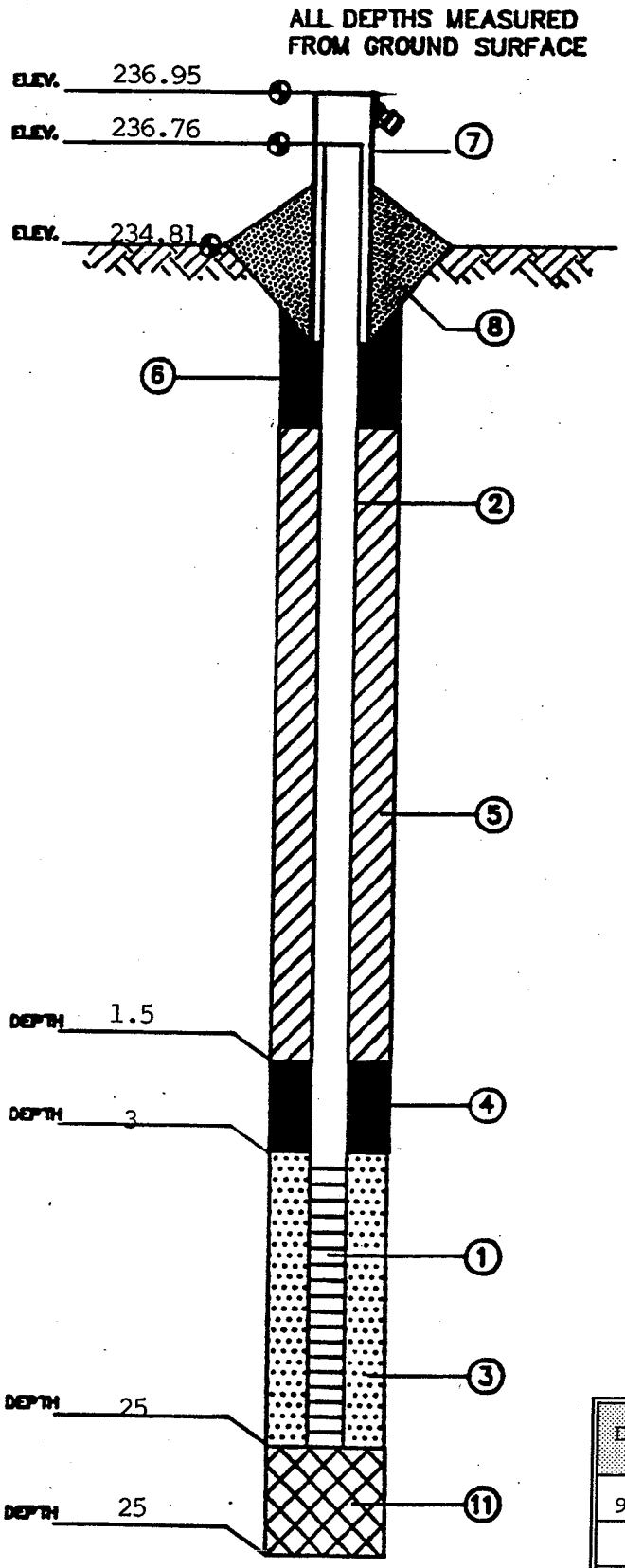
WATER LEVEL CHECKS*

DATE	TIME	DEPTH TO WATER	REMARKS
9/1/95	1250	14.96	

* FROM TOP OF WELL CASING

WELLCONS
092392

MA2711



MONITORING WELL CONSTRUCTION INFORMATION

JOB No. 560-44.5 CLIENT CSXT

LOCATION C&O Canal, Brunswick, MD

DATE 8/31/95 WELL No. MW-8

HYDROGEOLOGIST H. Ernst

DRILLING CONTRACTOR F&R Drilling

1.) SCREEN TYPE Schedule 40 PVC

SLOTTED LENGTH 20 ft.

SLOT SIZE .020 inches

2.) SOLID PIPE TYPE Schedule 40 PVC

SOLID PIPE LENGTH 7 ft.

PIPE & SCREEN DIA. 4 In.

JOINT TYPE-SLIP/GLUED _____ THREADED ✓

3.) TYPE OF BACKFILL AROUND SCREEN _____

#2 gravel

4.) TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite pellets

5.) TYPE OF BACKFILL Cement-bentonite grout

HOW INSTALLED _____

6.) TYPE OF SURFACE SEAL (IF INSTALLED)

None

7.) PROTECTIVE CASING - YES ✓ NO _____
LOCKING CAP YES ✓ NO _____

8.) CONCRETE SEAL - YES ✓ NO _____

9.) DRILLING METHOD Hollow Stem Auger

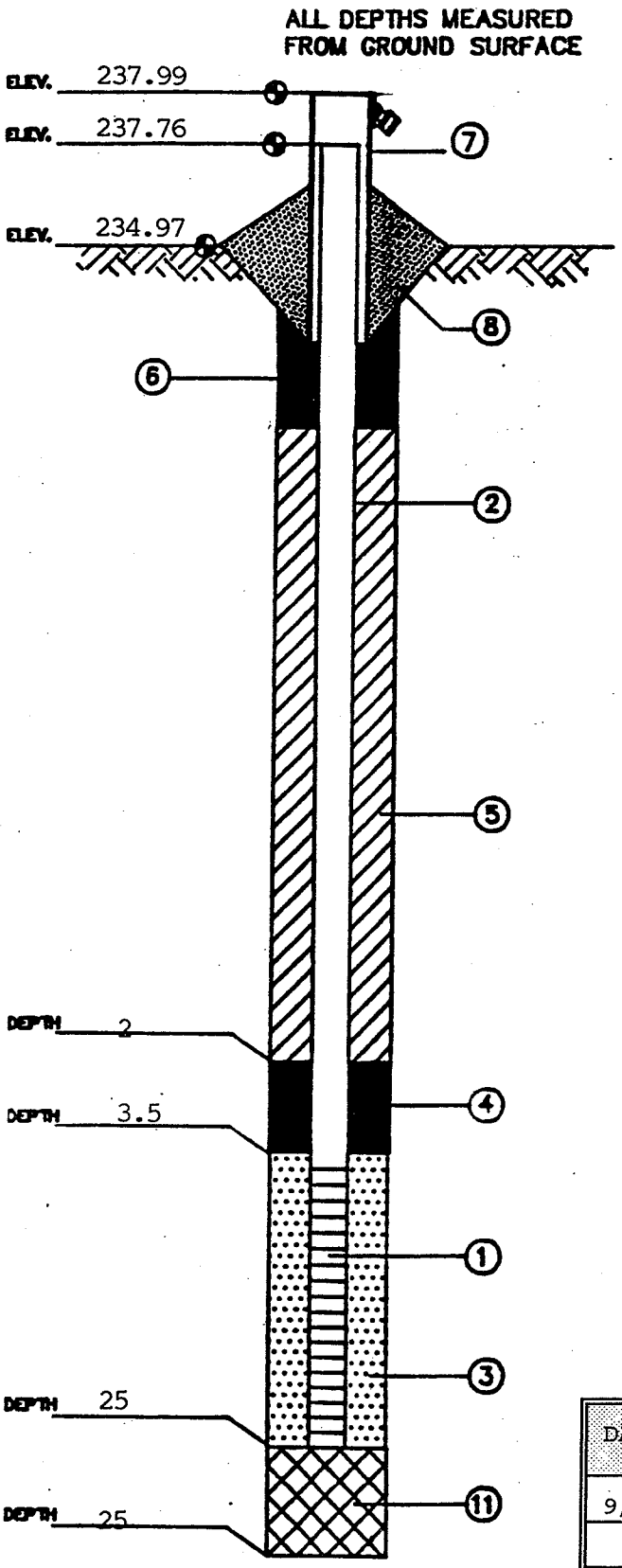
10.) ADDITIVES USED (IF ANY) None

WATER LEVEL CHECKS*

DATE	TIME	DEPTH TO WATER	REMARKS
9/1/95	0910	15.24	

* FROM TOP OF WELL CASING

MA2711



MONITORING WELL CONSTRUCTION INFORMATION

JOB No. 560-44.5 CLIENT CSXT

LOCATION C&O Canal, Brunswick, MD

DATE 8/31/95 WELL No. MW-9

HYDROGEOLOGIST H. Ernst

DRILLING CONTRACTOR F&R Drilling

1.) SCREEN TYPE Schedule 40 PVC

SLOTTED LENGTH 20 ft.

SLOT SIZE .020 inches

2.) SOLID PIPE TYPE Schedule 40 PVC

SOLID PIPE LENGTH 7 ft.

PIPE & SCREEN DIA. 4 In.

JOINT TYPE-SLIP/GLUED _____ THREADED ✓

3.) TYPE OF BACKFILL AROUND SCREEN

#2 gravel

4.) TYPE OF LOWER SEAL (IF INSTALLED)

Bentonite pellets

5.) TYPE OF BACKFILL Cement-bentonite grout

HOW INSTALLED _____

6.) TYPE OF SURFACE SEAL (IF INSTALLED)

None

7.) PROTECTIVE CASING - YES ✓ NO _____
LOCKING CAP YES ✓ NO _____

8.) CONCRETE SEAL - YES ✓ NO _____

9.) DRILLING METHOD Hollow Stem Auger

10.) ADDITIVES USED (IF ANY) None

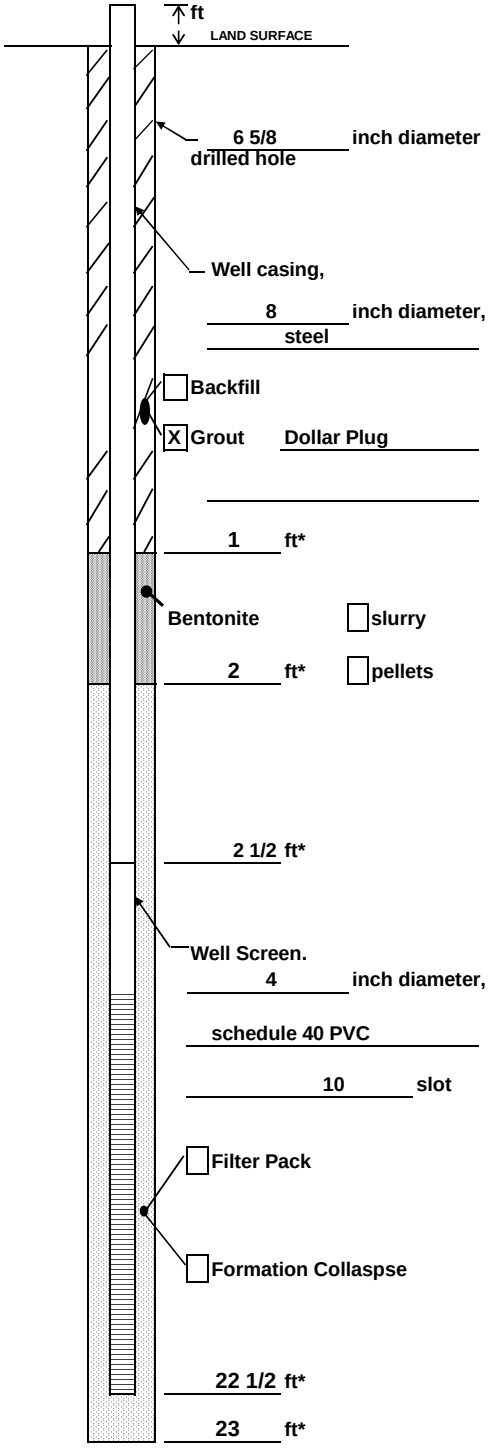
WATER LEVEL CHECKS*

DATE	TIME	DEPTH TO WATER	REMARKS
9/1/95	1515	15.23	

* FROM TOP OF WELL CASING

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-20 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0651

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 9/27/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

10/2/07 - sub. pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development 40 gallons

Static Depth to Water 10.03 feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 30 mins

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring

Remarks ____

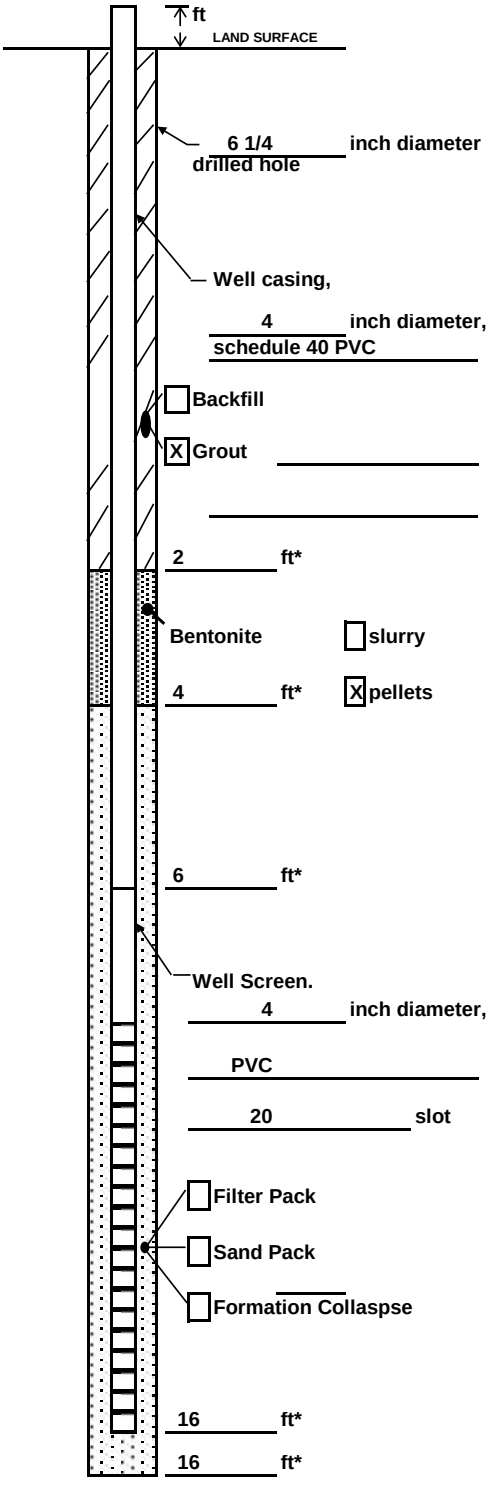
****Measuring Point is Top of Well Casing Unless Otherwise Noted.**

Prepared by JW

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-21 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0652

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/15/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/19/07 - submersive pump

Fluid Loss During Drilling N/A gallons

Water Removed During Development 15 gallons

Static Depth to Water 13.16 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 7 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose _____

Remarks _____

* Depth Below Land Surface

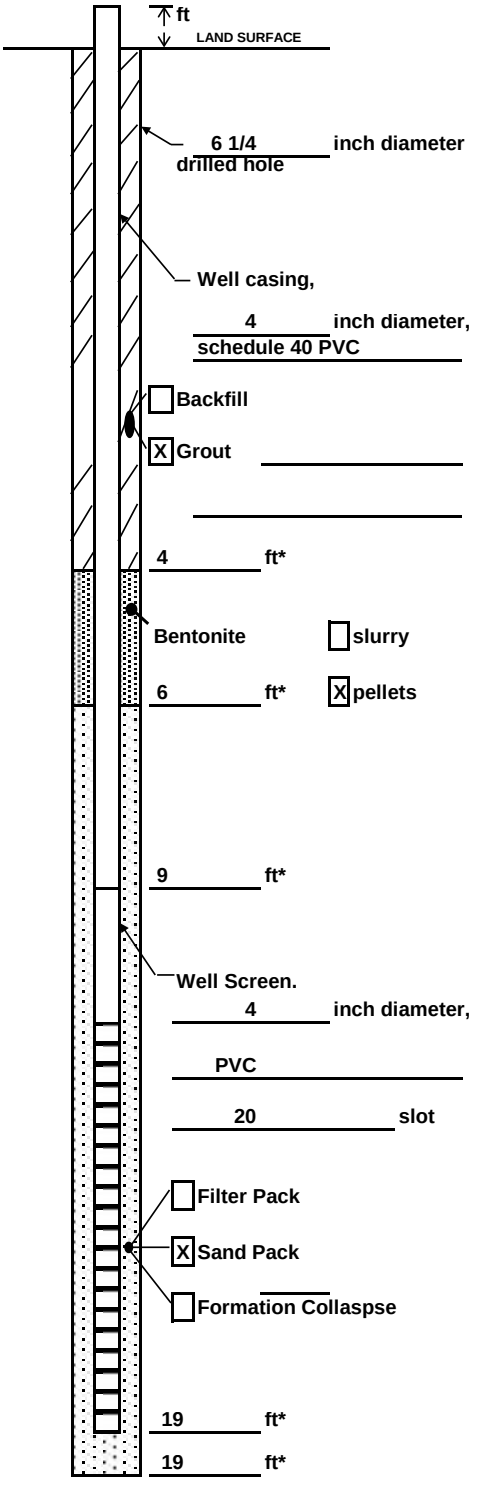
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-22 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0653

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/13/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/19/07 - submersive pump (4 inch)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 25 gallons

Static Depth to Water 14.31 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.25 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose _____

Remarks Allowed 1 hr for recharge between pumping.

* Depth Below Land Surface

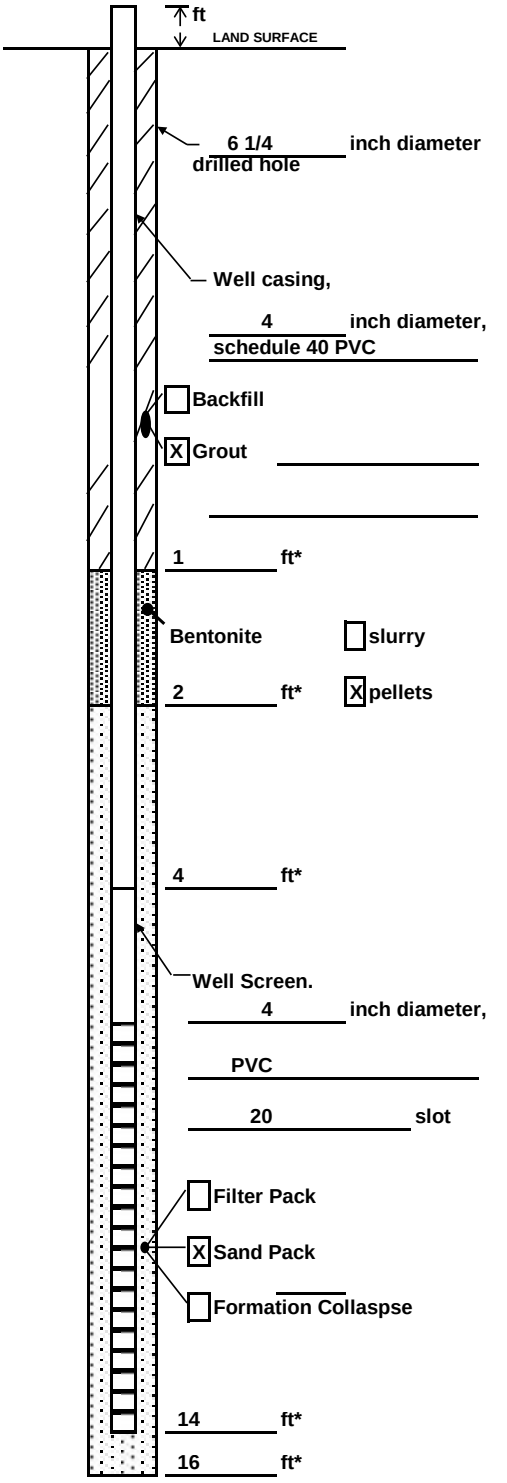
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-23 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0654

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/18/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/20/07 - added ~1 vol of water, surged, then pumped

Fluid Loss During Drilling N/A gallons (added 2 volumes)

Water Removed During Development 25 gallons

Static Depth to Water no water feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.25 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose _____

Remarks DTW 2 hrs after development = 1265

* Depth Below Land Surface

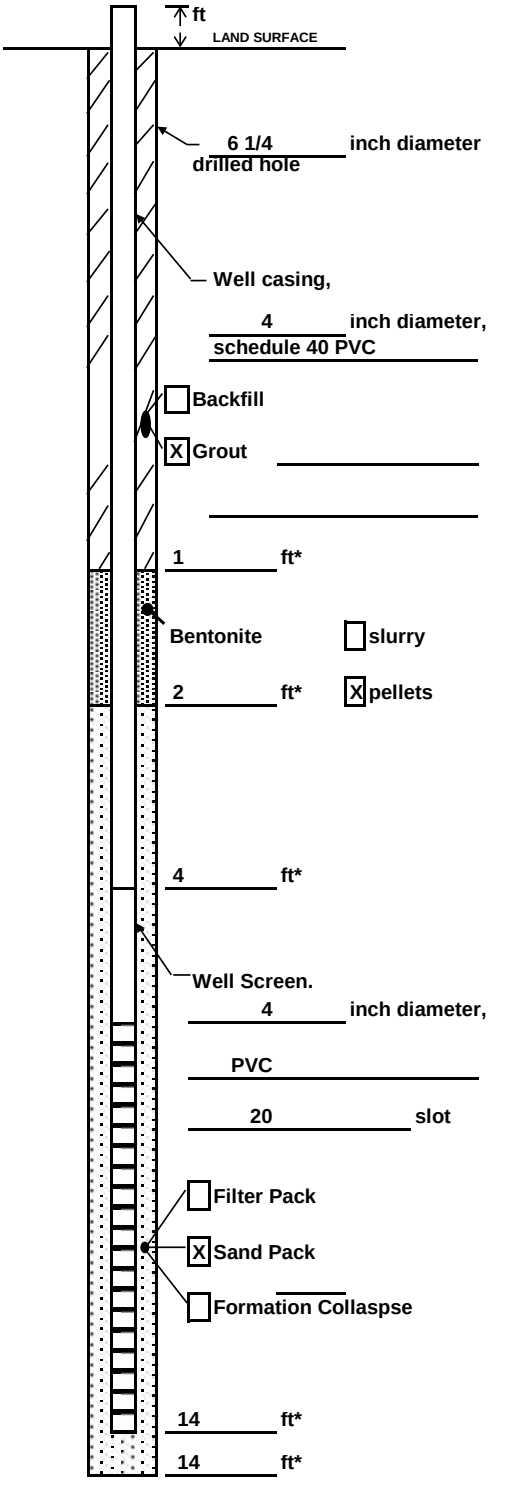
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-24 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0655

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/18/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/20/07 - added water & surged, then pumped (4 inch)

Fluid Loss During Drilling N/A gallons

Water Removed During Development (added 15 gallons) 30 gallons

Static Depth to Water 13.95 feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration hours

Yield gpm **Date**

Specific Capacity gpm/ft

Well Purpose

Remarks

* Depth Below Land Surface

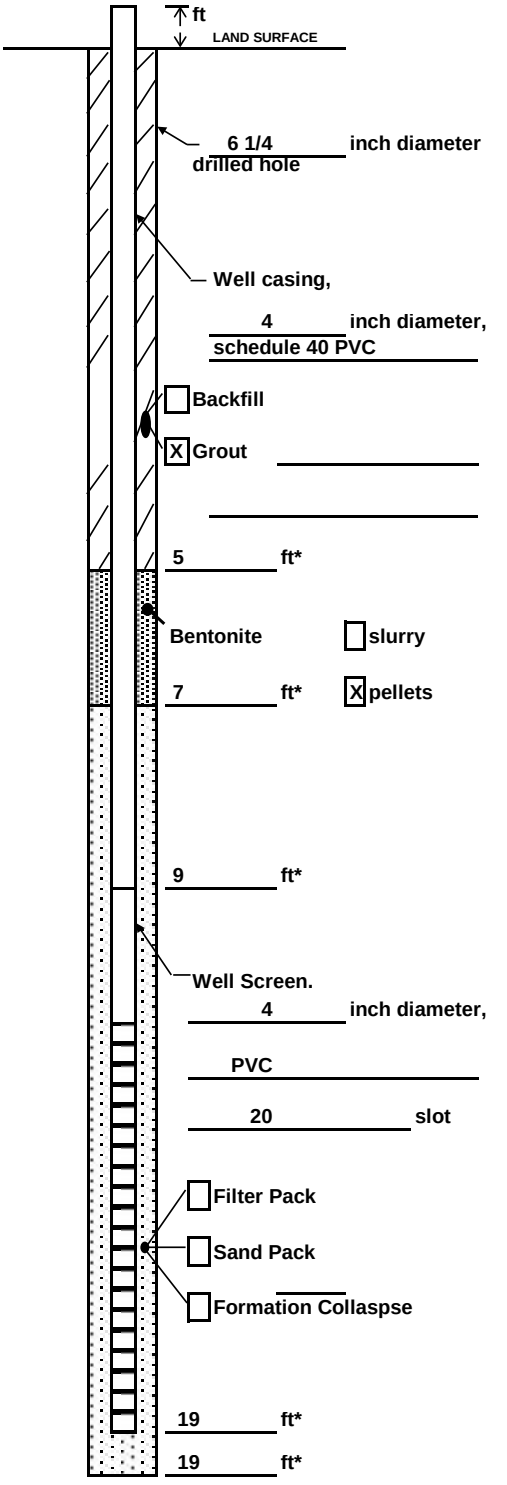
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-25 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0658

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/15/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/19/07 - submersive pump (4 inch)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 40 gallons

Static Depth to Water 14.29 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.5 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose _____

Remarks Pumped for 5 mins then allowed 10 mins for recharge.

Continued pumping for 25 mins.

* Depth Below Land Surface

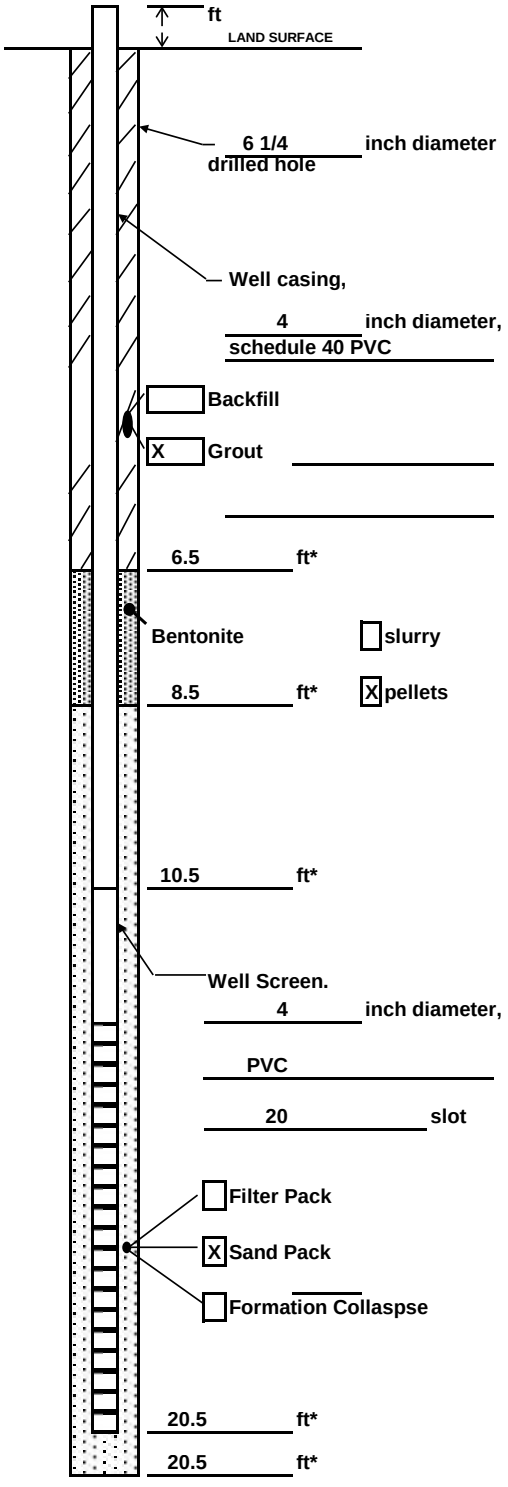
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-26 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0657

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/13/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/19/07 - submersive pump (4 inch)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 10 gallons

Static Depth to Water 14.28 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 5 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose _____

Remarks _____

* Depth Below Land Surface

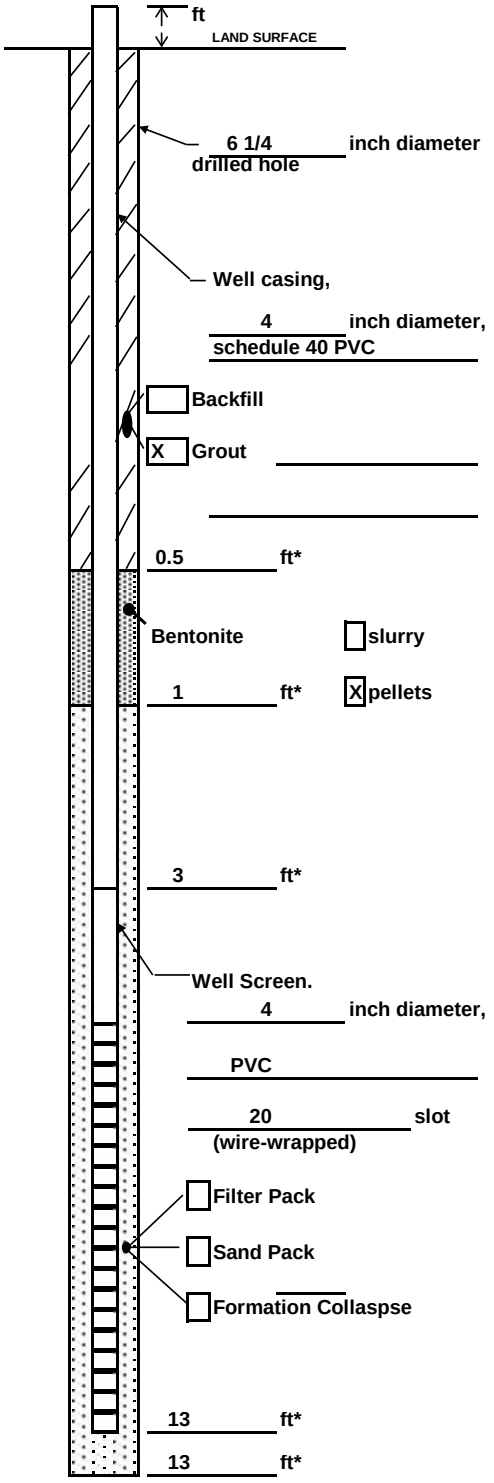
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick

Well MW-27 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-0656

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/18/2007

Drilling Method HSA

Drilling Contractor SGS Environmental

Drilling Fluid N/A

Development Technique(s) and Date(s)

6/19/07 - submersive pump (4 inch)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 15 gallons

Static Depth to Water 8.03 feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 0.5 mins

Yield gpm **Date**

Specific Capacity gpm/ft

Well Purpose

Remarks Allowed time for recharge; recharges slowly

* Depth Below Land Surface

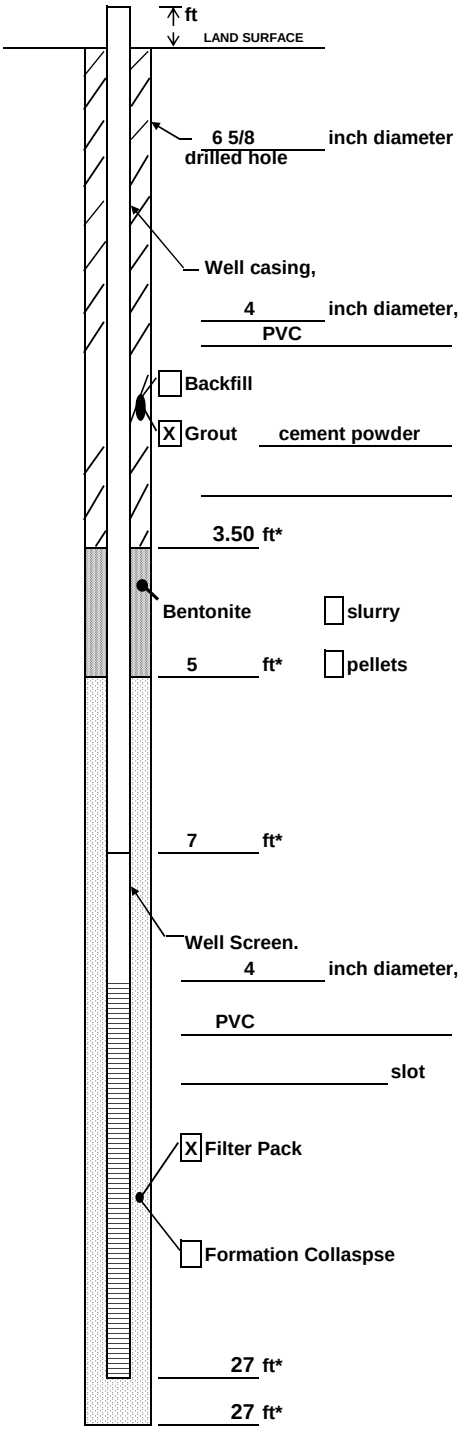
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Sandra Grabowski

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-28 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0771

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/12/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/29/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~20 gallons (3 pulses)

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.25 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater sampling

Remarks _____

* Depth Below Land Surface

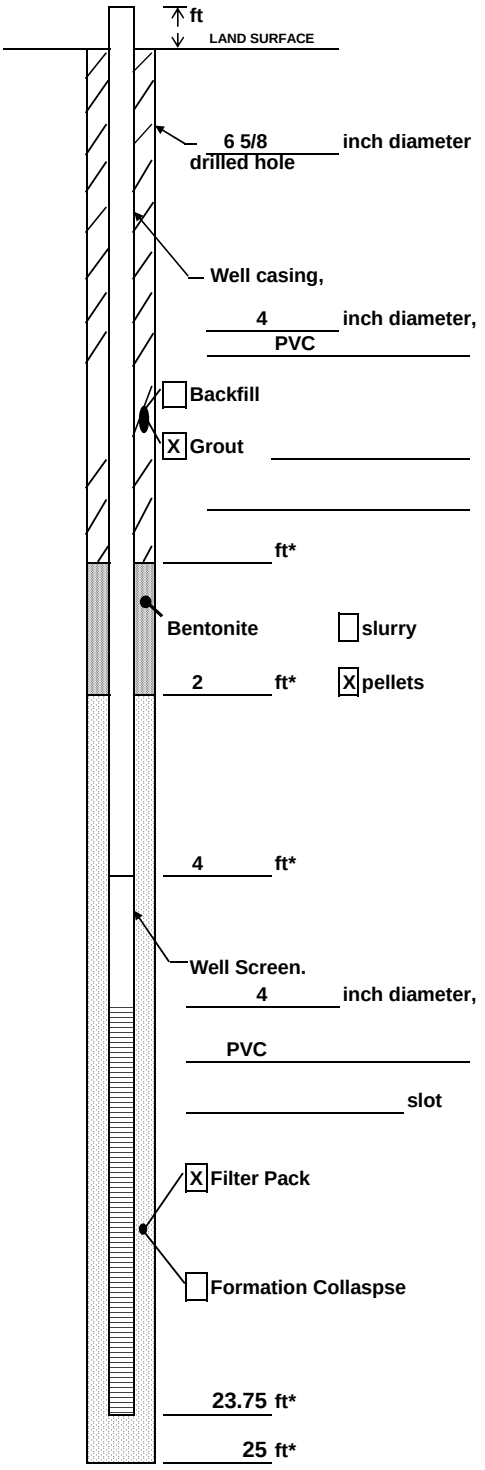
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by RK

ARCADIS

Well Construction Log

(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-29 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0772

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/13/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07 - sub. pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development ~10 gallons

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 40 mins

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring and sampling

Remarks ____

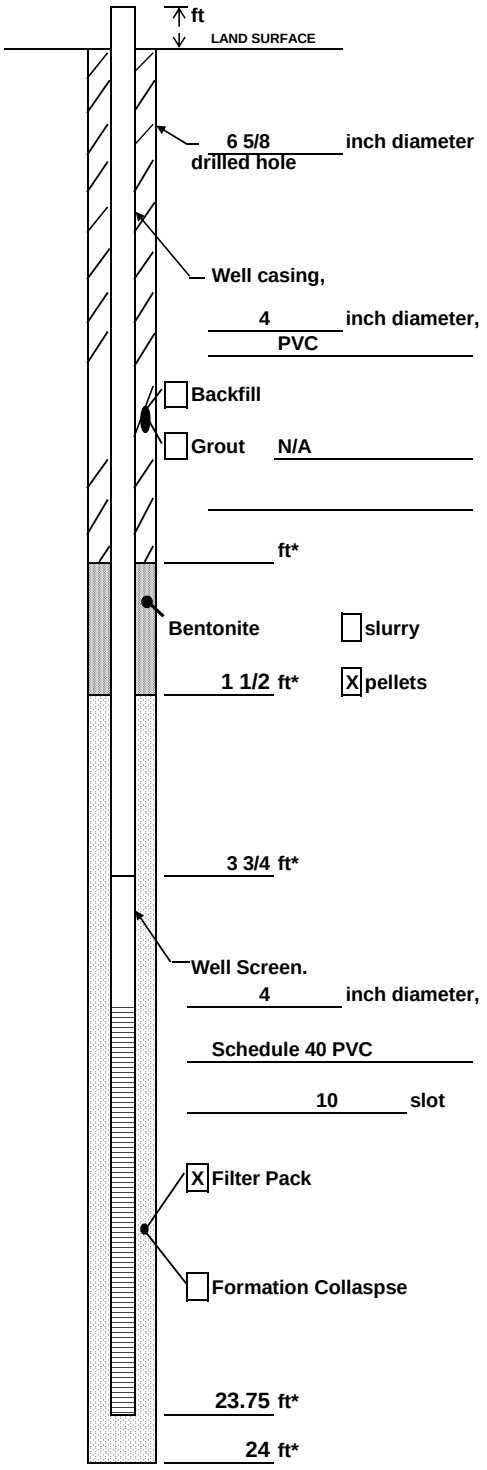
****Measuring Point is Top of Well Casing Unless Otherwise Noted.**

Prepared by RK

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-30 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0773

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/16/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/27/07, 11/28/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~30 gallons

Static Depth to Water 15.05 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.50 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

Remarks _____

* Depth Below Land Surface

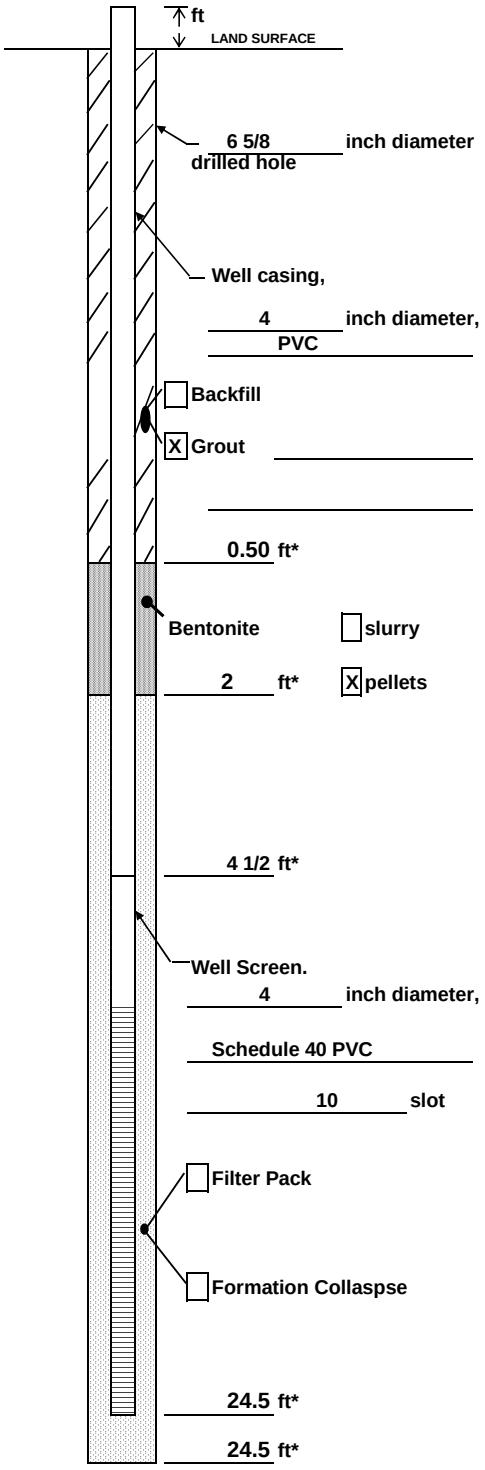
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log

(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-31 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0774

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/16/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/27/07 - sub. pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development 45 gallons

Static Depth to Water 8.18 feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 1.10 hours

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring

Remarks ____

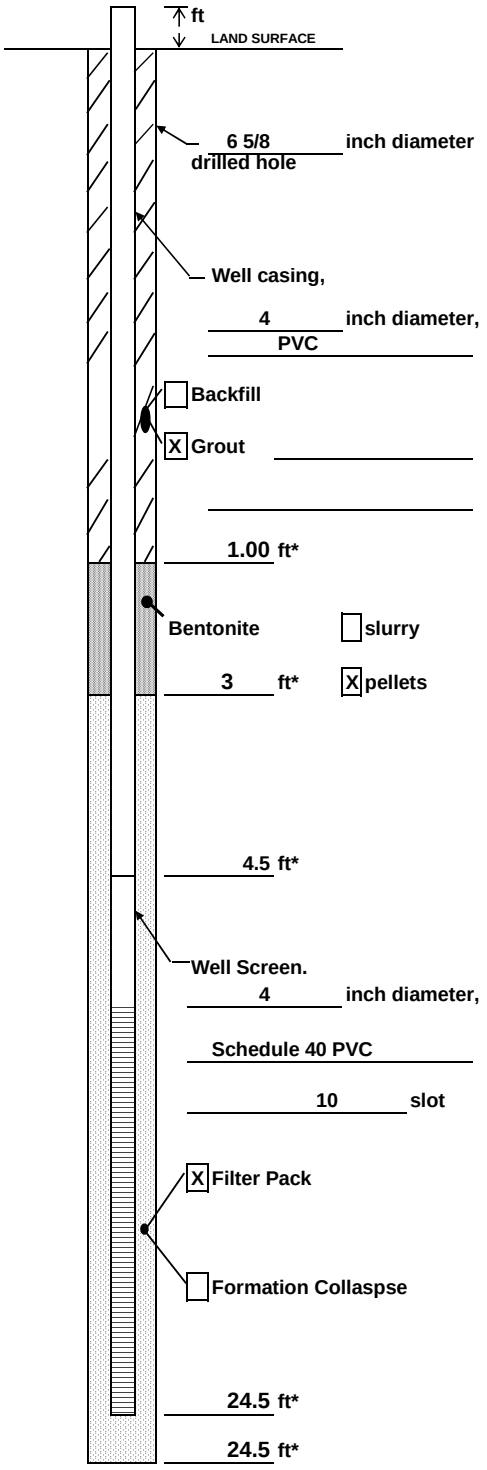
****Measuring Point is Top of Well Casing Unless Otherwise Noted.**

Prepared by SG

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-32 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0775

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/16/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07 - sub pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~10 gallons

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 0.25 hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

Remarks _____

* Depth Below Land Surface

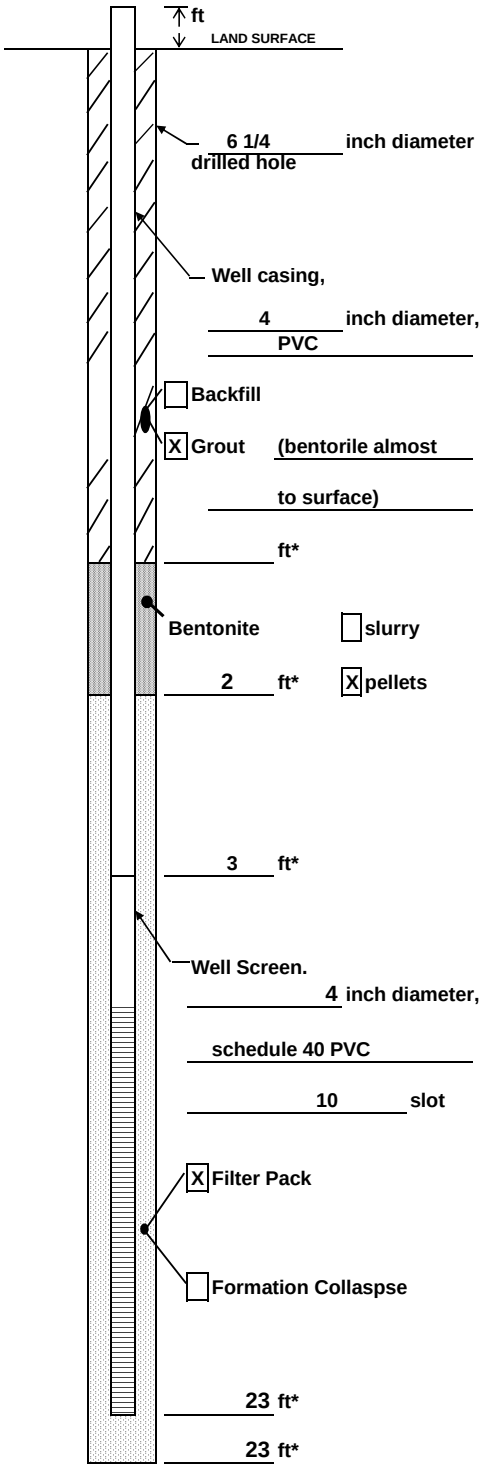
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-33 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0778

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/12/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/27/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~20 gallons

Static Depth to Water 13.2 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration _____ hours

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

Remarks _____

* Depth Below Land Surface

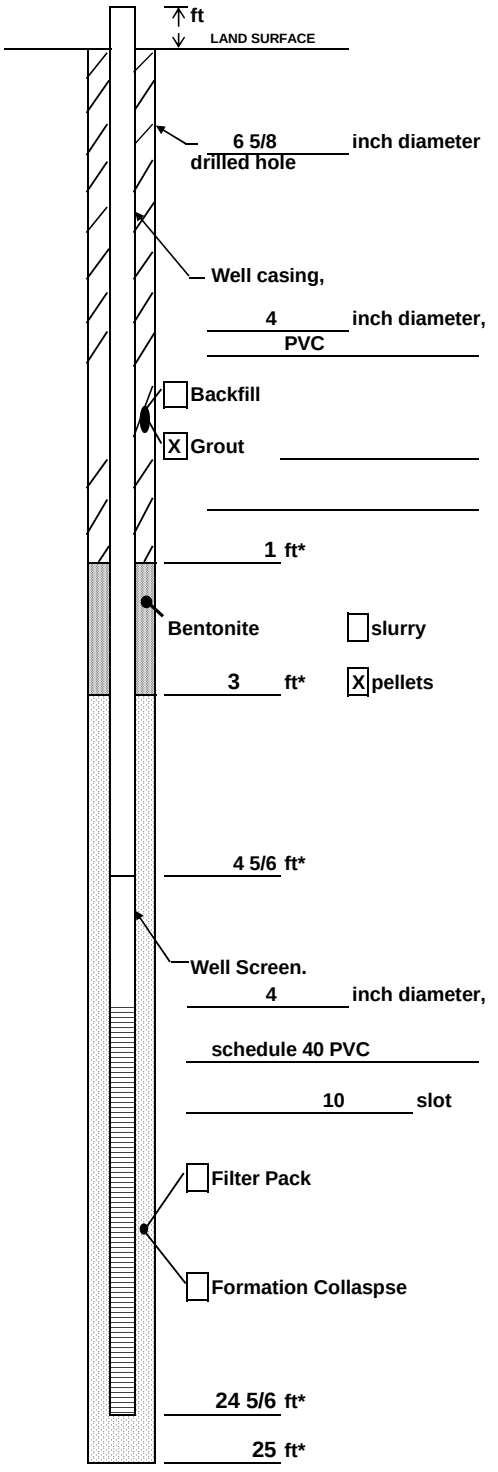
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-35 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0779

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/21/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~20 gallons

Static Depth to Water _____ feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 45 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

Remarks 1.5 bags of sand used

* Depth Below Land Surface

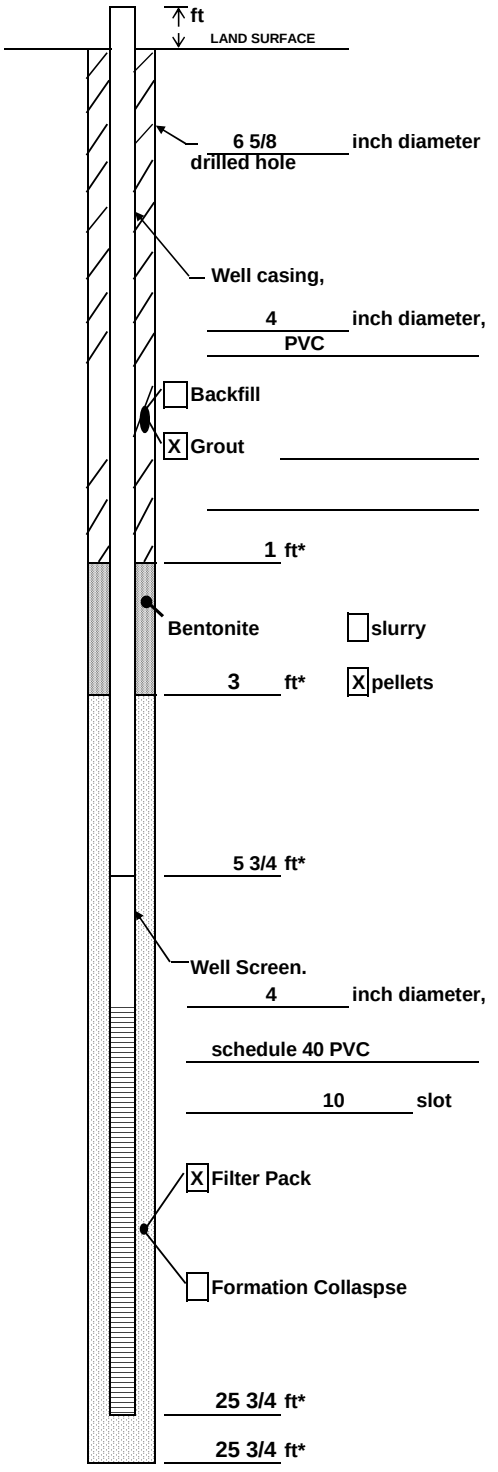
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-37 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0780

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/20/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07, 11/29/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~25 gallons

Static Depth to Water 15.11 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 20 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

Remarks _____

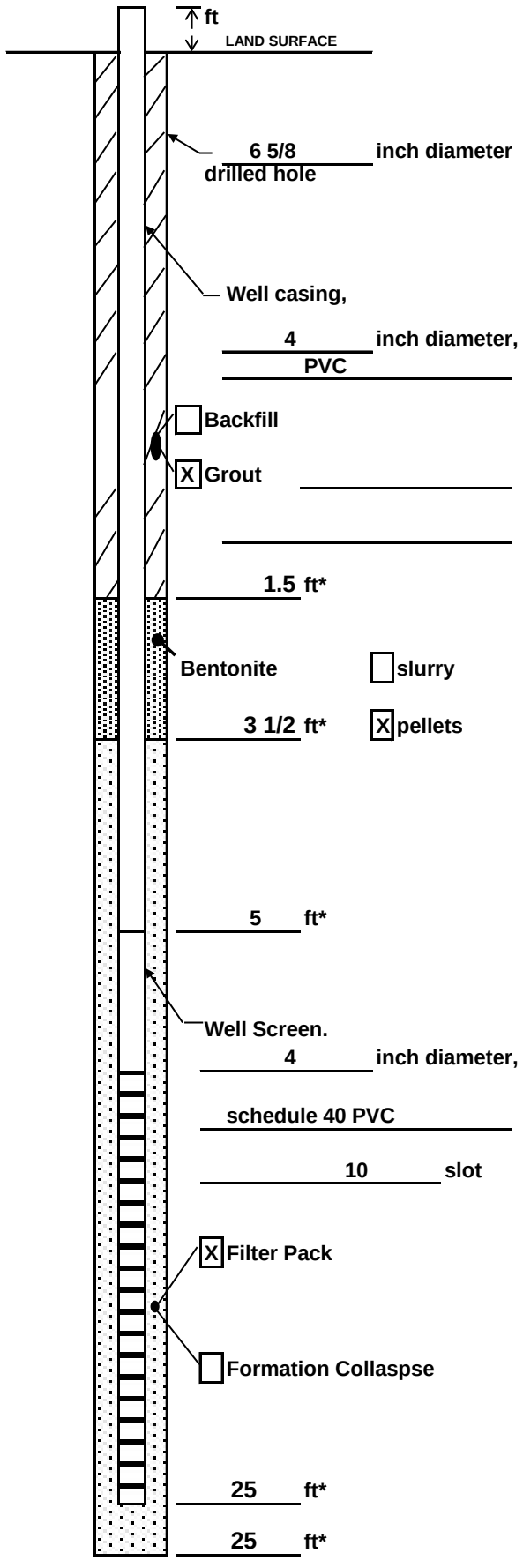
* Depth Below Land Surface

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-38 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0781

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/26/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~45 gallons

Static Depth to Water _____ feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 45 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

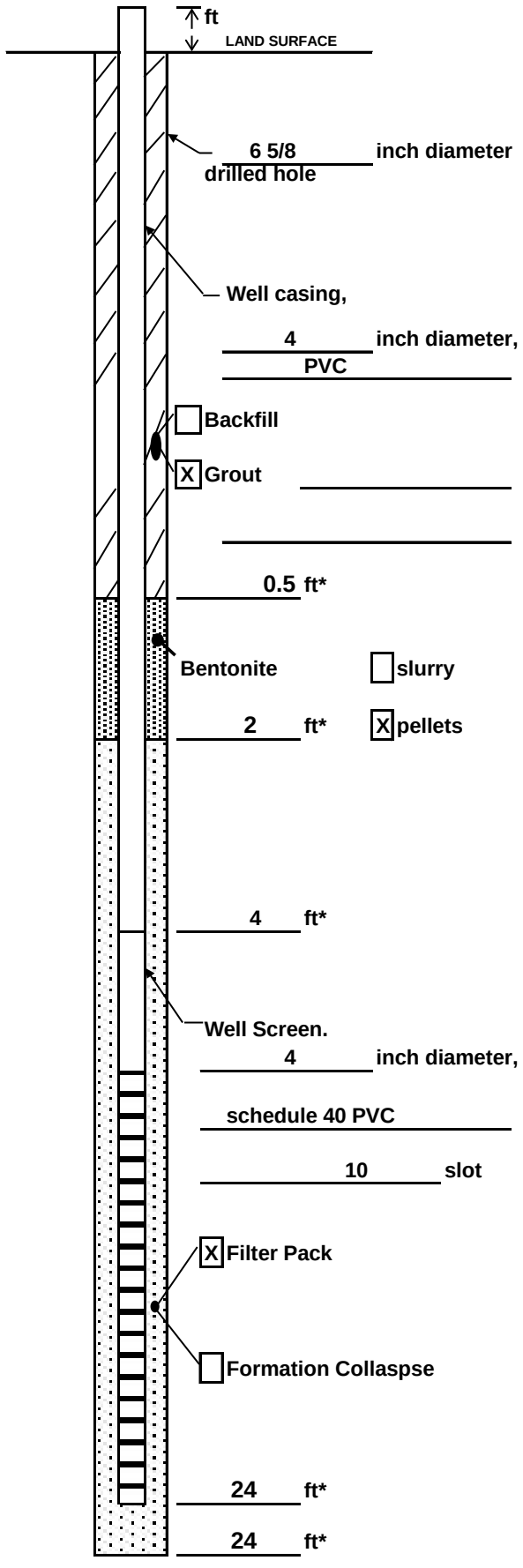
Remarks

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-39 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0782

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/21/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07, 11/29/07 - sub. pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development ~30 gallons

Static Depth to Water ____ feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 30 mins

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring

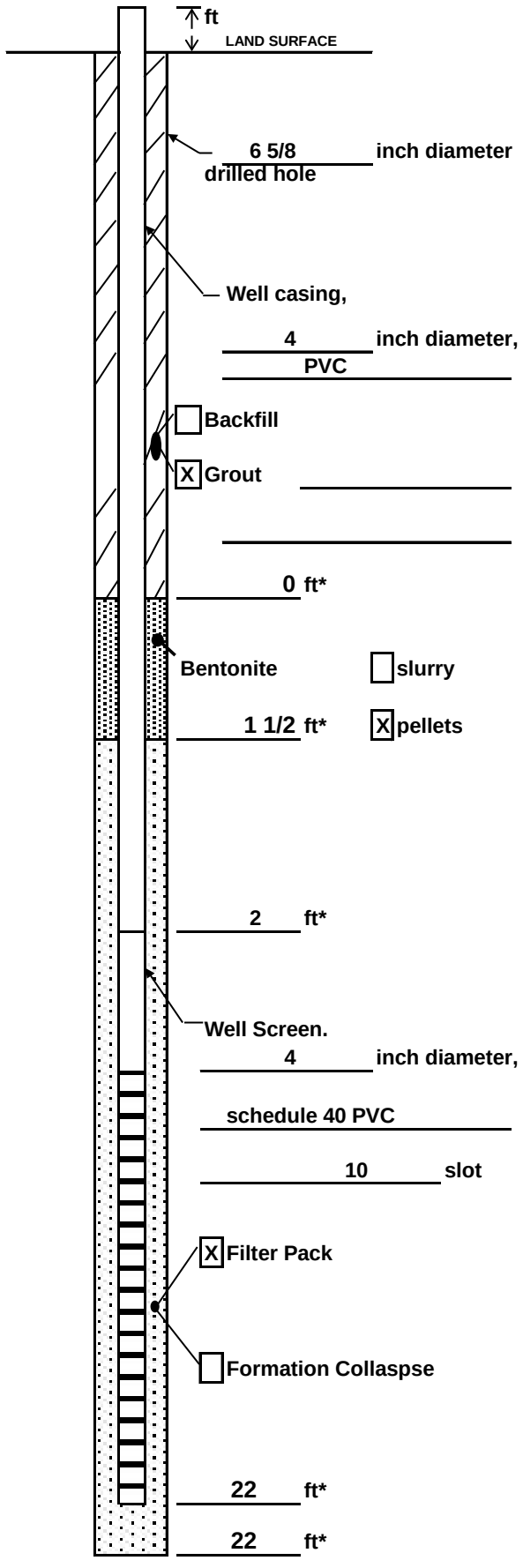
Remarks 35 bags of sand used in filter pack

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-41 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0784

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/19/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/27/07, 11/29/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development ~10 gallons

Static Depth to Water 15.79 feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 20 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

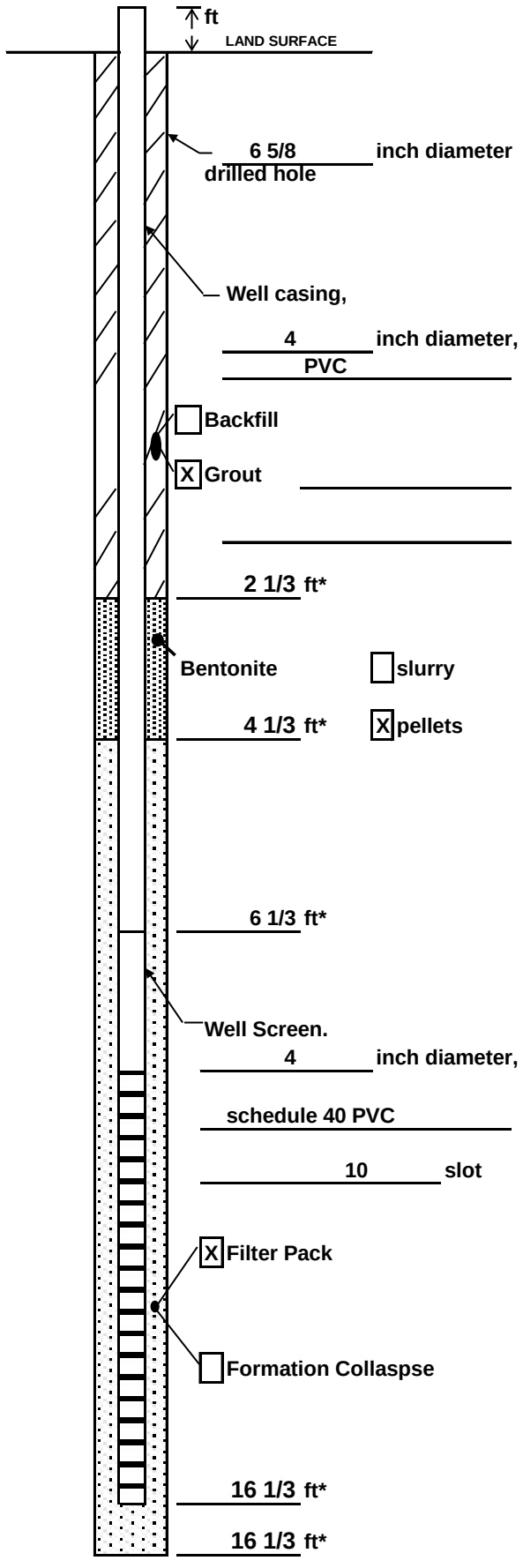
Remarks

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-43 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0785

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/26/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07 - sub. pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development ~25 gallons

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 18 mins

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring

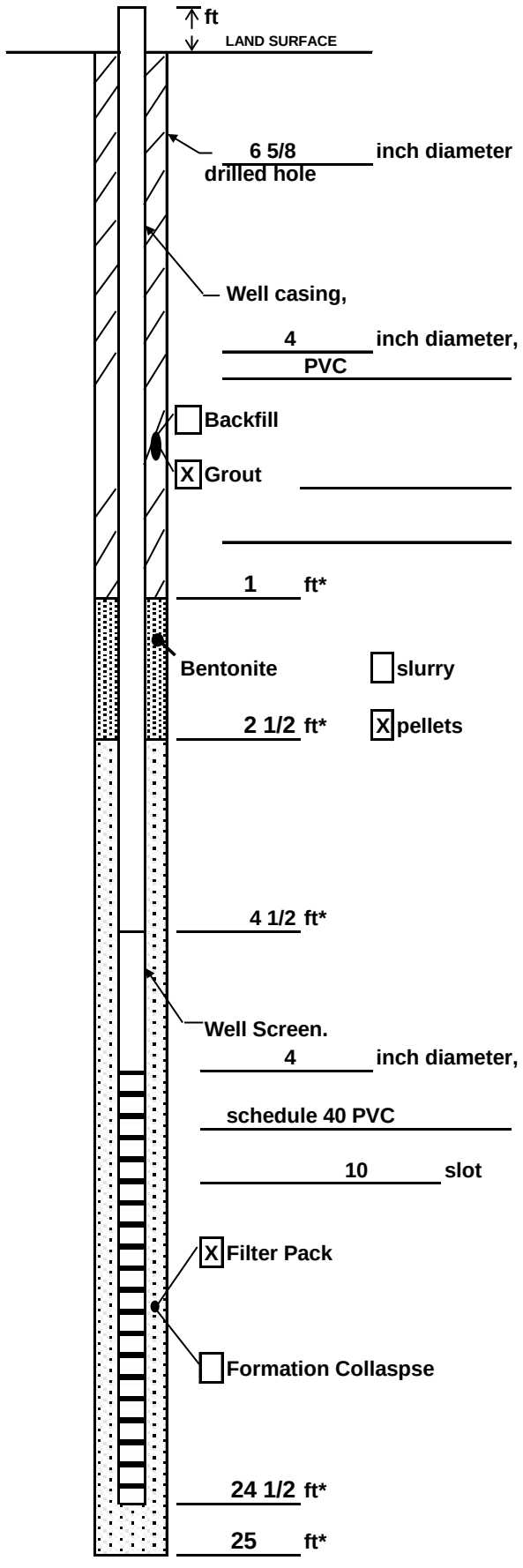
Remarks

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-49 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0783

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/19/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/27/07 - sub pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development ~35 gallons

Static Depth to Water 5.59 feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 45 mins

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring

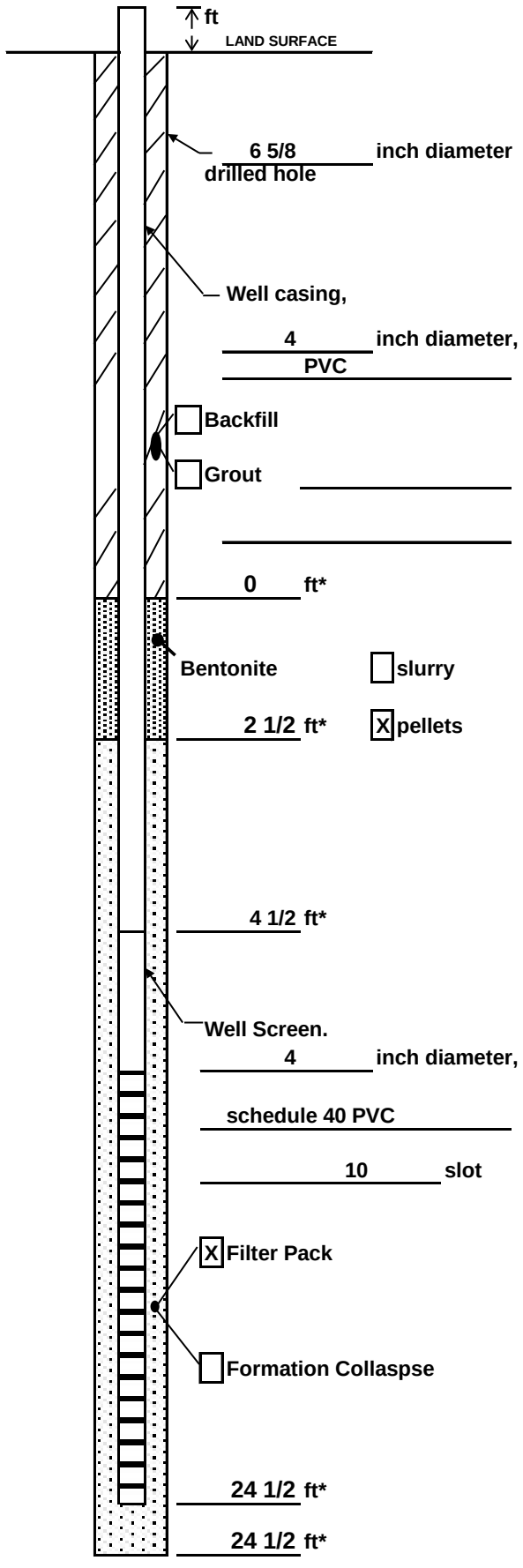
Remarks

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-50 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0786

Land-Surface Elevation and Datum:

____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/14/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/28/07 - sub. pump

Fluid Loss During Drilling ____ gallons

Water Removed During Development ~20 gallons

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water ____ feet below M.P.**

Pumping Duration 45 mins

Yield ____ gpm **Date** ____

Specific Capacity ____ gpm/ft

Well Purpose groundwater monitoring

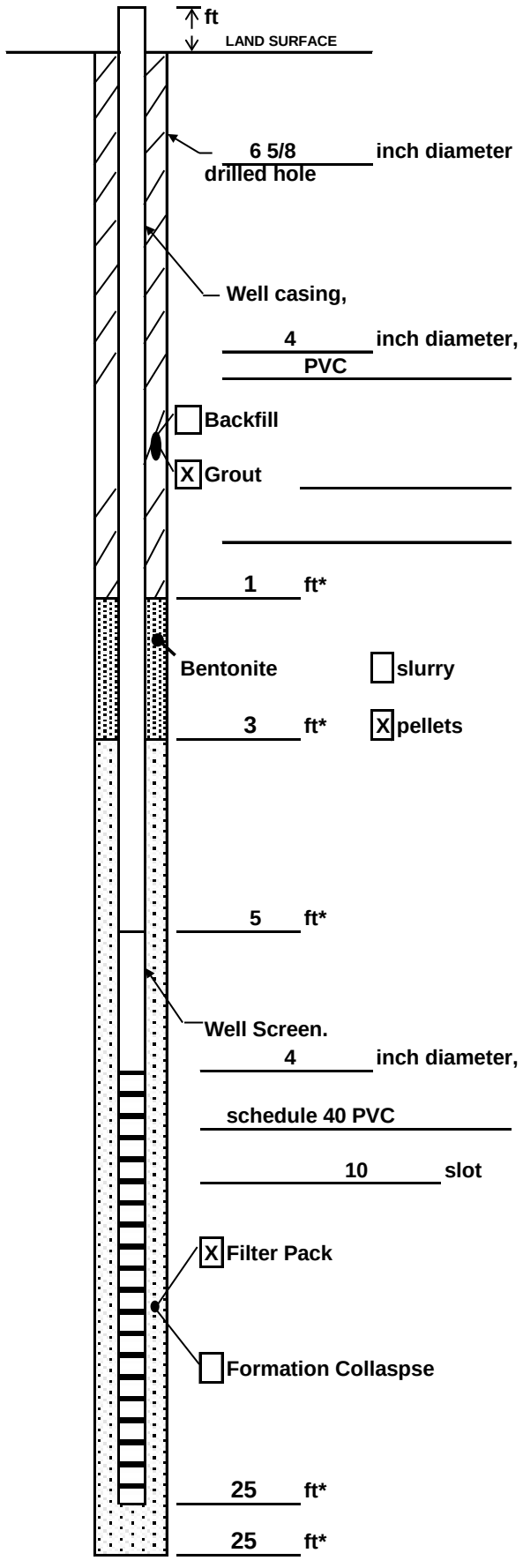
Remarks

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-51 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0776

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/20/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/29/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development 37 gallons

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 25 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

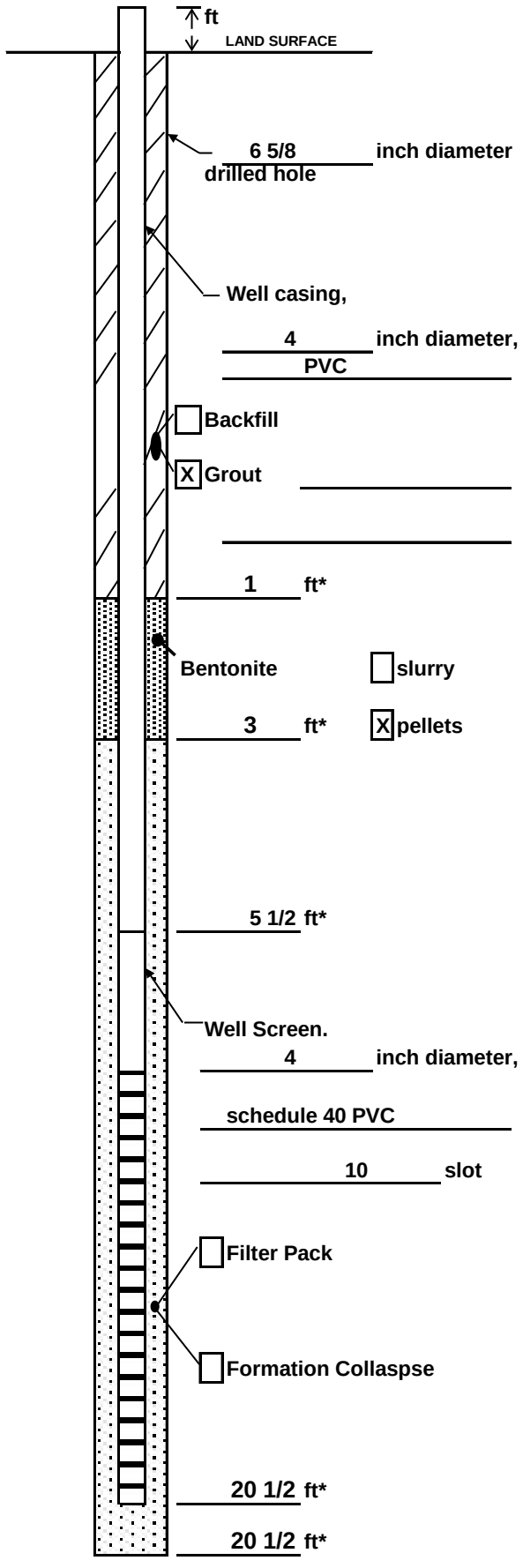
Remarks

**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log
(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSXT - Brunswick / MD000843.0006.00001

Well MW-52 **Town/City** Brunswick

County Frederick **State** Maryland

Permit No. FR-95-0777

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 11/14/2007

Drilling Method Hollow Stem Auger

Drilling Contractor SGS Environmental

Drilling Fluid none

Development Technique(s) and Date(s)

11/29/07 - sub. pump

Fluid Loss During Drilling _____ gallons

Water Removed During Development 15 gallons

Static Depth to Water NM feet below M.P.**

Pumping Depth to Water _____ feet below M.P.**

Pumping Duration 30 mins

Yield _____ gpm **Date** _____

Specific Capacity _____ gpm/ft

Well Purpose groundwater monitoring

Remarks The driller did not have a 5 ft. length of screen so a 10 ft. length was cut in half and used with an expandable plug on the bottom.

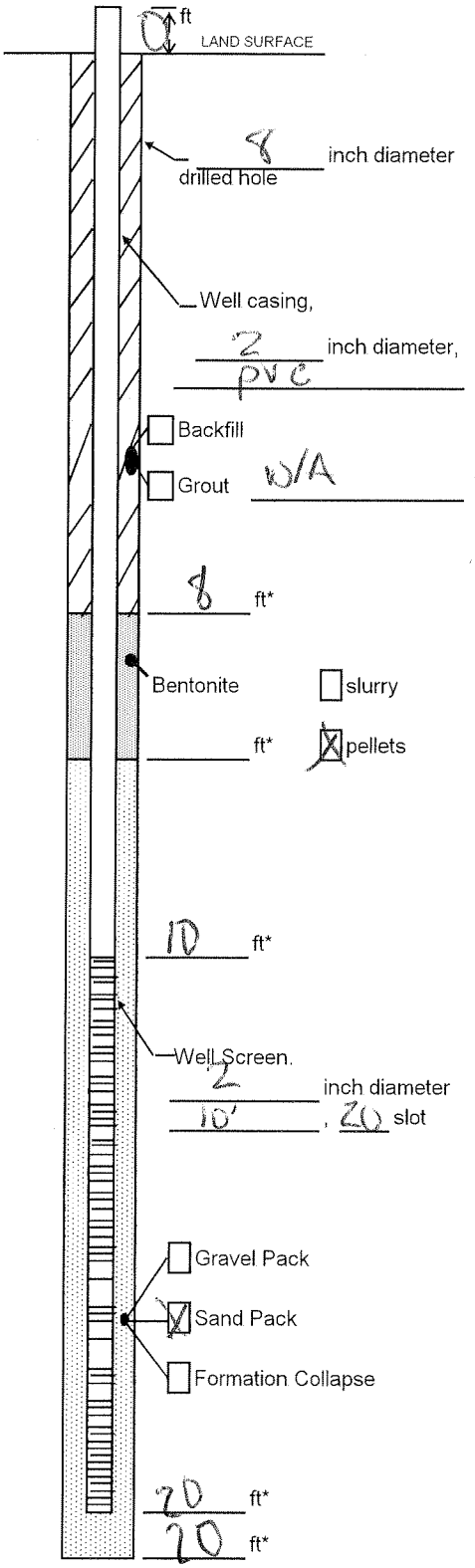
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by SG

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project MD000843.0006.00001 Well ~~MW-56~~ MW-53

Town/City Brunswick MD

County Frederick State MD

Permit No. FR 95-1180

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 12/17/08

Drilling Method HSA

Drilling Contractor SGS

Drilling Fluid N/A

Development Technique(s) and Date(s)

surge & purge 12/18/08

Fluid Loss During Drilling N/A gallons

Water Removed During Development 40 gallons

Static Depth to Water 13.98 feet below M.P.

Pumping Depth to Water 15.0 feet below M.P.

Pumping Duration 20 ~~hours~~ mins

Yield 2 gpm Date 12/18/08

Specific Capacity 2 gpm/ft

Well Purpose monitoring well

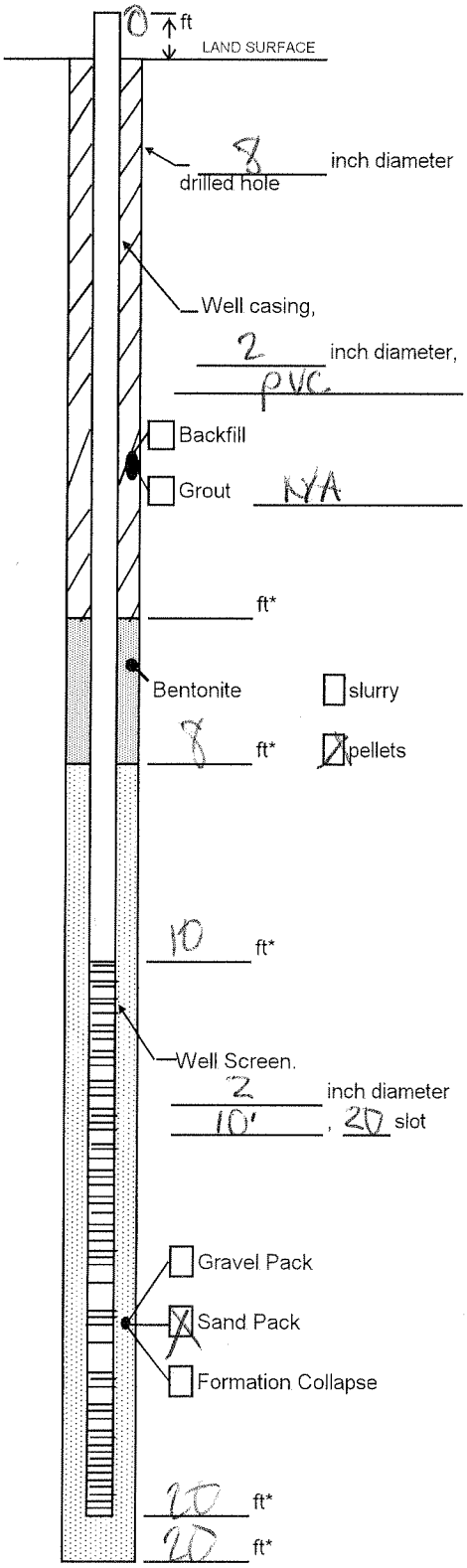
Remarks flush mount
DSI #2 sand
*hydrated bentonite

Prepared by GH

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project	MD000843.0006.00001	Well	MW-54
Town/City	Brunswick MD		
County	Frederick	State	MD
Permit No.	FR-95 1179		

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s)	12/13/08
Drilling Method	HSA
Drilling Contractor	SGS
Drilling Fluid	N/A

Development Technique(s) and Date(s)

surge and purge 12/18/08

Fluid Loss During Drilling	N/A	gallons	
Water Removed During Development	~10	gallons	
Static Depth to Water	13.65	feet below M.P.	
Pumping Depth to Water	14.9	feet below M.P.	
Pumping Duration	10	hours mins	
Yield	10 gpm	Date	12/18/08
Specific Capacity		gpm/ft	

Well Purpose: monitoring well

Remarks: flush mount

DSI #2 Sand

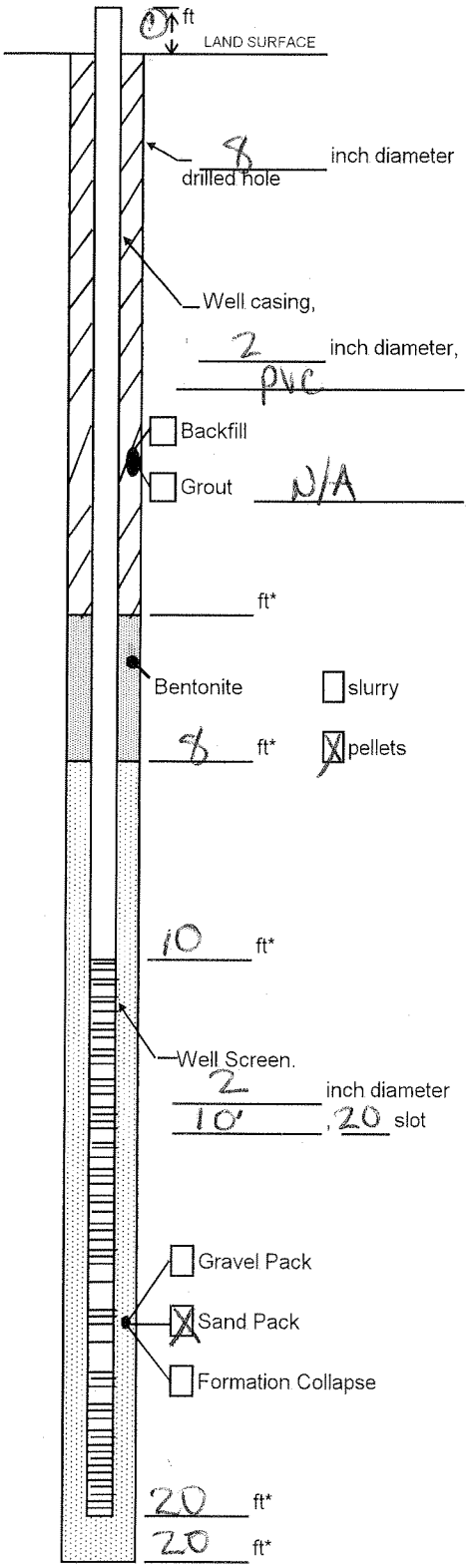
* hydrated bentonite

Prepared by: CJH

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project MD000843.0006.00001 Well MW-55

Town/City Brunswick MD

County _____ State MD

Permit No. ETZ 95-1178

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 12/17/08

Drilling Method HSA

Drilling Contractor SGS

Drilling Fluid N/A

Development Technique(s) and Date(s)

surge & purge 12/18/08

Fluid Loss During Drilling N/A gallons

Water Removed During Development ~10 gallons

Static Depth to Water 14.10 feet below M.P.

Pumping Depth to Water 15.6 feet below M.P.

Pumping Duration 10 ~~hours~~ mins

Yield 1 gpm Date 12/18/08

Specific Capacity _____ gpm/ft

Well Purpose monitoring well

Remarks flush mount
DSI #2 Sand

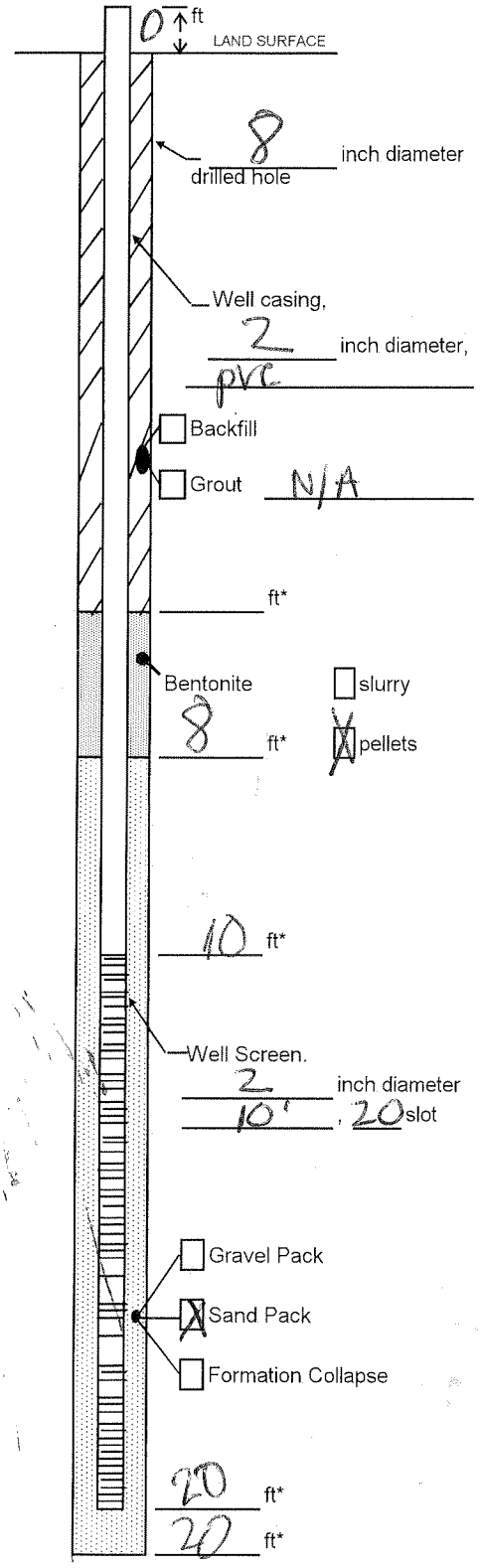
* hydrated bentonite

Prepared by GH

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project MD000843.0006.00001 Well MW-56

Town/City Brunswick MD

County _____ State MD

Permit No. FR 95-1177

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 12-16-08

Drilling Method HSA

Drilling Contractor SGS

Drilling Fluid none

Development Technique(s) and Date(s)

surge and purge

Fluid Loss During Drilling N/A gallons

Water Removed During Development 40 gallons

Static Depth to Water 12.57 feet below M.P.

Pumping Depth to Water 15.5 feet below M.P.

Pumping Duration 55 ~~hours~~ mins

Yield _____ gpm Date 12/17/08

Specific Capacity _____ gpm/ft

Well Purpose monitoring well for pilot system

Remarks

DSI #2 sand

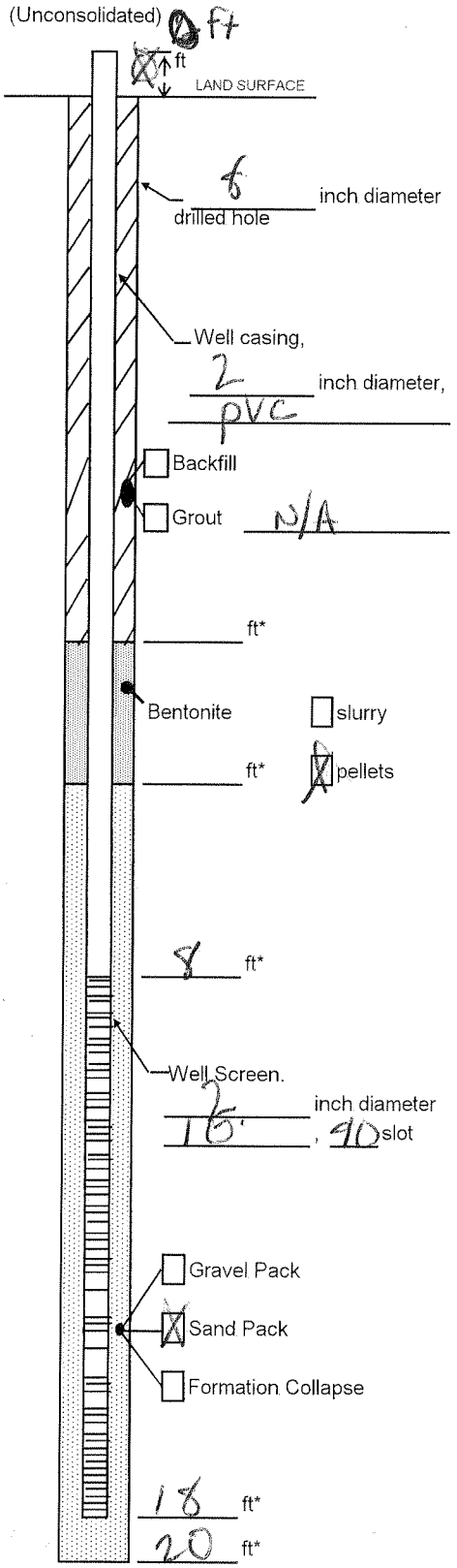
Flush mount

* hydrated bentonite

Prepared by GH, SC

ARCADIS

Well Construction Log



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project MD000843.0006.00001 Well MW-57

Town/City Brunswick MD

County _____ State MD

Permit No. FR-95-1176

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 12/16/08

Drilling Method HSA

Drilling Contractor SGS

Drilling Fluid N/A

Development Technique(s) and Date(s)

Surge and purge

Fluid Loss During Drilling N/A gallons

Water Removed During Development ~10 gallons

Static Depth to Water 12.57 feet below M.P.

Pumping Depth to Water 10.0 feet below M.P.

Pumping Duration 5 ~~hours~~ minutes

Yield _____ gpm Date 12/17/08

Specific Capacity _____ gpm/ft

Well Purpose

Monitoring well

Remarks ~~flush mount~~ stick up

DSI #2 sand

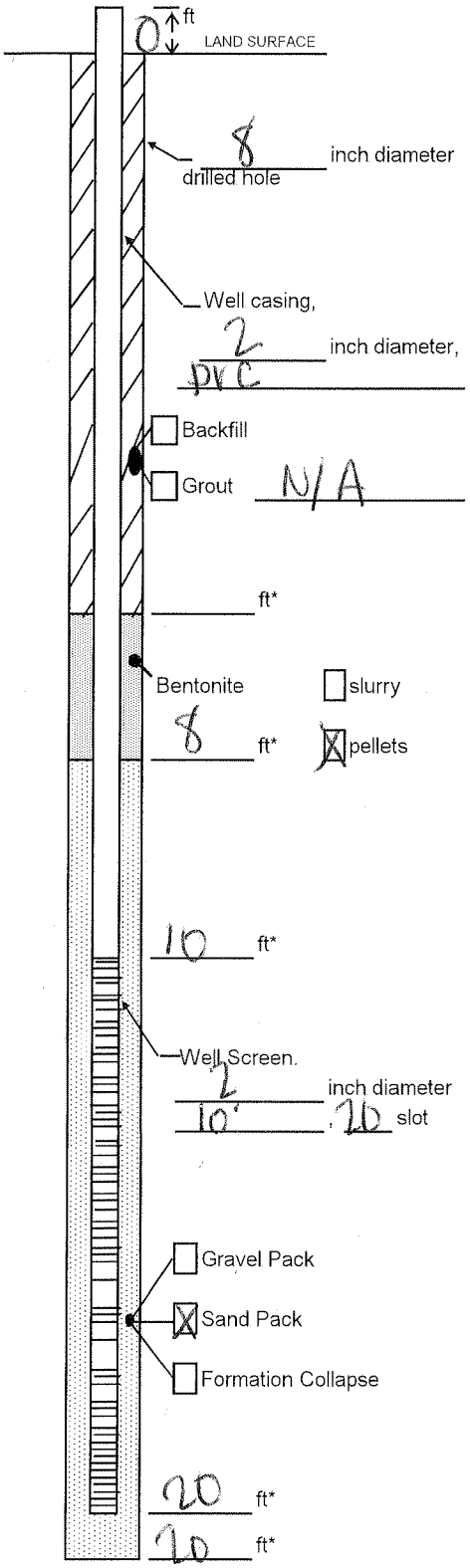
*hydrated bentonite

Prepared by GH, SC

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

* Depth Below Land Surface

Project MD000843.0006.00001 Well MW-58

Town/City Brunswick MD

County _____ State MD

Permit No. FR-95-1175

Land-Surface Elevation and Datum:

N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 12/10/08

Drilling Method HSA

Drilling Contractor SGS

Drilling Fluid N/A

Development Technique(s) and Date(s)

surge and purge

Fluid Loss During Drilling N/A gallons

Water Removed During Development ~40 gallons

Static Depth to Water 12.45 feet below M.P.

Pumping Depth to Water 14.09 feet below M.P.

Pumping Duration 20 ~~hours~~ min

Yield _____ gpm Date 12/17/08

Specific Capacity _____ gpm/ft

Well Purpose

monitoring well

Remarks flush mount

DSI #2 sand

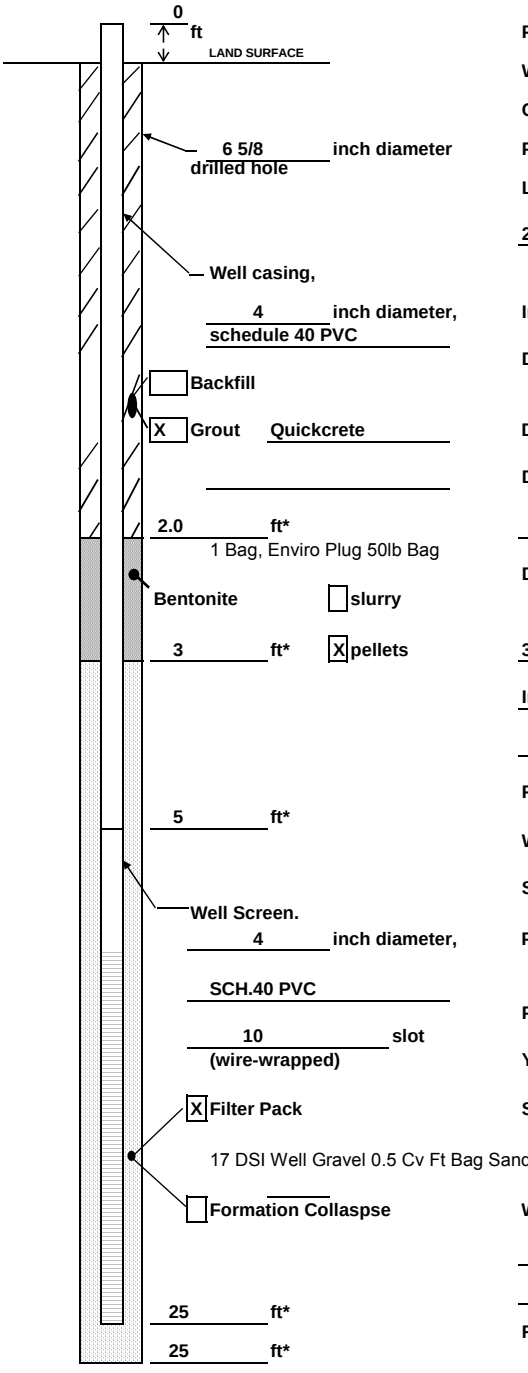
*hydrated bentonite

Prepared by GH, SC

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-59 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1960

Land-Surface Elevation and Datum:

246.33 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/15/2012 - 3/16/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/20/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 55 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 1 HR 40 MIN mins

Yield 0.55 gpm **Date** 3/20/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

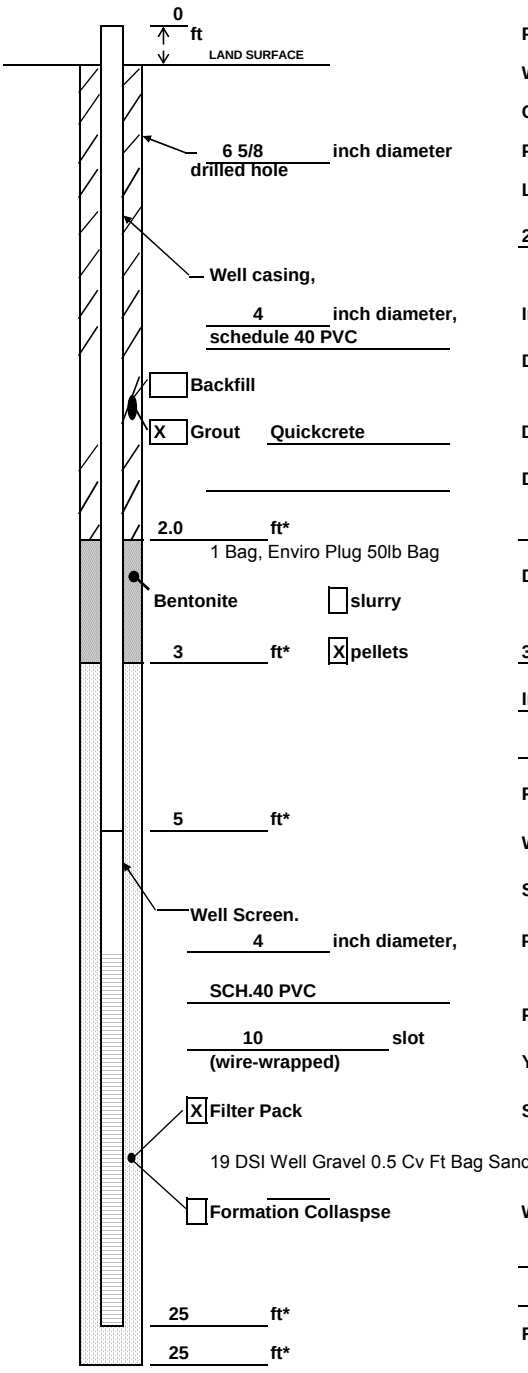
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-60 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1961

Land-Surface Elevation and Datum:

246.02 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/15/2012 - 3/16/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/19/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 110 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 1 HR 45 MIN mins

Yield 1.05 gpm **Date** 3/20/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

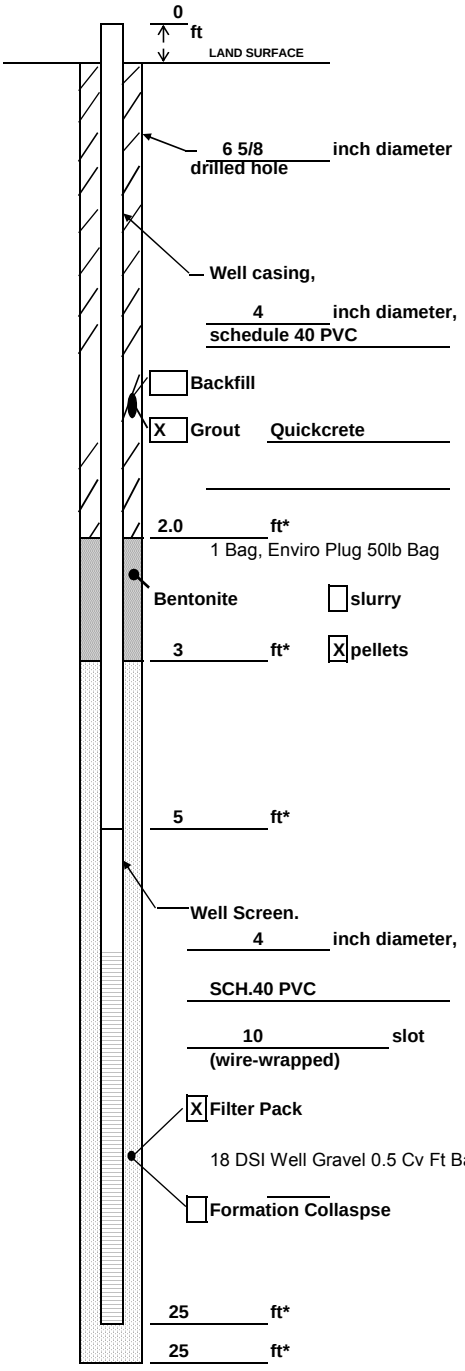
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-61 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1962

Land-Surface Elevation and Datum:

246.07 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/15/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/19/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 55 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 1 HR 50 MIN mins

Yield 0.5 gpm **Date** 3/19/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

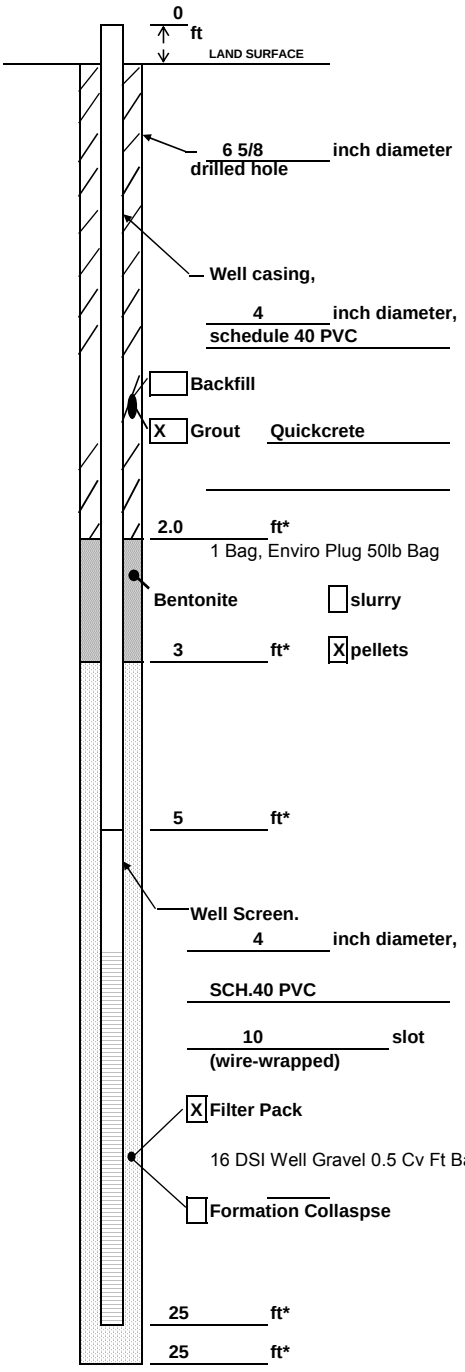
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-62 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1963

Land-Surface Elevation and Datum:

246.57 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/14/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/19/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 70 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 1 HR mins

Yield 1.17 gpm **Date** 3/19/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

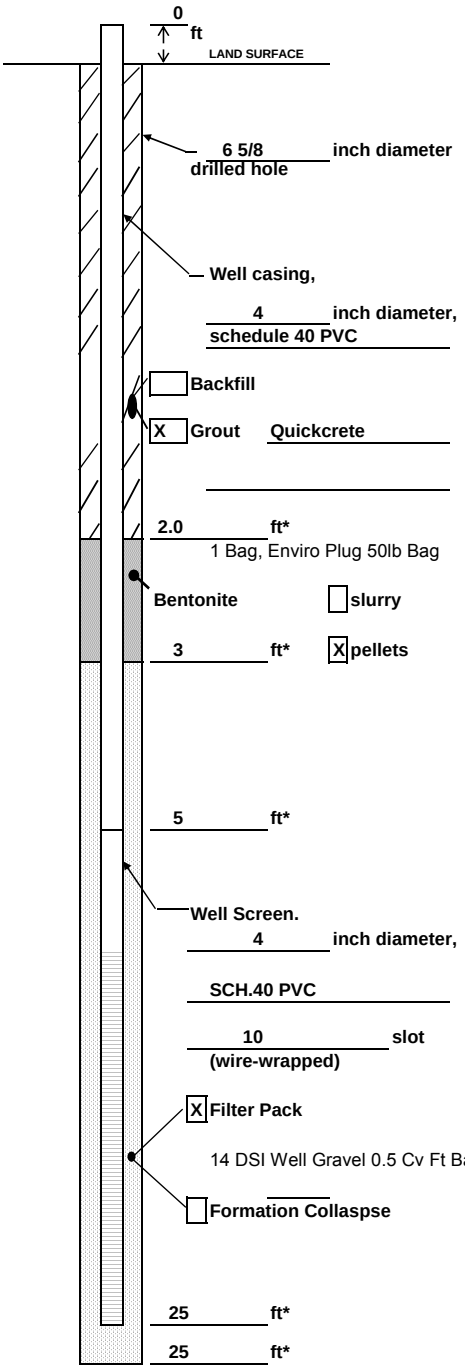
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-63 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1964

Land-Surface Elevation and Datum:

246.6 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/14/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/19/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 45 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 1 HR 15 MIN mins

Yield 0.6 gpm **Date** 3/19/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

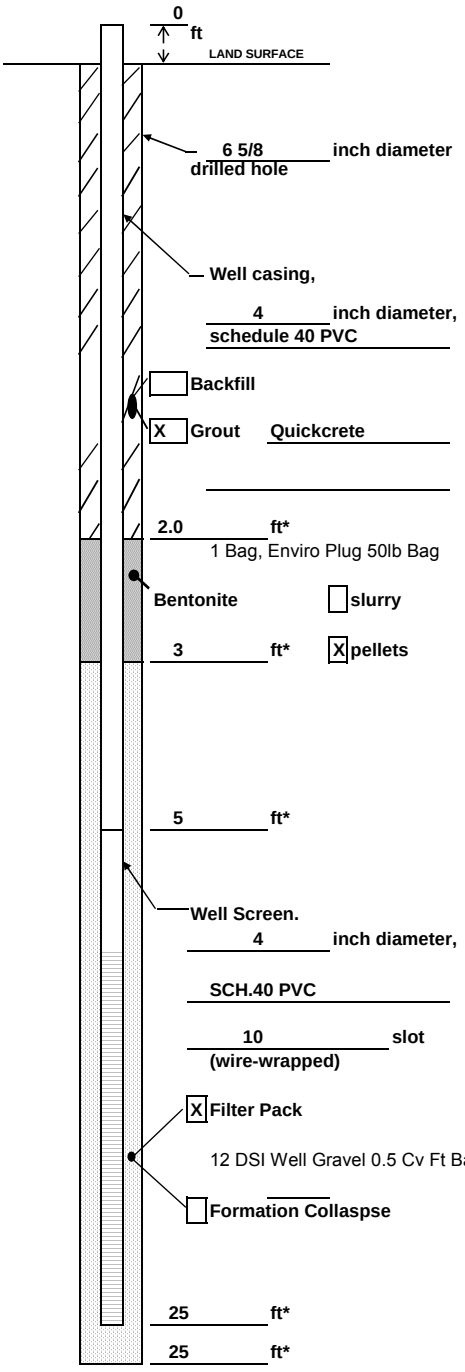
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-64 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1965

Land-Surface Elevation and Datum:

246.01 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/14/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/19/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 95 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 2 HR 30 MIN mins

Yield 0.63 gpm **Date** 3/19/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

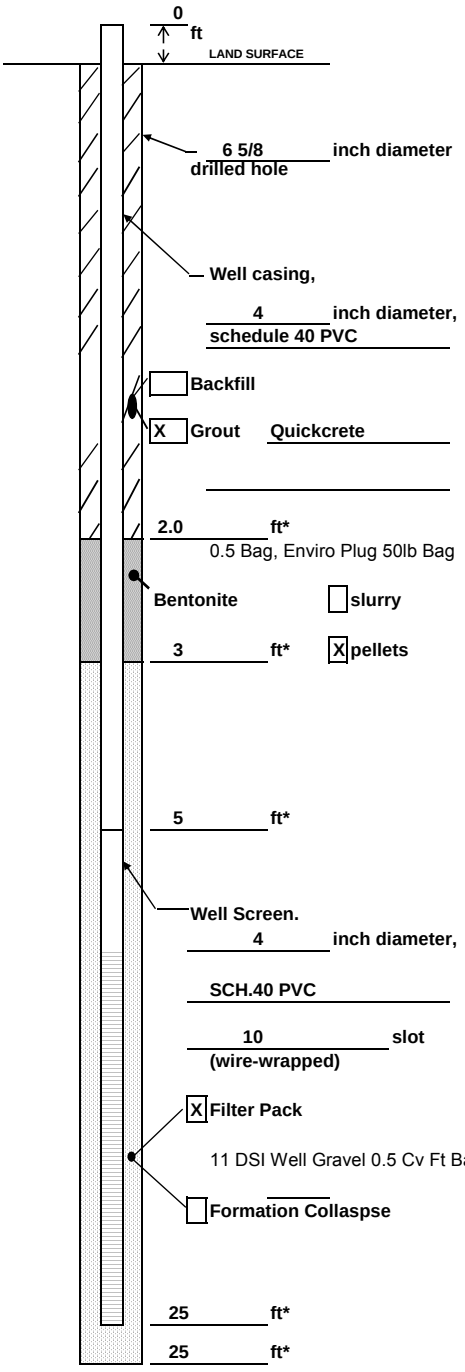
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



Project Name and No. CSX Brunswick, MD000843.0010.00001

Well MW-65 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-1966

Land-Surface Elevation and Datum:

245.98 feet [X] Surveyed [ ] Estimated

Installation Date(s) 3/13/2012

Drilling Method HSA

Drilling Contractor Drilling Tech

Drilling Fluid N/A

Development Technique(s) and Date(s)

3/19/2012, Water RA Pump and Submersible Pump

Into 55 Gallon Drums

Fluid Loss During Drilling 0 gallons

Water Removed During Development 110 gallons

Static Depth to Water feet below M.P.**

Pumping Depth to Water feet below M.P.**

Pumping Duration 1 HR 49 MIN mins

Yield 1.01 gpm **Date** 3/19/2012

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

* Depth Below Land Surface

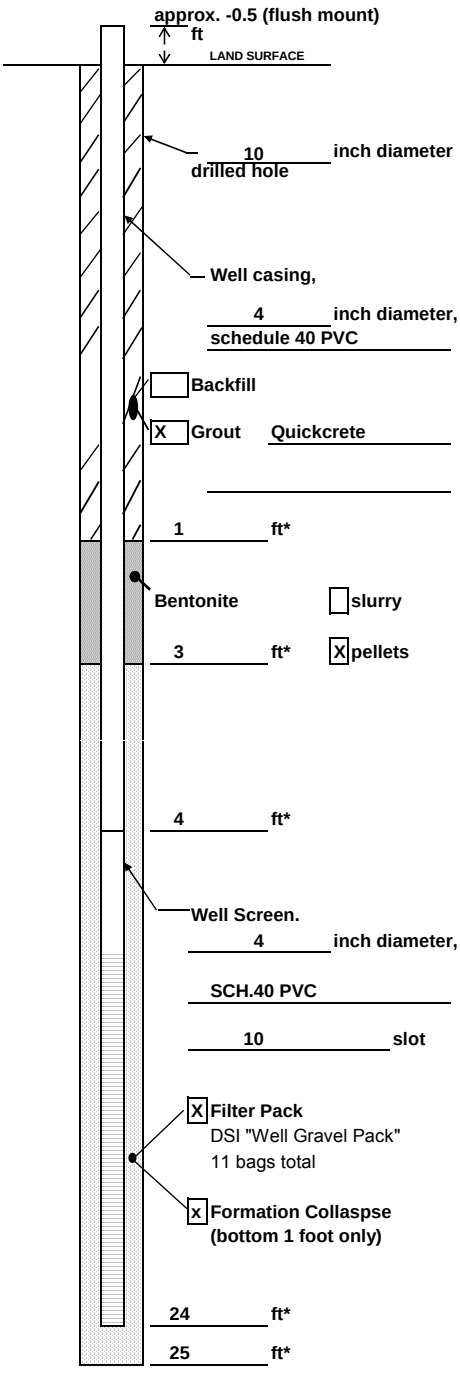
**Measuring Point is Top of Well Casing Unless Otherwise Noted.

Prepared by Justin Radford

ARCADIS

Well Construction Log

(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSX Brunswick, MD000843.0011.00002

Well MW-67 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-2137

Land-Surface Elevation and Datum:

246.27 feet [X] Surveyed [ ] Estimated

Installation Date(s) 1/7/2013

Drilling Method HSA

Drilling Contractor DTCI

Drilling Fluid N/A

Development Technique(s) and Date(s)

1/10/13, Water RA Pump and Submersible Pump

Fluid Loss During Drilling 0 gallons

Water Removed During Development 52 gallons

Static Depth to Water 12.99 feet below M.P.**

Pumping Depth to Water purged dry feet below M.P.**

Pumping Duration mins

Yield gpm **Date**

Specific Capacity gpm/ft

Well Purpose Monitoring Well

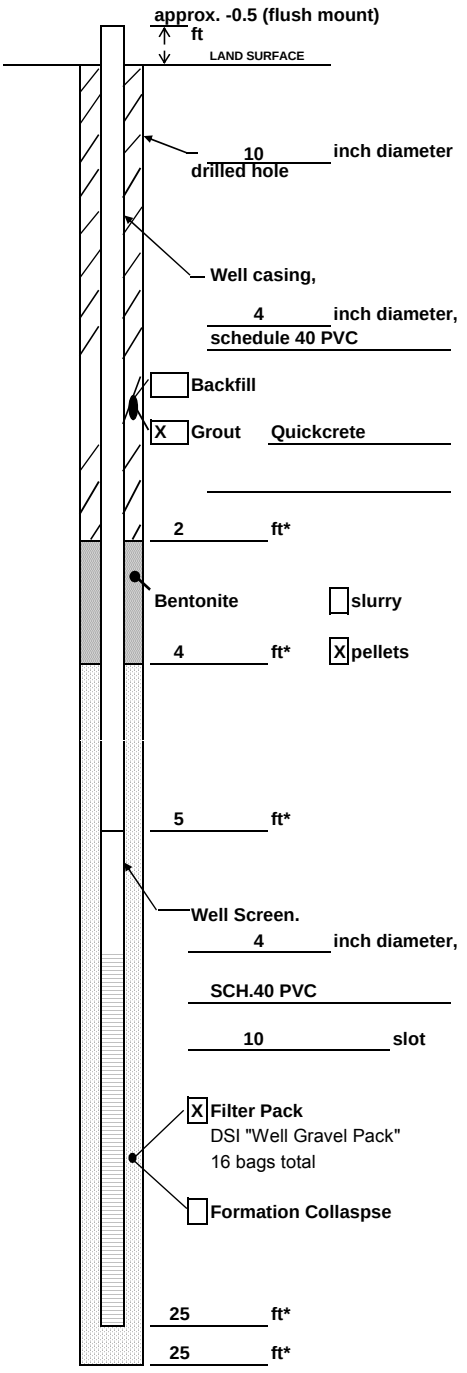
Remarks

Prepared by Katie Moran

ARCADIS

Well Construction Log

(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSX Brunswick, MD000843.0011.00002

Well MW-68 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-2138

Land-Surface Elevation and Datum:

245.97 feet [X] Surveyed [ ] Estimated

Installation Date(s) 1/8/2013

Drilling Method HSA

Drilling Contractor DTCI

Drilling Fluid N/A

Development Technique(s) and Date(s)

1/10/13, Water RA Pump and Submersible Pump

Fluid Loss During Drilling 0 gallons

Water Removed During Development 65 gallons

Static Depth to Water 4.69 feet below M.P.**

Pumping Depth to Water 4.77 feet below M.P.**

Pumping Duration 48 mins

Yield 1.35 gpm **Date** 1/10/2013

Specific Capacity gpm/ft

Well Purpose Monitoring Well

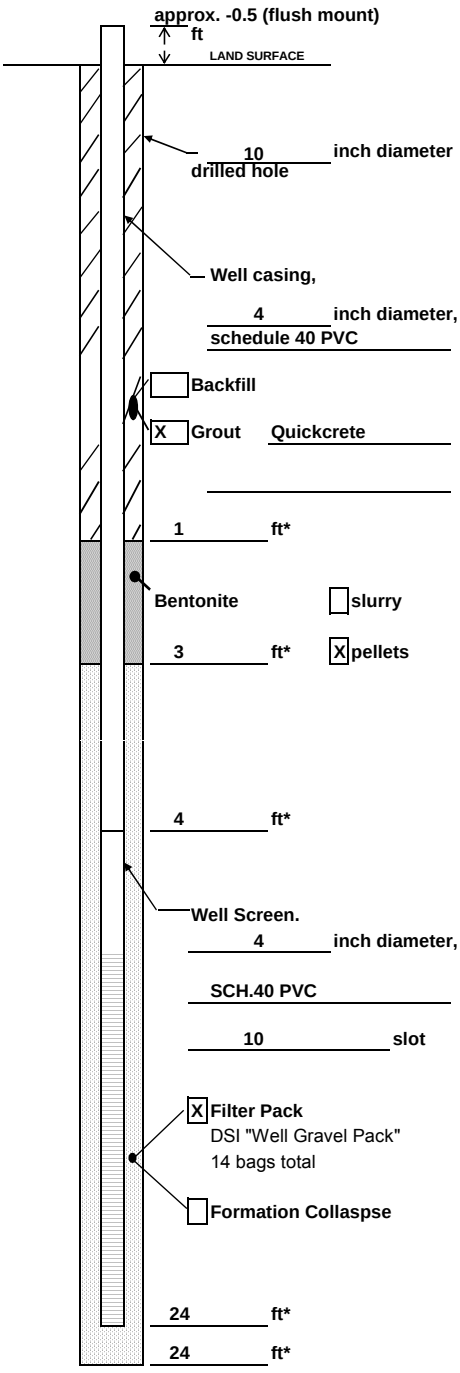
Remarks

Prepared by Katie Moran

ARCADIS

Well Construction Log

(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSX Brunswick, MD000843.0011.00002

Well MW-69 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-2139

Land-Surface Elevation and Datum:

245.82 feet [X] Surveyed [ ] Estimated

Installation Date(s) 1/8/2013 - 1/9/2013

Drilling Method HSA

Drilling Contractor DTCI

Drilling Fluid N/A

Development Technique(s) and Date(s)

1/10/13, Water RA Pump and Submersible Pump

Fluid Loss During Drilling 0 gallons

Water Removed During Development 40 gallons

Static Depth to Water 13.23 feet below M.P.**

Pumping Depth to Water purged dry feet below M.P.**

Pumping Duration mins

Yield gpm **Date**

Specific Capacity gpm/ft

Well Purpose Monitoring Well

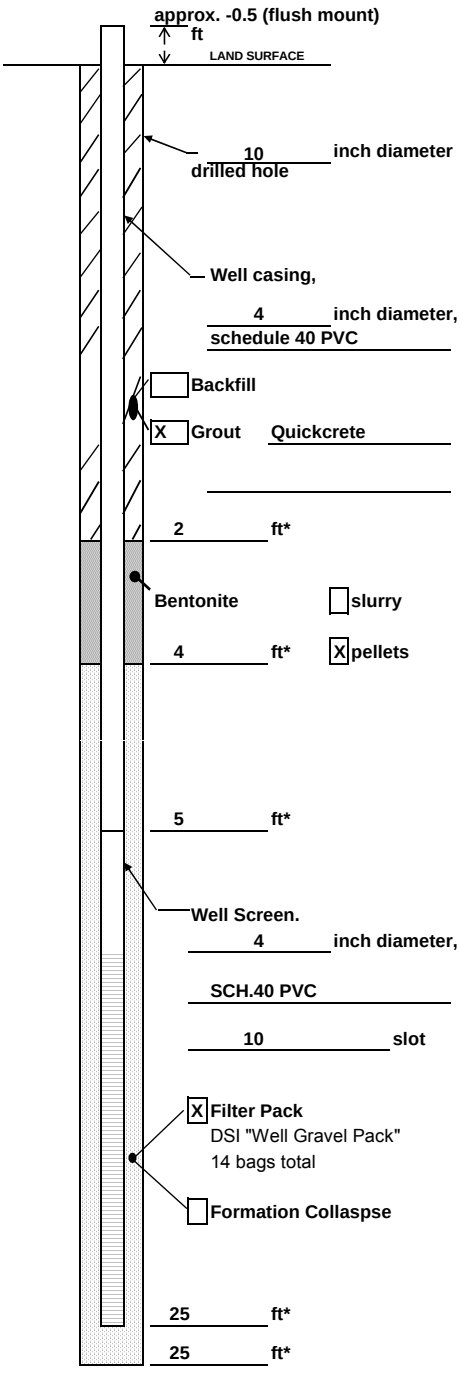
Remarks

Prepared by Katie Moran

ARCADIS

Well Construction Log

(Unconsolidated)



* Depth Below Land Surface

Project Name and No. CSX Brunswick, MD000843.0011.00002

Well MW-70 **Town/City** Brunswick

County Frederick **State** MD

Permit No. FR-95-2140

Land-Surface Elevation and Datum:

246.07 feet [X] Surveyed [ ] Estimated

Installation Date(s) 1/9/2013

Drilling Method HSA

Drilling Contractor DTCI

Drilling Fluid N/A

Development Technique(s) and Date(s)

1/10/13, Water RA Pump and Submersible Pump

Fluid Loss During Drilling 0 gallons

Water Removed During Development 80 gallons

Static Depth to Water 13.51 feet below M.P.**

Pumping Depth to Water purged dry feet below M.P.**

Pumping Duration mins

Yield gpm **Date**

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

Prepared by Katie Moran

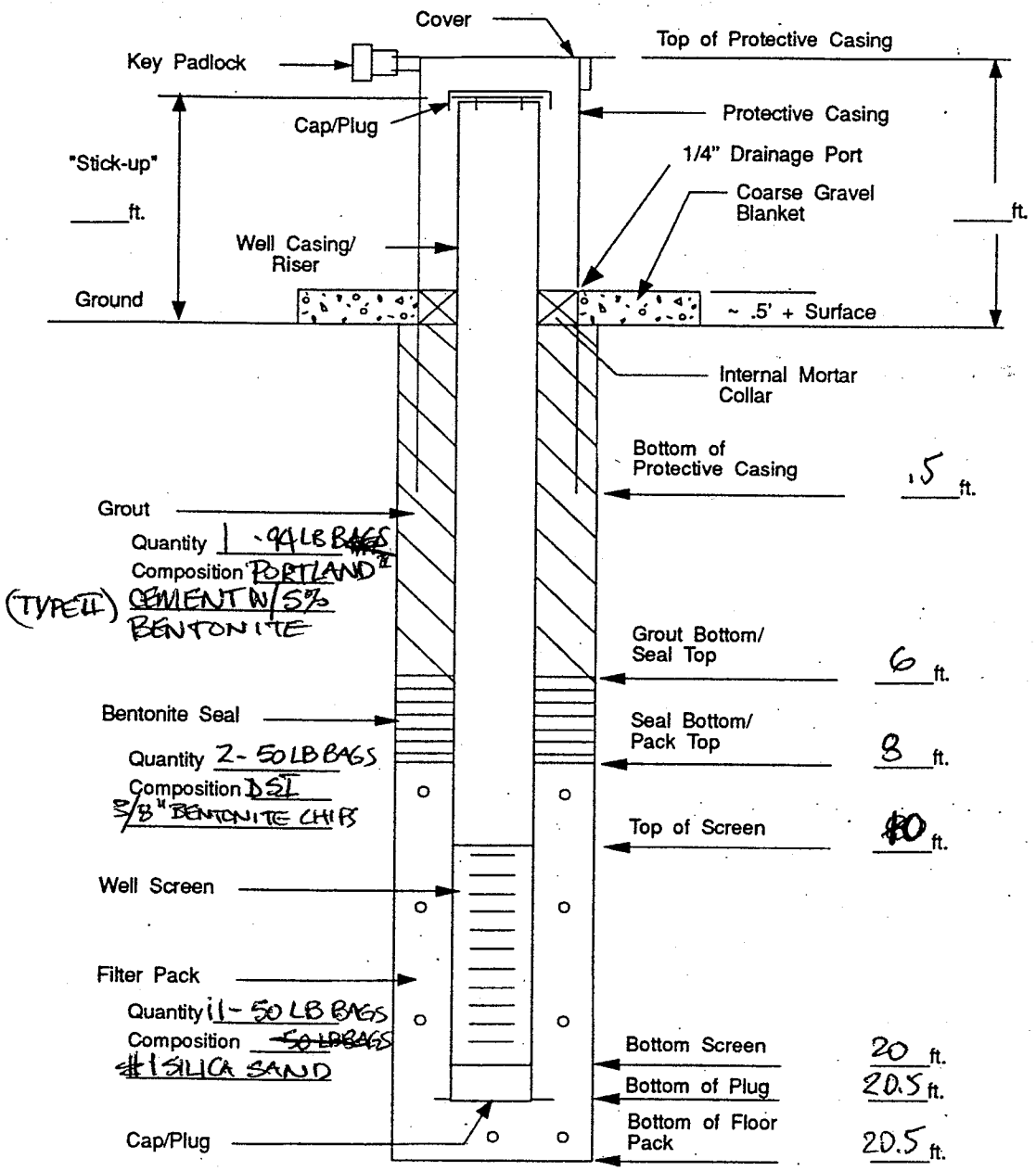
Well Construction Log: _____

Site ID Number: ~~NPS MW1 C&O CANAL~~

Well Number: NPS MW1

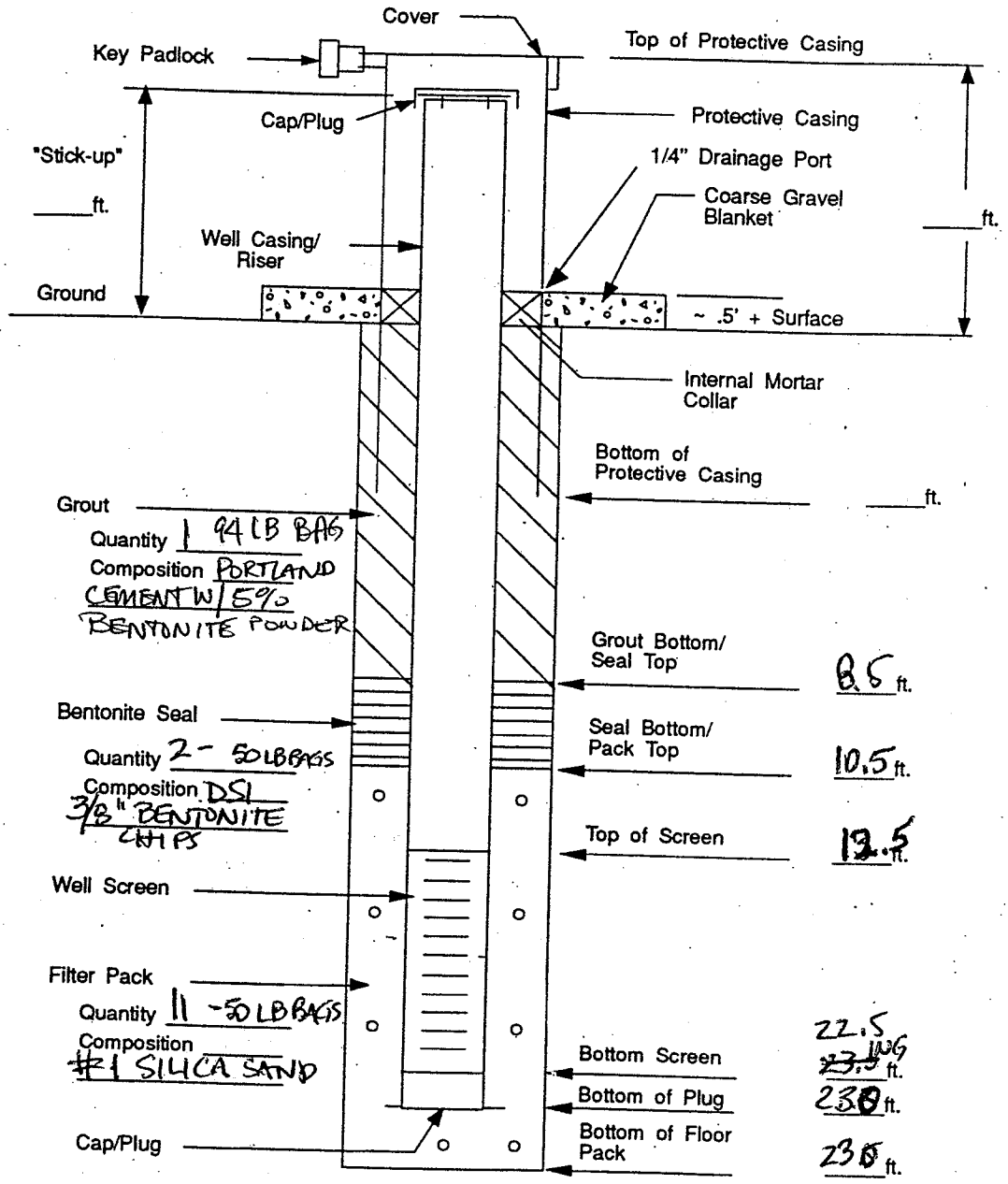
Today's Date: 8/29/96

WELL CONSTRUCTION



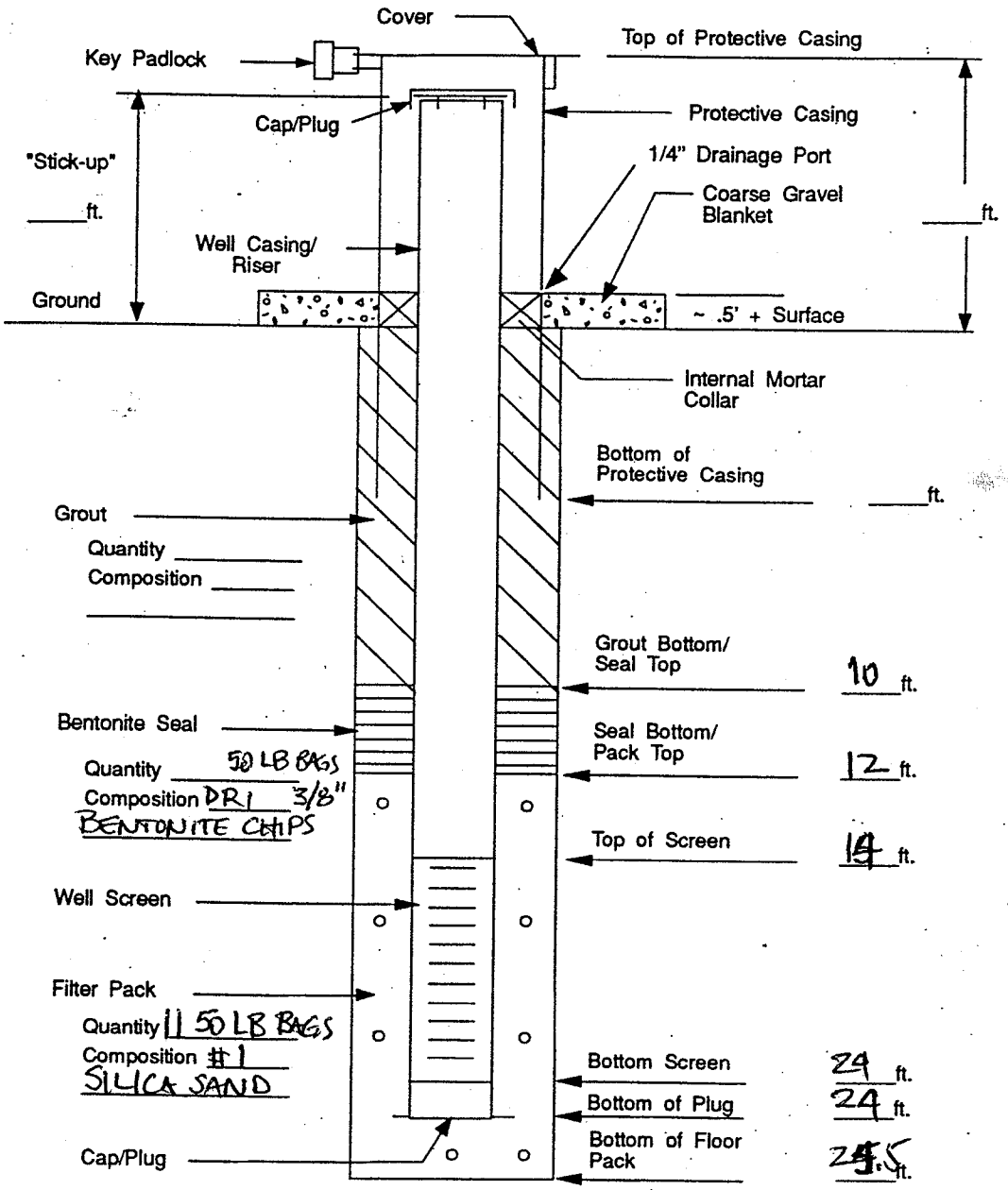
Well Construction Log:
Site ID Number: C&O CANAL
Well Number: NPS MW2
Today's Date: 8/30/96

WELL CONSTRUCTION



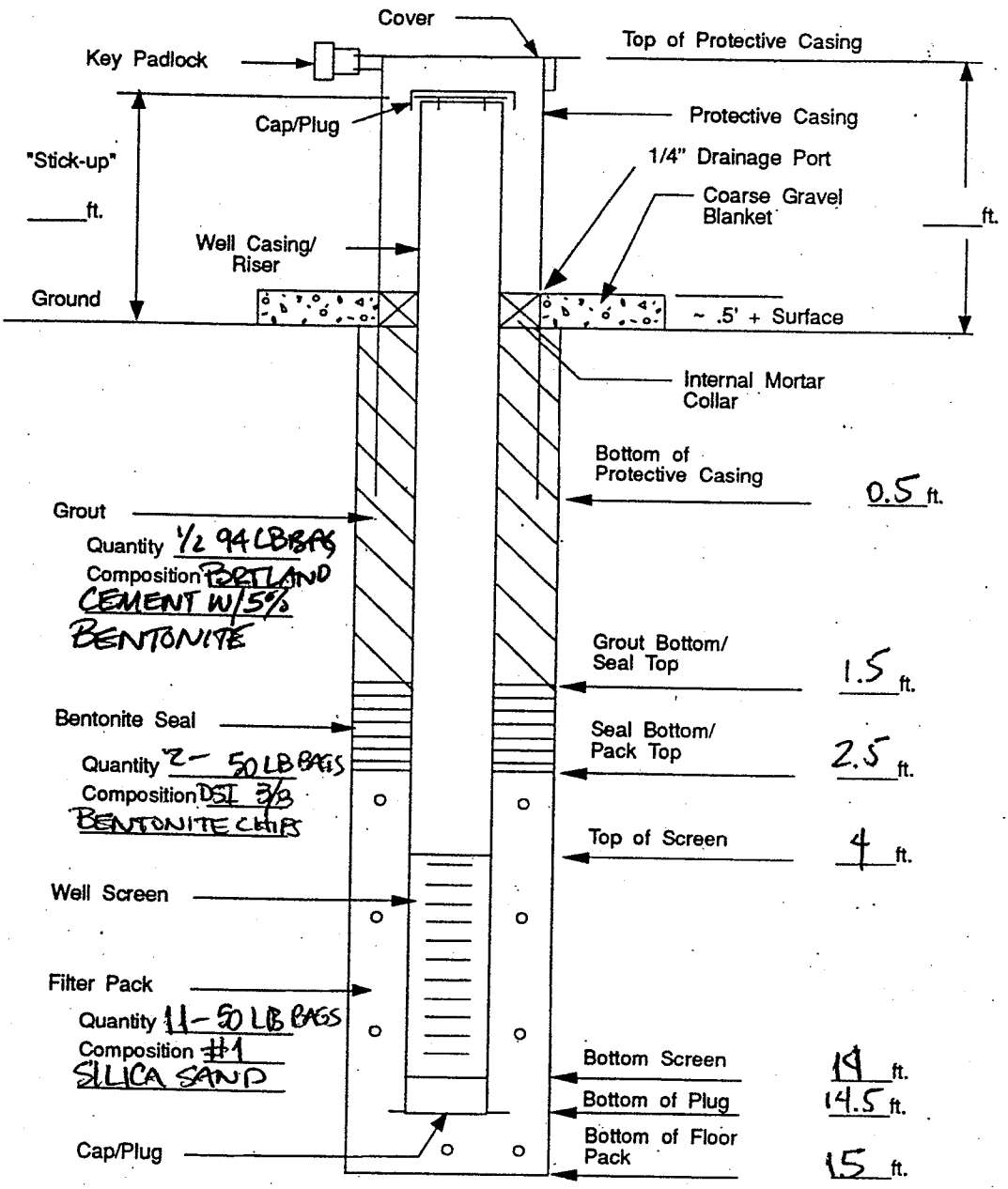
Well Construction Log:
Site ID Number: CEO CANAL
Well Number: MW3 NPS MW3
Today's Date: 8/27

WELL CONSTRUCTION



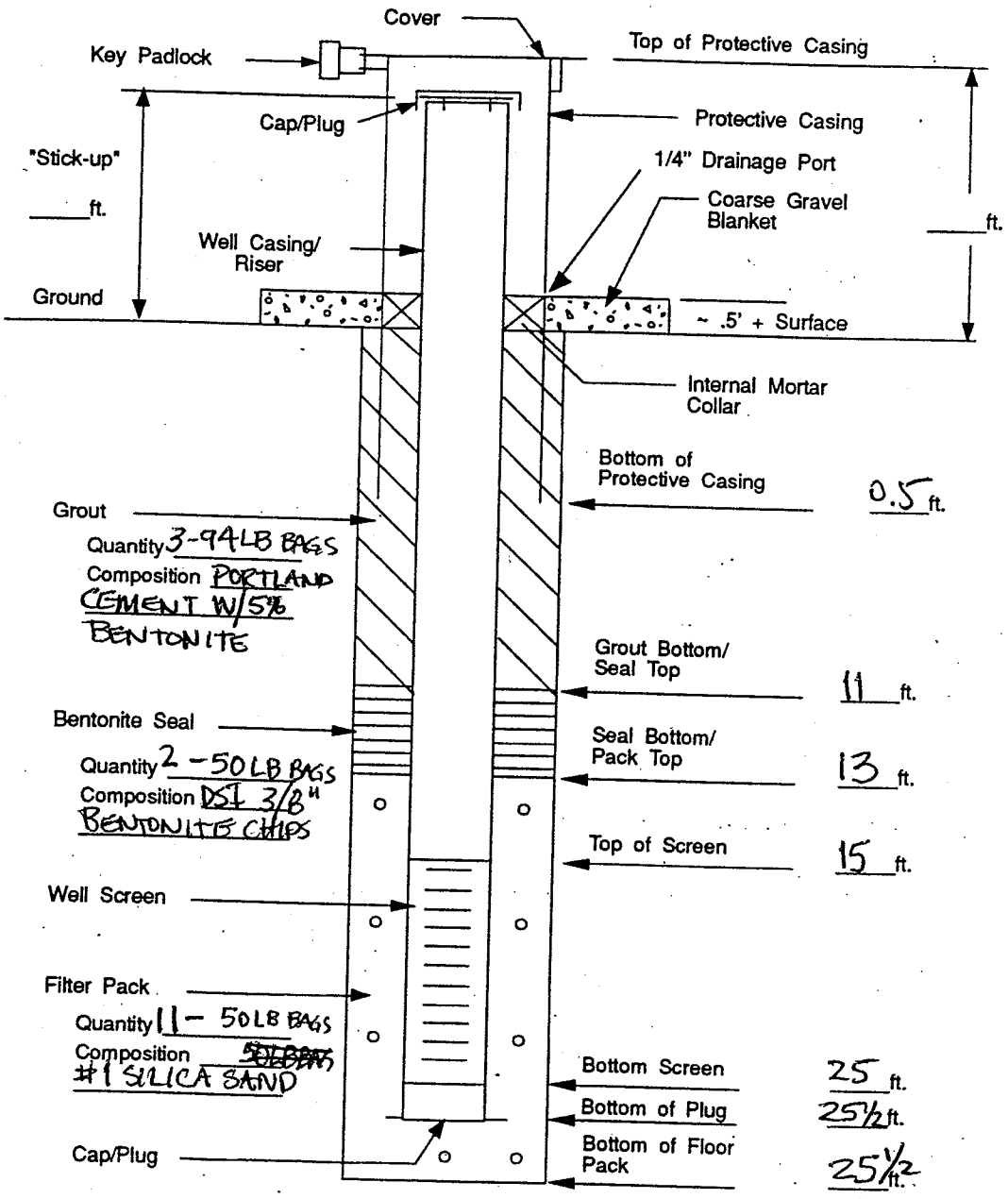
Well Construction Log: _____
Site ID Number: _____
Well Number: NPS MW4
Today's Date: 9/3/96

WELL CONSTRUCTION



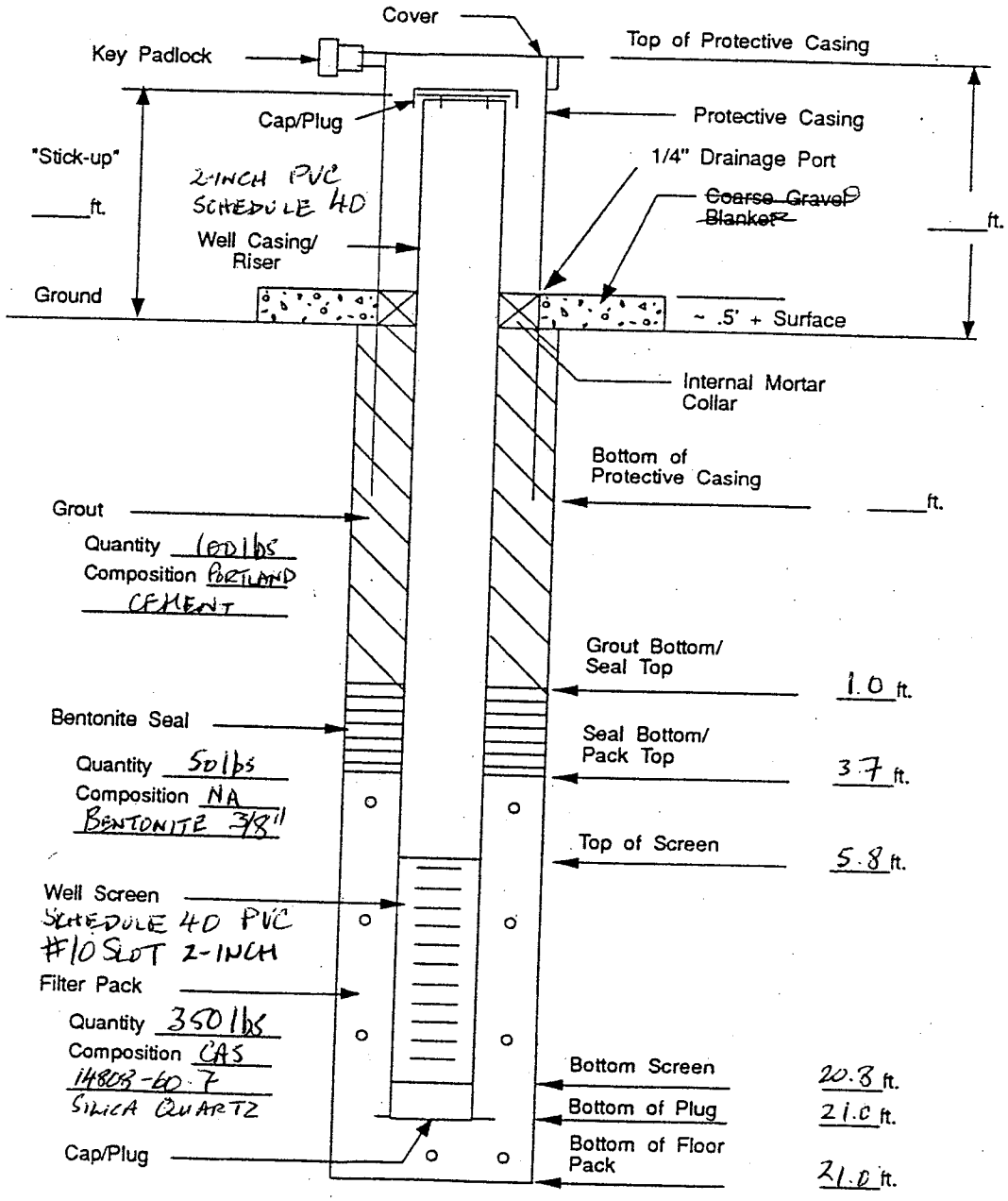
Well Construction Log:
Site ID Number: C&O CANAL
Well Number: NPSMW5
Today's Date: 8/23/96

WELL CONSTRUCTION



Well Construction Log: MW-10 2INCH PVC (NPS) Page:
Site ID Number: CHESAPEAKE AND OHIO NAT. HISTORIC PARK
Well Number: MW-10
Today's Date:

WELL CONSTRUCTION



(NPS)

Page:

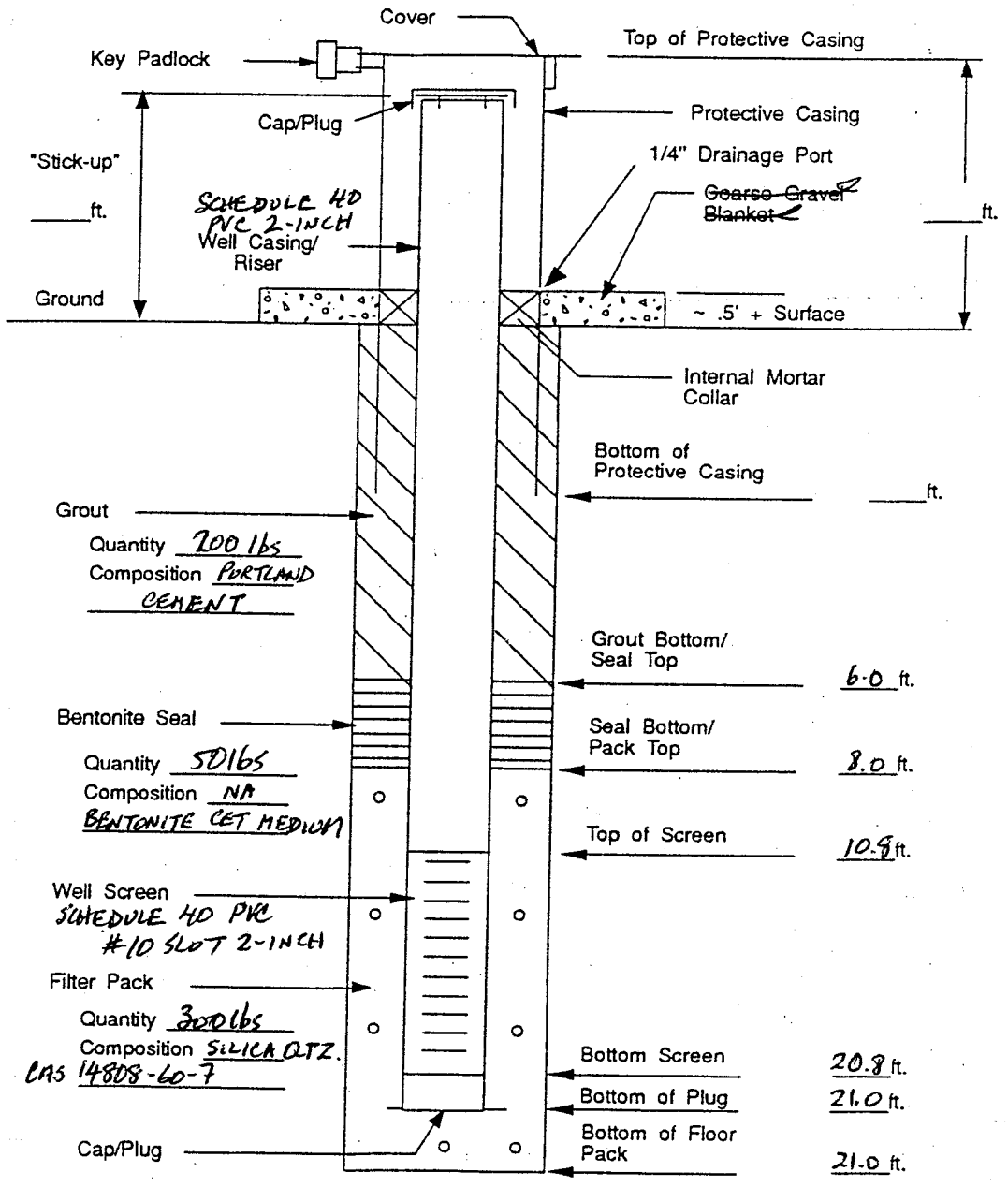
Well Construction Log: MW-11

Site ID Number: CHESAPEAKE AND OHIO NATIONAL HISTORIC PARK

Well Number: MW-11

Today's Date:

WELL CONSTRUCTION



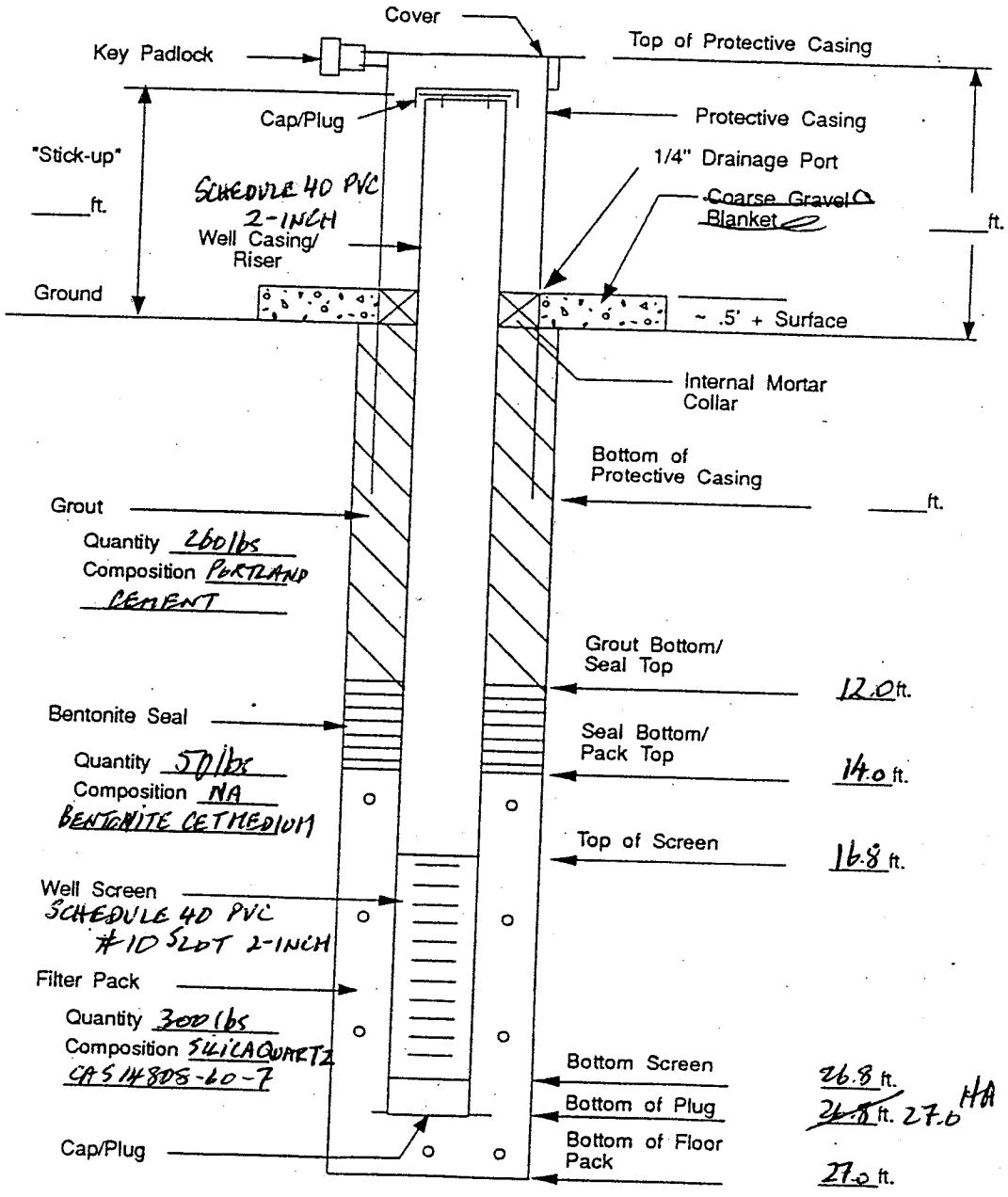
Well Construction Log: MW-12 (NPS) Page:

Site ID Number: CHESAPEAKE AND OHIO CANAL NATIONAL HISTORIC PARK

Well Number: MW-12

Today's Date:

WELL CONSTRUCTION



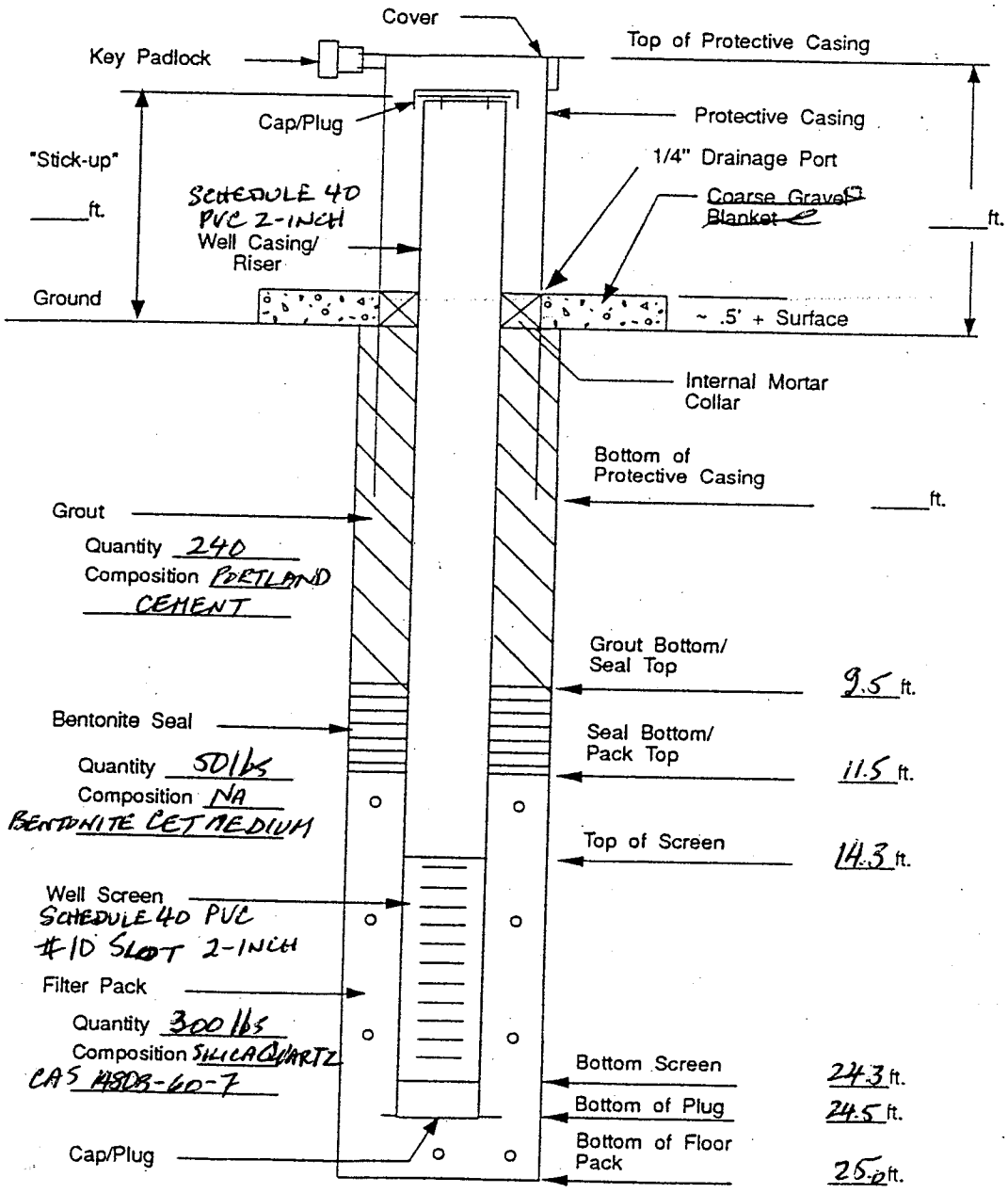
Well Construction Log: MW-13 (NPS) Page:

Site ID Number: CHESAPEAKE AND OHIO CANAL NATIONAL HISTORIC PARK

Well Number: MW-13

Today's Date:

WELL CONSTRUCTION



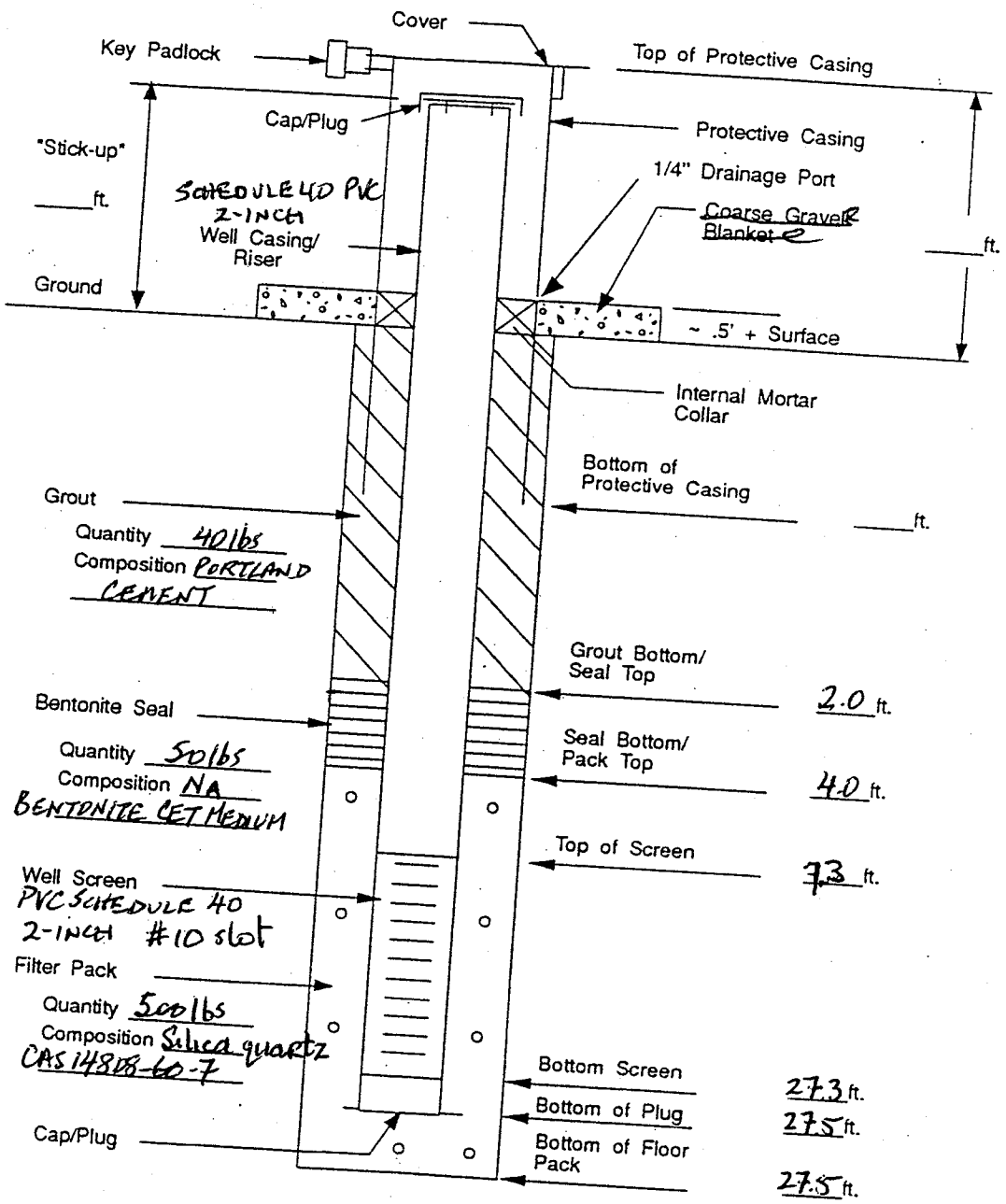
Well Construction Log: MW-14 (NPS) Page:

Site ID Number: CHESAPEAKE AND OHIO CANAL NATIONAL HISTORIC PARK.

Well Number: MW-14

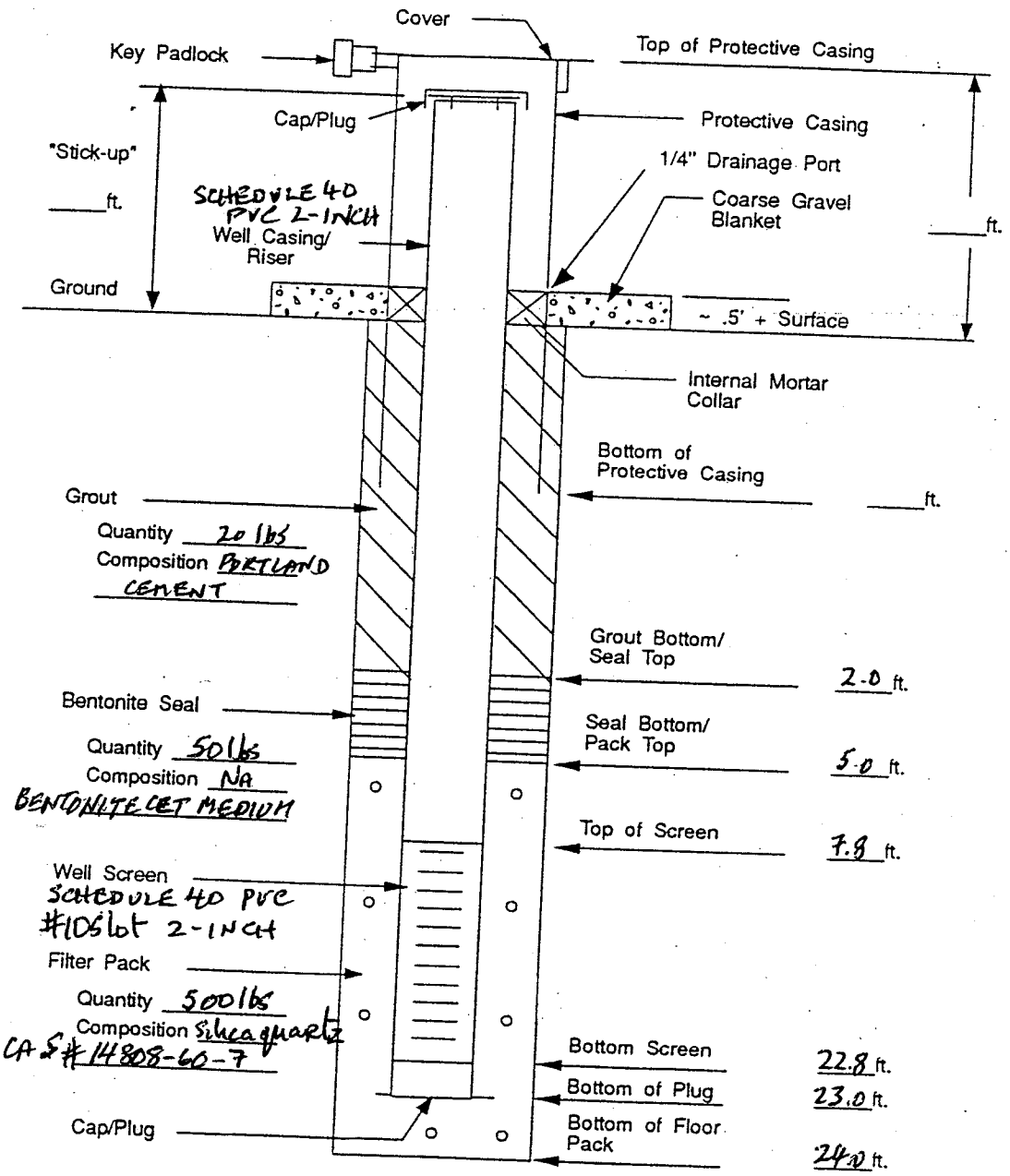
Today's Date:

WELL CONSTRUCTION



Well Construction Log: MW-15 (NPS) Page:
Site ID Number: CHESAPEAKE AND OHIO CANAL NAT. HISTORIC PARK
Well Number: MW - 15
Today's Date:

WELL CONSTRUCTION



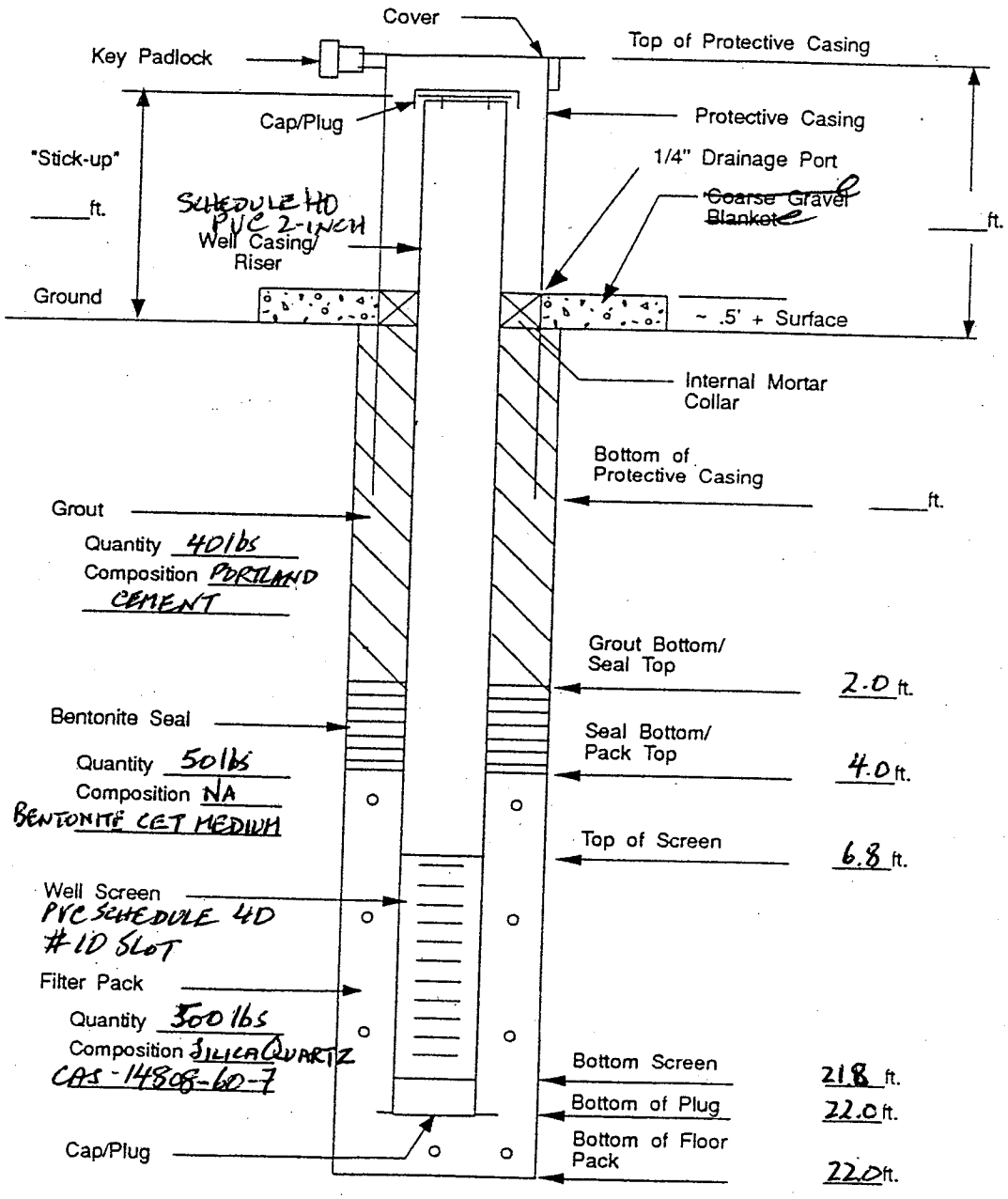
Well Construction Log: MW-16 (NPS) Page:

Site ID Number: CHESAPEAKE & OHIO CANAL NATIONAL HISTORIC PARK

Well Number: MW-16

Today's Date:

WELL CONSTRUCTION



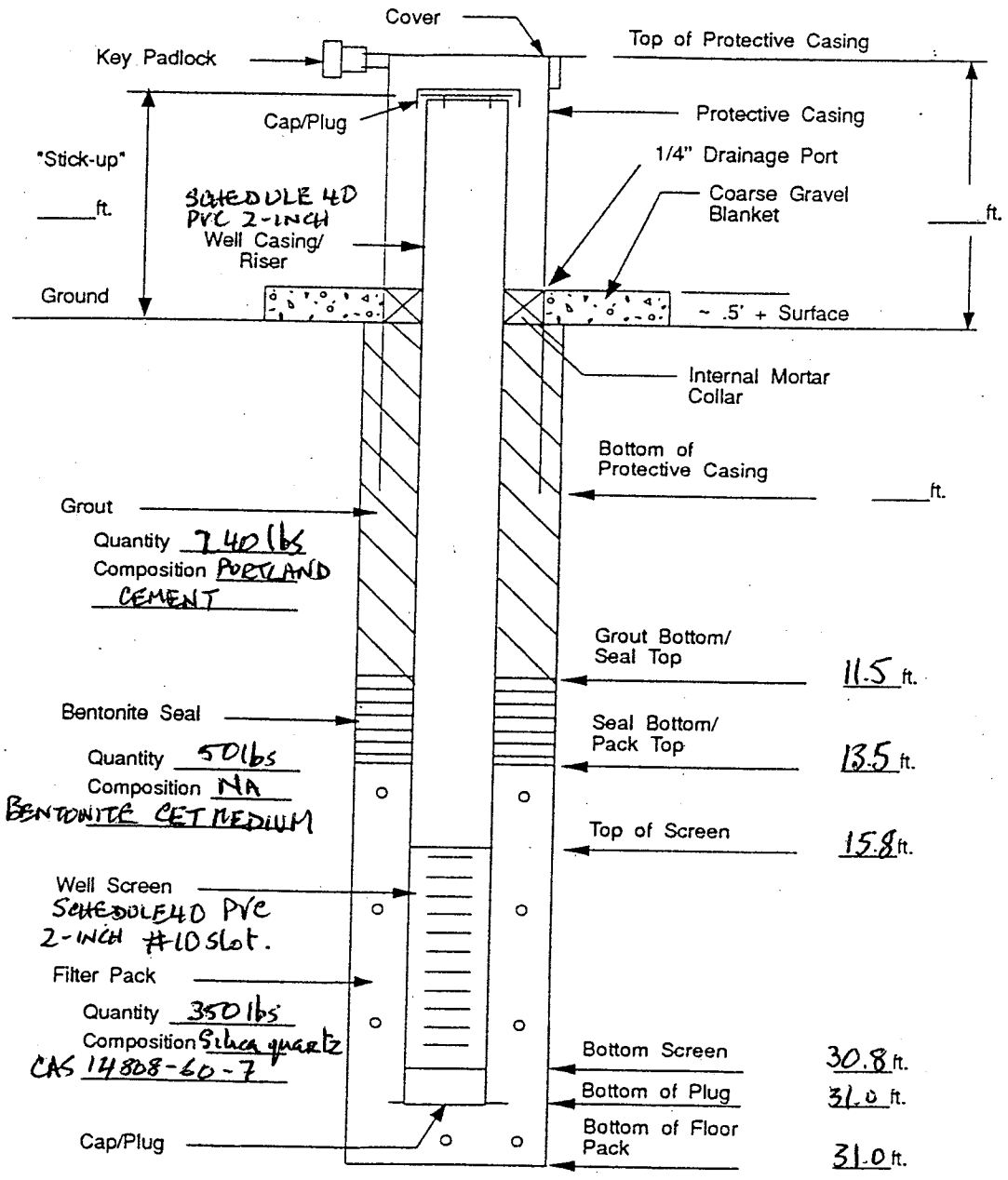
Well Construction Log: MW-17 (NPS) Page:

Site ID Number: CHESAPEAKE AND OHIO CANAL NATIONAL HISTORIC PARK

Well Number: MW-17.

Today's Date:

WELL CONSTRUCTION



ARCADIS

Appendix B

Historical LPH and Water Level Data

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-01	10/17/1997	247.20	17.63	18.01	0.38	229.52
	11/10/1997			14.61		232.59
	11/24/1997			15.65		231.55
	12/12/1997			16.88		230.32
	12/29/1997			15.76		231.44
	1/29/1998			12.33		234.87
	3/2/1998			13.30		233.90
	4/30/1998			14.27		232.93
	5/29/1998			15.50		231.70
	6/29/1998			15.50		231.70
	9/2/1998		17.17	17.18	0.01	230.02
	9/30/1998		17.82	18.15	0.01	229.06
	10/15/1998		18.10	18.21	0.33	229.28
	10/23/1998		18.24	18.30	0.11	229.00
	10/30/1998			18.31		228.89
	11/6/1998			18.47		228.73
	11/13/1998			18.47		228.73
	11/20/1998			18.55		228.65
	12/4/1998			18.79		228.41
	12/11/1998			18.83		228.37
	12/18/1998			18.96		228.24
	1/16/1999			18.84		228.36
	1/30/1999			17.51		229.69
	2/26/1999			17.29		229.91
	3/29/1999			15.91		231.29
	4/27/1999			16.17		231.03
	5/28/1999			17.19		230.01
	7/2/1999		18.02	18.18	0.16	229.16
	7/9/1999		17.96	18.00	0.04	229.23
	7/24/1999			18.46		228.74
	8/19/1999			18.65		228.55
	9/14/1999			17.57		229.63
	9/27/1999			16.87		230.33
	10/14/1999			15.15		232.05
	11/6/1999			16.40		230.80
	12/10/1999			16.95		230.25
	2/22/2000			15.57		231.63
	3/3/2000			15.33		231.87
	4/30/2000			14.71		232.49
	5/26/2000			15.92		231.28
	6/26/2000			15.17		232.03
	7/24/2000			15.34		231.86
	8/21/2000			15.67		231.53

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-01 (cont.)	8/30/2000			16.23		230.97
	9/8/2000			16.42		230.78
	9/14/2000			15.67		231.53
	9/21/2000			16.33		230.87
	9/29/2000			15.60		231.60
	10/6/2000			15.71		231.49
	10/13/2000			16.27		230.93
	10/20/2000			16.66		230.54
	10/26/2000			16.74		230.46
	11/3/2000			18.97		228.23
	11/10/2000			17.07		230.13
	11/17/2000			17.23		229.97
	11/28/2000			17.42		229.78
	12/1/2000			17.57		229.63
	12/8/2000			17.57		229.63
	12/15/2000			17.86		229.34
	12/29/2000			16.44		230.76
	1/19/2001			17.05		230.15
	1/26/2001			16.53		230.67
	2/2/2001			15.76		231.44
	2/9/2001			16.02		231.18
	3/9/2001			16.06		231.14
	4/9/2001			14.66		232.54
	5/18/2001			16.29		230.91
	6/21/2001			15.45		231.75
	7/11/2001			15.44		231.76
	8/14/2001			15.89		231.31
	9/12/2001			17.04		230.16
	10/12/2001			16.92		230.28
	11/30/2001		17.59	17.87	0.28	229.57
	12/13/2001			17.85		229.35
	1/28/2002		17.99	18.06	0.07	229.20
	2/18/2002		18.00	18.03	0.03	229.20
	3/22/2002			17.39		229.81
	4/26/2002			16.47		230.73
	5/9/2002			15.79		231.41
	6/7/2002			16.75		230.45
	7/19/2002			16.66		230.54
	8/19/2002			17.23		229.97
	9/6/2002			17.24		229.96
	10/10/2002			16.97		230.23
	11/8/2002			15.27		231.93
	12/17/2002			14.10		233.10

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-01 (cont.)	1/30/2003			15.46		231.74
	3/28/2003			13.78		233.42
	4/25/2003			13.85		233.35
	5/15/2003			14.42		232.78
	5/22/2003			12.78		234.42
	6/27/2003			13.89		233.31
	7/24/2003			14.97		232.23
	8/19/2003			14.86		232.34
	9/10/2003			14.25		232.95
	10/17/2003			14.74		232.46
	11/7/2003			15.03		232.17
	12/31/2003			14.30		232.90
	3/10/2004			14.65		232.55
	4/22/2004			13.93		233.27
	5/7/2004			13.83		233.37
	6/11/2004			13.42		233.78
	7/9/2004			15.27		231.93
	8/12/2004			16.39		230.81
	9/14/2004			16.72		230.48
	10/28/2004			15.33		231.87
	11/23/2004			15.04		232.16
	12/20/2004			14.33		232.87
	2/22/2005			15.03		232.17
	3/31/2005			12.47		234.73
	5/17/2005			15.38		231.82
	8/19/2005			16.31		230.89
	11/16/2005			15.38		231.82
	2/17/2006			13.95		233.25
	5/23/2006			16.48		230.72
	6/27/2006			15.10		232.10
	8/16/2006			16.42		230.78
	12/4/2006			16.85		230.35
	12/27/2006			15.22		231.98
	2/26/2007			15.13		232.07
	5/21/2007			15.73		231.47
	8/7/2007			17.49		229.71
	12/3/2007			17.09		230.11
	2/25/2008			15.60		231.60
	5/19/2008			13.39		233.81
	2/25/2009			16.45		230.75
MW-02	1/17/1995	247.55	14.18	14.42	0.24	233.34
	1/23/1995		13.82	13.89	0.07	233.72
	2/20/1995		15.41	15.43	0.02	232.14

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-02 (cont.)	3/20/1995		14.69	14.84	0.15	232.84
	4/28/1995		14.52	14.52	0.00	233.03
	7/21/1995		16.90	17.02	0.12	230.63
	8/28/1995		16.93	16.93	0.00	230.62
	10/25/1995		15.10	15.28	0.18	232.43
	1/31/1996		11.01	11.01	0.00	236.54
	2/23/1996		13.78	13.79	0.01	233.77
	3/15/1996		13.90	13.91	0.01	233.65
	3/29/1996		13.55	13.55	0.00	234.00
	4/26/1996		13.90	13.90	0.00	233.65
	5/29/1996		13.59	13.66	0.07	233.95
	7/2/1996		13.25	13.27	0.02	234.30
	7/29/1996		12.73	12.73	0.00	234.82
	8/30/1996		14.84	14.93	0.09	232.70
	11/1/1996		14.10	14.10	0.00	233.45
	12/2/1996		11.47	11.47	0.00	236.08
	1/3/1997		14.04	14.05	0.01	233.51
	2/7/1997		15.23	15.73	0.50	232.26
	3/10/1997		13.41	13.98	0.57	234.07
	5/21/1997		16.31	18.34	2.03	230.98
	7/24/1997		18.32	18.53	0.21	229.20
	8/12/1997		18.41	18.52	0.11	229.13
	8/26/1997		18.63	18.76	0.13	228.90
	9/12/1997		16.22	16.23	0.01	231.33
	9/19/1997		16.21	16.23	0.02	231.34
	9/25/1997		17.72	17.73	0.01	229.83
	10/3/1997		17.69	17.71	0.02	229.86
	10/17/1997			17.48		230.07
	10/24/1997		18.35	18.43	0.08	229.19
	12/12/1997			15.83		231.72
	12/29/1997			15.47		232.08
	1/29/1998		10.23	10.25	0.02	237.32
	3/2/1998		12.71	12.83	0.12	234.82
	4/30/1998		14.10	14.16	0.06	233.44
	5/29/1998		15.05	15.13	0.08	232.49
	6/29/1998		15.54	15.60	0.06	232.00
	9/2/1998		17.64	19.11	1.47	229.72
	9/30/1998		18.47	19.53	1.06	228.94
	10/15/1998		18.19	18.49	0.30	229.32
	10/23/1998		18.15	18.24	0.09	229.39
	10/30/1998			17.25		230.30
	11/6/1998			18.43		229.12
	11/13/1998			18.40		229.15

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-02 (cont.)	11/20/1998			18.39		229.16
	12/4/1998			18.64		228.91
	12/11/1998			17.81		229.74
	12/18/1998			18.83		228.72
	1/16/1999			18.74		228.81
	1/30/1999			17.28		230.27
	2/26/1999			17.82		229.73
	3/29/1999			15.40		232.15
	4/27/1999			15.73		231.82
	5/28/1999		17.10	17.66	0.56	230.38
	7/2/1999		17.89	18.77	0.88	229.55
	7/9/1999		17.92	18.06	0.14	229.61
	7/24/1999		18.36	18.45	0.09	229.18
	8/19/1999			18.67		228.88
	9/14/1999			17.30		230.25
	9/27/1999			16.62		230.93
	10/14/1999			14.64		232.91
	11/6/1999		16.19	16.41	0.22	231.33
	12/10/1999		16.68	18.20	1.52	230.67
	2/22/2000		14.83	15.27	0.44	232.66
	3/3/2000		14.83	15.01	0.18	232.70
	4/30/2000		14.16	14.26	0.10	233.38
	5/26/2000		15.55	15.58	0.03	232.00
	6/26/2000		14.73	14.82	0.09	232.81
	7/24/2000		15.52	15.73	0.21	232.00
	8/21/2000		15.18	15.20	0.02	232.37
	8/30/2000		15.82	15.86	0.04	231.72
	9/8/2000		16.12	16.13	0.01	231.43
	9/14/2000		16.41	16.54	0.13	231.12
	9/21/2000			15.97		231.58
	9/29/2000			14.96		232.59
	10/6/2000			15.17		232.38
	10/13/2000			15.88		231.67
	10/20/2000		16.47	16.50	0.03	231.08
	10/26/2000		16.56	16.62	0.06	230.98
	11/3/2000		16.90	17.09	0.19	230.63
	11/10/2000		16.95	17.19	0.24	230.57
	11/17/2000		17.24	17.30	0.06	230.30
	11/28/2000		17.35	17.80	0.45	230.14
	12/1/2000		17.50	17.61	0.11	230.04
	12/8/2000		17.50	17.75	0.25	230.02
	12/15/2000		17.62	17.85	0.23	229.90
	12/29/2000			16.36		231.19

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-02 (cont.)	1/19/2001		17.00	17.71	0.71	230.46
	1/26/2001		16.42	16.49	0.07	231.12
	2/2/2001		14.93	14.95	0.02	232.62
	2/9/2001		15.21	15.24	0.03	232.34
	3/9/2001		15.72	15.84	0.12	231.81
	4/9/2001		14.11	14.20	0.09	233.43
	5/18/2001		15.99	16.25	0.26	231.53
	6/21/2001		14.97	15.05	0.08	232.57
	7/11/2001			15.02		232.53
	8/14/2001		15.24	15.35	0.11	232.30
	9/12/2001		16.85	18.18	1.33	230.53
	10/12/2001		16.73	17.73	1.00	230.69
	11/30/2001		17.74	18.94	1.20	229.65
	12/13/2001		17.83	18.02	0.19	229.70
	1/28/2002		17.95	18.35	0.40	229.55
	2/18/2002		17.94	18.13	0.19	229.59
	3/22/2002			17.22		230.33
	4/26/2002		16.44	16.61	0.17	231.09
	5/9/2002			15.41		232.14
	6/7/2002		16.75	17.35	0.60	230.72
	7/19/2002		16.61	17.84	1.23	230.78
	8/19/2002		17.23	18.20	0.97	230.19
	9/6/2002		17.45	17.94	0.49	230.04
	10/10/2002		16.97	17.80	0.83	230.47
	11/8/2002			14.04		233.51
	12/17/2002			10.28		237.27
	1/30/2003			14.90		232.65
	3/28/2003			11.24		236.31
	4/25/2003			12.58		234.97
	5/15/2003			13.61		233.94
	5/22/2003			9.00		238.55
	6/27/2003		12.95	12.97	0.02	234.60
	7/24/2003			14.40		233.15
	8/19/2003			14.24		233.31
	9/10/2003			13.61		233.94
	10/17/2003		14.08	14.11	0.03	233.47
	11/7/2003			14.47		233.08
	12/31/2003			13.34		234.21
	3/10/2004			13.84		233.71
	4/22/2004			12.72		234.83
	5/7/2004			12.80		234.75
	6/11/2004			12.04		235.51
	7/9/2004			14.85		232.70

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-02 (cont.)	7/15/2004		15.05	15.07	0.02	232.50
	7/29/2004			12.20		235.35
	8/12/2004		16.22	16.34	0.12	231.31
	8/29/2004		16.32	16.43	0.11	231.22
	9/14/2004		16.61	16.71	0.10	230.93
	9/24/2004		15.37	15.69	0.32	232.14
	10/22/2004		14.66	14.99	0.33	232.85
	10/28/2004		14.99	15.21	0.22	232.53
	11/10/2004		15.11	16.11	1.00	232.31
	11/23/2004		14.63	15.37	0.74	232.82
	12/6/2004		13.95	14.76	0.81	233.49
	12/20/2004		13.94	14.32	0.38	233.56
	12/27/2004		14.09	14.29	0.20	233.43
	1/28/2005		14.54	16.10	1.56	232.81
	2/22/2005		14.63	16.43	1.80	232.69
	3/31/2005		10.32	14.77	4.45	236.65
	4/25/2005		14.15	14.17	0.02	233.40
	5/17/2005		15.15	15.59	0.44	232.34
	6/30/2005		15.80	16.18	0.38	231.70
	7/22/2005		14.30	15.25	0.95	233.13
	8/19/2005		15.83	18.82	2.99	231.33
	9/7/2005		16.08	18.31	2.23	231.18
	10/18/2005		14.68	15.62	0.94	232.75
	11/16/2005		15.11	15.91	0.80	232.34
	12/20/2005		13.46	15.38	1.92	233.84
	1/12/2006		13.80	15.54	1.74	233.52
	2/17/2006		13.33	15.88	2.55	233.89
	3/29/2006		15.34	18.90	3.56	231.75
	4/21/2006		15.98	17.96	1.98	231.31
	5/23/2006		16.15	18.90	2.75	231.04
	6/27/2006		14.18	15.88	1.70	233.15
	7/7/2006		13.40	13.47	0.07	234.14
	7/26/2006		15.14	15.34	0.20	232.38
	9/11/2006		15.45	16.05	0.60	232.02
	10/26/2006			16.06		231.49
	11/13/2006		14.60	15.27	0.67	232.86
	7/10/2008			16.99		230.56
	8/25/2008		18.04	18.05	0.01	229.51
	9/5/2008		18.13	18.13	0.00	229.42
	9/24/2008		17.08	17.10	0.02	230.47
	10/10/2008		17.56	17.58	0.02	229.99
	10/23/2008		18.07	18.14	0.07	229.47
	11/24/2008		17.67	17.85	0.18	229.86

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-02 (cont.)	12/9/2008		17.70	17.78	0.08	229.84
	12/23/2008			15.83		231.72
	1/13/2009		15.54	15.55	0.01	232.01
	2/16/2009		17.35	17.38	0.03	230.20
	2/25/2009		17.59	17.61	0.02	229.96
	3/5/2009		17.75	17.85	0.10	229.79
	3/18/2009		17.95	18.35	0.40	229.55
	3/27/2009		18.06	18.20	0.14	229.47
	4/17/2009		16.97	17.99	1.02	230.45
	4/23/2009		14.68	15.90	1.22	232.71
	5/4/2009		16.12	16.24	0.12	231.41
	5/22/2009		15.61	15.62	0.01	231.94
	6/5/2009		15.09	15.10	0.01	232.46
	6/24/2009		15.53	15.55	0.02	232.02
	7/14/2009		17.18	17.19	0.01	230.37
	7/22/2009		17.33	17.43	0.10	230.21
MW-03	3/10/1997	248.38		12.28		236.10
	3/2/1998			13.59		234.79
	11/6/1999			16.81		231.57
	4/30/2000			14.76		233.62
	5/18/2001			16.26		232.12
	5/9/2002			15.96		232.42
	5/15/2003			14.66		233.72
	5/7/2004			14.21		234.17
	3/31/2005			13.10		235.28
	5/17/2005			15.76		232.62
	8/19/2005			16.69		231.69
	11/16/2005			15.85		232.53
	5/23/2006			17.12		231.26
	8/16/2006			16.67		231.71
	12/4/2006			15.16		233.22
	2/26/2007			16.08		232.30
	5/21/2007			16.16		232.22
	8/7/2007			18.26		230.12
	12/3/2007			17.95		230.43
	2/25/2008			16.22		232.16
	5/19/2008			14.03		234.35
	2/25/2009			17.12		231.26
MW-04	11/29/1995	247.63	14.49	14.90	0.41	
	12/8/1995		14.88	15.47	0.59	
	12/21/1995		13.23	13.50	0.27	
	1/18/1996		13.79	13.91	0.12	
	1/31/1996		10.65	10.66	0.01	

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-04 (cont.)	2/9/1996			12.43		
	2/23/1996			12.06		
	3/15/1996			13.15		
	3/29/1996			12.80		
	4/26/1996			13.10		
	5/29/1996			12.64		
	7/2/1996		13.35	13.37	0.02	
	7/29/1996		12.83	12.87	0.04	
	8/30/1996		14.10	14.30	0.20	
	10/1/1996			12.57		
	11/1/1996		13.42	13.47	0.05	
	12/2/1996		10.78	10.82	0.04	
	1/3/1997		13.16	13.17	0.01	
	2/7/1997		14.76	14.90	0.14	
	3/10/1997		12.15	12.17	0.02	
	4/14/1997		14.60	14.76	0.16	
	5/21/1997		15.76	16.15	0.39	
	6/26/1997		16.55	17.04	0.49	
	7/24/1997		17.25	17.81	0.56	
	8/12/1997		17.45	17.79	0.34	
	8/26/1997		17.70	17.80	0.10	
	9/12/1997		16.14	16.20	0.06	
	9/19/1997			16.15		
	9/25/1997		16.68	16.69	0.01	
	10/3/1997		16.70	16.71	0.01	
	10/10/1997		16.90	16.92	0.02	
	10/17/1997		17.11	17.12	0.01	
	10/24/1997		17.08	17.10	0.02	
	11/10/1997			13.46		
	11/24/1997			14.43		
	12/12/1997			15.38		
	12/29/1997			14.44		
	1/29/1998			7.52		
	3/2/1998			11.30		
	4/30/1998			13.01		
	5/29/1998			14.35		
	6/29/1998			14.35		
	9/2/1998		16.67	16.68	0.01	
	9/30/1998		17.48	17.50	0.02	
	10/15/1998		17.73	17.74	0.01	
	10/23/1998		17.88	17.89	0.01	
	10/30/1998			17.96		
	11/6/1998			18.13		

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Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-04 (cont.)	11/13/1998			18.13		
	11/20/1998		18.21	18.25	0.04	
	12/4/1998			18.45		
	12/11/1998			18.53		
	12/18/1998			18.65		
	1/16/1999			16.52		
	1/30/1999			16.28		
	2/26/1999			16.54		
	3/29/1999			14.98		
	4/27/1999			15.40		
	5/28/1999			16.68		
	7/2/1999			17.61		
	7/9/1999			17.70		
	7/24/1999			17.99		
	8/19/1999			18.36		
	9/14/1999			16.97		
	9/27/1999			16.29		
	10/14/1999			13.92		
	11/6/1999			15.85		
	12/10/1999			16.55		
	2/22/2000			16.95		
	3/3/2000			14.39		
	4/30/2000			14.71		
	5/26/2000			14.52		
	6/26/2000			14.33		
	7/24/2000			16.03		
	8/21/2000			14.95		
	8/30/2000			15.59		
	9/8/2000			15.83		
	9/14/2000			16.17		
	9/21/2000			14.87		
	9/29/2000			14.20		
	10/6/2000			14.98		
	10/13/2000			15.62		
	10/20/2000			16.07		
	10/26/2000			16.18		
	11/3/2000			14.64		
	11/10/2000			16.58		
	11/17/2000			16.73		
	11/28/2000			16.94		
	12/1/2000			17.00		
	12/8/2000			17.04		
	12/15/2000			16.72		

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-04 (cont.)	12/29/2000			15.94		
	1/19/2001			16.63		
	1/26/2001			15.68		
	2/2/2001			14.21		
	2/9/2001			15.07		
	3/9/2001			15.48		
	4/9/2001			13.80		
	5/18/2001			15.71		
	6/21/2001			14.74		
	7/11/2001			14.52		
	8/14/2001			13.97		
	9/12/2001			16.61		
	10/12/2001			16.43		
	11/30/2001			17.22		
	12/13/2001			17.44		
	1/28/2002			16.97		
	2/18/2002			17.53		
	3/22/2002			14.73		
	4/26/2002			15.76		
	5/9/2002			15.17		
	6/7/2002			16.27		
	7/19/2002			16.08		
	8/19/2002			16.77		
	9/6/2002			16.77		
	10/10/2002			16.49		
	11/8/2002			13.20		
	12/17/2002			11.57		
	1/30/2003			14.87		
	3/28/2003			12.45		
	4/25/2003			12.58		
	5/15/2003			13.30		
	5/22/2003			10.14		
	6/27/2003			12.74		
	7/24/2003			12.85		
	8/19/2003			13.11		
	9/10/2003			13.33		
	10/17/2003			13.22		
	11/7/2003			13.69		
	12/31/2003			13.27		
	3/10/2004			12.83		
	4/22/2004			13.00		
	5/7/2004			12.62		
	6/11/2004			12.13		

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-04 (cont.)	7/9/2004			13.64		
	8/12/2004			12.52		
	9/14/2004			16.40		
	10/28/2004			14.35		
	11/23/2004			14.07		
	12/20/2004			13.20		
	12/27/2004			11.63		
	1/28/2005			14.38		
	2/22/2005			14.38		
	3/31/2005			6.90		
	5/17/2005			14.92		
	8/19/2005			15.95		
	11/16/2005			14.83		
	2/17/2006			12.39		
MW-04R	6/27/2007	244.68	14.30	14.66	0.36	230.33
	7/10/2007		14.58	15.60	1.02	229.97
	7/23/2007		14.75	15.44	0.69	229.84
	8/7/2007		14.99	15.63	0.64	229.61
	8/15/2007		15.12	16.04	0.92	229.44
	8/28/2007		14.33	14.83	0.50	230.29
	9/12/2007		14.81	14.90	0.09	229.86
	9/25/2007		9.80	9.81	0.01	234.88
	10/10/2007		15.45	15.78	0.33	229.19
	10/19/2007		15.63	15.90	0.27	229.01
	10/29/2007		15.24	15.52	0.28	229.40
	11/15/2007		15.10	15.15	0.05	229.57
	11/20/2007		14.65	14.80	0.15	230.01
	12/3/2007		14.74	14.75	0.01	229.94
	12/12/2007		14.49	14.50	0.01	230.19
	12/28/2007		14.06	14.09	0.03	230.62
	1/9/2008		13.73	14.12	0.39	230.90
	2/4/2008		13.06	13.80	0.74	231.52
	2/26/2008		12.68	13.22	0.54	231.93
	3/14/2008		11.90	12.28	0.38	232.73
	3/25/2008		12.29	12.60	0.31	232.35
	4/7/2008		12.40	13.31	0.91	232.16
	4/28/2008		10.95	11.80	0.85	233.62
	5/19/2008		10.35	10.57	0.22	234.30
	6/12/2008		12.12	12.28	0.16	232.54
	6/30/2008		12.94	13.34	0.40	231.69
	7/10/2008		13.25	13.40	0.15	231.41
	7/24/2008		13.18	13.84	0.66	231.41
	8/8/2008		13.80	13.96	0.16	230.86

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-04R (cont.)	8/25/2008		14.32	14.67	0.35	230.31
	9/5/2008		14.34	14.76	0.42	230.29
	9/24/2008		13.41	13.80	0.39	231.22
	10/10/2008		13.90	14.05	0.15	230.76
	10/23/2008		14.44	14.63	0.19	230.22
	11/6/2008		14.20	14.68	0.48	230.42
	11/24/2008		14.16	14.94	0.78	230.42
	12/9/2008		14.16	14.31	0.15	230.50
	12/23/2008		12.82	13.55	0.73	231.77
	1/13/2009		12.30	12.74	0.44	232.32
	1/30/2009			13.25		231.43
	2/16/2009			13.71		230.97
	2/25/2009		13.89	14.11	0.22	230.76
	3/5/2009		14.01	14.52	0.51	230.60
	3/18/2009		14.44	14.69	0.25	230.21
	3/27/2009		14.37	14.69	0.32	230.27
	4/17/2009		13.38	13.74	0.36	231.25
	4/23/2009		11.94	12.76	0.82	232.63
	5/4/2009		12.40	12.44	0.04	232.27
	5/22/2009		12.00	12.20	0.20	232.65
	6/5/2009		11.78	11.81	0.03	232.90
	6/24/2009		12.08	12.25	0.17	232.58
	7/14/2009			13.50		231.18
	7/22/2009			13.70		230.98
MW-05	3/10/1997	245.37		11.60		233.77
	3/2/1998			10.95		234.42
	11/6/1999		14.47	14.49	0.02	230.90
	4/30/2000			12.50		232.87
	5/18/2001			14.15		231.22
	5/9/2002			13.55		231.82
	5/15/2003			12.18		233.19
	5/7/2004			11.75		233.62
	2/22/2005			12.79		232.58
	3/31/2005			10.17		235.20
	5/17/2005			13.31		232.06
	8/19/2005			14.43		230.94
	11/16/2005			13.42		231.95
	5/23/2006			14.63		230.74
	8/16/2006			14.53		230.84
	12/4/2006			12.77		232.60
	2/26/2007			13.14		232.23
	5/21/2007			13.78		231.59
	8/7/2007			15.67		229.70

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-05 (cont.)	12/3/2007			15.35		230.02
	2/25/2008			13.37		232.00
	5/19/2008			10.20		235.17
	2/25/2009			14.54		230.83
MW-06R	4/22/2004	233.63		4.41		229.22
	5/7/2004			4.61		229.02
	6/11/2004			4.18		229.45
	7/9/2004			5.80		227.83
	8/12/2004			7.45		226.18
	9/14/2004			8.49		225.14
	10/28/2004			5.76		227.87
	11/23/2004			5.40		228.23
	12/20/2004			4.93		228.70
	2/22/2005			5.18		228.45
	3/31/2005			2.97		230.66
	5/17/2005			6.03		227.60
	8/19/2005			7.71		225.92
	11/16/2005			6.32		227.31
	5/23/2006			7.52		226.11
	8/16/2006			7.68		225.95
	11/13/2006		5.74	5.75	0.01	227.89
	12/4/2006			5.88		227.75
	5/21/2007			6.13		227.50
	8/7/2007			8.72		224.91
	12/3/2007			8.11		225.52
	2/25/2008			5.82		227.81
	5/19/2008			4.67		228.96
	2/25/2009			6.14		227.49
MW-08	3/10/1997	235.51		9.92		225.59
	3/2/1998			9.25		226.26
	11/6/1999			13.48		222.03
	4/30/2000			10.36		225.15
	5/18/2001			12.72		222.79
	5/9/2002			11.85		223.66
	5/15/2003			13.38		222.13
	5/7/2004			10.27		225.24
	5/17/2005			21.32		214.19
	12/4/2006			11.36		224.15
	2/26/2007			11.47		224.04
	5/21/2007			12.11		223.40
	8/7/2007			15.09		220.42
	12/3/2007			14.33		221.18
	2/25/2008			12.15		223.36

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Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-08 (cont.)	5/19/2008			9.54		225.97
	2/25/2009			12.71		222.80
MW-09	3/10/1997	237.54		12.74		224.80
	3/2/1998			12.00		225.54
	11/6/1999			13.64		223.90
	4/30/2000			10.36		227.18
	5/18/2001			14.25		223.29
	5/9/2002			13.38		224.16
	5/15/2003			10.47		227.07
	5/7/2004			12.20		225.34
	5/17/2005			13.15		224.39
	12/4/2006			12.77		224.77
	2/26/2007			12.71		224.83
	5/21/2007			13.12		224.42
	8/7/2007			14.82		222.72
	12/3/2007			14.29		223.25
	2/25/2008			12.85		224.69
	5/19/2008			11.78		225.76
	2/25/2009			13.19		224.35
MW-20	6/27/2007	236.27		13.43		222.84
	7/10/2007			13.69		222.58
	7/23/2007			12.34		223.93
	8/7/2007			12.65		223.62
	8/15/2007			12.76		223.51
	8/28/2007			11.32		224.95
	9/12/2007			12.23		224.04
	9/25/2007			12.63		223.64
	10/10/2007			10.10		226.17
	10/19/2007			10.21		226.06
	10/29/2007			10.12		226.15
	12/3/2007			9.59		226.68
	2/25/2008			8.12		228.15
	5/19/2008			16.15		220.12
	2/25/2009			8.77		227.50
MW-21	6/27/2007	244.26		13.43		230.83
	7/10/2007			13.69		230.57
	7/23/2007			12.34		231.92
	8/7/2007			12.65		231.61
	8/15/2007			12.76		231.50
	8/28/2007			11.32		232.94
	9/12/2007			12.23		232.03
	9/25/2007			12.63		231.63
	10/10/2007			10.10		234.16

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-21 (cont.)	10/19/2007			10.21		234.05
	10/29/2007			10.12		234.14
	12/3/2007			9.59		234.67
	2/25/2008			11.90		232.36
	5/19/2008			11.37		232.89
	2/25/2009			12.92		231.34
MW-22	6/27/2007	245.65		14.55		231.10
	7/10/2007			14.89		230.76
	7/23/2007			15.02		230.63
	8/7/2007			15.32		230.33
	8/15/2007			14.25		231.40
	8/28/2007			14.66		230.99
	9/12/2007			15.04		230.61
	9/25/2007			15.33		230.32
	10/10/2007			12.79		232.86
	10/19/2007			12.95		232.70
	10/29/2007			11.52		234.13
	11/20/2007			11.74		233.91
	12/3/2007			12.10		233.55
	12/12/2007			12.31		233.34
	2/25/2008			13.19		232.46
	5/19/2008			10.65		235.00
	2/25/2009			14.28		231.37
MW-23	10/10/2007	244.57		15.70		228.87
	10/19/2007			15.89		228.68
	10/29/2007			15.58		228.99
	11/20/2007			15.01		229.56
	12/3/2007			15.04		229.53
	1/9/2008			13.46		231.11
	2/4/2008			13.15		231.42
	2/25/2008			12.65		231.92
	2/26/2008			12.50		232.07
	3/14/2008			11.50		233.07
	3/25/2008			11.92		232.65
	4/7/2008			12.51		232.06
	5/19/2008			9.73		234.84
	6/12/2008			11.81		232.76
	6/30/2008			12.60		231.97
	7/10/2008			12.85		231.72
	7/24/2008			13.10		231.47
	8/8/2008			14.06		230.51
	8/25/2008			13.76		230.81
	9/5/2008			13.84		230.73

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-23 (cont.)	9/24/2008		13.11	13.13	0.02	231.46
	10/10/2008		13.44	13.49	0.05	231.12
	10/23/2008		13.76	13.80	0.04	230.80
	1/30/2009		12.80	13.01	0.21	231.74
	2/25/2009		13.60	13.66	0.06	230.96
	3/5/2009		13.70	13.75	0.05	230.86
	4/17/2009			12.99		231.58
	4/23/2009		10.54	10.56	0.02	234.03
	5/22/2009			11.75		232.82
	6/24/2009			11.84		232.73
	7/14/2009			13.20		231.37
	7/22/2009		13.49	13.50	0.01	231.08
MW-24	6/27/2007	244.50		14.22		230.28
	7/10/2007			14.20		230.30
	7/23/2007			13.70		230.80
	8/7/2007			14.14		230.36
	8/15/2007			14.14		230.36
	8/28/2007			9.70		234.80
	9/12/2007			13.80		230.70
	9/25/2007			14.21		230.29
	10/10/2007			14.14		230.36
	10/19/2007			14.14		230.36
	11/20/2007			14.14		230.36
	12/3/2007			14.15		230.35
	12/12/2007			14.12		230.38
	12/28/2007			13.78		230.72
	2/25/2008			8.70		235.80
	5/19/2008			1.64		242.86
	2/25/2009			12.88		231.62
MW-25	6/27/2007	245.36		14.52		230.84
	7/10/2007			14.88		230.48
	7/23/2007			15.10		230.26
	8/7/2007			15.43		229.93
	8/15/2007			15.57		229.79
	8/28/2007			14.74		230.62
	9/12/2007			15.02		230.34
	9/25/2007			15.45		229.91
	10/10/2007			14.20		231.16
	10/19/2007			14.21		231.15
	10/29/2007			3.49		241.87
	11/20/2007			8.59		236.77
	12/3/2007			2.59		242.77
	12/12/2007			10.45		234.91

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Well Gauging Data Summary Table
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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-25 (cont.)	2/25/2008			13.58		231.78
	5/19/2008			11.70		233.66
	2/25/2009			14.34		231.02
MW-26	6/27/2007	244.67		14.56		230.11
	7/10/2007			14.99		229.68
	7/23/2007			15.08		229.59
	8/7/2007			15.36		229.31
	8/15/2007			15.54		229.13
	8/28/2007			14.65		230.02
	9/12/2007			15.11		229.56
	9/25/2007			15.36		229.31
	10/10/2007			15.57		229.10
	10/19/2007			15.80		228.87
	10/29/2007			15.46		229.21
	11/20/2007			15.25		229.42
	12/3/2007			15.18		229.49
	12/12/2007			15.10		229.57
	2/4/2008		13.53	13.58	0.05	231.13
	2/25/2008			13.20		231.47
	2/26/2008		12.95	12.96	0.01	231.72
	3/14/2008			12.24		232.43
	3/25/2008			12.63		232.04
	4/7/2008			13.14		231.53
	5/19/2008		11.70	11.72	0.02	232.97
	6/12/2008		12.42	12.43	0.01	232.25
	6/30/2008		13.39	13.40	0.01	231.28
	7/10/2008		13.55	13.90	0.35	231.07
	7/24/2008		13.53	13.78	0.25	231.11
	8/8/2008		14.06	14.14	0.08	230.60
	8/25/2008		14.61	14.73	0.12	230.04
	9/5/2008		14.60	14.79	0.19	230.05
	9/24/2008		13.69	13.70	0.01	230.98
	10/10/2008		14.14	14.22	0.08	230.52
	10/23/2008		14.65	14.72	0.07	230.01
	11/6/2008		14.57	14.69	0.12	230.08
	11/24/2008		14.50	14.54	0.04	230.16
	12/9/2008		14.43	14.45	0.02	230.24
	12/23/2008		13.14	13.18	0.04	231.52
	1/13/2009		12.59	12.60	0.01	232.08
	2/16/2009		13.88	13.89	0.01	230.79
	2/25/2009			14.06		230.61
	3/5/2009			14.28		230.39
	3/18/2009		14.55	14.60	0.05	230.11

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-26 (cont.)	3/27/2009			14.49		230.18
	4/17/2009		13.79	13.94	0.15	230.86
	4/23/2009		12.42	12.46	0.04	232.24
	5/4/2009		12.78	12.80	0.02	231.89
	5/22/2009		12.20	12.21	0.01	232.47
	6/24/2009		12.27	12.29	0.02	232.40
	7/22/2009		13.88	13.89	0.01	230.79
MW-27	6/27/2007	244.29		12.22		232.07
	7/10/2007			12.80		231.49
	7/23/2007			13.81		230.48
	8/7/2007			12.82		231.47
	8/15/2007			12.81		231.48
	8/28/2007			7.43		236.86
	9/12/2007			7.78		236.51
	9/25/2007			11.52		232.77
	10/10/2007		15.73	15.75	0.02	228.56
	10/19/2007		15.92	15.93	0.01	228.37
	10/29/2007			15.56		228.73
	11/20/2007			14.99		229.30
	12/3/2007			14.89		229.40
	12/12/2007			14.86		229.43
	1/9/2008			7.37		236.92
	2/4/2008			7.28		237.01
	2/25/2008			7.10		237.19
	2/26/2008			7.34		236.95
	3/14/2008			7.26		237.03
	3/25/2008			7.29		237.00
	4/7/2008			7.08		237.21
	4/28/2008			6.04		238.25
	5/19/2008			7.16		237.13
	6/12/2008			7.30		236.99
	6/30/2008			7.40		236.89
	7/10/2008			7.49		236.80
	7/24/2008			7.41		236.88
	8/25/2008			7.81		236.48
	2/25/2009			9.75		234.54
	3/27/2009			7.93		236.36
MW-28	12/3/2007	244.23	14.30	14.33	0.03	229.93
	12/12/2007		14.16	14.23	0.07	230.06
	12/28/2007		13.48	13.50	0.02	230.75
	1/9/2008		13.34	14.20	0.86	230.78
	2/4/2008		12.59	13.85	1.26	231.48
	2/25/2008			12.60		231.63

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-28 (cont.)	2/26/2008		12.19	12.40	0.21	232.01
	3/14/2008		11.26	11.54	0.28	232.93
	3/25/2008		11.71	11.76	0.05	232.51
	4/7/2008		12.66	12.70	0.04	231.56
	5/19/2008		10.34	10.90	0.56	233.82
	6/12/2008		11.43	11.44	0.01	232.80
	6/30/2008		12.48	12.49	0.01	231.75
	7/10/2008			12.60		231.63
	7/24/2008			12.72		231.51
	8/8/2008			13.25		230.98
	8/25/2008		13.75	14.50	0.75	230.38
	9/5/2008		13.83	14.48	0.55	230.23
	9/24/2008		12.89	13.10	0.21	231.31
	10/10/2008		13.30	13.42	0.12	230.91
	10/23/2008		13.90	14.05	0.15	230.31
	11/6/2008		13.59	13.73	0.14	230.62
	11/24/2008		13.59	13.61	0.02	230.64
	12/9/2008		13.54	13.55	0.01	230.69
	12/23/2008		12.31	12.33	0.02	231.92
	1/13/2009			11.71		232.52
	1/30/2009			13.27		230.96
	2/16/2009		13.19	13.23	0.04	231.03
	2/25/2009		13.43	13.44	0.01	230.80
	3/5/2009		13.59	13.62	0.03	230.64
	3/18/2009		13.82	13.86	0.04	230.40
	3/27/2009		13.91	14.11	0.20	230.29
	4/17/2009		12.62	12.75	0.13	231.59
	4/23/2009		11.42	11.43	0.01	232.81
	5/22/2009		11.55	11.56	0.01	232.68
	6/24/2009		11.45	11.46	0.01	232.78
	7/14/2009		12.97	12.98	0.01	231.26
	7/22/2009		13.14	13.20	0.06	231.08
MW-29	12/3/2007	243.74		15.22		228.52
	2/25/2008			14.00		229.74
	5/19/2008			12.44		231.30
	2/25/2009			14.79		228.95
MW-30	12/3/2007	245.46		15.16		230.30
	2/25/2008			13.65		231.81
	5/19/2008		10.90	11.05	0.15	234.54
	6/12/2008			12.73		232.73
	6/30/2008			13.73		231.73
	7/10/2008			13.72		231.74
	7/24/2008			13.90		231.56

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-30 (cont.)	8/8/2008		14.31	14.32	0.01	231.15
	8/25/2008		14.83	14.92	0.09	230.62
	9/5/2008		14.89	14.94	0.05	230.56
	9/24/2008		13.98	13.99	0.01	231.48
	10/10/2008		14.34	14.34	0.00	231.12
	10/23/2008		14.95	14.96	0.01	230.51
	11/6/2008			14.76	0.00	230.70
	11/24/2008		14.63	14.64	0.01	230.83
	12/9/2008			14.39		231.07
	12/23/2008			13.27		232.19
	1/13/2009		12.32	12.33	0.01	233.14
	1/30/2009			13.99		231.47
	2/16/2009		14.17	14.18	0.01	231.29
	2/25/2009			14.45		231.01
	3/5/2009			14.63		230.83
	3/18/2009			14.85		230.61
	3/27/2009			14.93		230.53
	4/17/2009			13.63		231.83
	4/23/2009			12.39		233.07
	5/4/2009			12.97		232.49
	5/22/2009			12.53		232.93
	6/5/2009			11.95		233.51
	6/24/2009			12.57		232.89
	7/22/2009			14.23		231.23
MW-31	12/3/2007	244.79		14.44		230.35
	12/12/2007			14.13		230.66
	12/28/2007			13.29		231.50
	1/9/2008			13.49		231.30
	2/4/2008			12.42		232.37
	2/25/2008			12.20		232.59
	2/26/2008			12.08		232.71
	3/14/2008			10.50		234.29
	3/25/2008			10.85		233.94
	4/7/2008			11.67		233.12
	4/28/2008			8.82		235.97
	5/19/2008			9.20		235.59
	6/12/2008			10.37		234.42
	6/30/2008			11.74		233.05
	7/10/2008			12.12		232.67
	7/24/2008			12.23		232.56
	8/8/2008			13.41		231.38
	8/25/2008			13.92		230.87
	9/5/2008			14.12		230.67

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-31 (cont.)	9/24/2008			12.61		232.18
	10/10/2008			12.63		232.16
	10/23/2008			14.00		230.79
	11/6/2008			13.79		231.00
	2/25/2009			12.74		232.05
	3/5/2009			13.70		231.09
	3/18/2009			14.21		230.58
	3/27/2009			14.33		230.46
	4/17/2009			6.86		237.93
	4/23/2009			6.47		238.32
	5/4/2009			5.87		238.92
	5/22/2009			7.25		237.54
	6/5/2009			6.02		238.77
	6/24/2009			7.27		237.52
	7/22/2009			12.81		231.98
MW-32	12/3/2007	245.80		14.95		230.85
	2/25/2008			12.89		232.91
	5/19/2008			3.89		241.91
	2/25/2009		14.11	14.20	0.09	231.68
	3/5/2009		14.36	14.46	0.10	231.43
	3/18/2009		14.56	14.70	0.14	231.22
	5/22/2009		12.20	12.30	0.10	233.59
	7/14/2009		13.65	13.90	0.25	232.12
	7/16/2009		13.54	13.75	0.21	232.23
	7/22/2009		13.85	14.03	0.18	231.93
MW-33	12/3/2007	244.26		14.14		230.12
	2/25/2008			12.80		231.46
	5/19/2008		11.35	11.37	0.02	232.91
	7/10/2008			13.71		230.55
	7/24/2008			13.78		230.48
	8/8/2008			13.07		231.19
	9/5/2008			13.29		230.97
	2/16/2009		12.88	13.24	0.36	231.33
	2/25/2009		13.25	13.46	0.21	230.98
	3/27/2009		13.47	13.80	0.33	230.75
	6/24/2009			11.75		232.51
	7/14/2009		12.49	12.50	0.01	231.77
MW-35	12/3/2007	245.80		15.65		230.15
	2/25/2008			14.10		231.70
	5/19/2008			12.06		233.74
	2/25/2009			14.84		230.96
MW-37	12/3/2007	245.06		15.09		229.97
	2/25/2008			13.19		231.87

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-37 (cont.)	5/19/2008			11.04		234.02
	6/30/2008		13.22	13.23	0.01	231.84
	7/10/2008		13.45	13.60	0.15	231.59
	7/24/2008		13.50	13.71	0.21	231.53
	8/8/2008		13.99	14.74	0.75	230.97
	8/25/2008		14.63	14.85	0.22	230.40
	9/5/2008			14.12		230.94
	9/24/2008		13.70	13.74	0.04	231.35
	11/6/2008		14.52	15.18	0.66	230.45
	11/24/2008		14.66	14.75	0.09	230.39
	12/9/2008			14.64		230.42
	12/23/2008		13.32	13.34	0.02	231.74
	1/13/2009			12.85		232.21
	2/16/2009		14.03	14.13	0.10	231.02
	2/25/2009		14.22	14.23	0.01	230.84
	3/5/2009		14.41	14.46	0.05	230.64
	3/18/2009		14.65	14.76	0.11	230.40
	3/27/2009		14.45	14.59	0.14	230.59
	4/17/2009			12.85		232.21
	4/23/2009		12.83	12.92	0.09	232.22
	5/22/2009			12.35		232.71
	6/24/2009		12.15	12.53	0.38	232.86
	7/14/2009		13.61	14.09	0.48	231.39
	7/16/2009		13.54	13.75	0.51	231.75
	7/22/2009		13.88	14.60	0.72	231.09
MW-38	12/3/2007	246.09		4.93		241.16
	12/12/2007		4.87	4.88	0.01	241.22
	12/28/2007		5.01	5.18	0.17	241.06
	1/9/2008		5.05	12.90	7.85	240.02
	2/4/2008		5.20	12.05	6.85	240.00
	2/25/2008		9.47	10.52	1.05	236.48
	2/26/2008		9.90	10.45	0.55	236.12
	3/14/2008		4.93	7.89	2.96	240.78
	3/25/2008		13.20	15.22	2.02	232.63
	4/7/2008		12.43	15.40	2.97	233.27
	4/28/2008		4.44	5.43	0.99	241.52
	5/19/2008		4.10	4.12	0.02	241.99
	6/12/2008		4.55	4.56	0.01	241.54
	6/30/2008		4.92	5.04	0.12	241.15
	7/10/2008		4.80	5.13	0.33	241.25
	7/24/2008		4.74	5.10	0.36	241.30
	8/8/2008		10.17	17.05	6.88	235.03
	8/25/2008		13.15	19.85	6.70	232.07

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-38 (cont.)	9/5/2008		13.24	19.94	5.70	231.11
	9/24/2008		5.68	7.70	2.02	240.15
	10/10/2008		8.47	8.78	0.31	237.58
	10/23/2008		13.48	17.59	4.11	232.08
	11/6/2008		12.08	15.02	2.94	233.63
	11/24/2008		12.52	15.46	2.94	233.19
	12/9/2008		11.35	13.78	2.43	234.42
	12/23/2008		5.08	5.95	0.87	240.90
	1/13/2009		5.32	7.44	2.12	240.49
	2/16/2009		14.44	15.69	1.25	231.49
	2/25/2009		14.77	15.42	0.65	231.24
	3/18/2009		15.22	15.95	0.73	230.78
	3/27/2009		14.96	16.07	1.11	230.99
	4/17/2009		5.32	7.44	2.12	240.49
	4/23/2009		4.98	5.16	0.18	241.09
	5/4/2009		4.94	5.06	0.12	241.13
	5/22/2009		4.90	4.99	0.09	241.18
	6/5/2009		4.55	4.62	0.07	241.53
	6/24/2009		4.63	4.65	0.02	241.46
	7/14/2009		5.22	9.60	4.38	240.30
MW-39	12/3/2007	245.65		15.37		230.28
	2/25/2008			12.80		232.85
	5/19/2008			10.75		234.90
	2/25/2009			11.21		234.44
MW-41	12/3/2007	246.07	15.87	15.88	0.01	230.20
	12/12/2007		15.71	15.72	0.01	230.36
	12/28/2007		15.03	15.04	0.01	231.04
	1/9/2008		14.73	15.91	1.18	231.19
	2/4/2008		14.45	16.00	1.55	231.42
	2/25/2008		13.97	15.19	1.22	231.94
	2/26/2008		13.82	15.13	1.31	232.08
	3/14/2008		12.96	14.08	1.12	232.96
	3/25/2008		6.92	7.72	0.80	239.05
	4/7/2008		13.80	16.12	2.32	231.97
	4/28/2008		12.08	13.80	1.72	233.77
	5/19/2008		11.23	14.01	2.78	234.48
	6/12/2008		13.00	14.80	1.80	232.84
	6/30/2008		13.73	16.20	2.47	232.02
	7/10/2008		14.15	15.35	1.20	231.76
	7/24/2008		14.19	14.58	0.39	231.83
	8/8/2008		14.72	15.56	0.84	231.24
	8/25/2008		15.32	15.83	0.51	230.68
	9/5/2008		15.48	16.00	0.52	230.52

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-41 (cont.)	9/24/2008		14.42	15.35	0.93	231.53
	10/10/2008		14.89	14.99	0.10	231.17
	10/23/2008		15.48	15.88	0.40	230.54
	11/6/2008		15.34	15.55	0.21	230.70
	11/24/2008		15.48	15.67	0.19	230.57
	12/9/2008		15.47	15.55	0.08	230.59
	12/23/2008		14.13	14.55	0.42	231.89
	1/13/2009		13.59	13.87	0.28	232.44
	1/30/2009		14.18	16.10	1.92	231.64
	2/16/2009		14.64	16.58	1.94	231.18
	2/25/2009		14.90	16.17	1.27	231.00
	3/5/2009		15.03	16.70	1.67	230.82
	3/18/2009		15.30	16.74	1.44	230.58
	3/27/2009		15.50	15.95	0.45	230.51
	4/17/2009		14.71	15.02	0.31	231.32
	4/23/2009		13.54	14.00	0.46	232.47
	5/4/2009		13.74	14.52	0.78	232.23
	5/22/2009		12.84	14.98	2.14	232.95
	6/5/2009		12.92	15.45	2.53	232.82
	6/24/2009		12.52	15.58	3.06	233.15
	7/14/2009		14.30	16.13	1.83	231.53
	7/16/2009		14.25	16.13	1.88	231.58
	7/22/2009		14.75	15.33	0.58	231.24
MW-43	12/3/2007	238.90		9.55		229.35
	2/25/2008			7.50		231.40
	5/19/2008			5.51		233.39
	2/25/2009			8.54		230.36
MW-49	12/3/2007	246.02		13.93		232.09
	2/25/2008		11.89	12.60	0.71	234.04
	5/19/2008		5.44	6.60	1.16	240.43
	6/12/2008		6.19	6.55	0.36	239.78
	6/30/2008		8.77	9.11	0.34	237.21
	7/10/2008		9.25	12.01	2.76	236.41
	7/24/2008		9.74	12.18	2.44	235.96
	8/8/2008		14.11	15.11	1.00	231.78
	8/25/2008		14.84	15.77	0.93	231.06
	9/5/2008		14.99	16.10	1.11	230.89
	9/24/2008		6.37	7.07	0.70	239.56
	10/10/2008		13.89	14.24	0.35	232.08
	10/23/2008		14.98	15.40	0.42	230.99
	11/6/2008		14.88	15.41	0.53	231.07
	11/24/2008		14.99	15.18	0.19	231.01
	12/9/2008		14.97	15.12	0.15	231.03

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January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-49 (cont.)	12/23/2008		5.68	6.45	0.77	240.24
	1/13/2009		8.43	8.82	0.39	237.54
	2/16/2009		14.32	15.20	0.88	231.59
	2/25/2009		14.55	14.91	0.36	231.42
	3/5/2009		14.77	15.21	0.44	231.19
	3/18/2009		15.01	15.39	0.38	230.96
	4/17/2009		8.43	8.82	0.39	237.54
	4/23/2009		7.60	7.83	0.23	238.39
	5/4/2009			9.06		236.96
	5/22/2009		5.10	5.15	0.05	240.91
	6/5/2009		5.07	5.65	0.58	240.87
	6/24/2009		4.92	5.25	0.33	241.06
	7/14/2009		12.25	13.68	1.43	233.58
	7/16/2009		13.00	14.35	1.35	232.84
	7/22/2009		13.98	14.56	0.58	231.96
MW-50	12/3/2007	245.53		14.88		230.65
	2/25/2008			13.39		232.14
	5/19/2008			11.53		234.00
	2/25/2009			14.04		231.49
MW-51	12/3/2007	249.34		15.21		234.13
	2/25/2008			13.73		235.61
	5/19/2008			10.18		239.16
	2/25/2009			14.78		234.56
MW-52	12/3/2007	247.00		11.17		235.83
	2/25/2008			10.29		236.71
	5/19/2008			8.16		238.84
	2/25/2009			11.36		235.64
MW-53	1/13/2009	246.10	13.54	14.43	0.89	232.44
	2/16/2009		14.70	16.71	2.01	231.14
	2/25/2009		14.89	16.56	1.67	230.99
	3/5/2009		15.07	17.04	1.97	230.77
	3/18/2009		14.92	16.27	1.35	231.00
	3/27/2009		15.50	17.40	1.90	230.35
	4/17/2009		14.71	15.72	1.01	231.26
	4/23/2009		13.62	13.79	0.17	232.46
	5/4/2009		13.65	15.12	1.47	232.26
	5/22/2009		12.97	15.11	2.14	232.85
	6/5/2009		12.81	15.50	2.69	232.94
	6/24/2009		12.95	15.91	2.96	232.77
	7/14/2009		14.30	16.75	2.45	231.48
MW-54	1/13/2009	245.60	13.05	13.91	0.86	232.44
	1/30/2009		13.75	15.81	2.06	231.58
	2/16/2009		14.25	15.94	1.69	231.13

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Well Gauging Data Summary Table
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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-54 (cont.)	2/25/2009		14.53	15.35	0.82	230.96
	3/5/2009		14.66	15.92	1.26	230.78
	3/18/2009		15.32	17.23	1.91	230.03
	3/27/2009		15.15	16.39	1.24	230.29
	4/17/2009		14.23	15.08	0.85	231.26
	4/23/2009		13.10	13.42	0.32	232.46
	5/4/2009		13.17	14.50	1.33	232.26
	5/22/2009		12.52	14.43	1.91	232.83
	6/5/2009		12.28	14.80	2.52	232.99
	6/24/2009		12.47	15.70	3.23	232.71
	7/14/2009		13.78	16.67	2.91	231.46
	7/16/2009		13.73	16.48	2.75	231.51
MW-55	1/13/2009	246.12	13.39	15.23	1.84	232.49
	1/30/2009		14.11	17.00	2.89	231.63
	2/16/2009		14.67	17.27	2.60	231.11
	2/25/2009		14.90	16.94	2.04	230.95
	3/5/2009		15.05	17.28	2.23	230.78
	3/18/2009		15.33	17.63	2.30	230.49
	3/27/2009		15.74	17.29	1.55	230.18
	4/17/2009		14.76	15.61	0.85	231.25
	4/23/2009		13.63	14.03	0.40	232.44
	5/4/2009		13.56	15.97	2.41	232.25
	5/22/2009		12.82	16.40	3.58	232.83
	6/5/2009		12.85	14.95	2.10	233.00
	6/24/2009		12.91	16.75	3.84	232.71
	7/14/2009		14.29	17.25	2.96	231.45
	7/16/2009		14.22	17.10	2.88	231.53
	7/22/2009		14.58	17.10	2.52	231.21
MW-56	1/13/2009	244.63	12.43	13.60	1.17	232.05
	1/30/2009		14.00	14.90	0.90	230.51
	2/16/2009		13.34	16.98	3.64	230.82
	2/25/2009		13.44	16.78	3.34	230.76
	3/5/2009		13.60	17.03	3.43	230.58
	3/18/2009		13.89	16.79	2.90	230.36
	3/27/2009		14.12	16.30	2.18	230.23
	4/17/2009		13.01	16.37	3.36	231.18
	4/23/2009		12.08	13.40	1.32	232.38
	5/4/2009		12.04	15.78	3.74	232.10
	5/22/2009		11.44	16.31	4.87	232.56
	6/5/2009		11.50	15.22	3.72	232.65
	6/24/2009		11.58	15.25	3.67	232.57
	7/14/2009		13.06	16.25	3.19	231.16
	7/16/2009		12.99	16.33	3.34	231.21

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
MW-56 (cont.)	7/22/2009		13.35	15.82	2.47	230.96
MW-57	1/13/2009	244.52	11.85	17.13	5.28	231.98
	1/30/2009		12.50	17.30	4.80	231.40
	2/16/2009		13.23	17.41	4.18	230.75
	2/25/2009		13.39	16.81	3.42	230.69
	3/5/2009		13.54	16.98	3.44	230.53
	3/18/2009		13.83	16.75	2.92	230.31
	3/27/2009		13.99	16.52	2.53	230.20
	4/17/2009		12.96	16.28	3.32	231.13
	4/23/2009		11.95	13.72	1.77	232.34
	5/4/2009		12.02	15.44	3.42	232.06
	5/22/2009		11.43	15.76	4.33	232.53
	6/5/2009		11.41	15.27	3.86	232.61
	6/24/2009		11.53	15.50	3.97	232.47
	7/14/2009		12.98	16.24	3.26	231.12
	7/16/2009		12.89	16.40	3.51	231.17
	7/22/2009		13.33	15.63	2.30	230.89
MW-58	1/13/2009	244.42	12.33	13.21	0.88	231.98
	1/30/2009		12.90	14.40	1.50	231.33
	2/16/2009		13.55	14.59	1.04	230.73
	2/25/2009		13.67	14.18	0.51	230.68
	3/5/2009		13.80	14.56	0.76	230.52
	3/18/2009		14.04	14.66	0.62	230.30
	3/27/2009		14.18	14.55	0.37	230.19
	4/17/2009		13.26	13.49	0.23	231.13
	4/23/2009		12.03	12.11	0.08	232.38
	5/22/2009		11.82	12.44	0.62	232.52
	6/24/2009		12.27	12.90	0.63	232.07
	7/14/2009		13.23	13.93	0.70	231.10
	7/16/2009		13.23	13.94	0.71	231.10
	7/22/2009		13.49	13.96	0.47	230.87
EW-1	4/22/2004	243.50		9.19		234.31
	4/30/2004			9.32		234.18
	5/7/2004			9.16		234.34
	5/14/2004			9.69		233.81
	5/28/2004			9.72		233.78
	6/11/2004			9.02		234.48
	6/25/2004			9.42		234.08
	7/9/2004			10.58		232.92
	7/15/2004			10.80		232.70
	8/12/2004			12.38		231.12
	9/14/2004			12.84		230.66
	10/28/2004			11.06		232.44

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-1 (cont.)	11/23/2004			10.84		232.66
	12/20/2004			9.90		233.60
	1/28/2005			10.58		232.92
	2/22/2005			10.64		232.86
	3/31/2005			8.41		235.09
	4/25/2005			9.94		233.56
	5/17/2005		11.59	11.69	0.10	231.90
	6/30/2005			12.08		231.42
	7/22/2005			10.42		233.08
	8/19/2005			12.46		231.04
	9/7/2005			12.65		230.85
	10/18/2005			11.75		231.75
	11/16/2005			11.39		232.11
	12/20/2005			10.46		233.04
	1/12/2006			10.38		233.12
	2/17/2006			10.45		233.05
	3/29/2006			12.24		231.26
	4/21/2006			12.72		230.78
	5/23/2006			12.98		230.52
	6/27/2006			12.32		231.18
	7/7/2006			10.23		233.27
	7/26/2006			11.83		231.67
	8/16/2006			12.94		230.56
	8/31/2006			13.62		229.88
	9/11/2006			12.02		231.48
	9/22/2006			12.06		231.44
	10/26/2006			13.52		229.98
	11/13/2006			11.37		232.13
	12/6/2006			11.38		232.12
	12/27/2006			11.60		231.90
	1/10/2007			10.88		232.62
	1/25/2007			11.72		231.78
	2/7/2007			12.28		231.22
	2/22/2007			12.58		230.92
	2/26/2007			11.90		231.60
	3/9/2007			10.94		232.56
	3/22/2007			10.07		233.43
	4/5/2007			10.95		232.55
	4/19/2007			10.44		233.06
	5/4/2007			10.98		232.52
	5/21/2007			12.09		231.41
	6/1/2007			12.42		231.08
	6/12/2007			12.96		230.54

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C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-1 (cont.)	6/27/2007			13.54		229.96
	7/10/2007			14.00		229.50
	7/23/2007			14.19		229.31
	8/7/2007			14.53		228.97
	8/15/2007			14.71		228.79
	8/28/2007			13.77		229.73
	9/12/2007			13.99		229.51
	9/25/2007			14.45		229.05
	10/10/2007			14.93		228.57
	10/19/2007			15.17		228.33
	10/29/2007			14.82		228.68
	11/15/2007			14.45		229.05
	11/20/2007			14.01		229.49
	12/12/2007			13.69		229.81
	12/28/2007			13.07		230.43
	1/9/2008			12.71		230.79
	2/4/2008			12.46		231.04
	2/26/2008			11.86		231.64
	3/14/2008			10.86		232.64
	3/25/2008			11.18		232.32
	4/7/2008			11.90		231.60
	4/28/2008			10.04		233.46
	5/19/2008			9.59		233.91
	6/4/2008			11.17		232.33
	6/12/2008			11.25		232.25
	6/30/2008			12.09		231.41
	7/10/2008			12.23		231.27
	7/24/2008			12.24		231.26
	8/8/2008			12.95		230.55
	8/25/2008			13.60		229.90
	9/5/2008			13.68		229.82
	9/24/2008			7.53		235.97
	10/10/2008			7.61		235.89
	10/23/2008			7.81		235.69
	11/6/2008			7.90		235.60
	11/24/2008			11.47		232.03
	12/9/2008			12.02		231.48
	12/23/2008			8.17		235.33
	1/13/2009			8.07		235.43
	1/30/2009			12.10		231.40
	2/16/2009			9.61		233.89
	2/25/2009			12.71		230.79
	3/5/2009			13.18		230.32

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-1 (cont.)	3/18/2009			13.55		229.95
	3/27/2009			10.27		233.23
	4/17/2009			10.81		232.69
	4/23/2009			7.66		235.84
	5/22/2009			10.33		233.17
	6/5/2009			10.50		233.00
	6/24/2009			10.34		233.16
	7/22/2009			8.78		234.72
EW-2	4/22/2004	243.30		8.85		234.45
	4/30/2004			9.34		233.96
	5/7/2004			8.96		234.34
	5/14/2004			9.61		233.69
	5/28/2004			9.95		233.35
	6/11/2004			8.44		234.86
	6/25/2004			9.28		234.02
	7/9/2004			10.77		232.53
	7/15/2004			10.98		232.32
	8/12/2004			12.90		230.40
	9/14/2004			13.31		229.99
	10/28/2004			10.61		232.69
	11/23/2004			10.19		233.11
	12/20/2004			9.22		234.08
	1/28/2005			10.02		233.28
	2/22/2005			10.35		232.95
	3/31/2005			7.37		235.93
	4/25/2005			9.55		233.75
	5/17/2005			10.79		232.51
	6/30/2005			12.45		230.85
	7/22/2005			10.30		233.00
	8/19/2005			12.63		230.67
	9/7/2005			13.07		230.23
	10/18/2005			10.98		232.32
	11/16/2005			11.36		231.94
	12/20/2005			9.38		233.92
	1/12/2006			9.12		234.18
	2/17/2006			8.91		234.39
	3/29/2006			12.11		231.19
	4/21/2006			12.88		230.42
	5/23/2006			13.15		230.15
	6/27/2006			12.86		230.44
	7/7/2006			7.90		235.40
	8/16/2006			11.49		231.81
	8/31/2006			13.16		230.14

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-2 (cont.)	9/11/2006			11.16		232.14
	9/22/2006			8.98		234.32
	10/12/2006			10.17		233.13
	10/26/2006			9.30		234.00
	11/13/2006			8.78		234.52
	12/6/2006			7.56		235.74
	12/27/2006			10.70		232.60
	1/10/2007			8.74		234.56
	1/25/2007			10.13		233.17
	2/7/2007			11.51		231.79
	2/22/2007			12.34		230.96
	3/9/2007			10.14		233.16
	3/22/2007			7.13		236.17
	4/5/2007			8.06		235.24
	4/19/2007			9.33		233.97
	5/4/2007			9.39		233.91
	5/21/2007			11.32		231.98
	6/1/2007			12.16		231.14
	6/12/2007			12.88		230.42
	6/27/2007			13.45		229.85
	7/10/2007			13.83		229.47
	7/23/2007			14.09		229.21
	8/7/2007			14.43		228.87
	8/15/2007			14.61		228.69
	8/28/2007			13.76		229.54
	9/12/2007			14.18		229.12
	9/25/2007			14.46		228.84
	10/10/2007		14.84	14.85	0.01	228.46
	10/19/2007		15.06	15.07	0.01	228.24
	10/29/2007			14.62		228.68
	11/15/2007			14.45		228.85
	11/20/2007		14.00	14.01	0.01	229.30
	12/12/2007			14.11		229.19
	12/28/2007			13.50		229.80
	1/9/2008		13.16	13.17	0.01	230.14
	2/4/2008			12.62		230.68
	2/26/2008		11.99	12.00	0.01	231.31
	3/14/2008		11.24	11.27	0.03	232.06
	3/25/2008		11.55	11.58	0.03	231.75
	4/7/2008			12.28		231.02
	4/28/2008			10.41		232.89
	5/19/2008			8.90		234.40
	6/4/2008			12.01		231.29

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-2 (cont.)	6/12/2008			11.35		231.95
	6/30/2008			12.36		230.94
	7/10/2008		12.60	12.60		230.70
	7/24/2008		12.28	12.38	0.10	231.01
	8/8/2008			13.39		229.91
	8/25/2008		14.73	14.75	0.02	228.57
	9/5/2008		14.84	14.84		228.46
	9/24/2008		12.86	13.00	0.22	230.49
	10/10/2008		13.28	13.42	0.14	230.00
	10/23/2008		14.00	14.01	0.01	229.30
	11/6/2008		13.62	13.64	0.02	229.68
	11/24/2008		13.62	13.70	0.08	229.67
	12/9/2008		13.53	13.69	0.16	229.75
	12/23/2008		12.28	12.35	0.07	231.01
	1/13/2009		11.70	11.71	0.01	231.60
	1/30/2009		12.55	12.65	0.10	230.74
	2/16/2009		13.00	13.11	0.11	230.29
	2/25/2009			13.19		230.11
	3/5/2009			13.35		229.95
	3/18/2009			14.09		229.21
	3/27/2009			13.72		229.58
	4/17/2009			12.78		230.52
	4/23/2009			11.55		231.75
	5/4/2009		11.86	11.87	0.01	231.44
	5/22/2009			11.32		231.98
	6/5/2009			11.20		232.10
	6/24/2009		11.45	11.48	0.03	231.85
	7/22/2009			13.03		230.27
EW-3	4/22/2004	242.70		9.98		232.72
	4/30/2004		10.21	12.45	2.24	232.20
	5/7/2004		10.18	11.05	0.87	232.41
	5/14/2004		10.94	11.34	0.40	231.71
	5/28/2004		10.99	11.47	0.48	231.65
	6/11/2004		9.84	10.24	0.40	232.81
	6/25/2004		10.70	11.25	0.55	231.93
	7/9/2004		11.73	12.45	0.72	230.88
	7/15/2004		11.98	12.40	0.42	230.67
	7/29/2004		12.69	13.33	0.64	229.93
	8/12/2004		13.00	13.65	0.65	229.62
	8/29/2004		13.18	14.03	0.85	229.41
	9/14/2004		13.36	13.98	0.62	229.26
	9/24/2004		12.19	12.38	0.19	230.49
	10/22/2004		11.75	12.25	0.50	230.89

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-3 (cont.)	10/28/2004		11.81	12.04	0.23	230.86
	11/10/2004		11.99	12.22	0.23	230.68
	11/23/2004		11.64	11.93	0.29	231.02
	12/6/2004		11.02	11.06	0.04	231.67
	12/20/2004		10.77	10.98	0.21	231.90
	12/27/2004		10.94	11.08	0.14	231.74
	1/28/2005		11.49	11.91	0.42	231.16
	2/22/2005		11.55	11.88	0.33	231.11
	3/31/2005		8.98	9.24	0.26	233.69
	4/25/2005		10.90	11.29	0.39	231.75
	5/17/2005		11.96	12.34	0.38	230.69
	6/30/2005		12.93	13.74	0.81	229.66
	7/22/2005		11.28	11.45	0.17	231.40
	8/19/2005		13.02	13.54	0.52	229.61
	9/7/2005		13.16	13.54	0.38	229.49
	10/18/2005		12.02	12.27	0.25	230.65
	11/16/2005		11.69	12.03	0.34	230.97
	12/20/2005		10.72	10.99	0.27	231.94
	1/12/2006		10.82	11.07	0.25	231.85
	3/29/2006		12.52	13.11	0.59	230.10
	4/21/2006		12.98	13.46	0.48	229.66
	5/23/2006		13.30	13.90	0.60	229.32
	6/27/2006		12.39	12.68	0.29	230.27
	7/7/2006		10.48	10.60	0.12	232.20
	8/16/2006		13.12	13.64	0.52	229.51
	8/31/2006		13.75	14.31	0.56	228.88
	9/11/2006		12.26	12.43	0.17	230.42
	9/22/2006		12.29	12.54	0.25	230.38
	10/12/2006		12.33	12.81	0.48	230.31
	10/26/2006		12.75	12.98	0.23	229.92
	11/13/2006		11.34	11.60	0.26	231.33
	12/6/2006		11.43	11.80	0.37	231.22
	12/27/2006		11.95	12.26	0.31	230.71
	1/10/2007		11.29	11.45	0.16	231.39
	1/25/2007		11.89	12.04	0.15	230.79
	2/7/2007		12.49	12.58	0.09	230.20
	2/22/2007		12.39	12.42	0.03	230.31
	3/9/2007		11.31	11.37	0.06	231.38
	3/22/2007		10.33	10.35	0.02	232.37
	4/5/2007		11.29	11.41	0.12	231.39
	4/19/2007		10.73	10.86	0.13	231.95
	5/4/2007		11.29	11.39	0.10	231.40
	5/21/2007		12.30	12.55	0.25	230.37

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-3 (cont.)	6/1/2007		12.63	13.10	0.47	230.01
	6/12/2007		13.14	13.29	0.15	229.54
	6/27/2007		13.52	13.87	0.35	229.13
	7/10/2007		13.90	14.17	0.27	228.76
	7/23/2007		14.08	14.10	0.02	228.62
	8/7/2007		14.29	14.56	0.27	228.37
	8/15/2007		14.49	14.89	0.40	228.16
	8/28/2007		13.65	13.73	0.08	229.04
	9/12/2007		14.12	14.36	0.24	228.55
	9/25/2007		14.33	14.56	0.23	228.34
	10/10/2007		14.74	14.80	0.06	227.95
	10/19/2007		14.93	15.18	0.25	227.74
	10/29/2007		14.53	14.59	0.06	228.16
	11/15/2007		14.39	14.52	0.13	228.29
	11/20/2007		13.93	14.20	0.27	228.73
	12/12/2007		13.89	13.91	0.02	228.81
	12/28/2007		13.38	13.55	0.17	229.30
	1/9/2008		13.04	13.35	0.31	229.62
	2/4/2008		12.55	13.20	0.65	230.07
	2/26/2008		12.02	12.25	0.23	230.65
	3/14/2008		11.22	11.33	0.11	231.47
	3/25/2008		11.55	11.62	0.07	231.14
	4/7/2008			12.22		230.48
	4/28/2008			10.32		232.38
	5/19/2008		10.00	10.28	0.28	232.66
	6/4/2008			11.51		231.19
	6/12/2008		11.36	11.53	0.17	231.32
	6/30/2008		12.26	12.35	0.09	230.43
	7/10/2008		12.53	13.10	0.57	230.10
	7/24/2008			13.04		229.66
	8/8/2008		12.99	13.61	0.62	229.63
	8/25/2008		13.60	13.82	0.22	229.07
	9/5/2008		13.61	13.91	0.30	229.05
	9/24/2008		12.71	12.93	0.22	229.96
	10/10/2008		13.18	13.38	0.20	229.49
	10/23/2008		13.61	13.70	0.09	229.08
	11/6/2008		13.50	13.69	0.19	229.18
	11/24/2008		13.53	13.73	0.20	229.14
	12/9/2008		13.42	13.58	0.16	229.26
	12/23/2008		12.20	12.29	0.09	230.49
	1/13/2009		11.55	11.74	0.19	231.13
	1/30/2009			13.23		229.47
	2/16/2009		12.95	13.24	0.29	229.71

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-3 (cont.)	2/25/2009			13.11		229.59
	3/5/2009		13.23	13.27	0.04	229.46
	3/18/2009		13.69	13.75	0.06	229.00
	3/27/2009			13.57		229.13
	4/17/2009		12.90	13.16	0.26	229.77
	4/23/2009			11.42		231.28
	5/4/2009		11.78	11.88	0.10	230.91
	5/22/2009		11.25	11.38	0.13	231.43
	6/5/2009		11.11	11.30	0.19	231.57
	6/24/2009		11.35	11.48	0.13	231.33
	7/16/2009		12.55	12.73	0.18	230.13
	7/22/2009		12.81	12.90	0.09	229.88
EW-4	4/22/2004	243.20	9.89	11.06	1.17	233.16
	4/30/2004		10.25	10.54	0.29	232.91
	5/7/2004		9.90	10.04	0.14	233.28
	5/14/2004		10.68	10.87	0.19	232.50
	5/28/2004		10.71	11.02	0.31	232.45
	6/11/2004		9.47	9.93	0.46	233.67
	6/25/2004		10.43	10.78	0.35	232.72
	7/9/2004		11.48	12.03	0.55	231.65
	7/15/2004		11.75	11.98	0.23	231.42
	7/29/2004		12.43	13.20	0.77	230.67
	8/12/2004		12.75	13.03	0.28	230.41
	8/29/2004		12.99	13.39	0.40	230.16
	9/14/2004		13.17	13.88	0.71	229.94
	9/24/2004		11.95	11.97	0.02	231.25
	10/22/2004		11.68	11.78	0.10	231.51
	10/28/2004		11.52	11.60	0.08	231.67
	11/10/2004		11.73	11.91	0.18	231.45
	11/23/2004		11.24	11.37	0.13	231.94
	12/6/2004		10.71	10.71		232.49
	12/20/2004		10.47	10.50	0.03	232.73
	12/27/2004		10.55	10.56	0.01	232.65
	1/28/2005		11.16	11.17	0.01	232.04
	2/22/2005		11.28	11.35	0.07	231.91
	3/31/2005		7.95	8.40	0.45	235.19
	4/25/2005		10.51	10.59	0.08	232.68
	5/17/2005		11.69	11.76	0.07	231.50
	6/30/2005		12.32	13.08	0.76	230.78
	7/22/2005		10.81	10.81		232.39
	8/19/2005		12.69	12.91	0.22	230.48
	9/7/2005		12.79	13.21	0.42	230.36
	10/18/2005		11.56	11.63	0.07	231.63

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-4 (cont.)	11/16/2005		11.23	11.73		231.47
	12/20/2005		9.98	10.07	0.09	233.21
	1/12/2006		10.23	10.29	0.06	232.96
	3/29/2006		12.17	12.95	0.78	230.93
	4/21/2006		12.70	12.98	0.28	230.46
	5/23/2006		12.95	13.35	0.40	230.20
	6/27/2006		11.79	11.95	0.16	231.39
	7/7/2006		9.03	9.05	0.02	234.17
	8/16/2006		12.73	12.84	0.11	230.46
	8/31/2006		13.41	13.56	0.15	229.77
	9/11/2006		8.94	8.98	0.04	234.25
	9/22/2006		11.86	11.89	0.03	231.34
	10/12/2006		11.85	11.86	0.01	231.35
	10/26/2006			12.32		230.88
	12/6/2006		10.72	10.77	0.05	232.47
	12/27/2006			10.00		233.20
	1/10/2007			9.29		233.91
	1/25/2007		11.57	11.58	0.01	231.63
	2/7/2007			12.18		231.02
	3/9/2007		10.55	10.56	0.01	232.65
	3/22/2007		8.48	8.49	0.01	234.72
	4/5/2007		10.58	10.59	0.01	232.62
	4/19/2007			9.13		234.07
	5/4/2007		10.21	10.22	0.01	232.99
	5/21/2007		11.98	11.99	0.01	231.22
	6/1/2007		12.40	12.42	0.02	230.80
	6/12/2007		12.85	13.03	0.18	230.33
	6/27/2007		13.24	13.28	0.04	229.95
	7/10/2007			13.62		229.58
	7/23/2007			13.72		229.48
	8/7/2007		13.99	14.01	0.02	229.21
	8/15/2007		14.19	14.20	0.01	229.01
	8/28/2007			13.31		229.89
	9/12/2007			13.64		229.56
	9/25/2007			13.99		229.21
	10/10/2007		14.39	14.42	0.03	228.81
	10/19/2007		14.61	14.65	0.04	228.58
	10/29/2007			14.19		229.01
	11/20/2007			13.20		230.00
	12/12/2007			12.77		230.43
	12/28/2007			12.45		230.75
	1/9/2008			11.60		231.60
	2/4/2008			11.30		231.90

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-4 (cont.)	2/26/2008			9.45		233.75
	3/14/2008		8.29	8.30	0.01	234.91
	3/25/2008			9.55		233.65
	4/7/2008			11.04		232.16
	5/19/2008			7.37		235.83
	6/12/2008			9.64		233.56
	6/30/2008		10.67	10.68	0.01	232.53
	7/10/2008			11.99		231.21
	7/24/2008			12.06		231.14
	8/8/2008			14.37		228.83
	8/25/2008			13.19		230.01
	9/5/2008			13.28		229.92
	9/24/2008			12.19		231.01
	10/10/2008			12.60		230.60
	10/23/2008			13.22		229.98
	11/6/2008			13.08		230.12
	11/24/2008			13.08		230.12
	12/9/2008			12.84		230.36
	12/23/2008			10.59		232.61
	1/13/2009			9.72		233.48
	1/30/2009			11.81		231.39
	2/16/2009			12.53		230.67
	2/25/2009			12.67		230.53
	3/5/2009			12.84		230.36
	3/18/2009			13.15		230.05
	3/27/2009			13.12		230.08
	4/17/2009			11.71		231.49
	4/23/2009			7.35		235.85
	5/22/2009			9.15		234.05
	6/24/2009			8.88		234.32
	7/22/2009			12.49		230.71
EW-5	4/22/2004	243.60		11.05		232.55
	4/30/2004			11.31		232.29
	5/7/2004			10.96		232.64
	5/14/2004			11.69		231.91
	5/28/2004			11.76		231.84
	6/11/2004			10.58		233.02
	6/25/2004			11.48		232.12
	7/9/2004			12.56		231.04
	7/15/2004		12.74	12.76	0.02	230.86
	7/29/2004		13.51	13.56	0.05	230.08
	8/12/2004		13.82	13.85	0.03	229.78
	8/29/2004			14.07		229.53

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-5 (cont.)	9/14/2004		14.20	14.29	0.09	229.39
	9/24/2004			12.97		230.63
	10/22/2004			12.60		231.00
	10/28/2004		12.58	12.59	0.01	231.02
	11/10/2004		12.77	12.78	0.01	230.83
	11/23/2004		12.26	12.27	0.01	231.34
	12/6/2004			11.74		231.86
	12/20/2004		11.50	11.51	0.01	232.10
	12/27/2004			11.65		231.95
	1/28/2005		12.24	12.27	0.03	231.36
	2/22/2005		12.35	12.49	0.14	231.23
	3/31/2005		9.70	9.72	0.02	233.90
	4/25/2005		11.62	11.70	0.08	231.97
	5/17/2005		12.69	12.88	0.19	230.89
	6/30/2005		13.74	14.00	0.26	229.83
	7/22/2005		12.01	12.07	0.06	231.58
	8/19/2005		13.83	13.98	0.15	229.75
	9/7/2005		13.93	14.00	0.07	229.66
	10/18/2005		12.79	12.84	0.05	230.80
	11/16/2005		12.46	12.52	0.06	231.13
	12/20/2005		11.52	11.58	0.06	232.07
	1/12/2006		11.61	11.67	0.06	231.98
	3/29/2006		13.32	13.62	0.30	230.24
	4/21/2006		13.80	13.90	0.10	229.79
	5/23/2006		14.05	14.22	0.17	229.53
	6/27/2006		13.10	13.19	0.09	230.49
	7/7/2006		11.27	11.28	0.01	232.33
	8/16/2006		13.90	14.08	0.18	229.68
	8/31/2006		14.46	14.60	0.14	229.12
	9/11/2006		13.05	13.11	0.06	230.54
	9/22/2006		13.10	13.11	0.01	230.50
	10/12/2006		13.17	13.27	0.10	230.42
	10/26/2006		13.49	13.55	0.06	230.10
	11/13/2006		11.70	11.95	0.25	231.87
	12/6/2006		12.27	12.31	0.04	231.32
	12/27/2006		12.66	12.68	0.02	230.94
	1/10/2007		11.99	12.02	0.03	231.61
	1/25/2007		12.68	12.70	0.02	230.92
	2/7/2007		13.28	13.32	0.04	230.31
	2/22/2007		13.18	13.22	0.04	230.41
	2/26/2007		12.74	12.77	0.03	230.86
	3/9/2007		12.09	12.10	0.01	231.51
	3/22/2007			11.04		232.56

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-5 (cont.)	4/5/2007		12.08	12.10	0.02	231.52
	4/19/2007		11.45	11.46	0.01	232.15
	5/4/2007		12.04	12.06	0.02	231.56
	5/21/2007		13.10	13.15	0.05	230.49
	6/1/2007		13.49	13.63	0.14	230.09
	6/12/2007		13.98	14.10	0.12	229.60
	6/27/2007		14.33	14.43	0.10	229.26
	7/10/2007		14.73	14.85	0.12	228.85
	7/23/2007			14.85		228.75
	8/7/2007		15.06	15.23	0.17	228.52
	8/15/2007			15.28		228.32
	8/28/2007		14.44	14.60	0.16	229.14
	9/12/2007		14.91	15.01	0.10	228.68
	9/25/2007		15.14	15.24	0.10	228.45
	10/10/2007		15.55	15.56	0.01	228.05
	10/19/2007		15.73	15.84	0.11	227.86
	10/29/2007			15.31		228.29
	11/15/2007		15.14	15.20	0.06	228.45
	11/20/2007		14.69	14.71	0.02	228.91
	12/12/2007		14.76	14.77	0.01	228.84
	12/28/2007		14.14	14.16	0.02	229.46
	1/9/2008		13.84	13.90	0.06	229.75
	2/4/2008		13.36	13.42	0.06	230.23
	2/26/2008		12.80	12.81	0.01	230.80
	3/14/2008		12.01	12.02	0.01	231.59
	3/25/2008		12.42	12.43	0.01	231.18
	4/7/2008			12.98		230.62
	4/28/2008			11.21		232.39
	5/19/2008			10.73		232.87
	6/4/2008			12.59		231.01
	6/12/2008		12.24	12.25	0.01	231.36
	6/30/2008		13.18	13.19	0.01	230.42
	7/10/2008			13.30		230.30
	7/24/2008		13.15	13.30	0.15	230.43
	8/8/2008			13.85		229.75
	8/25/2008		14.40	14.44	0.04	229.19
	9/5/2008		14.42	14.53	0.11	229.17
	9/24/2008		13.52	13.53	0.01	230.08
	10/10/2008		13.96	14.01	0.05	229.63
	10/23/2008			14.46		229.14
	11/6/2008		14.27	14.32	0.05	229.32
	11/24/2008		14.29	14.31	0.02	229.31
	12/9/2008		14.21	14.23	0.02	229.39

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Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-5 (cont.)	12/23/2008			12.93		230.67
	1/13/2009		12.39	12.40	0.01	231.21
	2/16/2009		13.70	13.71	0.01	229.90
	2/25/2009			13.86		229.74
	3/5/2009		13.99	14.00	0.01	229.61
	3/18/2009		14.53	14.56	0.03	229.07
	3/27/2009			14.39		229.21
	4/17/2009		13.71	13.72	0.01	229.89
	4/23/2009			12.19		231.41
	5/4/2009			12.66		230.94
	5/22/2009			12.02		231.58
	6/5/2009		11.91	11.93	0.02	231.69
	6/24/2009		12.15	12.16	0.01	231.45
	7/16/2009		13.35	13.36	0.01	230.25
	7/22/2009			13.65		229.95
EW-6	4/22/2004	242.40		9.90		232.50
	4/30/2004			10.41		231.99
	5/7/2004			9.79		232.61
	5/14/2004			10.89		231.51
	5/28/2004			10.97		231.43
	6/11/2004			9.44		232.96
	6/25/2004			10.58		231.82
	7/9/2004			11.95		230.45
	7/15/2004			12.17		230.23
	8/12/2004			13.52		228.88
	9/14/2004			13.88		228.52
	10/28/2004			11.64		230.76
	11/23/2004			11.17		231.23
	12/20/2004			10.15		232.25
	1/28/2005			11.27		231.13
	2/22/2005			10.81		231.59
	3/31/2005			8.23		234.17
	4/25/2005			10.20		232.20
	5/17/2005			11.90		230.50
	6/30/2005			13.32		229.08
	7/22/2005			9.80		232.60
	8/19/2005			13.32		229.08
	9/7/2005			13.55		228.85
	10/18/2005			11.27		231.13
	11/16/2005			10.25		232.15
	12/20/2005			9.39		233.01
	1/12/2006			9.51		232.89
	2/17/2006			9.74		232.66

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-6 (cont.)	3/29/2006			12.91		229.49
	4/21/2006			13.45		228.95
	5/23/2006			13.74		228.66
	6/27/2006			12.88		229.52
	7/7/2006			9.05		233.35
	8/16/2006			13.20		229.20
	8/31/2006			14.18		228.22
	9/11/2006			10.27		232.13
	9/22/2006			10.47		231.93
	10/12/2006			10.53		231.87
	10/26/2006			11.41		230.99
	11/13/2006			9.39		233.01
	12/6/2006			9.84		232.56
	12/27/2006			10.14		232.26
	1/10/2007			9.58		232.82
	1/25/2007			10.68		231.72
	2/7/2007			11.92		230.48
	2/22/2007			12.76		229.64
	2/26/2007			11.02		231.38
	3/9/2007			9.57		232.83
	3/22/2007			8.70		233.70
	4/5/2007			9.76		232.64
	4/19/2007			9.02		233.38
	5/4/2007			9.72		232.68
	5/21/2007			12.12		230.28
	6/1/2007			12.91		229.49
	6/12/2007			13.56		228.84
	6/27/2007			13.98		228.42
	7/10/2007			14.41		227.99
	7/23/2007			14.55		227.85
	8/7/2007			14.63		227.77
	8/15/2007			14.99		227.41
	8/28/2007			13.73		228.67
	9/12/2007			14.13		228.27
	9/25/2007			14.80		227.60
	10/10/2007			15.23		227.17
	10/19/2007			15.41		226.99
	10/29/2007			15.05		227.35
	11/15/2007			14.48		227.92
	11/20/2007			13.13		229.27
	12/12/2007			14.85		227.55
	12/28/2007			12.53		229.87
	1/9/2008			12.11		230.29

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-6 (cont.)	2/4/2008			11.78		230.62
	2/26/2008			11.75		230.65
	3/14/2008			10.81		231.59
	3/25/2008			11.25		231.15
	4/7/2008			12.09		230.31
	4/28/2008			10.32		232.08
	5/19/2008			9.48		232.92
	6/4/2008			11.43		230.97
	6/12/2008			10.95		231.45
	6/30/2008			12.02		230.38
	7/10/2008			12.36		230.04
	7/24/2008			12.10		230.30
	8/8/2008			13.52		228.88
	8/25/2008			14.11		228.29
	9/5/2008			14.20		228.20
	9/24/2008			13.17		229.23
	10/10/2008			13.63		228.77
	10/23/2008			14.14		228.26
	11/6/2008			13.94		228.46
	11/24/2008			14.00		228.40
	12/9/2008			13.95		228.45
	12/23/2008			12.64		229.76
	1/13/2009			12.13		230.27
	2/16/2009			13.39		229.01
	2/25/2009			13.55		228.85
	3/5/2009			13.74		228.66
	3/18/2009			13.99		228.41
	3/27/2009			14.07		228.33
	4/17/2009			13.24		229.16
	4/23/2009			11.91		230.49
	5/4/2009			12.27		230.13
	5/22/2009			11.67		230.73
	6/5/2009			11.55		230.85
	6/24/2009			11.80		230.60
	7/22/2009			13.33		229.07
EW-7	4/22/2004	243.20		10.64		232.56
	4/30/2004			10.92		232.28
	5/7/2004			10.50		232.70
	5/14/2004			11.24		231.96
	5/28/2004			11.32		231.88
	6/11/2004			9.94		233.26
	6/25/2004			11.07		232.13
	7/9/2004			12.08		231.12

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-7 (cont.)	8/12/2004			13.37		229.83
	9/14/2004			13.74		229.46
	10/28/2004			17.11		226.09
	11/23/2004			11.81		231.39
	12/20/2004			11.07		232.13
	1/28/2005			11.76		231.44
	2/22/2005			11.87		231.33
	3/31/2005			9.22		233.98
	4/25/2005			11.17		232.03
	5/17/2005			12.24		230.96
	6/30/2005			13.32		229.88
	7/22/2005			11.58		231.62
	8/19/2005			13.36		229.84
	9/7/2005			13.49		229.71
	10/18/2005			12.33		230.87
	11/16/2005			12.05		231.15
	12/20/2005			11.13		232.07
	1/12/2006			11.18		232.02
	2/17/2006			11.23		231.97
	3/29/2006			12.94		230.26
	4/21/2006			13.39		229.81
	5/23/2006			13.68		229.52
	6/27/2006			12.87		230.33
	7/7/2006			10.83		232.37
	7/26/2006			10.83		232.37
	8/16/2006			13.46		229.74
	8/31/2006			14.05		229.15
	9/11/2006			12.63		230.57
	9/22/2006			12.60		230.60
	10/26/2006			13.03		230.17
	11/13/2006			12.66		230.54
	12/6/2006			11.80		231.40
	12/27/2006			12.24		230.96
	1/10/2007			11.69		231.51
	1/25/2007			12.23		230.97
	2/7/2007			12.81		230.39
	2/22/2007			8.62		234.58
	3/9/2007			11.69		231.51
	3/22/2007			10.77		232.43
	4/5/2007			11.61		231.59
	4/19/2007			11.09		232.11
	5/4/2007			11.61		231.59
	5/21/2007			12.63		230.57

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-7 (cont.)	6/1/2007			12.98		230.22
	6/12/2007			13.48		229.72
	6/27/2007			13.98		229.22
	7/10/2007			14.26		228.94
	7/23/2007			14.42		228.78
	8/7/2007			14.70		228.50
	8/15/2007			14.87		228.33
	8/28/2007			14.02		229.18
	9/12/2007			14.44		228.76
	9/25/2007			14.73		228.47
	10/10/2007			15.11		228.09
	10/19/2007			15.29		227.91
	10/29/2007			14.90		228.30
	11/15/2007			14.78		228.42
	11/20/2007			14.35		228.85
	12/12/2007			14.18		229.02
	12/28/2007			13.69		229.51
	1/9/2008			13.34		229.86
	2/4/2008			12.99		230.21
	2/26/2008			12.45		230.75
	3/14/2008			11.63		231.57
	3/25/2008			11.87		231.33
	4/7/2008			12.44		230.76
	4/28/2008			10.79		232.41
	5/19/2008			10.24		232.96
	6/4/2008			12.16		231.04
	6/12/2008			11.73		231.47
	6/30/2008			12.54		230.66
	8/8/2008			13.36		229.84
	8/25/2008			13.95		229.25
	9/5/2008			14.04		229.16
	9/24/2008			13.02		230.18
	10/10/2008			13.47		229.73
	11/6/2008			13.85		229.35
	11/24/2008			13.94		229.26
	12/9/2008			13.88		229.32
	12/23/2008			12.61		230.59
	1/13/2009			12.09		231.11
	2/16/2009			13.30		229.90
	2/25/2009			13.50		229.70
	3/5/2009			13.65		229.55
	3/18/2009			13.86		229.34
	3/27/2009			13.94		229.26

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
EW-7 (cont.)	4/17/2009			13.12		230.08
	4/23/2009			11.93		231.27
	5/4/2009			12.21		230.99
	5/22/2009			11.60		231.60
	6/5/2009			11.51		231.69
	6/24/2009			11.70		231.50
	7/22/2009			13.22		229.98
CS-1	9/12/2007	239.38		9.84		229.54
	9/25/2007			9.99		229.39
	10/19/2007		10.80	10.91	0.11	228.57
	10/29/2007		9.83	9.84	0.01	229.55
	11/20/2007		9.81	9.82	0.01	229.57
	12/3/2007			9.84		229.54
	12/12/2007			9.81		229.57
	12/28/2007		9.61	9.62	0.01	229.77
	1/9/2008			9.58		229.80
	2/4/2008		9.14	9.16	0.02	230.24
	2/26/2008			8.43		230.95
	3/14/2008			8.48		230.90
	3/25/2008			8.58		230.80
	4/7/2008			8.85		230.53
	4/28/2008			8.63		230.75
	5/19/2008			7.85		231.53
	6/4/2008			8.13		231.25
	6/12/2008		8.59	8.60	0.01	230.78
	6/30/2008			8.78		230.60
	7/10/2008			9.65		229.73
	7/24/2008			9.81		229.57
	8/8/2008			9.70		229.68
	8/25/2008			9.81		229.57
	9/5/2008			9.90		229.48
	9/24/2008			9.28		230.10
CS-2	9/12/2007	236.90		7.73		229.17
	9/25/2007		7.97	7.98	0.01	228.93
	10/10/2007			6.30		230.60
	10/19/2007			8.48		228.42
	10/29/2007		8.00	8.01	0.01	228.90
	11/20/2007		7.74	7.76	0.02	229.16
	12/3/2007		7.64	7.65	0.01	229.26
	12/12/2007			7.54		229.36
	12/28/2007		7.13	7.14	0.01	229.77
	1/9/2008			7.11		229.79
	2/4/2008			6.65		230.25

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
CS-2 (cont.)	2/26/2008			6.44		230.46
	3/14/2008			6.02		230.88
	3/25/2008			6.10		230.80
	4/7/2008			6.37		230.53
	4/28/2008			6.27		230.63
	5/19/2008			5.42		231.48
	6/4/2008			5.79		231.11
	6/12/2008			6.12		230.78
	6/30/2008			6.23		230.67
	7/10/2008			7.20		229.70
	7/24/2008			7.35		229.55
	8/8/2008			7.25		229.65
	8/25/2008			7.65		229.25
	9/5/2008			7.73		229.17
	9/24/2008			6.81		230.09
CS-3	9/12/2007	235.13		6.04		229.09
	9/25/2007			6.29		228.84
	10/10/2007			6.62		228.51
	10/19/2007			6.80		228.33
	10/29/2007			6.32		228.81
	11/20/2007			6.09		229.04
	12/3/2007			5.95		229.18
	12/12/2007			5.88		229.25
	12/28/2007			5.49		229.64
	1/9/2008			5.05		230.08
	2/4/2008			5.05		230.08
	2/26/2008		4.95	4.96	0.01	230.18
	3/14/2008			4.55		230.58
	3/25/2008			4.63		230.50
	4/7/2008			4.83		230.30
	4/28/2008			4.61		230.52
	5/19/2008			4.04		231.09
	6/4/2008			4.26		230.87
	6/12/2008			4.61		230.52
	6/30/2008			4.74		230.39
	7/10/2008			5.50		229.63
	7/24/2008			6.62		228.51
	8/8/2008			5.62		229.51
	8/25/2008			6.02		229.11
	9/5/2008			6.13		229.00
	9/24/2008			5.20		229.93
CS-4	9/12/2007	234.81		5.69		229.12
	9/25/2007			5.93		228.88

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
CS-4 (cont.)	10/10/2007			6.25		228.56
	10/19/2007			6.43		228.38
	10/29/2007			5.95		228.86
	11/20/2007			5.72		229.09
	12/3/2007			5.61		229.20
	12/12/2007			5.49		229.32
	12/28/2007			5.14		229.67
	1/9/2008			5.11		229.70
	2/4/2008			4.69		230.12
	2/26/2008			4.61		230.20
	3/14/2008			4.24		230.57
	3/25/2008			4.29		230.52
	4/7/2008			4.49		230.32
	4/28/2008			4.31		230.50
	5/19/2008			3.71		231.10
	6/4/2008			3.94		230.87
	6/12/2008			4.29		230.52
	6/30/2008			4.39		230.42
	7/10/2008			5.24		229.57
	7/24/2008			5.39		229.42
	8/8/2008			5.29		229.52
	8/25/2008			5.67		229.14
	9/5/2008			5.76		229.05
	9/24/2008			4.85		229.96
CS-5	9/12/2007	232.45		5.91		226.54
	9/25/2007			6.92		225.53
	10/10/2007			7.41		225.04
	10/19/2007			7.53		224.92
	10/29/2007			5.88		226.57
	11/20/2007			4.94		227.51
	12/3/2007			5.41		227.04
	12/12/2007			4.93		227.52
	12/28/2007			2.73		229.72
	1/9/2008			4.77		227.68
	2/4/2008			2.25		230.20
	2/26/2008			2.19		230.26
	3/14/2008			1.82		230.63
	3/25/2008			1.90		230.55
	4/7/2008			2.08		230.37
	4/28/2008			2.28		230.17
	5/19/2008			1.35		231.10
	6/4/2008			1.65		230.80
	6/12/2008			1.88		230.57

Appendix B-1
Well Gauging Data Summary Table
January 1995 through June 2009
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	Depth-to-LPH (ft TOC)	Depth-to-water (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)
CS-5 (cont.)	6/30/2008			2.11		230.34
	7/10/2008			2.94		229.51
	7/24/2008			3.09		229.36
	8/8/2008			2.99		229.46
	8/25/2008			4.70		227.75
	9/5/2008			4.79		227.66
	9/24/2008			2.43		230.02

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-01	6/15/2010	247.20		15.81		231.39	--		
MW-01	9/21/2010	247.20		17.67		229.53	--		
MW-01	12/10/2010	247.20		15.81		231.39	--		
MW-01	2/14/2011	247.20		15.97		231.23	--		
MW-01	5/27/2011	247.20		14.09		233.11	--		
MW-01	8/8/2011	247.20		16.98		230.22	--		
MW-01	12/15/2011	247.20		14.34		232.86	--		
MW-01	3/21/2012	247.20		15.39		231.81	--		
MW-01	6/13/2012	247.20		15.00		232.20	--		
MW-01	9/24/2012	247.20		15.54		231.66	--		
MW-01	1/11/2013	247.20		15.05		232.15	--		0
MW-02	7/14/2009	247.55	17.18	17.19	0.01	230.37	--		
MW-02	7/22/2009	247.55	17.33	17.43	0.10	230.21	--		
MW-02	8/3/2009	247.55		15.38		232.17	--		
MW-02	8/18/2009	247.55		17.37		230.18	--		
MW-02	9/3/2009	247.55	17.23	17.32	0.09	230.31	PP	0.026	
MW-02	9/18/2009	247.55	17.76	17.93	0.17	229.77	PP	0.066	
MW-02	10/6/2009	247.55	17.98	18.32	0.34	229.53	PP	0.251	
MW-02	10/19/2009	247.55	16.15	16.44	0.29	231.36	PS		
MW-02	11/5/2009	247.55	16.07	16.08	0.01	231.48	PS		
MW-02	11/12/2009	247.55		16.55		231.00	PS		
MW-02	12/4/2009	247.55		15.36		232.19	--		
MW-02	12/11/2009	247.55		12.94		234.61	--		
MW-02	12/16/2009	247.55		14.25		233.30	--		
MW-02	1/20/2010	247.55		14.86		232.69	--		
MW-02	2/16/2010	247.55		13.30		234.25	--		
MW-02	3/1/2010	247.55		12.70		234.85	--		
MW-02	3/8/2010	247.55	14.37	14.38	0.01	233.18	--		
MW-02	4/5/2010	247.55		14.47		233.08	--		
MW-02	5/3/2010	247.55		15.35		232.20	--		
MW-02	5/26/2010	247.55		13.60		233.95	--		
MW-02	6/15/2010	247.55	16.81	16.82	0.01	230.74	--		
MW-02	6/18/2010	247.55	16.80	16.81	0.01	230.75	AS	0.003	
MW-02	7/30/2010	247.55		18.21		229.34	--		
MW-02	9/2/2010	247.55	19.05	19.11	0.06	228.49	AS	0.02	
MW-02	9/21/2010	247.55	18.85	19.42	0.57	228.63	PP	0.106	
MW-02	10/13/2010	247.55	17.65	17.72	0.07	229.89	AS	0.02	
MW-02	11/4/2010	247.55		17.63		229.92	--		
MW-02	12/10/2010	247.55		16.69		230.86	--		
MW-02	1/28/2011	247.55		18.75		228.80	--		
MW-02	2/14/2011	247.55	16.71	16.76	0.05	230.83	--		
MW-02	3/4/2011	247.55	16.45	16.50	0.05	231.09	--		
MW-02	4/13/2011	247.55	12.60	12.62	0.02	234.95	AS	0.007	
MW-02	4/29/2011	247.55	11.32	11.38	0.06	236.22	--		
MW-02	5/13/2011	247.55		15.61		231.94	AS	0.013	
MW-02	5/27/2011	247.55		14.38		233.17	--		
MW-02	6/15/2011	247.55		16.86		230.69	--		
MW-02	7/14/2011	247.55		17.51		230.04	--		
MW-02	8/8/2011	247.55		17.62		229.93	--		
MW-02	9/14/2011	247.55		13.82		233.73	--		
MW-02	10/25/2011	247.55		14.37		233.18	--		
MW-02	12/15/2011	247.55					--		
MW-02	1/6/2012	247.55		15.43		232.12	--		
MW-02	1/27/2012	247.55		14.95		232.60	--		
MW-02	2/28/2012	247.55		16.50		231.05	--		
MW-02	3/21/2012	247.55		15.84		231.71	--		
MW-02	5/25/2012	247.55		12.82		234.73	--		
MW-02	6/13/2012	247.55		12.70		234.85	--		
MW-02	7/18/2012	247.55		16.88		230.67	--		
MW-02	8/16/2012	247.55		17.03		230.52	--		
MW-02	9/24/2012	247.55		15.26		232.29	--		
MW-02	12/14/2012	247.55		16.23		231.32	--		
MW-02	1/11/2013	247.55		15.23		232.32	--		0.512
MW-03	6/15/2010	248.38		16.30		232.08	--		
MW-03	9/21/2010	248.38		18.76		229.62	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-03	12/10/2010	248.38		16.74		231.64	--		
MW-03	2/14/2011	248.38		17.21		231.17	--		
MW-03	5/26/2011	248.38		14.57		233.81	--		
MW-03	8/8/2011	248.38		17.72		230.66	--		
MW-03	12/15/2011	248.38					--		
MW-03	3/21/2012	248.38		16.06		232.32	--		
MW-03	6/13/2012	248.38		15.71		232.67	--		
MW-03	9/24/2012	248.38		16.63		231.75	26.26		
MW-03	1/11/2013	248.38		16.02		232.36	--		0
MW-04R	7/14/2009	244.68		13.50		231.18	--		
MW-04R	7/22/2009	244.68		13.70		230.98	--		
MW-04R	8/3/2009	244.68	12.78	13.01	0.23	231.87	--		
MW-04R	8/18/2009	244.68	14.18	14.25	0.07	230.49	PS	0.145	
MW-04R	9/3/2009	244.68	13.60	13.97	0.37	231.03	PS	0.066	
MW-04R	9/18/2009	244.68	14.14	14.23	0.09	230.53	PS	0.568	
MW-04R	10/6/2009	244.68	14.32	14.61	0.29	230.32	PS	0.092	
MW-04R	10/19/2009	244.68	13.39	13.42	0.03	231.29	PS	0.713	
MW-04R	11/5/2009	244.68	12.76	12.80	0.04	231.91	PS	0.174	
MW-04R	11/12/2009	244.68	12.70	12.78	0.08	231.97	PS	0.066	
MW-04R	12/4/2009	244.68	12.29	12.32	0.03	232.39	PS	0.264	
MW-04R	12/11/2009	244.68		11.04		233.64	PS	0.026	
MW-04R	12/16/2009	244.68	11.81	11.82	0.01	232.87	--		
MW-04R	1/20/2010	244.68		11.28		233.40	--		
MW-04R	2/16/2010	244.68		12.00		232.68	--		
MW-04R	3/1/2010	244.68		8.54		236.14	--		
MW-04R	4/5/2010	244.68		10.21		234.47	--		
MW-04R	5/3/2010	244.68		11.60		233.08	--		
MW-04R	5/26/2010	244.68		9.92		234.76	--		
MW-04R	6/15/2010	244.68		13.15		231.53	--		
MW-04R	7/30/2010	244.68		14.57		230.11	--		
MW-04R	9/2/2010	244.68	15.29	15.35	0.06	229.38	AS	0.013	
MW-04R	9/21/2010	244.68	15.29	15.74	0.45	229.33	PP	0.092	
MW-04R	10/13/2010	244.68	13.98	14.19	0.21	230.67	AS	0.04	
MW-04R	11/4/2010	244.68	13.65	13.72	0.07	231.02	AS	0.02	
MW-04R	12/10/2010	244.68	13.16	13.24	0.08	231.51	--		
MW-04R	1/28/2011	244.68		14.65		230.03	--		
MW-04R	2/14/2011	244.68	12.93	13.13	0.20	231.72	--		
MW-04R	3/4/2011	244.68	11.74	12.03	0.29	232.90	--		
MW-04R	4/13/2011	244.68		8.40		236.28	--		
MW-04R	4/29/2011	244.68	8.15	8.16	0.01	236.53	--		
MW-04R	5/26/2011	244.68		13.63		231.05	--		
MW-04R	6/15/2011	244.68	12.86	12.94	0.08	231.81	--		
MW-04R	7/14/2011	244.68		13.35		231.33	--		
MW-04R	8/8/2011	244.68	14.50	14.51	0.01	230.18	--		
MW-04R	9/14/2011	244.68		10.94		233.74	--		
MW-04R	10/25/2011	244.68		11.19		233.49	--		
MW-04R	12/15/2011	244.68		10.71		233.97	--		
MW-04R	1/27/2012	244.68		10.41		234.27	--		
MW-04R	2/28/2012	244.68		13.25		231.43	--		
MW-04R	3/21/2012	244.68		12.59		232.09	--		
MW-04R	5/25/2012	244.68		7.36		237.32	--		
MW-04R	6/13/2012	244.68		7.54		237.14	--		
MW-04R	7/18/2012	244.68		13.71		230.97	--		
MW-04R	8/16/2012	244.68		13.85		230.83	--		
MW-04R	9/24/2012	244.68		12.37		232.31	--		
MW-04R	12/14/2012	244.68		13.04		231.64	--		
MW-04R	1/11/2013	244.68		12.25		232.43	--		2.279
MW-05	6/15/2010	245.37		13.85		231.52	--		
MW-05	9/21/2010	245.37		15.93		229.44	--		
MW-05	12/10/2010	245.37		13.97		231.40	--		
MW-05	2/14/2011	245.37		14.22		231.15	--		
MW-05	5/27/2011	245.37		11.98		233.39	--		
MW-05	8/8/2011	245.37		15.12		230.25	--		
MW-05	12/15/2011	245.37		12.33		233.04	--		
MW-05	3/20/2012	245.37		13.38		231.99	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-05	6/13/2012	245.37		13.10		232.27	--		
MW-05	9/24/2012	245.37		13.84		231.53	--		
MW-05	1/11/2013	245.37		13.12		232.25	--		0
MW-06R	6/15/2010	233.63		6.55		227.08	--		
MW-06R	9/21/2010	233.63		8.98		224.65	--		
MW-06R	12/10/2010	233.63		6.42		227.21	--		
MW-06R	2/14/2011	233.63		6.19		227.44	--		
MW-06R	5/26/2011	233.63		4.68		228.95	--		
MW-06R	8/8/2011	233.63		8.34		225.29	--		
MW-06R	12/15/2011	233.63		4.53		229.10	--		
MW-06R	3/21/2012	233.63		5.00		228.63	--		
MW-06R	6/13/2012	233.63		4.89		228.74	--		
MW-06R	9/24/2012	233.63		5.95		227.68	14.52		
MW-06R	1/11/2013	233.63		4.98		228.65	--		0
MW-08	6/15/2010	235.51		12.98		222.53	--		
MW-08	9/21/2010	235.51		15.74		219.77	--		
MW-08	12/10/2010	235.51		13.96		221.55	--		
MW-08	2/14/2011	235.51		13.28		222.23	--		
MW-08	5/26/2011	235.51		9.94		225.57	--		
MW-08	8/8/2011	235.51		15.11		220.40	--		
MW-08	12/15/2011	235.51		10.11		225.40	--		
MW-08	3/20/2012	235.51		11.13		224.38	--		
MW-08	6/13/2012	235.51		11.95		223.56	--		
MW-08	9/24/2012	235.51		14.68		220.83	--		
MW-08	1/11/2013	235.51		11.23		224.28	--		0
MW-09	6/15/2010	237.54		13.45		224.09	--		
MW-09	9/21/2010	237.54		15.11		222.43	--		
MW-09	12/10/2010	237.54		13.41		224.13	--		
MW-09	2/14/2011	237.54		13.03		224.51	--		
MW-09	5/26/2011	237.54		11.92		225.62	--		
MW-09	8/8/2011	237.54		14.53		223.01	--		
MW-09	12/15/2011	237.54		11.84		225.70	--		
MW-09	3/20/2012	237.54		12.18		225.36	--		
MW-09	6/13/2012	237.54		12.20		225.34	--		
MW-09	9/24/2012	237.54		12.92		224.62	--		
MW-09	1/11/2013	237.54		12.19		225.35	--		0
MW-20	6/15/2010	236.27		8.68		227.59	--		
MW-20	9/21/2010	236.27		9.99		226.28	--		
MW-20	12/10/2010	236.27		8.30		227.97	--		
MW-20	2/14/2011	236.27		8.40		227.87	--		
MW-20	5/26/2011	236.27		6.33		229.94	--		
MW-20	8/8/2011	236.27		9.62		226.65	--		
MW-20	12/15/2011	236.27		6.64		229.63	--		
MW-20	3/20/2012	236.27		7.34		228.93	--		
MW-20	6/13/2012	236.27		7.23		229.04	--		
MW-20	9/24/2012	236.27		8.59		227.68	--		
MW-20	1/11/2013	236.27		7.52		228.75	--		0
MW-21	6/15/2010	244.26		12.38		231.88	--		
MW-21	9/21/2010	244.26		12.73		231.53	--		
MW-21	12/10/2010	244.26		11.92		232.34	--		
MW-21	2/14/2011	244.26		12.70		231.56	--		
MW-21	5/27/2011	244.26		11.62		232.64	--		
MW-21	8/8/2011	244.26		12.68		231.58	--		
MW-21	12/15/2011	244.26		11.81		232.45	--		
MW-21	3/21/2012	244.26		12.44		231.82	--		
MW-21	6/13/2012	244.26		11.98		232.28	--		
MW-21	9/24/2012	244.26		11.68		232.58	--		
MW-21	1/11/2013	244.26		12.33		231.93	--		0
MW-22	6/15/2010	245.65		13.52		232.13	--		
MW-22	9/21/2010	245.65		15.61		230.04	--		
MW-22	12/10/2010	245.65		13.72		231.93	--		
MW-22	2/14/2011	245.65		13.95		231.70	--		
MW-22	5/26/2011	245.65		11.25		234.40	--		
MW-22	8/8/2011	245.65		14.70		230.95	--		
MW-22	12/15/2011	245.65		11.45		234.20	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-22	3/21/2012	245.65		13.07		232.58	--		
MW-22	6/13/2012	245.65		12.78		232.87	--		
MW-22	9/24/2012	245.65		13.52		232.13	18.11		
MW-22	1/11/2013	245.65		12.84		232.81	--		0
MW-23	7/14/2009	244.57		13.20		231.37	--		
MW-23	7/22/2009	244.57	13.49	13.50	0.01	231.08	--		
MW-23	8/18/2009	244.57	13.51	13.53	0.02	231.06	PP	0.026	
MW-23	9/18/2009	244.57		13.75		230.82	--		
MW-23	10/6/2009	244.57		13.78		230.79	--		
MW-23	10/19/2009	244.57		10.83		233.74	--		
MW-23	11/5/2009	244.57	12.28	12.29	0.01	232.29	--		
MW-23	11/12/2009	244.57		12.83		231.74	--		
MW-23	12/4/2009	244.57		9.48		235.09	--		
MW-23	1/20/2010	244.57		4.41		240.16	--		
MW-23	2/16/2010	244.57		11.04		233.53	--		
MW-23	4/5/2010	244.57		10.81		233.76	--		
MW-23	5/3/2010	244.57		11.45		233.12	--		
MW-23	5/26/2010	244.57		9.62		234.95	--		
MW-23	6/15/2010	244.57		12.95		231.62	--		
MW-23	7/30/2010	244.57		13.77		230.80	--		
MW-23	9/2/2010	244.57		13.19		231.38	--		
MW-23	9/21/2010	244.57		13.75		230.82	--		
MW-23	10/13/2010	244.57		13.75		230.82	--		
MW-23	11/4/2010	244.57		13.57		231.00	--		
MW-23	12/10/2010	244.57		13.07		231.50	--		
MW-23	1/28/2011	244.57		13.77		230.80	--		
MW-23	2/14/2011	244.57		12.10		232.47	--		
MW-23	3/4/2011	244.57		11.14		233.43	--		
MW-23	4/13/2011	244.57					--		
MW-23	5/26/2011	244.57		12.84		231.73	--		
MW-23	6/15/2011	244.57		12.65		231.92	--		
MW-23	7/14/2011	244.57		13.03		231.54	--		
MW-23	8/8/2011	244.57		13.74		230.83	--		
MW-23	9/14/2011	244.57		12.51		232.06	--		
MW-23	10/25/2011	244.57		11.05		233.52	--		
MW-23	12/15/2011	244.57		10.42		234.15	--		
MW-23	1/27/2012	244.57		8.52		236.05	--		
MW-23	2/28/2012	244.57		12.89		231.68	--		
MW-23	3/21/2012	244.57		12.03		232.54	--		
MW-23	5/25/2012	244.57		2.68		241.89	--		
MW-23	6/13/2012	244.57		1.69		242.88	--		
MW-23	7/18/2012	244.57		12.93		231.64	--		
MW-23	8/1/2012	244.57		12.78		231.79	--		
MW-23	9/24/2012	244.57		11.01		233.56	--		
MW-23	11/19/2012	244.57		10.31		234.26	--		
MW-23	12/14/2012	244.57		11.88		232.69	--		
MW-23	1/7/2013	244.57		10.52		234.05	--		
MW-23	1/11/2013	244.57		11.45		233.12	--		0.026
MW-24	6/15/2010	244.50		11.85		232.65	--		
MW-24	9/21/2010	244.50		11.02		233.48	--		
MW-24	12/10/2010	244.50		8.52		235.98	--		
MW-24	2/14/2011	244.50		8.20		236.30	--		
MW-24	5/26/2011	244.50					--		
MW-24	8/8/2011	244.50		12.34		232.16	--		
MW-24	12/15/2011	244.50					--		
MW-24	3/20/2012	244.50		11.63		232.87	--		
MW-24	6/13/2012	244.50					--		
MW-24	9/24/2012	244.50		12.98		231.52	14.1		
MW-24	1/11/2013	244.50		11.23		233.27	--		0
MW-25	6/15/2010	245.36		13.55		231.81	--		
MW-25	9/21/2010	245.36		15.85		229.51	--		
MW-25	12/10/2010	245.36		14.04		231.32	--		
MW-25	2/14/2011	245.36		14.63		230.73	--		
MW-25	5/26/2011	245.36		12.19		233.17	--		
MW-25	8/8/2011	245.36		14.83		230.53	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-25	12/15/2011	245.36		12.54		232.82	--		
MW-25	3/21/2012	245.36		13.45		231.91	--		
MW-25	6/13/2012	245.36		13.15		232.21	--		
MW-25	9/24/2012	245.36		13.98		231.38	18.9		
MW-25	1/11/2013	245.36		13.51		231.85	--		0
MW-26	7/22/2009	244.67	13.88	13.89	0.01	230.79	--		
MW-26	9/3/2009	244.67	13.92	14.06	0.14	230.73	PP	0.04	
MW-26	9/18/2009	244.67	14.35	14.50	0.15	230.30	PP	0.03	
MW-26	10/6/2009	244.67	14.61	14.67	0.06	230.05	AS		
MW-26	10/19/2009	244.67	13.83	14.08	0.25	230.81	AS	0.106	
MW-26	11/5/2009	244.67		12.99		231.68	AS	0.007	
MW-26	12/4/2009	244.67		13.08		231.59	--		
MW-26	1/20/2010	244.67		12.39		232.28	--		
MW-26	4/5/2010	244.67		11.60		233.07	--		
MW-26	5/3/2010	244.67		11.95		232.72	--		
MW-26	5/26/2010	244.67	11.59	11.75	0.16	233.06	AS	0.066	
MW-26	6/15/2010	244.67		13.60		231.07	--		
MW-26	7/30/2010	244.67	14.95	14.97	0.02	229.72	AS	0.003	
MW-26	9/2/2010	244.67	15.77	16.01	0.24	228.87	PP	0.066	
MW-26	9/21/2010	244.67	15.58	16.03	0.45	229.03	PP	0.079	
MW-26	10/13/2010	244.67	14.46	14.48	0.02	230.21	AS	0.264	
MW-26	11/4/2010	244.67		14.33		230.34	--		
MW-26	11/24/2010	244.67		14.16		230.51	AS	0.04	
MW-26	12/10/2010	244.67		13.78		230.89	--		
MW-26	1/28/2011	244.67	15.15	15.16	0.01	229.52	AS	0.003	
MW-26	2/14/2011	244.67	13.75	13.96	0.21	230.89	--		
MW-26	3/4/2011	244.67	14.46	14.66	0.20	230.18	--		
MW-26	4/13/2011	244.67	12.11	12.36	0.25	232.53	PP	0.053	
MW-26	4/20/2011	244.67	10.55	10.82	0.27	234.08	--		
MW-26	4/29/2011	244.67		11.29		233.38	AS	0.079	
MW-26	5/13/2011	244.67		12.42		232.25	AS	0.053	
MW-26	5/26/2011	244.67		13.23		231.44	--		
MW-26	6/15/2011	244.67		13.14		231.53	AS	0.053	
MW-26	7/14/2011	244.67	13.98	13.99	0.01	230.69	AS	0.026	
MW-26	8/8/2011	244.67	14.73	14.84	0.11	229.93	--		
MW-26	9/14/2011	244.67	13.30	13.50	0.20	231.34	AS	0.132	
MW-26	10/25/2011	244.67		12.51		232.16	--		
MW-26	12/15/2011	244.67		10.43		234.24	--		
MW-26	1/6/2012	244.67	12.50	12.51	0.01	232.17	AS	0.066	
MW-26	1/27/2012	244.67		12.59		232.08	--		
MW-26	2/7/2012	244.67		12.99		231.68	AS	0.079	
MW-26	2/28/2012	244.67		13.55		231.12	--		
MW-26	3/21/2012	244.67		13.08		231.59	--		
MW-26	4/27/2012	244.67	13.74	13.78	0.04	230.92	AS	0.079	
MW-26	5/25/2012	244.67		12.84		231.83	AS	0.013	
MW-26	6/13/2012	244.67	12.63	12.64	0.01	232.04	AS		
MW-26	7/18/2012	244.67	14.10	14.22	0.12	230.55	AS	0.026	
MW-26	8/16/2012	244.67	14.25	14.40	0.15	230.40	AS	0.04	
MW-26	9/24/2012	244.67	13.57	13.63	0.06	231.09	AS		
MW-26	10/8/2012	244.67	13.42	13.48	0.06	231.24	AS	0.159	
MW-26	11/19/2012	244.67		12.11		232.56	AS	0.04	
MW-26	12/14/2012	244.67		13.53		231.14	AS	0.053	
MW-26	1/7/2013	244.67		12.77		231.90	AS	0.026	
MW-26	1/11/2013	244.67		12.79		231.88	--		
MW-26	3/1/2013	244.67	12.18	12.19	0.01	232.49	AS	0.145	1.826
MW-27	6/15/2010	244.29		7.50		236.79	--		
MW-27	9/21/2010	244.29		12.71		231.58	--		
MW-27	12/10/2010	244.29		7.39		236.90	--		
MW-27	2/14/2011	244.29		7.36		236.93	--		
MW-27	5/26/2011	244.29		7.32		236.97	--		
MW-27	8/8/2011	244.29					--		
MW-27	12/15/2011	244.29					--		
MW-27	3/21/2012	244.29		7.50		236.79	--		
MW-27	6/13/2012	244.29		7.15		237.14	--		
MW-27	9/24/2012	244.29		7.45		236.84	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-27	1/11/2013	244.29		7.46		236.83	--		0
MW-28	7/14/2009	244.23	12.97	12.98	0.01	231.26	--		
MW-28	7/22/2009	244.23	13.14	13.20	0.06	231.08	--		
MW-28	8/3/2009	244.23		11.71		232.52	--		
MW-28	8/18/2009	244.23	13.25	13.32	0.07	230.97	PP	0.053	
MW-28	9/3/2009	244.23	12.98	13.05	0.07	231.24	PP	0.013	
MW-28	9/18/2009	244.23	13.48	13.57	0.09	230.74	PP	0.026	
MW-28	10/6/2009	244.23	13.77	13.80	0.03	230.46	AS		
MW-28	10/19/2009	244.23	12.85	12.90	0.05	231.37	AS	0.007	
MW-28	11/5/2009	244.23		12.33		231.90	AS	0.001	
MW-28	12/4/2009	244.23		11.71		232.52	AS	0.001	
MW-28	1/20/2010	244.23		11.48		232.75	--		
MW-28	4/5/2010	244.23		10.40		233.83	--		
MW-28	5/3/2010	244.23		11.07		233.16	--		
MW-28	5/26/2010	244.23		10.22		234.01	--		
MW-28	6/15/2010	244.23	12.60	12.61	0.01	231.63	--		
MW-28	6/18/2010	244.23	12.61	12.63	0.02	231.62	AS	0.003	
MW-28	7/30/2010	244.23		13.94		230.29	--		
MW-28	9/2/2010	244.23		14.36		229.87	--		
MW-28	9/21/2010	244.23	14.73	14.74	0.01	229.50	AS	0.003	
MW-28	10/13/2010	244.23	13.45	13.49	0.04	230.77	AS	0.006	
MW-28	12/10/2010	244.23		12.54		231.69	--		
MW-28	1/28/2011	244.23		14.35		229.88	--		
MW-28	2/14/2011	244.23		12.59		231.64	--		
MW-28	3/4/2011	244.23		12.28		231.95	--		
MW-28	4/13/2011	244.23		8.27		235.96	--		
MW-28	4/29/2011	244.23		9.53		234.70	--		
MW-28	5/27/2011	244.23		10.24		233.99	--		
MW-28	6/15/2011	244.23		12.32		231.91	--		
MW-28	7/14/2011	244.23		12.75		231.48	--		
MW-28	8/8/2011	244.23		13.83		230.40	--		
MW-28	9/14/2011	244.23	11.35	11.36	0.01	232.88	AS	0.005	
MW-28	10/25/2011	244.23	12.74	12.75	0.01	231.49	--		
MW-28	12/15/2011	244.23		10.35		233.88	--		
MW-28	1/6/2012	244.23		10.78		233.45	--		
MW-28	1/27/2012	244.23		10.78		233.45	--		
MW-28	2/28/2012	244.23		12.43		231.80	--		
MW-28	3/21/2012	244.23		11.50		232.73	--		
MW-28	5/25/2012	244.23	9.06	9.09	0.03	235.17	AS	0.013	
MW-28	6/13/2012	244.23	10.70	10.71	0.01	233.53	--		
MW-28	7/18/2012	244.23		12.43		231.80	--		
MW-28	8/16/2012	244.23		12.38		231.85	--		
MW-28	9/24/2012	244.23		10.71		233.52	--		
MW-28	12/14/2012	244.23		12.03		232.20	--		
MW-28	1/11/2013	244.23		10.83		233.40	--		0.131
MW-29	6/15/2010	243.74		13.89		229.85	--		
MW-29	9/21/2010	243.74		15.48		228.26	--		
MW-29	12/10/2010	243.74		13.81		229.93	--		
MW-29	2/14/2011	243.74		14.07		229.67	--		
MW-29	5/27/2011	243.74		12.64		231.10	--		
MW-29	8/8/2011	243.74		14.63		229.11	--		
MW-29	12/15/2011	243.74		12.68		231.06	--		
MW-29	3/21/2012	243.74		13.30		230.44	--		
MW-29	6/13/2012	243.74		7.15		236.59	--		
MW-29	9/24/2012	243.74		13.18		230.56	23.33		
MW-29	1/11/2013	243.74		13.25		230.49	--		0
MW-30	7/22/2009	245.46		14.23		231.23	--		
MW-30	8/18/2009	245.46		14.28		231.18	--		
MW-30	9/18/2009	245.46		14.60		230.86	--		
MW-30	10/6/2009	245.46		14.81		230.65	--		
MW-30	10/19/2009	245.46		13.22		232.24	--		
MW-30	11/5/2009	245.46		12.83		232.63	--		
MW-30	12/4/2009	245.46		12.10		233.36	--		
MW-30	1/20/2010	245.46		12.41		233.05	--		
MW-30	2/16/2010	245.46		11.55		233.91	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-30	4/5/2010	245.46		11.37		234.09	--		
MW-30	5/3/2010	245.46		11.94		233.52	--		
MW-30	5/26/2010	245.46		10.24		235.22	--		
MW-30	6/15/2010	245.46		13.66		231.80	--		
MW-30	9/2/2010	245.46		15.49		229.97	--		
MW-30	9/21/2010	245.46	15.78	15.79	0.01	229.68	--		
MW-30	10/13/2010	245.46		14.19		231.27	--		
MW-30	11/4/2010	245.46		14.50		230.96	--		
MW-30	12/10/2010	245.46		13.56		231.90	--		
MW-30	1/28/2011	245.46		15.19		230.27	--		
MW-30	2/14/2011	245.46		12.74		232.72	--		
MW-30	3/4/2011	245.46		11.93		233.53	--		
MW-30	4/13/2011	245.46		9.42		236.04	--		
MW-30	5/27/2011	245.46		10.18		235.28	--		
MW-30	6/15/2011	245.46		15.38		230.08	--		
MW-30	7/14/2011	245.46		13.43		232.03	--		
MW-30	8/8/2011	245.46		14.94		230.52	--		
MW-30	9/14/2011	245.46		11.80		233.66	--		
MW-30	10/25/2011	245.46		11.39		234.07	--		
MW-30	12/15/2011	245.46		11.91		233.55	--		
MW-30	1/27/2012	245.46		11.54		233.92	--		
MW-30	2/28/2012	245.46		13.79		231.67	--		
MW-30	3/20/2012	245.46		13.14		232.32	--		
MW-30	5/25/2012	245.46		10.67		234.79	--		
MW-30	6/13/2012	245.46		12.22		233.24	--		
MW-30	7/18/2012	245.46		14.25		231.21	--		
MW-30	9/24/2012	245.46		12.66		232.80	--		
MW-30	12/14/2012	245.46		13.70		231.76	--		
MW-30	1/11/2013	245.46		12.51		232.95	--		0
MW-31	7/22/2009	244.79		12.81		231.98	--		
MW-31	9/18/2009	244.79		11.60		233.19	--		
MW-31	10/6/2009	244.79		9.94		234.85	--		
MW-31	10/19/2009	244.79		6.44		238.35	--		
MW-31	11/5/2009	244.79		7.03		237.76	--		
MW-31	12/4/2009	244.79		6.57		238.22	--		
MW-31	1/20/2010	244.79		6.33		238.46	--		
MW-31	4/5/2010	244.79		7.14		237.65	--		
MW-31	5/3/2010	244.79		7.12		237.67	--		
MW-31	5/26/2010	244.79		6.79		238.00	--		
MW-31	6/15/2010	244.79		9.64		235.15	--		
MW-31	7/30/2010	244.79		11.28		233.51	--		
MW-31	9/2/2010	244.79		14.13		230.66	--		
MW-31	9/21/2010	244.79		14.35		230.44	--		
MW-31	11/4/2010	244.79		7.29		237.50	--		
MW-31	12/10/2010	244.79		7.29		237.50	--		
MW-31	2/14/2011	244.79		6.84		237.95	--		
MW-31	3/4/2011	244.79		6.62		238.17	--		
MW-31	4/13/2011	244.79					--		
MW-31	5/27/2011	244.79		7.11		237.68	--		
MW-31	7/14/2011	244.79		10.36		234.43	--		
MW-31	8/8/2011	244.79		13.55		231.24	--		
MW-31	12/15/2011	244.79		7.15		237.64	--		
MW-31	3/21/2012	244.79		7.76		237.03	--		
MW-31	6/13/2012	244.79		7.35		237.44	--		
MW-31	9/24/2012	244.79		7.01		237.78	--		
MW-31	1/11/2013	244.79		7.30		237.49	--		0
MW-32	7/14/2009	245.80	13.65	13.90	0.25	232.12	--		
MW-32	7/16/2009	245.80	13.54	13.75	0.21	232.23	PP	0.238	
MW-32	7/22/2009	245.80	13.85	14.03	0.18	231.93	--		
MW-32	8/3/2009	245.80	12.99	13.30	0.31	232.77	--		
MW-32	8/18/2009	245.80	13.96	13.98	0.02	231.84	PS	0.317	
MW-32	9/3/2009	245.80	13.82	13.86	0.04	231.97	PS	0.132	
MW-32	9/18/2009	245.80	14.56	14.65	0.09	231.23	PS	0.159	
MW-32	10/6/2009	245.80	14.82	14.84	0.02	230.98	PS	0.291	
MW-32	10/19/2009	245.80	13.76	13.78	0.02	232.04	PS	0.159	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-32	11/5/2009	245.80	13.00	13.01	0.01	232.80	PS	0.066	
MW-32	11/12/2009	245.80		13.17		232.63	PS		
MW-32	12/4/2009	245.80	12.93	12.95	0.02	232.87	PS	0.198	
MW-32	12/11/2009	245.80		11.74		234.06	PS	0.007	
MW-32	12/16/2009	245.80	11.88	11.91	0.03	233.92	PS	0.003	
MW-32	12/29/2009	245.80	10.43	10.58	0.10	235.31	PS	0.003	
MW-32	1/20/2010	245.80	12.24	12.25	0.01	233.56	PS	0.003	
MW-32	2/16/2010	245.80	11.80	11.97	0.17	233.98	--		
MW-32	3/1/2010	245.80	9.65	9.97	0.32	236.11	--		
MW-32	3/8/2010	245.80	11.27	11.29	0.02	234.53	PS	0.225	
MW-32	4/5/2010	245.80	11.30	11.33	0.03	234.50	PS	0.001	
MW-32	5/3/2010	245.80	12.07	12.09	0.02	233.73	PS		
MW-32	5/26/2010	245.80		11.75		234.05	PS	0.003	
MW-32	6/15/2010	245.80					--		
MW-32	6/18/2010	245.80	14.23	14.24	0.01	231.57	PS	0.003	
MW-32	10/13/2010	245.80					--		
MW-32	11/4/2010	245.80					--		
MW-32	12/3/2010	245.80	13.42	13.47	0.05	232.37	PS	0.003	
MW-32	12/10/2010	245.80	14.09	14.11	0.02	231.71	--		
MW-32	12/21/2010	245.80	14.20	14.21	0.01	231.60	PS	0.003	
MW-32	1/6/2011	245.80	14.63	14.74	0.11	231.16	PS	0.001	
MW-32	1/28/2011	245.80	14.78	14.79	0.01	231.02	PS	0.007	
MW-32	2/14/2011	245.80	14.46	14.47	0.01	231.34	--		
MW-32	2/18/2011	245.80	14.58	14.60	0.02	231.22	PS	0.396	
MW-32	3/4/2011	245.80	14.35	14.36	0.01	231.45	PS	0.053	
MW-32	3/22/2011	245.80	12.25	12.27	0.02	233.55	PS	0.005	
MW-32	4/13/2011	245.80	12.45	12.46	0.01	233.35	PS	0.005	
MW-32	4/20/2011	245.80	9.76	9.81	0.05	236.03	PS	0.026	
MW-32	4/29/2011	245.80	10.90	10.93	0.03	234.90	PS	0.003	
MW-32	5/13/2011	245.80	12.33	12.34	0.01	233.47	PS	0.003	
MW-32	5/26/2011	245.80	13.31	13.33	0.02	232.49	--		
MW-32	6/15/2011	245.80	13.09	13.10	0.01	232.71	PS	0.005	
MW-32	7/21/2011	245.80		14.15		231.65	PS	0.026	
MW-32	8/8/2011	245.80	14.93	14.95	0.02	230.87	--		
MW-32	8/17/2011	245.80	14.95	15.00	0.05	230.84	PS	0.003	
MW-32	8/24/2011	245.80	14.97	15.01	0.04	230.82	PS	0.005	
MW-32	9/1/2011	245.80	15.20	15.23	0.03	230.60	PS	0.005	
MW-32	9/14/2011	245.80	13.15	13.20	0.05	232.64	PS	0	
MW-32	10/6/2011	245.80	12.66	12.70	0.04	233.13	PP	0.003	
MW-32	10/25/2011	245.80	12.34	12.35	0.10	233.54	PS	0	
MW-32	11/15/2011	245.80		13.63		232.17	PS	0.013	
MW-32	12/8/2011	245.80	12.61	12.62	0.01	233.19	PS	0	
MW-32	12/15/2011	245.80	11.88	11.93	0.05	233.91	--		
MW-32	12/21/2011	245.80	12.89	12.90	0.01	232.91	PS	0.003	
MW-32	1/6/2012	245.80	12.80	12.83	0.03	233.00	PS	0.003	
MW-32	1/27/2012	245.80					--		
MW-32	2/7/2012	245.80	13.24	13.32	0.08	232.55	PS	0.001	
MW-32	2/28/2012	245.80	13.34	13.36	0.02	232.46	PS	0.007	
MW-32	3/3/2012	245.80	12.32	12.35	0.03	233.48	PS	0.159	
MW-32	3/21/2012	245.80	13.95	13.97	0.02	231.85	--		
MW-32	3/27/2012	245.80	13.50	13.54	0.04	232.29	PS	0.013	
MW-32	4/13/2012	245.80	14.06	14.07	0.01	231.74	AS	0.132	
MW-32	4/27/2012	245.80	13.98	13.99	0.01	231.82	AS	0.106	
MW-32	5/25/2012	245.80		12.81		232.99	AS	0.013	
MW-32	6/7/2012	245.80		12.43		233.37	AS	0.013	
MW-32	6/13/2012	245.80		12.79		233.01	AS		
MW-32	6/21/2012	245.80		14.23		231.57	AS	0.001	
MW-32	7/18/2012	245.80		14.29		231.51	AS	0.106	
MW-32	8/16/2012	245.80	14.59	14.60	0.01	231.21	AS	0.172	
MW-32	9/24/2012	245.80	13.54	13.59	0.05	232.25	AS		
MW-32	10/8/2012	245.80	13.56	13.59	0.03	232.24	AS	0.132	
MW-32	11/19/2012	245.80	12.14	12.15	0.01	233.66	AS	0.145	
MW-32	12/14/2012	245.80		13.55		232.25	AS	0.066	
MW-32	1/7/2013	245.80		12.78		233.02	AS	0.04	
MW-32	1/11/2013	245.80		12.60		233.20	--		3.485

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-33	7/14/2009	244.26	12.49	12.50	0.01	231.77	--		
MW-33	8/3/2009	244.26		12.19		232.07	--		
MW-33	9/18/2009	244.26		12.97		231.29	--		
MW-33	10/6/2009	244.26	13.24	13.25	0.01	231.02	--		
MW-33	12/4/2009	244.26					--		
MW-33	5/3/2010	244.26					--		
MW-33	5/11/2010	244.26					--		
MW-33	5/26/2010	244.26		11.60		232.66	--		
MW-33	6/15/2010	244.26					--		
MW-33	7/30/2010	244.26		13.00		231.26	--		
MW-33	9/2/2010	244.26		12.47		231.79	--		
MW-33	10/13/2010	244.26		12.72		231.54	--		
MW-33	11/4/2010	244.26					--		
MW-33	12/10/2010	244.26		12.25		232.01	--		
MW-33	1/28/2011	244.26		13.51		230.75	--		
MW-33	2/14/2011	244.26		13.14		231.12	--		
MW-33	3/4/2011	244.26		12.81		231.45	--		
MW-33	4/13/2011	244.26					PS		
MW-33	5/26/2011	244.26		11.49		232.77	--		
MW-33	6/15/2011	244.26		12.05		232.21	--		
MW-33	7/14/2011	244.26		12.30		231.96	--		
MW-33	8/8/2011	244.26		12.71		231.55	--		
MW-33	9/14/2011	244.26		12.25		232.01	--		
MW-33	10/25/2011	244.26					--		
MW-33	12/15/2011	244.26					--		
MW-33	1/27/2012	244.26					--		
MW-33	2/7/2012	244.26					--		
MW-33	2/28/2012	244.26					--		
MW-33	3/20/2012	244.26		12.10		232.16	--		
MW-33	5/25/2012	244.26		12.15		232.11	--		
MW-33	6/13/2012	244.26		11.93		232.33	--		
MW-33	7/18/2012	244.26		12.79		231.47	--		
MW-33	9/24/2012	244.26		12.36		231.90	--		
MW-33	12/14/2012	244.26		12.41		231.85	--		
MW-33	1/11/2013	244.26		12.16		232.10	--		0
MW-35	6/15/2010	245.80		14.00		231.80	--		
MW-35	9/21/2010	245.80		16.37		229.43	--		
MW-35	12/10/2010	245.80		14.51		231.29	--		
MW-35	2/14/2011	245.80		15.03		230.77	--		
MW-35	5/26/2011	245.80		12.58		233.22	--		
MW-35	8/8/2011	245.80		15.29		230.51	--		
MW-35	12/15/2011	245.80		12.84		232.96	--		
MW-35	3/21/2012	245.80		13.89		231.91	--		
MW-35	6/13/2012	245.80		13.62		232.18	--		
MW-35	9/24/2012	245.80		14.45		231.35	--		
MW-35	1/11/2013	245.80		13.90		231.90	--		0
MW-37	7/14/2009	245.06	13.61	14.09	0.48	231.39	--		
MW-37	7/16/2009	245.06	13.54	13.75	0.51	231.75	PP	0.264	
MW-37	7/22/2009	245.06	13.88	14.60	0.72	231.09	--		
MW-37	8/3/2009	245.06	13.16	13.58	0.42	231.85	--		
MW-37	8/18/2009	245.06	13.95	14.35	0.40	231.06	PS	0.238	
MW-37	9/3/2009	245.06	13.90	13.94	0.04	231.15	PS	0.608	
MW-37	9/18/2009	245.06	14.41	14.67	0.26	230.62	PS		
MW-37	10/6/2009	245.06	14.66	14.86	0.20	230.37	PS	0.37	
MW-37	10/19/2009	245.06	13.90	13.91	0.01	231.16	PS	0.363	
MW-37	11/5/2009	245.06	13.18	13.19	0.01	231.88	PS	0.079	
MW-37	11/12/2009	245.06	13.28	13.32	0.04	231.77	PS		
MW-37	12/4/2009	245.06	13.02	13.06	0.04	232.03	PS	0.225	
MW-37	12/11/2009	245.06	12.05	12.11	0.06	233.00	PS	0.004	
MW-37	12/16/2009	245.06	12.10	12.11	0.01	232.96	PS	0.003	
MW-37	12/29/2009	245.06	11.48	11.50	0.02	233.58	PS	0.003	
MW-37	1/20/2010	245.06	12.47	12.83	0.36	232.54	--		
MW-37	2/16/2010	245.06	12.20	12.45	0.25	232.83	PS	0.211	
MW-37	3/1/2010	245.06	11.37	11.39	0.02	233.69	PS	0.036	
MW-37	3/8/2010	245.06	11.55	11.65	0.10	233.50	PS	0.003	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-37	4/5/2010	245.06	11.61	11.76	0.15	233.43	PS		
MW-37	5/3/2010	245.06	12.21	12.97	0.76	232.75	PS	0.013	
MW-37	5/11/2010	245.06	12.57	12.70	0.19	232.53	PS	0.581	
MW-37	5/26/2010	245.06					--		
MW-37	6/15/2010	245.06					--		
MW-37	7/30/2010	245.06	14.68	15.82	1.14	230.23	PS	0.132	
MW-37	9/2/2010	245.06	16.17	16.21	0.04	228.88	PS	0.053	
MW-37	9/21/2010	245.06	15.62	16.75	1.13	229.29	PS	0.132	
MW-37	10/13/2010	245.06	14.34	15.10	0.76	230.62	--		
MW-37	11/4/2010	245.06					PS		
MW-37	11/12/2010	245.06	13.78	13.83	0.05	231.27	PS	0.106	
MW-37	11/19/2010	245.06	13.41	13.60	0.19	231.63	PS	0.476	
MW-37	12/3/2010	245.06	13.63	14.09	0.46	231.37	PS	0.793	
MW-37	12/10/2010	245.06	13.75	13.98	0.23	231.28	--		
MW-37	12/21/2010	245.06	14.09	14.27	0.18	230.95	PS	0.793	
MW-37	1/6/2011	245.06	14.53	14.82	0.29	230.49	PS	0.007	
MW-37	1/28/2011	245.06	13.21	13.24	0.03	231.85	PS	0.317	
MW-37	2/14/2011	245.06					--		
MW-37	3/4/2011	245.06					PS		
MW-37	3/22/2011	245.06	12.33	12.35	0.02	232.73	PS	0.793	
MW-37	4/13/2011	245.06					PS		
MW-37	4/20/2011	245.06	10.95	10.98	0.03	234.11	PS	0.005	
MW-37	4/29/2011	245.06	11.43	11.52	0.09	233.62	PS	0.003	
MW-37	5/13/2011	245.06	12.41	12.69	0.28	232.61	PS	0.005	
MW-37	5/26/2011	245.06	13.94	13.98	0.04	231.11	--		
MW-37	6/9/2011	245.06	12.97	13.38	0.41	232.04	PS	0.198	
MW-37	6/15/2011	245.06	13.15	13.47	0.32	231.87	PS	0.264	
MW-37	7/14/2011	245.06					PS		
MW-37	7/21/2011	245.06	14.16	14.40	0.24	230.87	PS	0.423	
MW-37	8/8/2011	245.06	15.15	15.30	0.15	229.89	--		
MW-37	8/17/2011	245.06	14.98	15.31	0.33	230.04	PS	0.005	
MW-37	8/24/2011	245.06	15.08	15.31	0.23	229.95	PS	0.172	
MW-37	9/1/2011	245.06	15.22	15.25	0.03	229.84	PS	0.172	
MW-37	9/14/2011	245.06	13.55	13.58	0.03	231.51	PS	0.106	
MW-37	10/6/2011	245.06	12.89	13.01	0.12	232.15	PP	0.211	
MW-37	10/25/2011	245.06					--		
MW-37	11/15/2011	245.06					--		
MW-37	12/15/2011	245.06					--		
MW-37	1/27/2012	245.06					--		
MW-37	2/7/2012	245.06					--		
MW-37	2/28/2012	245.06					--		
MW-37	3/3/2012	245.06	12.41	13.87	1.46	232.46	PS	0.251	
MW-37	3/21/2012	245.06	14.00	14.50	0.50	231.00	--		
MW-37	3/27/2012	245.06	13.30	13.95	0.65	231.68	PS	0.343	
MW-37	4/13/2012	245.06	13.98	14.16	0.18	231.06	PS	0.766	
MW-37	4/27/2012	245.06	14.02	14.03	0.01	231.04	PS	0.449	
MW-37	5/11/2012	245.06	13.75	13.76	0.01	231.31	PS	0.476	
MW-37	5/25/2012	245.06	13.08	13.09	0.01	231.98	PS	0.145	
MW-37	6/7/2012	245.06	12.73	12.74	0.01	232.33	PS	0.079	
MW-37	6/13/2012	245.06	12.87	12.89	0.02	232.19	PS	0.106	
MW-37	6/21/2012	245.06	13.65	13.67	0.02	231.41	PS	0.066	
MW-37	7/3/2012	245.06	13.95	14.04	0.09	231.10	PS	0.225	
MW-37	7/18/2012	245.06	14.40	14.52	0.12	230.64	PS	0.007	
MW-37	8/1/2012	245.06	14.15	14.19	0.04	230.90	PS	0.291	
MW-37	8/16/2012	245.06	14.69	14.70	0.01	230.37	PS	0.132	
MW-37	9/7/2012	245.06	15.18	15.19	0.01	229.88	PS	0.079	
MW-37	9/24/2012	245.06	13.80	13.84	0.04	231.25	PS		
MW-37	10/8/2012	245.06	13.68	13.84	0.16	231.36	PS	0.013	
MW-37	10/24/2012	245.06	13.51	13.54	0.03	231.55	PS	0.304	
MW-37	11/19/2012	245.06	12.55	12.56	0.01	232.51	PS		
MW-37	12/14/2012	245.06					--		
MW-37	1/7/2013	245.06	13.21	13.31	0.10	231.84	PS	0.079	
MW-37	1/11/2013	245.06	13.04	13.06	0.02	232.02	--		
MW-37	2/6/2013	245.06	12.16	12.19	0.03	232.90	PS	0.003	
MW-37	3/1/2013	245.06	12.43	12.46	0.03	232.63	PS	0.053	12.034

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-38	7/14/2009	246.09	5.22	9.60	4.38	240.30	--		
MW-38	8/3/2009	246.09	4.67	9.25	4.58	240.82	SP	10	
MW-38	8/18/2009	246.09	5.60	12.60	7.00	239.58	SP	2.316	
MW-38	8/20/2009	246.09	5.44	11.67	6.23	239.84	SP	3.281	
MW-38	9/3/2009	246.09	5.11	11.61	6.50	240.14	SP	1.93	
MW-38	9/8/2009	246.09					SP	9.843	
MW-38	9/9/2009	246.09	5.65	6.15	0.50	240.38	--		
MW-38	9/18/2009	246.09	7.13	7.58	0.45	238.90	SP	6.8	
MW-38	10/6/2009	246.09	7.24	7.87	0.63	238.77	SP	15.2	
MW-38	10/19/2009	246.09	4.67	5.15	0.48	241.36	SP	3.47	
MW-38	11/5/2009	246.09	4.90	4.99	0.09	241.18	--		
MW-38	11/12/2009	246.09	5.12	5.13	0.01	240.97	SP	1.93	
MW-38	12/4/2009	246.09	4.92	5.20	0.00	240.89	SP		
MW-38	12/11/2009	246.09	4.52	4.60	0.08	241.56	SP	0.58	
MW-38	12/16/2009	246.09	4.73	4.74	0.01	241.36	SP	0.19	
MW-38	12/24/2009	246.09	4.94	5.13	0.19	241.13	SP		
MW-38	12/29/2009	246.09	4.31	4.35	0.04	241.77	SP	0.2	
MW-38	1/20/2010	246.09	4.59	4.60	0.01	241.50	PS	0.026	
MW-38	2/16/2010	246.09	4.77	4.80	0.02	241.31	PS	0.013	
MW-38	3/1/2010	246.09	4.24	4.25	0.01	241.85	PS	0.003	
MW-38	3/8/2010	246.09	4.45	4.48	0.03	241.64	--		
MW-38	4/5/2010	246.09		4.46		241.63	--		
MW-38	5/3/2010	246.09	4.73	4.77	0.04	241.35	--		
MW-38	5/26/2010	246.09	4.52	4.62	0.10	241.56	AS	0.053	
MW-38	6/15/2010	246.09	5.10	5.26	0.16	240.97	--		
MW-38	6/18/2010	246.09	5.43	5.61	0.18	240.64	PP	0.066	
MW-38	7/30/2010	246.09	8.39	8.65	0.26	237.67	AS	0.079	
MW-38	9/2/2010	246.09	9.89	10.05	0.16	236.18	PP	0.026	
MW-38	9/21/2010	246.09	9.67	10.35	0.66	236.31	PP	0.119	
MW-38	10/13/2010	246.09	4.79	5.25	0.46	241.24	--		
MW-38	11/4/2010	246.09	5.09	5.20	0.11	240.99	PS	0.007	
MW-38	11/12/2010	246.09	5.03	5.21	0.18	241.04	PS	0.026	
MW-38	11/19/2010	246.09	5.09	5.16	0.07	240.99	PS	0.026	
MW-38	12/3/2010	246.09	4.68	5.01	0.33	241.37	PS	0.079	
MW-38	12/10/2010	246.09	4.97	5.04	0.07	241.11	--		
MW-38	12/21/2010	246.09	5.20	5.42	0.22	240.86	PS	0.003	
MW-38	1/6/2011	246.09	14.89	14.99	0.10	231.19	--		
MW-38	1/28/2011	246.09	15.01	15.04	0.03	231.08	PS	0.053	
MW-38	2/14/2011	246.09	14.09	14.26	0.17	231.98	--		
MW-38	2/18/2011	246.09	15.15	15.23	0.08	230.93	PS	0.132	
MW-38	3/4/2011	246.09	5.40	5.58	0.18	240.67	PS	0.449	
MW-38	3/22/2011	246.09	4.73	4.76	0.03	241.36	PS	0.211	
MW-38	4/13/2011	246.09	4.67	4.70	0.03	241.42	PS	0.092	
MW-38	4/20/2011	246.09	4.29	4.30	0.01	241.80	PS	0.026	
MW-38	4/29/2011	246.09	4.38	4.40	0.02	241.71	PS	0.007	
MW-38	5/13/2011	246.09	4.74	4.77	0.03	241.35	PS	0.007	
MW-38	5/26/2011	246.09	5.16	5.17	0.01	240.93	--		
MW-38	6/15/2011	246.09	4.93	4.95	0.02	241.16	PS	0.066	
MW-38	7/14/2011	246.09					PS		
MW-38	7/21/2011	246.09		5.20		240.89	PS	0.317	
MW-38	8/8/2011	246.09	6.11	6.24	0.13	239.96	--		
MW-38	8/17/2011	246.09	5.17	5.80	0.63	240.84	PS	0.581	
MW-38	8/24/2011	246.09	5.17	6.58	1.41	240.74	PS	0.132	
MW-38	9/1/2011	246.09	4.98	6.02	1.04	240.97	PS	0.74	
MW-38	9/14/2011	246.09	4.61	4.62	0.01	241.48	PS	0.793	
MW-38	10/6/2011	246.09	4.50	4.55	0.05	241.58	PP	0.119	
MW-38	10/25/2011	246.09	4.52	4.54	0.02	241.57	PS	0.013	
MW-38	11/15/2011	246.09	4.85	4.87	0.02	241.24	PS	0.066	
MW-38	12/8/2011	246.09	4.54	4.56	0.02	241.55	PS	0.211	
MW-38	12/15/2011	246.09	4.67	4.69	0.02	241.42	--		
MW-38	12/21/2011	246.09	4.82	4.84	0.02	241.27	PS	0.172	
MW-38	1/6/2012	246.09	5.03	5.06	0.03	241.06	PS	0.343	
MW-38	1/27/2012	246.09	5.05	5.07	0.02	241.04	PS	0.634	
MW-38	2/7/2012	246.09	5.15	5.30	0.15	240.92	PS	0.145	
MW-38	2/28/2012	246.09		13.89		232.20	PS		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-38	3/3/2012	246.09	5.08	5.22	0.14	240.99	PS	0.74	
MW-38	3/21/2012	246.09	6.62	6.69	0.07	239.46	--		
MW-38	3/27/2012	246.09	9.61	9.88	0.27	236.44	PS	0.079	
MW-38	4/13/2012	246.09	14.35	14.36	0.01	231.74	PS	0.264	
MW-38	4/27/2012	246.09	14.83	14.84	0.01	231.26	PS	0	
MW-38	5/25/2012	246.09		4.71		241.38	PS	0.33	
MW-38	6/7/2012	246.09	4.73	4.74	0.01	241.36	PS	0.634	
MW-38	6/13/2012	246.09	4.81	4.82	0.01	241.28	PS	0.079	
MW-38	6/21/2012	246.09	5.02	5.14	0.12	241.05	PS	0.092	
MW-38	7/3/2012	246.09	5.33	5.85	0.52	240.69	PS	0.172	
MW-38	7/18/2012	246.09	5.41	6.00	0.59	240.60	PS	0.132	
MW-38	8/1/2012	246.09	4.98	4.99	0.01	241.11	PS	0.74	
MW-38	8/16/2012	246.09	5.05	6.17	1.12	240.89	PS	0.713	
MW-38	9/7/2012	246.09	5.47	7.35	1.88	240.38	PS	0.013	
MW-38	9/24/2012	246.09	4.70	5.01	0.31	241.35	PS		
MW-38	10/8/2012	246.09	4.81	4.97	0.16	241.26	PS	0.02	
MW-38	10/24/2012	246.09	4.82	5.08	0.26	241.24	PS		
MW-38	11/19/2012	246.09	4.75	4.79	0.04	241.33	PS	0.013	
MW-38	12/14/2012	246.09	5.79	5.83	0.04	240.30	PS	0.001	
MW-38	1/7/2013	246.09	4.98	5.10	0.12	241.09	PS	0.013	
MW-38	1/11/2013	246.09		5.05		241.04	--		
MW-38	2/6/2013	246.09	4.86	4.90	0.04	241.22	PS	0.005	
MW-38	3/1/2013	246.09	5.09	5.54	0.46	240.95	PS	0.053	65.668
MW-39	6/15/2010	245.65		13.22		232.43	--		
MW-39	9/21/2010	245.65		16.38		229.27	--		
MW-39	12/10/2010	245.65		13.95		231.70	--		
MW-39	2/14/2011	245.65		14.73		230.92	--		
MW-39	5/26/2011	245.65		11.95		233.70	--		
MW-39	8/8/2011	245.65		15.16		230.49	--		
MW-39	12/15/2011	245.65		11.95		233.70	--		
MW-39	3/21/2012	245.65		13.45		232.20	--		
MW-39	6/13/2012	245.65		13.23		232.42	--		
MW-39	9/24/2012	245.65		14.08		231.57	--		
MW-39	1/11/2013	245.65	13.22	13.31	0.09	232.42	--		0
MW-41	7/14/2009	246.07	14.30	16.13	1.83	231.53	--		
MW-41	7/16/2009	246.07	14.25	16.13	1.88	231.58	PP	1.268	
MW-41	7/22/2009	246.07	14.75	15.33	0.58	231.24	--		
MW-41	8/3/2009	246.07	13.96	14.69	0.73	232.02	PP	0.502	
MW-41	8/18/2009	246.07	14.76	15.53	0.77	231.21	PP	0.37	
MW-41	9/3/2009	246.07	14.74	15.30	0.56	231.26	PP	0.423	
MW-41	9/18/2009	246.07	15.21	15.71	0.50	230.80	PP		
MW-41	10/6/2009	246.07	17.39	17.41	0.02	228.68	PS	0.476	
MW-41	10/19/2009	246.07	16.73	16.81	0.08	229.33	PS	0.003	
MW-41	11/5/2009	246.07	14.50	14.81	0.31	231.53	AS	0.264	
MW-41	11/5/2009	246.07	14.50	14.81	0.31	231.53	PP	0.608	
MW-41	11/12/2009	246.07					AS	0.211	
MW-41	11/12/2009	246.07	14.57	15.22	0.65	231.42	PP	0.291	
MW-41	12/4/2009	246.07	14.42	15.55	1.13	231.50	AS	0.264	
MW-41	12/4/2009	246.07	14.42	15.55	1.13	231.50	PP	0.872	
MW-41	12/11/2009	246.07	12.70	13.64	0.94	233.25	--		
MW-41	12/16/2009	246.07	14.12	14.71	0.59	231.87	PS	0.779	
MW-41	12/29/2009	246.07	13.13	14.54	1.41	232.76	PS	0.079	
MW-41	1/20/2010	246.07	13.25	14.33	1.08	232.68	PS	0.119	
MW-41	2/16/2010	246.07	13.65	14.78	1.13	232.27	PS	0.004	
MW-41	3/1/2010	246.07	12.40	13.68	1.28	233.50	PS	0.449	
MW-41	3/8/2010	246.07	13.68	13.89	0.21	232.36	PS	0.793	
MW-41	4/5/2010	246.07	13.25	14.50	1.25	232.66	PS	0.449	
MW-41	5/3/2010	246.07		14.28		231.79	PS	0.872	
MW-41	5/11/2010	246.07	14.45	15.80	1.35	231.44	PS	0.925	
MW-41	5/26/2010	246.07	13.68	14.93	1.25	232.23	PS	0.793	
MW-41	6/15/2010	246.07	16.04	17.48	1.44	229.84	--		
MW-41	6/18/2010	246.07	16.03	17.39	1.36	229.86	PS	0.449	
MW-41	7/30/2010	246.07	16.46	17.74	1.28	229.44	PS	0.317	
MW-41	9/2/2010	246.07	15.57	16.32	0.75	230.40	--		
MW-41	9/9/2010	246.07	16.66	16.67	0.01	229.41	SP	0.193	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-41	9/21/2010	246.07	16.83	16.88	0.05	229.23	SP		
MW-41	10/13/2010	246.07	15.62	15.81	0.19	230.43	SP	1.158	
MW-41	11/4/2010	246.07	15.00	15.97	0.97	230.94	SP		
MW-41	11/12/2010	246.07	15.38	15.73	0.35	230.64	SP	0.386	
MW-41	12/3/2010	246.07	14.55	14.81	0.26	231.49	SP	0.193	
MW-41	12/10/2010	246.07	14.65	15.31	0.66	231.33	--		
MW-41	12/21/2010	246.07	14.37	14.51	0.16	231.70	SP		
MW-41	1/6/2011	246.07	15.31	15.89	0.58	230.68	SP	1.544	
MW-41	1/28/2011	246.07	15.97	16.65	0.69	230.02	SP	0.193	
MW-41	2/14/2011	246.07	15.18	15.31	0.13	230.87	--		
MW-41	2/18/2011	246.07	15.20	15.53	0.33	230.83	SP	0.193	
MW-41	3/4/2011	246.07	14.75	14.82	0.07	231.31	SP	1.158	
MW-41	3/22/2011	246.07	13.07	13.65	0.58	232.92	SP	0.386	
MW-41	4/13/2011	246.07	13.33	13.47	0.14	232.72	SP	4.632	
MW-41	4/20/2011	246.07	11.59	11.73	0.14	234.46	SP	0	
MW-41	4/29/2011	246.07	12.11	13.78	1.67	233.74	SP	0.193	
MW-41	5/13/2011	246.07	13.44	14.05	0.61	232.55	SP	6.755	
MW-41	5/20/2011	246.07	10.94	11.00	0.06	235.12	SP	0.193	
MW-41	5/26/2011	246.07	13.36	13.94	0.48	232.55	--		
MW-41	6/9/2011	246.07	13.63	14.66	1.03	232.31	SP	0.193	
MW-41	6/15/2011	246.07	14.34	14.35	0.01	231.73	SP	2.316	
MW-41	7/14/2011	246.07	14.93	16.20	1.27	230.97	SP	6.176	
MW-41	7/29/2011	246.07					SP	5.018	
MW-41	8/8/2011	246.07	15.54	15.95	0.41	230.48	--		
MW-41	8/17/2011	246.07	16.10	16.20	0.10	229.96	SP	1.544	
MW-41	8/24/2011	246.07	16.05	16.20	0.15	230.00	SP	0.386	
MW-41	9/1/2011	246.07	16.12	16.23	0.11	229.94	SP	0.193	
MW-41	9/14/2011	246.07	14.50	14.54	0.04	231.56	SP	0.386	
MW-41	10/6/2011	246.07	13.74	14.15	0.41	232.28	SP	0.386	
MW-41	10/25/2011	246.07	13.19	13.55	0.36	232.83	SP	0.193	
MW-41	11/15/2011	246.07	13.98	14.80	0.82	231.98	SP	0.193	
MW-41	12/8/2011	246.07	12.68	13.61	0.93	233.27	SP	1.351	
MW-41	12/15/2011	246.07	12.42	12.95	0.53	233.58	--		
MW-41	12/21/2011	246.07	13.13	14.28	1.15	232.79	SP	0.386	
MW-41	1/6/2012	246.07	13.39	13.67	0.28	232.64	SP	1.544	
MW-41	1/27/2012	246.07	13.13	14.40	1.27	232.77	SP	1.544	
MW-41	2/7/2012	246.07	14.04	14.41	0.37	231.98	SP	3.667	
MW-41	2/28/2012	246.07	14.62	14.64	0.02	231.45	SP	0.193	
MW-41	3/3/2012	246.07	13.53	13.78	0.25	232.51	SP	0.965	
MW-41	3/21/2012	246.07	13.96	15.18	1.22	231.95	--		
MW-41	3/27/2012	246.07	14.21	15.45	1.24	231.70	SP	0	
MW-41	4/13/2012	246.07	15.05	15.37	0.32	230.98	SP	3.474	
MW-41	4/27/2012	246.07	14.65	15.49	0.84	231.31	SP	0	
MW-41	5/11/2012	246.07	14.73	15.03	0.30	231.30	SP	1.54	
MW-41	5/25/2012	246.07	13.84	14.09	0.25	232.20	SP	0.772	
MW-41	6/7/2012	246.07	13.49	13.56	0.07	232.57	SP	0.579	
MW-41	6/13/2012	246.07	13.71	14.16	0.45	232.30	SP		
MW-41	6/21/2012	246.07	13.99	14.65	0.66	231.99	SP	1.349	
MW-41	7/3/2012	246.07	14.80	15.23	0.43	231.21	SP	1.546	
MW-41	7/18/2012	246.07	15.08	15.34	0.26	230.96	SP	0.392	
MW-41	8/1/2012	246.07	14.85	15.70	0.85	231.11	SP	1.351	
MW-41	8/16/2012	246.07	15.42	15.53	0.11	230.64	SP	0.965	
MW-41	9/7/2012	246.07	15.68	15.93	0.25	230.36	SP	0.193	
MW-41	9/24/2012	246.07	14.58	14.71	0.13	231.47	SP		
MW-41	10/8/2012	246.07	14.55	14.71	0.16	231.50	SP	0.193	
MW-41	10/24/2012	246.07	14.53	14.67	0.14	231.52	SP	1.158	
MW-41	11/19/2012	246.07	13.33	13.62	0.29	232.70	SP	0.386	
MW-41	12/14/2012	246.07	13.34	15.73	2.39	232.42	SP	0.772	
MW-41	1/7/2013	246.07	13.77	15.19	1.42	232.12	SP	3.86	
MW-41	1/11/2013	246.07	13.67	15.02	1.35	232.22	--		
MW-41	2/6/2013	246.07	12.48	13.74	1.26	233.43	PP	1.11	
MW-41	3/1/2013	246.07	13.26	13.40	0.14	232.79	SP	4.439	79.47
MW-43	6/15/2010	238.90		7.94		230.96	--		
MW-43	9/21/2010	238.90		10.22		228.68	--		
MW-43	12/10/2010	238.90		8.05		230.85	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-43	2/14/2011	238.90		8.24		230.66	--		
MW-43	5/26/2011	238.90		5.91		232.99	--		
MW-43	8/8/2011	238.90		9.12		229.78	--		
MW-43	12/15/2011	238.90		5.66		233.24	--		
MW-43	3/21/2012	238.90		7.14		231.76	--		
MW-43	6/13/2012	238.90		6.87		232.03	--		
MW-43	9/24/2012	238.90		7.73		231.17	--		
MW-43	1/11/2013	238.90		6.81		232.09	--		0
MW-49	7/14/2009	246.02	12.25	13.68	1.43	233.58	--		
MW-49	7/16/2009	246.02	13.00	14.35	1.35	232.84	PP	0.5	
MW-49	7/22/2009	246.02	13.98	14.56	0.58	231.96	--		
MW-49	8/3/2009	246.02	5.58	5.65	0.07	240.43	--		
MW-49	8/18/2009	246.02	12.93	14.00	1.07	232.95	PS	0.793	
MW-49	9/3/2009	246.02	11.43	11.85	0.42	234.54	PS	0.793	
MW-49	9/18/2009	246.02	14.62	15.50	0.88	231.29	PP	0.82	
MW-49	10/6/2009	246.02	14.91	15.74	0.83	231.00	PP	0.74	
MW-49	10/19/2009	246.02	5.62	5.82	0.20	240.37	PP	0.528	
MW-49	11/5/2009	246.02	5.20	5.45	0.25	240.79	PP	1.4	
MW-49	11/12/2009	246.02	5.70	5.85	0.15	240.30	PP	0.317	
MW-49	12/4/2009	246.02	5.63	5.93	0.30	240.35	PP	0.449	
MW-49	12/11/2009	246.02	4.71	5.15	0.44	241.25	--		
MW-49	12/16/2009	246.02	4.82	4.85	0.03	241.20	PS	0.502	
MW-49	12/29/2009	246.02	4.42	4.44	0.02	241.60	PS	0.238	
MW-49	1/20/2010	246.02	4.77	4.78	0.01	241.25	PS	0.04	
MW-49	2/16/2010	246.02	4.94	4.95	0.01	241.08	PS	0.013	
MW-49	3/1/2010	246.02	4.31	4.33	0.02	241.71	PS	0.005	
MW-49	3/8/2010	246.02	4.58	4.59	0.01	241.44	PS	0.003	
MW-49	4/5/2010	246.02		4.61		241.41	PS	0.003	
MW-49	5/3/2010	246.02	4.93	4.95	0.02	241.09	PS		
MW-49	5/11/2010	246.02	5.30	5.33	0.03	240.72	PS	0.013	
MW-49	5/26/2010	246.02	4.70	4.72	0.02	241.32	PS	0.159	
MW-49	6/15/2010	246.02	10.04	10.25	0.21	235.95	--		
MW-49	6/18/2010	246.02	10.00	10.27	0.27	235.98	PS	0.04	
MW-49	7/30/2010	246.02	15.08	15.22	0.14	230.92	PS	0.003	
MW-49	9/2/2010	246.02	15.87	16.04	0.17	230.13	PS	0.026	
MW-49	9/21/2010	246.02	15.97	16.60	0.63	229.97	PP	0.092	
MW-49	10/13/2010	246.02	5.06	5.06	0.01	240.97	--		
MW-49	11/4/2010	246.02	10.67	11.18	0.51	235.28	PS	0.001	
MW-49	11/12/2010	246.02	8.63	8.71	0.08	237.38	AS	0.013	
MW-49	11/19/2010	246.02	9.14	9.29	0.15	236.86	AS	0.053	
MW-49	12/3/2010	246.02	5.29	5.52	0.23	240.70	PS	0.502	
MW-49	12/10/2010	246.02	8.17	8.18	0.01	237.85	--		
MW-49	12/21/2010	246.02	14.09	14.27	0.45	232.14	PP	0.74	
MW-49	12/21/2010	246.02	14.09	14.27	0.45	232.14	PS	0.026	
MW-49	1/6/2011	246.02	14.86	15.22	0.36	231.11	SP		
MW-49	1/28/2011	246.02	14.35	14.36	0.01	231.67	PS	0.026	
MW-49	2/14/2011	246.02	14.41	14.79	0.38	231.56	PS		
MW-49	2/18/2011	246.02	14.44	14.80	0.36	231.53	PS		
MW-49	3/4/2011	246.02	14.20	14.78	0.58	231.74	PP	0.396	
MW-49	3/22/2011	246.02	4.84	5.11	0.27	241.14	PS	0.003	
MW-49	4/13/2011	246.02	4.97	5.10	0.13	241.03	PS	0.132	
MW-49	4/20/2011	246.02	4.38	4.39	0.01	241.64	PS	0.066	
MW-49	4/29/2011	246.02	4.49	4.51	0.02	241.53	PS	0.026	
MW-49	5/13/2011	246.02	4.93	4.95	0.02	241.09	PS	0.013	
MW-49	5/26/2011	246.02	6.38	6.41	0.03	239.64	--		
MW-49	6/15/2011	246.02	5.31	5.33	0.02	240.71	PS	0.026	
MW-49	7/14/2011	246.02					PS		
MW-49	7/21/2011	246.02	12.30	13.10	0.80	233.62	PS	0	
MW-49	8/8/2011	246.02	14.95	16.33	1.38	230.89	--		
MW-49	8/17/2011	246.02	15.20	16.45	1.25	230.66	PS	0	
MW-49	8/17/2011	246.02	15.20	16.45	1.25	230.66	PP	0.898	
MW-49	8/24/2011	246.02	15.38	15.45	0.07	230.63	PS	0.793	
MW-49	9/1/2011	246.02	14.99	15.08	0.09	231.02	PS	0.793	
MW-49	9/14/2011	246.02	4.73	5.10	0.37	241.24	PS	0.793	
MW-49	10/6/2011	246.02	4.71	4.76	0.05	241.30	PP	0.396	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-49	10/25/2011	246.02	4.70	4.71	0.10	241.40	PS	0.066	
MW-49	11/15/2011	246.02	5.65	5.90	0.25	240.34	PS	0.026	
MW-49	12/8/2011	246.02	4.82	4.93	0.11	241.19	PS	0.793	
MW-49	12/15/2011	246.02	5.93	5.94	0.01	240.09	--		
MW-49	12/21/2011	246.02	5.44	5.59	0.15	240.56	PS	0.132	
MW-49	1/6/2012	246.02	5.88	6.05	0.17	240.12	PS	0.66	
MW-49	1/27/2012	246.02	10.84	12.44	1.60	234.97	PS	0.026	
MW-49	2/7/2012	246.02	13.43	13.88	0.45	232.53	PS	0.528	
MW-49	2/28/2012	246.02	14.12	14.17	0.05	231.89	PS	0.7	
MW-49	3/3/2012	246.02	12.58	13.10	0.52	233.37	PS	0.132	
MW-49	3/21/2012	246.02	14.33	14.35	0.02	231.69	--		
MW-49	3/27/2012	246.02	13.78	13.82	0.04	232.23	PS	0.449	
MW-49	4/13/2012	246.02	14.71	14.72	0.01	231.31	PS	0.185	
MW-49	4/27/2012	246.02	14.80	14.81	0.01	231.22	PS	0.059	
MW-49	5/11/2012	246.02	14.11	14.12	0.01	231.91	PS	0.003	
MW-49	5/25/2012	246.02		7.15		238.87	PS	0.003	
MW-49	6/7/2012	246.02	5.81	5.94	0.13	240.19	PS	0.476	
MW-49	6/13/2012	246.02	6.70	6.71	0.01	239.32	PS	0.476	
MW-49	6/21/2012	246.02	10.40	11.46	1.06	235.48	PS	0.001	
MW-49	7/3/2012	246.02	13.85	14.35	0.50	232.11	PS	0.766	
MW-49	7/18/2012	246.02	14.23	16.10	1.87	231.55	PS	0.502	
MW-49	8/1/2012	246.02	13.22	14.03	0.81	232.69	PS	0.008	
MW-49	8/16/2012	246.02	14.40	16.00	1.60	231.41	PS	0.74	
MW-49	9/7/2012	246.02	15.05	16.97	1.92	230.72	PS	0.476	
MW-49	9/24/2012	246.02	7.05	7.06	0.01	238.97	PS		
MW-49	10/8/2012	246.02	6.90	6.91	0.01	239.12	PS	0.008	
MW-49	10/24/2012	246.02	9.82	9.88	0.06	236.19	PS	0.013	
MW-49	11/19/2012	246.02	4.82	5.12	0.30	241.16	PS		
MW-49	12/14/2012	246.02	13.69	14.10	0.41	232.28	PS	0.277	
MW-49	1/7/2013	246.02	10.56	11.33	0.77	235.36	PS	0.013	
MW-49	1/11/2013	246.02	12.57	12.85	0.28	233.41	--		
MW-49	2/6/2013	246.02	4.91	5.15	0.24	241.08	PS	0.007	
MW-49	3/1/2013	246.02	11.12	11.43	0.31	234.86	PS	0.211	20.909
MW-50	6/15/2010	245.53		13.23		232.30	--		
MW-50	9/21/2010	245.53		15.88		229.65	--		
MW-50	12/10/2010	245.53		13.81		231.72	--		
MW-50	2/14/2011	245.53		14.44		231.09	--		
MW-50	5/26/2011	245.53		12.04		233.49	--		
MW-50	8/8/2011	245.53		14.16		231.37	--		
MW-50	12/15/2011	245.53		12.09		233.44	--		
MW-50	3/21/2012	245.53		12.94		232.59	--		
MW-50	6/13/2012	245.53		12.66		232.87	--		
MW-50	9/24/2012	245.53		13.40		232.13	--		
MW-50	1/11/2013	245.53		12.98		232.55	--		0
MW-51	6/15/2010	249.34		13.63		235.71	--		
MW-51	9/21/2010	249.34		15.75		233.59	--		
MW-51	12/10/2010	249.34		14.08		235.26	--		
MW-51	2/14/2011	249.34		14.04		235.30	--		
MW-51	5/26/2011	249.34		11.03		238.31	--		
MW-51	8/8/2011	249.34		14.74		234.60	--		
MW-51	12/15/2011	249.34		11.39		237.95	--		
MW-51	3/20/2012	249.34		13.30		236.04	--		
MW-51	6/13/2012	249.34		13.12		236.22	--		
MW-51	9/24/2012	249.34		13.96		235.38	--		
MW-51	1/11/2013	249.34		13.15		236.19	--		0
MW-52	6/15/2010	247.00		10.68		236.32	--		
MW-52	9/21/2010	247.00		12.63		234.37	--		
MW-52	12/10/2010	247.00		10.78		236.22	--		
MW-52	2/14/2011	247.00		10.72		236.28	--		
MW-52	5/26/2011	247.00		9.59		237.41	--		
MW-52	8/8/2011	247.00		11.46		235.54	--		
MW-52	12/15/2011	247.00					--		
MW-52	3/20/2012	247.00		10.60		236.40	--		
MW-52	6/13/2012	247.00		10.47		236.53	--		
MW-52	9/24/2012	247.00		10.65		236.35	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-52	1/11/2013	247.00		10.45		236.55	--		0
MW-53	7/14/2009	246.10	14.30	16.75	2.45	231.48	--		
MW-53	8/3/2009	246.10	14.25	14.60	0.35	231.80	SP	6	
MW-53	8/18/2009	246.10	14.95	16.35	1.40	230.97	SP	6.948	
MW-53	8/20/2009	246.10	15.12	15.64	0.52	230.91	SP	1.159	
MW-53	9/3/2009	246.10	15.00	15.38	0.32	231.00	SP	2.702	
MW-53	9/8/2009	246.10					SP	0.579	
MW-53	9/9/2009	246.10	15.24	15.86	0.62	230.78	--		
MW-53	9/18/2009	246.10	15.42	15.98	0.56	230.61	SP	2.2	
MW-53	10/6/2009	246.10	15.56	16.32	0.76	230.44	SP	5.02	
MW-53	10/19/2009	246.10	14.92	15.15	0.23	231.15	SP	5.7	
MW-53	11/5/2009	246.10	14.16	14.34	0.18	231.92	SP	0.58	
MW-53	11/12/2009	246.10	14.03	15.42	1.39	231.89	SP	7.92	
MW-53	12/4/2009	246.10	13.98	14.80	0.82	232.01	SP	4.63	
MW-53	12/11/2009	246.10	12.84	12.94	0.10	233.25	SP	0.97	
MW-53	12/16/2009	246.10	12.90	13.00	0.10	233.19	SP		
MW-53	12/29/2009	246.10	12.10	13.49	1.39	233.82	PP	0.449	
MW-53	1/20/2010	246.10	13.05	15.57	2.52	232.72	PP	0.845	
MW-53	2/16/2010	246.10	12.74	15.55	2.81	232.99	PP	1.004	
MW-53	3/1/2010	246.10	11.85	14.28	2.43	233.93	PP	0.608	
MW-53	3/8/2010	246.10	11.95	14.90	2.95	233.77	--		
MW-53	4/5/2010	246.10	12.00	15.47	3.47	233.65	PP	1.057	
MW-53	5/3/2010	246.10	12.76	15.60	2.84	232.97	PP	0.925	
MW-53	5/26/2010	246.10	12.52	14.20	1.68	233.36	PP	0.449	
MW-53	6/15/2010	246.10	13.96	17.06	3.10	231.74	--		
MW-53	6/18/2010	246.10	13.95	16.98	3.03	231.76	PP	0.634	
MW-53	7/30/2010	246.10	15.36	17.99	2.63	230.40	PP	0.819	
MW-53	9/2/2010	246.10	16.13	18.26	2.13	229.69	--		
MW-53	9/9/2010	246.10	16.37	18.46	2.09	229.46	SP	3.28	
MW-53	9/21/2010	246.10	16.37	18.53	2.16	229.45	SP		
MW-53	10/13/2010	246.10	15.48	16.05	0.57	230.55	SP	1.545	
MW-53	11/4/2010	246.10	15.20	15.23	0.03	230.90	SP	4.246	
MW-53	11/12/2010	246.10	15.24	16.77	1.53	230.66	SP	1.158	
MW-53	12/3/2010	246.10	14.29	14.33	0.04	231.80	SP	3.763	
MW-53	12/10/2010	246.10	14.50	14.96	0.46	231.54	--		
MW-53	12/21/2010	246.10	14.11	14.15	0.04	231.98	SP	0.869	
MW-53	1/6/2011	246.10	15.10	16.93	1.83	230.76	SP	0.965	
MW-53	1/28/2011	246.10	15.89	17.94	2.05	229.94	SP	0.869	
MW-53	2/14/2011	246.10	14.94	15.91	0.97	231.03	--		
MW-53	2/18/2011	246.10	14.95	15.26	0.31	231.11	SP	2.509	
MW-53	3/4/2011	246.10	14.65	14.80	0.15	231.43	SP	2.702	
MW-53	3/22/2011	246.10	13.10	13.20	0.10	232.99	SP	1.351	
MW-53	4/13/2011	246.10	13.04	14.42	1.38	232.88	SP	0.386	
MW-53	4/20/2011	246.10	11.51	11.73	0.22	234.56	SP	0.579	
MW-53	4/29/2011	246.10	12.12	13.44	1.32	233.81	SP	0.097	
MW-53	5/13/2011	246.10	13.03	15.33	2.30	232.77	SP	0.869	
MW-53	5/20/2011	246.10	10.88	11.00	0.12	235.20	SP	1.641	
MW-53	5/26/2011	246.10	13.91	14.23	0.32	232.15	--		
MW-53	6/9/2011	246.10	13.72	13.93	0.21	232.35	SP	1.641	
MW-53	6/15/2011	246.10	13.93	15.62	1.69	231.95	SP	0.097	
MW-53	7/14/2011	246.10	14.74	16.65	1.91	231.11	SP	2.123	
MW-53	7/29/2011	246.10					SP	1.255	
MW-53	8/8/2011	246.10	15.56	18.40	2.84	230.17	--		
MW-53	8/17/2011	246.10	15.87	16.25	0.38	230.18	SP	3.378	
MW-53	8/24/2011	246.10	15.79	17.62	1.83	230.07	SP	0.386	
MW-53	9/1/2011	246.10	15.91	17.90	1.99	229.93	SP	0	
MW-53	9/14/2011	246.10		14.35		231.75	SP	0.193	
MW-53	10/6/2011	246.10	13.75	13.91	0.16	232.33	SP	0.29	
MW-53	10/25/2011	246.10	13.20	14.52	1.32	232.73	SP	0.097	
MW-53	11/15/2011	246.10	13.90	15.48	1.58	231.99	SP	3.185	
MW-53	12/8/2011	246.10	12.89	13.55	0.66	233.12	SP	1.351	
MW-53	12/15/2011	246.10	12.23	13.48	1.25	233.71	--		
MW-53	12/21/2011	246.10	12.97	15.10	2.13	232.85	SP	0.386	
MW-53	1/6/2012	246.10	13.22	14.67	1.45	232.69	SP	0.579	
MW-53	1/27/2012	246.10	13.02	15.16	2.14	232.80	SP	3.281	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-53	2/7/2012	246.10	13.95	14.16	0.21	232.12	SP	3.11	
MW-53	2/28/2012	246.10	14.33	16.28	1.95	231.52	SP	0	
MW-53	3/3/2012	246.10	13.23	14.65	1.42	232.69	SP	0.94	
MW-53	3/21/2012	246.10	14.29	15.10	0.81	231.70	--		
MW-53	3/27/2012	246.10	14.16	15.84	1.68	231.72	SP	0.865	
MW-53	4/13/2012	246.10	14.69	16.50	1.81	231.17	SP	1.641	
MW-53	4/27/2012	246.10	14.63	15.90	1.27	231.30	SP	0.97	
MW-53	5/11/2012	246.10	14.59	14.82	0.23	231.48	SP	0.3	
MW-53	5/25/2012	246.10	13.74	13.77	0.03	232.36	SP	0.48	
MW-53	6/7/2012	246.10	13.29	13.73	0.44	232.75	SP	0.29	
MW-53	6/13/2012	246.10	13.82	14.35	0.53	232.21	SP		
MW-53	6/21/2012	246.10	13.90	15.44	1.54	232.00	SP	0.579	
MW-53	7/3/2012	246.10	14.66	16.17	1.51	231.24	SP	1.158	
MW-53	7/18/2012	246.10	14.93	16.35	1.42	230.99	SP	0.772	
MW-53	8/1/2012	246.10	14.75	16.20	1.45	231.16	SP	0.579	
MW-53	8/16/2012	246.10	15.33	15.45	0.12	230.75	SP	1.737	
MW-53	9/7/2012	246.10	15.50	17.33	1.83	230.36	SP	0.579	
MW-53	9/24/2012	246.10	14.44	14.61	0.17	231.64	SP		
MW-53	10/8/2012	246.10	14.37	14.45	0.08	231.72	SP	1.062	
MW-53	10/24/2012	246.10		14.62		231.48	SP	0.965	
MW-53	11/19/2012	246.10	13.11	13.60	0.49	232.93	SP	0.242	
MW-53	12/14/2012	246.10	14.44	15.45	1.01	231.53	SP	3.667	
MW-53	1/7/2013	246.10	13.65	14.78	1.13	232.30	SP	2.413	
MW-53	1/11/2013	246.10	13.58	14.40	0.82	232.41	--		
MW-53	2/6/2013	246.10	12.58	13.41	0.83	233.41	SP		
MW-53	3/1/2013	246.10	13.04	14.25	1.21	232.90	SP	0.579	119.197
MW-54	7/14/2009	245.60	13.78	16.67	2.91	231.46	--		
MW-54	7/16/2009	245.60	13.73	16.48	2.75	231.51	PP	1.427	
MW-54	8/3/2009	245.60	13.42	14.55	1.13	232.03	PP	0.594	
MW-54	8/18/2009	245.60	14.14	16.62	2.48	231.14	PP	1.374	
MW-54	9/3/2009	245.60	14.16	16.05	1.89	231.19	PP	0.713	
MW-54	9/18/2009	245.60	14.60	16.59	1.99	230.74	PP	0.845	
MW-54	10/6/2009	245.60	14.86	16.81	1.95	230.49	PP	0.77	
MW-54	10/19/2009	245.60	14.27	15.45	1.18	231.18	PP	0.185	
MW-54	11/5/2009	245.60	13.43	13.85	0.42	232.12	PP	0.079	
MW-54	11/12/2009	245.60	13.51	14.78	1.27	231.92	PP	0.581	
MW-54	12/4/2009	245.60	13.20	14.95	1.75	232.17	PP	1.057	
MW-54	12/11/2009	245.60	12.32	12.76	0.44	233.22	--		
MW-54	12/16/2009	245.60	12.39	12.58	0.46	233.42	PS	0.12	
MW-54	12/29/2009	245.60	11.76	12.85	1.09	233.70	PS	0.396	
MW-54	1/20/2010	245.60	12.75	15.45	2.70	232.50	PS	0.264	
MW-54	2/16/2010	245.60	12.70	14.10	1.40	232.72	PS	1.057	
MW-54	3/1/2010	245.60	11.63	13.73	2.10	233.70	PS	0.67	
MW-54	3/8/2010	245.60	11.73	13.10	1.37	233.69	--		
MW-54	4/5/2010	245.60	11.05	14.85	3.80	234.06	PS	0.793	
MW-54	5/3/2010	245.60	12.72	14.90	2.18	232.60	ps	0.528	
MW-54	5/11/2010	245.60	13.58	15.81	2.23	231.73	PS	0.264	
MW-54	5/26/2010	245.60	12.12	13.30	1.18	233.33	PS	0.132	
MW-54	6/15/2010	245.60	14.12	16.40	2.28	231.18	--		
MW-54	6/18/2010	245.60	14.09	16.31	2.22	231.22	PS	0.555	
MW-54	7/30/2010	245.60	15.08	15.89	0.81	230.41	PS	0.132	
MW-54	9/2/2010	245.60	16.24	17.33	1.09	229.22	--		
MW-54	9/21/2010	245.60	15.90	16.89	0.99	229.57	SP		
MW-54	10/13/2010	245.60	14.68	16.00	1.32	230.75	--		
MW-54	11/4/2010	245.60	14.48	15.99	1.54	230.95	SP		
MW-54	11/12/2010	245.60	14.58	16.10	1.52	230.82	--		
MW-54	12/3/2010	245.60	13.81	14.07	0.26	231.76	SP	3.764	
MW-54	12/10/2010	245.60	14.11	14.39	0.28	231.45	--		
MW-54	12/21/2010	245.60					SP	0.868	
MW-54	1/6/2011	245.60	14.64	16.14	1.50	230.77	PP	0.872	
MW-54	1/6/2011	245.60	14.64	16.14	1.50	230.77	SP	0.965	
MW-54	1/28/2011	245.60	15.45	16.77	1.32	229.98	SP	0.868	
MW-54	2/14/2011	245.60	14.48	15.78	1.30	230.95	--		
MW-54	2/18/2011	245.60	14.41	15.76	1.35	231.01	SP	2.509	
MW-54	3/4/2011	245.60	14.13	14.47	0.34	231.43	SP	2.702	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-54	3/22/2011	245.60		12.68		232.92	--		
MW-54	4/13/2011	245.60	12.69	13.20	0.51	232.84	SP	0.386	
MW-54	4/20/2011	245.60	11.13	11.19	0.06	234.46	SP	0.579	
MW-54	4/29/2011	245.60	11.80	12.02	0.22	233.77	SP	0.096	
MW-54	5/13/2011	245.60	12.72	13.92	1.20	232.72	SP	0.868	
MW-54	5/20/2011	245.60	10.44	10.45	0.01	235.16	SP	1.64	
MW-54	5/26/2011	245.60	13.86	14.88	1.02	231.61	--		
MW-54	6/9/2011	245.60	13.22	14.15	0.93	232.26	SP	1.64	
MW-54	6/15/2011	245.60	13.54	15.09	1.55	231.86	SP	0.096	
MW-54	7/14/2011	245.60	14.40	14.65	0.25	231.17	SP	2.123	
MW-54	7/29/2011	245.60					SP	1.254	
MW-54	8/8/2011	245.60	15.20	16.32	1.12	230.25	--		
MW-54	8/17/2011	245.60	15.25	16.48	1.23	230.19	SP	3.377	
MW-54	8/24/2011	245.60	15.34	16.56	1.22	230.10	SP	0.386	
MW-54	9/1/2011	245.60	15.42	16.52	1.10	230.04	SP	0	
MW-54	9/14/2011	245.60		13.89		231.71	SP	0.193	
MW-54	10/6/2011	245.60	13.11	13.89	0.78	232.39	SP	0.289	
MW-54	10/25/2011	245.60	12.81	13.61	0.80	232.69	SP	0.096	
MW-54	11/15/2011	245.60	13.63	13.83	0.20	231.94	SP	3.184	
MW-54	12/8/2011	245.60	12.43	12.99	0.56	233.10	SP	1.351	
MW-54	12/15/2011	245.60	12.04	12.21	0.17	233.54	--		
MW-54	12/21/2011	245.60	12.68	13.98	1.30	232.75	SP	0.386	
MW-54	1/6/2012	245.60	12.88	13.32	0.44	232.66	SP	0.579	
MW-54	1/27/2012	245.60	12.70	13.94	1.24	232.74	SP	3.281	
MW-54	2/7/2012	245.60	13.35	14.30	0.95	232.13	SP	3.11	
MW-54	2/28/2012	245.60	13.97	15.55	1.58	231.42	SP	0	
MW-54	3/3/2012	245.60	12.94	12.98	0.04	232.65	SP	0.94	
MW-54	3/21/2012	245.60	13.80	14.95	1.15	231.65	--		
MW-54	3/27/2012	245.60	13.76	14.72	0.96	231.72	SP	0.865	
MW-54	4/13/2012	245.60	14.36	14.95	0.59	231.16	SP	1.641	
MW-54	4/27/2012	245.60	14.15	15.34	1.19	231.30	SP	0.97	
MW-54	5/11/2012	245.60	14.05	14.86	0.81	231.44	SP	0.3	
MW-54	5/25/2012	245.60	13.27	13.34	0.07	232.32	SP	0.48	
MW-54	6/7/2012	245.60	12.87	12.88	0.01	232.73	SP	0.29	
MW-54	6/13/2012	245.60	13.33	13.43	0.10	232.26	SP		
MW-54	6/21/2012	245.60	13.73	14.73	1.00	231.74	SP	0.579	
MW-54	7/3/2012	245.60	14.23	14.24	0.01	231.37	SP	1.158	
MW-54	7/18/2012	245.60	14.55	15.57	1.02	230.92	SP	0.772	
MW-54	8/1/2012	245.60	14.32	15.60	1.28	231.11	SP	0.579	
MW-54	8/16/2012	245.60	14.95	15.05	0.10	230.64	SP	1.737	
MW-54	9/7/2012	245.60	15.14	16.53	1.39	230.28	SP	0.579	
MW-54	9/24/2012	245.60	14.30	14.42	0.12	231.28	SP		
MW-54	10/8/2012	245.60	13.91	13.98	0.07	231.68	SP	1.062	
MW-54	10/24/2012	245.60	13.86	13.88	0.02	231.74	SP	0.965	
MW-54	11/19/2012	245.60	12.77	12.93	0.16	232.81	SP	0.242	
MW-54	12/14/2012	245.60	13.92	14.85	0.93	231.56	SP	3.667	
MW-54	1/7/2013	245.60	13.30	13.31	0.01	232.30	SP	2.413	
MW-54	1/11/2013	245.60	13.19	13.20	0.01	232.41	--		
MW-54	2/6/2013	245.60	12.14	12.53	0.39	233.41	SP		
MW-54	3/1/2013	245.60	12.65	12.77	0.12	232.93	SP	0.579	69.816
MW-55	7/14/2009	246.12	14.29	17.25	2.96	231.45	--		
MW-55	7/16/2009	246.12	14.22	17.10	2.88	231.53	PP	1.374	
MW-55	7/22/2009	246.12	14.58	17.10	2.52	231.21	--		
MW-55	8/3/2009	246.12	13.92	15.72	1.80	231.97	--		
MW-55	8/18/2009	246.12	14.69	16.90	2.21	231.14	PS	0.132	
MW-55	9/3/2009	246.12	14.62	16.60	1.98	231.24	PS	0.132	
MW-55	9/18/2009	246.12	15.14	17.05	1.91	230.73	PS	0.132	
MW-55	9/18/2009	246.12	14.60	16.59	1.91	231.19	PP	0.687	
MW-55	10/6/2009	246.12	15.12	17.68	2.56	230.67	PP	0.96	
MW-55	10/19/2009	246.12	14.82	15.65	0.83	231.19	PP	0.37	
MW-55	11/5/2009	246.12	13.79	15.82	2.03	232.07	PP	0.55	
MW-55	11/12/2009	246.12	13.92	16.16	2.24	231.91	PP	0.819	
MW-55	12/4/2009	246.12	13.68	15.82	2.14	232.16	PP	0.687	
MW-55	12/11/2009	246.12	12.65	14.85	2.20	233.18	PP	1.268	
MW-55	12/16/2009	246.12	12.60	15.51	2.91	233.14	PP	1.347	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-55	12/29/2009	246.12	12.20	14.45	2.25	233.63	SP	0.2	
MW-55	1/14/2010	246.12	13.16	16.25	3.09	232.56	SP	0.77	
MW-55	1/20/2010	246.12	13.25	15.55	2.30	232.57	SP	3.28	
MW-55	2/16/2010	246.12	12.82	16.00	3.18	232.89	SP	9.65	
MW-55	3/1/2010	246.12	12.01	15.54	3.53	233.65	--		
MW-55	3/8/2010	246.12	12.42	13.39	0.97	233.57	SP		
MW-55	4/5/2010	246.12	12.34	15.92	3.55	233.29	SP	6.36	
MW-55	5/3/2010	246.12	13.00	15.15	2.15	232.84	SP	9.46	
MW-55	5/11/2010	246.12	13.90	15.20	1.30	232.05	SP	3.08	
MW-55	5/26/2010	246.12	12.80	14.13	1.33	233.15	SP	6.76	
MW-55	6/15/2010	246.12	14.63	15.39	0.76	231.39	--		
MW-55	6/18/2010	246.12	14.59	15.37	0.78	231.43	SP	11.19	
MW-55	7/30/2010	246.12	15.62	17.81	2.19	230.22	SP	4.06	
MW-55	9/2/2010	246.12	16.98	18.01	1.03	229.01	SP	1.86	
MW-55	9/9/2010	246.12	16.32	18.19	1.87	229.56	SP		
MW-55	9/21/2010	246.12	16.44	18.08	1.64	229.47	SP		
MW-55	10/13/2010	246.12	15.26	16.06	0.80	230.76	SP	4.053	
MW-55	11/4/2010	246.12	15.14	16.55	1.41	230.80	SP	0.579	
MW-55	11/12/2010	246.12	15.18	16.08	0.90	230.82	SP	0.193	
MW-55	11/24/2010	246.12	15.09	16.62	1.43	230.74	PP	0.872	
MW-55	12/3/2010	246.12					SP	0.965	
MW-55	12/10/2010	246.12	14.62	14.98	0.36	231.45	--		
MW-55	12/21/2010	246.12	15.06	15.61	0.55	230.99	SP	1.544	
MW-55	1/6/2011	246.12	15.17	15.18	0.10	231.03	SP	1.737	
MW-55	1/28/2011	246.12	15.85	17.76	1.91	230.02	SP	0.579	
MW-55	2/14/2011	246.12	15.07	15.08	0.01	231.05	--		
MW-55	2/18/2011	246.12					SP	1.158	
MW-55	3/4/2011	246.12	14.67	14.91	0.24	231.42	SP	1.544	
MW-55	3/22/2011	246.12	12.88	13.86	0.98	233.11	SP	1.93	
MW-55	4/13/2011	246.12	13.05	13.19	0.14	233.05	SP	4.246	
MW-55	4/20/2011	246.12	11.49	11.50	0.01	234.63	SP	0.772	
MW-55	4/29/2011	246.12	11.91	13.79	1.88	233.97	SP	0.193	
MW-55	5/13/2011	246.12	13.13	13.74	0.61	232.91	SP	3.86	
MW-55	5/20/2011	246.12	10.84	10.85	0.01	235.28	SP	1.544	
MW-55	5/26/2011	246.12	13.79	14.98	1.19	232.18	--		
MW-55	6/9/2011	246.12	13.24	16.25	3.01	232.49	SP	0.193	
MW-55	6/15/2011	246.12	13.95	14.47	0.52	232.10	SP	1.93	
MW-55	7/14/2011	246.12	14.70	15.65	0.95	231.30	SP	3.667	
MW-55	7/29/2011	246.12					SP	0	
MW-55	8/8/2011	246.12	15.27	17.47	2.20	230.56	--		
MW-55	8/17/2011	246.12	15.59	17.27	1.68	230.31	SP	4.632	
MW-55	8/24/2011	246.12	15.64	17.33	1.69	230.26	SP	0.193	
MW-55	9/1/2011	246.12	15.73	17.24	1.51	230.19	SP	0.193	
MW-55	9/14/2011	246.12	14.21	14.28	0.07	231.90	SP	0.386	
MW-55	10/6/2011	246.12	13.44	14.60	1.16	232.53	SP	1.93	
MW-55	10/25/2011	246.12	12.97	15.26	2.29	232.85	SP	0.965	
MW-55	11/15/2011	246.12	13.61	16.45	2.84	232.14	SP	2.193	
MW-55	12/8/2011	246.12	12.77	13.32	0.55	233.28	SP	1.158	
MW-55	12/15/2011	246.12	12.12	13.68	1.56	233.80	--		
MW-55	12/21/2011	246.12	12.85	15.64	2.74	232.86	SP	0.579	
MW-55	1/6/2012	246.12	13.19	13.78	0.59	232.85	SP	5.211	
MW-55	1/27/2012	246.12	13.06	13.77	0.71	232.97	SP	4.439	
MW-55	2/7/2012	246.12	13.84	14.44	0.60	232.20	SP	7.52	
MW-55	2/28/2012	246.12	14.47	14.49	0.02	231.65	SP	4.63	
MW-55	3/3/2012	246.12	13.21	13.83	0.62	232.83	SP	1.73	
MW-55	3/21/2012	246.12	14.15	14.57	0.42	231.92	--		
MW-55	3/27/2012	246.12	14.13	14.73	0.60	231.91	SP	2.5	
MW-55	4/13/2012	246.12	14.66	15.45	0.79	231.36	SP	2.51	
MW-55	4/27/2012	246.12	14.61	14.78	0.17	231.49	SP	1.74	
MW-55	5/11/2012	246.12	14.44	14.76	0.32	231.64	SP	1.35	
MW-55	5/25/2012	246.12	13.41	14.61	1.20	232.55	PP	0.396	
MW-55	6/7/2012	246.12	12.88	15.27	2.39	232.93	PP	0.819	
MW-55	6/13/2012	246.12	13.19	15.60	2.41	232.62	--		
MW-55	6/21/2012	246.12	13.52	16.34	2.82	232.23	--	0	
MW-55	7/3/2012	246.12	14.52	16.53	2.01	231.34	SP	1.737	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-55	7/18/2012	246.12	14.78	15.75	0.97	231.21	SP	1.351	
MW-55	8/1/2012	246.12	14.45	16.78	2.33	231.37	SP	0	
MW-55	8/16/2012	246.12	15.28	15.66	0.38	230.79	SP	2.895	
MW-55	9/7/2012	246.12	15.31	17.25	1.94	230.56	SP	0.772	
MW-55	9/24/2012	246.12	14.40	14.41	0.01	231.72	--		
MW-55	10/8/2012	246.12	14.42	14.51	0.09	231.69	SP	1.158	
MW-55	10/24/2012	246.12	14.01	15.64	1.63	231.90	SP		
MW-55	11/19/2012	246.12	12.87	13.63	0.76	233.15	SP	5.597	
MW-55	12/14/2012	246.12	14.28	14.97	0.69	231.75	PS		
MW-55	1/7/2013	246.12	13.51	14.81	1.30	232.44	SP	1.737	
MW-55	1/11/2013	246.12	13.41	15.76	2.35	232.40	--		
MW-55	2/6/2013	246.12	12.40	14.52	2.12	233.44	SP		
MW-55	3/1/2013	246.12	13.02	13.33	0.31	233.06	SP	4.053	161.061
MW-56	7/14/2009	244.63	13.06	16.25	3.19	231.16	--		
MW-56	7/16/2009	244.63	12.99	16.33	3.34	231.21	PP	1.294	
MW-56	7/22/2009	244.63	13.35	15.82	2.47	230.96	--		
MW-56	8/3/2009	244.63	12.44	15.90	3.46	231.74	--		
MW-56	8/18/2009	244.63	13.32	16.74	3.42	230.87	PP	2.061	
MW-56	8/20/2009	244.63	13.61	15.42	1.81	230.78	SP		
MW-56	9/3/2009	244.63	13.40	15.55	2.15	230.95	SP	0.965	
MW-56	9/8/2009	244.63					SP	0.965	
MW-56	9/9/2009	244.63	13.90	15.26	1.36	230.55	SP		
MW-56	9/18/2009	244.63	13.86	16.02	2.16	230.49	SP	0.001	
MW-56	10/6/2009	244.63	14.38	14.39	0.01	230.25	SP	3.08	
MW-56	10/19/2009	244.63	13.65	13.66	0.01	230.98	SP	1.16	
MW-56	11/5/2009	244.63	12.45	15.16	2.71	231.83	PP	0.489	
MW-56	11/12/2009	244.63	12.59	15.11	2.52	231.71	SP	7.72	
MW-56	12/4/2009	244.63	12.42	14.49	2.07	231.94	SP	2.12	
MW-56	12/11/2009	244.63	11.10	14.61	3.51	233.07	--		
MW-56	12/16/2009	244.63	11.59	12.76	1.17	232.89	SP	1.35	
MW-56	12/24/2009	244.63	10.48	14.18	3.70	233.67	SP	0.77	
MW-56	1/14/2010	244.63	11.70	15.35	3.65	232.46	SP	3.47	
MW-56	1/20/2010	244.63	11.62	15.76	4.14	232.47	--		
MW-56	2/16/2010	244.63	11.34	15.34	4.00	232.77	SP	18.72	
MW-56	3/1/2010	244.63	10.67	11.65	0.98	233.83	--		
MW-56	3/8/2010	244.63	10.71	13.54	2.83	233.55	SP		
MW-56	4/5/2010	244.63	10.40	16.00	5.60	233.50	--		
MW-56	4/6/2010	244.63	10.60	15.89	5.29	233.34	--		
MW-56	5/3/2010	244.63	11.46	15.90	4.44	232.59	PS		
MW-56	5/3/2010	244.63	11.46	15.90	4.44	232.59	SP	0.38	
MW-56	5/11/2010	244.63	12.09	15.95	3.86	232.04	SP		
MW-56	5/26/2010	244.63	11.50	12.28	0.78	233.03	SP	3.28	
MW-56	6/15/2010	244.63	12.88	15.30	2.42	231.44	--		
MW-56	6/18/2010	244.63	12.97	15.01	2.04	231.39	SP	0.97	
MW-56	7/30/2010	244.63	14.23	16.78	2.55	230.07	SP	5.01	
MW-56	9/2/2010	244.63	14.96	15.37	0.41	229.62	SP	2.38	
MW-56	9/9/2010	244.63	14.84	16.99	2.15	229.51	SP	0.386	
MW-56	9/21/2010	244.63	15.23	15.79	0.56	229.33	SP		
MW-56	10/13/2010	244.63	14.17	14.41	0.24	230.43	SP	4.246	
MW-56	11/4/2010	244.63	13.80	14.12	0.32	230.79	SP	2.316	
MW-56	11/12/2010	244.63	13.96	14.35	0.39	230.62	SP	0.772	
MW-56	12/3/2010	244.63	12.84	13.68	0.84	231.68	SP	1.93	
MW-56	12/10/2010	244.63	13.25	13.72	0.47	231.32	--		
MW-56	12/21/2010	244.63	12.96	13.24	0.28	231.63	SP	0.965	
MW-56	1/6/2011	244.63	13.80	15.82	2.02	230.57	SP	0.772	
MW-56	1/28/2011	244.63	14.37	16.59	2.22	229.97	SP	0.386	
MW-56	2/14/2011	244.63	13.23	15.88	2.65	231.06	--		
MW-56	2/18/2011	244.63	13.37	15.92	2.55	230.93	SP	0.386	
MW-56	3/4/2011	244.63	13.22	13.24	0.02	231.41	SP	2.316	
MW-56	3/22/2011	244.63	11.86	12.00	0.14	232.75	SP		
MW-56	4/13/2011	244.63	11.36	15.54	4.18	232.73	SP	0	
MW-56	4/20/2011	244.63	10.05	11.22	1.17	234.43	SP	3.088	
MW-56	4/29/2011	244.63	10.88	11.60	0.72	233.66	SP	0.193	
MW-56	5/13/2011	244.63	11.78	14.30	2.52	232.52	SP	1.158	
MW-56	5/20/2011	244.63	9.02	12.57	3.55	235.15	SP	0	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-56	5/26/2011	244.63	12.94	13.85	0.91	231.57	--		
MW-56	6/9/2011	244.63	12.08	16.29	4.21	232.00	SP	0	
MW-56	6/15/2011	244.63	12.92	13.23	0.31	231.67	SP	2.123	
MW-56	7/14/2011	244.63	13.76	14.12	0.36	230.82	SP	2.316	
MW-56	7/29/2011	244.63					SP	0.579	
MW-56	8/8/2011	244.63	14.45	14.81	0.36	230.13	--		
MW-56	8/17/2011	244.63	14.60	15.01	0.41	229.98	SP	0.965	
MW-56	8/24/2011	244.63	14.64	15.10	0.46	229.93	SP	1.158	
MW-56	9/1/2011	244.63	14.75	15.08	0.33	229.84	SP	0.386	
MW-56	9/14/2011	244.63	13.05	13.10	0.05	231.57	SP	0.579	
MW-56	10/6/2011	244.63	11.96	15.33	3.37	232.23	SP	0	
MW-56	10/25/2011	244.63	11.61	15.37	3.76	232.53	SP	0.386	
MW-56	11/15/2011	244.63	12.85	12.87	0.02	231.78	SP	3.667	
MW-56	12/8/2011	244.63	11.09	15.03	3.94	233.03	PS	0.264	
MW-56	12/15/2011	244.63	11.03	15.80	4.77	232.98	--		
MW-56	12/21/2011	244.63	11.28	16.19	4.91	232.71	PP	1.215	
MW-56	1/6/2012	244.63	11.83	15.67	3.84	232.30	PP		
MW-56	1/27/2012	244.63	11.50	15.45	3.95	232.62	PS	0.132	
MW-56	2/7/2012	244.63	12.52	13.57	1.05	231.97	SP	1.73	
MW-56	2/28/2012	244.63	12.97	16.10	3.13	231.25	SP	0	
MW-56	3/3/2012	244.63	11.87	13.50	1.63	232.55	SP	2.32	
MW-56	3/21/2012	244.63	12.65	12.99	0.34	231.94	--		
MW-56	3/27/2012	244.63	12.94	13.10	0.16	231.67	SP	1.54	
MW-56	4/13/2012	244.63	13.41	14.53	1.12	231.07	SP	0.193	
MW-56	4/27/2012	244.63	13.19	15.54	2.35	231.13	SP	0.386	
MW-56	5/25/2012	244.63	12.14	13.50	1.36	232.31	SP	0.965	
MW-56	6/7/2012	244.63	11.60	14.97	3.37	232.59	SP	0.193	
MW-56	6/13/2012	244.63	12.12	14.95	2.83	232.14	SP		
MW-56	6/21/2012	244.63	12.45	15.37	2.92	231.80	SP	0.965	
MW-56	7/3/2012	244.63	13.35	15.93	2.58	230.94	SP	0	
MW-56	7/18/2012	244.63	13.56	16.18	2.62	230.73	SP	0	
MW-56	8/1/2012	244.63	13.21	16.75	3.54	230.96	SP	0	
MW-56	8/16/2012	244.63	14.00	14.43	0.43	230.57	SP		
MW-56	9/7/2012	244.63	14.29	14.60	0.31	230.30	SP	1.544	
MW-56	9/24/2012	244.63	13.09	13.67	0.58	231.46	SP		
MW-56	10/8/2012	244.63	13.10	13.21	0.11	231.52	SP	0.579	
MW-56	11/19/2012	244.63	11.63	13.64	2.01	232.74	SP	2.316	
MW-56	12/14/2012	244.63	12.77	15.82	3.05	231.46	SP	0.132	
MW-56	1/7/2013	244.63	12.39	12.54	0.15	232.22	SP	2.509	
MW-56	1/11/2013	244.63	12.25	13.18	0.93	232.26	--		
MW-56	2/6/2013	244.63	11.08	13.25	2.17	233.27	PP	0.581	
MW-56	3/1/2013	244.63	11.36	15.34	3.98	232.75	SP	0	104.822
MW-57	7/14/2009	244.52	12.98	16.24	3.26	231.12	--		
MW-57	7/16/2009	244.52	12.89	16.40	3.51	231.17	PP	1.4	
MW-57	7/22/2009	244.52	13.33	15.63	2.30	230.89	--		
MW-57	8/3/2009	244.52	12.39	15.76	3.37	231.69	PP	1.11	
MW-57	8/18/2009	244.52	13.29	16.45	3.16	230.82	PP	1.11	
MW-57	9/3/2009	244.52	13.25	16.25	3.00	230.88	PP	0.977	
MW-57	9/18/2009	244.52	13.72	16.45	2.73	230.45	PP	1.189	
MW-57	10/6/2009	244.52	14.01	16.49	2.48	230.19	PP	0.82	
MW-57	10/19/2009	244.52	13.22	15.92	2.70	230.95	--		
MW-57	11/5/2009	244.52	12.66	13.78	1.12	231.71	SP	2.1	
MW-57	11/12/2009	244.52	12.63	14.33	1.70	231.67	PP	0.37	
MW-57	12/4/2009	244.52	12.12	15.83	3.71	231.92	PP	1.11	
MW-57	12/11/2009	244.52	11.05	14.20	3.15	233.06	PP	0.74	
MW-57	12/16/2009	244.52	11.31	13.80	2.49	232.89	PP	0.502	
MW-57	12/29/2009	244.52	10.42	13.30	2.88	233.73	--		
MW-57	1/14/2010	244.52	12.03	12.20	0.17	232.47	SP	1.16	
MW-57	1/20/2010	244.52	12.06	12.46	0.40	232.41	SP	2.31	
MW-57	2/16/2010	244.52	11.76	12.21	0.45	232.70	SP	3.66	
MW-57	3/1/2010	244.52	10.90	11.90	1.00	233.49	--		
MW-57	3/8/2010	244.52	10.92	11.30	0.38	233.55	SP		
MW-57	4/5/2010	244.52	11.05	11.40	0.35	233.42	SP	1.93	
MW-57	5/3/2010	244.52	11.48	15.05	3.57	232.58	PS		
MW-57	5/3/2010	244.52	11.48	15.05	3.57	232.58	SP		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-57	5/11/2010	244.52	12.10	15.00	2.90	232.04	SP	0.97	
MW-57	5/26/2010	244.52	11.43	11.46	0.03	233.09	SP	1.93	
MW-57	6/15/2010	244.52	12.84	15.05	2.21	231.39	--		
MW-57	6/18/2010	244.52	12.86	14.21	1.35	231.48	SP		
MW-57	7/30/2010	244.52	14.18	16.74	2.56	230.01	SP	2.12	
MW-57	9/2/2010	244.52	14.89	15.98	1.09	229.49	SP	0.98	
MW-57	9/9/2010	244.52	14.80	16.81	2.01	229.46	SP	1.158	
MW-57	9/21/2010	244.52	15.13	16.35	1.22	229.23	SP		
MW-57	10/13/2010	244.52	13.79	16.18	2.39	230.42	SP	0.579	
MW-57	11/4/2010	244.52	13.52	15.82	2.30	230.70	SP		
MW-57	11/12/2010	244.52	13.64	16.12	2.46	230.54	--		
MW-57	11/19/2010	244.52	13.05	14.81	1.76	231.24	PP	0.37	
MW-57	12/3/2010	244.52	12.44	15.50	3.06	231.68	PP	0.925	
MW-57	12/3/2010	244.52	12.44	15.50	3.06	231.68	SP	1.544	
MW-57	12/10/2010	244.52	13.07	14.95	1.88	231.21	--		
MW-57	12/21/2010	244.52	13.27	15.78	2.51	230.92	PP	0.872	
MW-57	1/6/2011	244.52	13.74	16.03	2.29	230.48	SP		
MW-57	1/28/2011	244.52	14.42	15.85	1.43	229.91	SP	0.965	
MW-57	2/14/2011	244.52	13.30	15.16	1.86	230.98	--		
MW-57	2/18/2011	244.52	13.37	15.44	2.07	230.88	SP	1.351	
MW-57	3/4/2011	244.52	12.76	15.80	3.04	231.36	SP		
MW-57	3/22/2011	244.52	11.50	13.78	2.28	232.72	SP	2.123	
MW-57	4/13/2011	244.52	11.40	14.29	2.89	232.74	SP	0	
MW-57	4/20/2011	244.52	9.83	11.64	1.81	234.45	SP	0	
MW-57	4/29/2011	244.52	10.59	12.45	1.86	233.69	SP	0.193	
MW-57	5/13/2011	244.52	11.78	13.24	1.46	232.55	SP	0.772	
MW-57	5/20/2011	244.52	9.24	10.03	0.79	235.18	SP	0	
MW-57	5/26/2011	244.52	13.07	14.59	1.52	231.25	--		
MW-57	6/9/2011	244.52	12.17	14.74	2.57	232.02	SP	0.193	
MW-57	6/15/2011	244.52	12.87	12.88	0.01	231.65	SP	0.193	
MW-57	7/14/2011	244.52	13.45	15.48	2.03	230.81	PP	0.476	
MW-57	7/14/2011	244.52	13.45	15.48	2.03	230.81	SP	1.351	
MW-57	7/29/2011	244.52					SP	0	
MW-57	8/8/2011	244.52	14.20	16.09	1.89	230.07	--		
MW-57	8/17/2011	244.52	14.37	16.32	1.95	229.90	SP	0	
MW-57	8/24/2011	244.52	14.43	16.22	1.79	229.86	SP	0	
MW-57	9/1/2011	244.52	14.53	16.14	1.61	229.78	SP	0	
MW-57	9/14/2011	244.52	12.73	15.53	2.80	231.43	PP	0.845	
MW-57	10/6/2011	244.52	12.08	13.82	1.74	232.21	PP	0.386	
MW-57	10/25/2011	244.52	11.91	12.47	0.56	232.54	PP	0.159	
MW-57	11/15/2011	244.52	12.70	13.23	0.53	231.75	PP	0.264	
MW-57	12/8/2011	244.52	10.96	10.97	0.01	233.56	PS	0.003	
MW-57	12/15/2011	244.52	11.43	11.46	0.02	233.08	--		
MW-57	12/21/2011	244.52	11.73	11.74	0.01	232.79	PS	0.005	
MW-57	1/6/2012	244.52	11.93	11.95	0.02	232.59	PS	0.013	
MW-57	1/27/2012	244.52	11.29	11.37	0.08	233.22	--		
MW-57	2/7/2012	244.52	12.73	12.79	0.06	231.78	PS	0.007	
MW-57	2/28/2012	244.52	13.23	13.36	0.13	231.27	PS	0.013	
MW-57	3/3/2012	244.52	12.19	12.24	0.05	232.32	PS	0	
MW-57	3/21/2012	244.52	12.73	12.85	0.12	231.77	--		
MW-57	3/27/2012	244.52	13.08	13.23	0.15	231.42	PS	0.007	
MW-57	4/13/2012	244.52	13.82	13.88	0.06	230.69	PS		
MW-57	4/27/2012	244.52	14.24	14.30	0.06	230.27	PS	0.003	
MW-57	5/25/2012	244.52	11.98	12.30	0.32	232.50	--		
MW-57	6/7/2012	244.52	11.97	11.98	0.01	232.55	PS	0.092	
MW-57	6/13/2012	244.52		12.68		231.84	PS		
MW-57	7/18/2012	244.52	13.83	13.98	0.15	230.67	PS	0.001	
MW-57	8/1/2012	244.52	13.35	13.72	0.37	231.12	--		
MW-57	8/16/2012	244.52	13.73	14.12	0.39	230.74	--		
MW-57	9/7/2012	244.52	14.11	14.34	0.23	230.38	AS		
MW-57	9/24/2012	244.52		13.11		231.41	PS		
MW-57	10/8/2012	244.52		12.85		231.67	AS	0.066	
MW-57	11/19/2012	244.52		11.43		233.09	AS	0.013	
MW-57	12/14/2012	244.52		13.03		231.49	AS	0	
MW-57	1/7/2013	244.52		11.81		232.71	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-57	1/11/2013	244.52		11.82		232.70	--		
MW-57	2/6/2013	244.52	10.73	10.74	0.01	233.79	AS		
MW-57	3/1/2013	244.52		11.81		232.71	--		41.43
MW-58	7/14/2009	244.42	13.23	13.93	0.70	231.10	--		
MW-58	7/16/2009	244.42	13.23	13.94	0.71	231.10	PP	0.119	
MW-58	7/22/2009	244.42	13.49	13.96	0.47	230.87	--		
MW-58	8/3/2009	244.42	12.71	13.10	0.39	231.66	PP	0.066	
MW-58	8/18/2009	244.42	13.52	14.28	0.76	230.80	PP	0.159	
MW-58	9/3/2009	244.42	13.60	14.04	0.44	230.76	PP	0.079	
MW-58	9/18/2009	244.42	13.91	14.55	0.64	230.43	--		
MW-58	10/6/2009	244.42	14.14	14.68	0.54	230.21	PS	0.132	
MW-58	10/19/2009	244.42	13.38	13.63	0.25	231.01	PS	0.132	
MW-58	11/5/2009	244.42	12.61	12.90	0.29	231.77	PS	0.003	
MW-58	11/12/2009	244.42					--		
MW-58	12/4/2009	244.42	12.49	12.52	0.03	231.93	PS	0.132	
MW-58	12/11/2009	244.42		11.39		233.03	PS	0.079	
MW-58	12/16/2009	244.42	11.57	11.64	0.07	232.84	--		
MW-58	1/20/2010	244.42		12.02		232.40	--		
MW-58	2/16/2010	244.42		11.75		232.67	AS		
MW-58	3/1/2010	244.42		10.65		233.77	--		
MW-58	4/5/2010	244.42	11.00	11.11	0.11	233.41	PP	0.053	
MW-58	5/3/2010	244.42	11.73	12.00	0.27	232.65	PP	0.053	
MW-58	5/26/2010	244.42	11.33	11.42	0.09	233.08	AS	0.013	
MW-58	6/15/2010	244.42	13.21	13.38	0.26	231.27	--		
MW-58	6/18/2010	244.42	13.14	13.36	0.22	231.25	PP	0.106	
MW-58	7/30/2010	244.42	14.26	15.52	1.26	230.00	PP	0.317	
MW-58	9/2/2010	244.42	15.54	15.83	0.29	228.84	PP	0.079	
MW-58	9/21/2010	244.42	14.98	16.41	1.43	229.25	PP	0.211	
MW-58	10/13/2010	244.42	13.87	14.93	1.06	230.41	PP	0.304	
MW-58	11/4/2010	244.42					--		
MW-58	11/12/2010	244.42	13.26	13.31	0.05	231.15	PS	0.132	
MW-58	11/19/2010	244.42	13.08	13.20	0.12	231.32	PS	0.132	
MW-58	11/24/2010	244.42					PS	0.079	
MW-58	12/3/2010	244.42	12.84	13.05	0.21	231.55	PS	0.003	
MW-58	12/10/2010	244.42	13.35	13.36	0.01	231.07	--		
MW-58	12/21/2010	244.42	13.57	13.59	0.02	230.85	PS	0.132	
MW-58	1/6/2011	244.42	14.03	14.20	0.17	230.37	PS	0.003	
MW-58	1/28/2011	244.42	14.43	14.98	0.55	229.92	PS	0.132	
MW-58	2/14/2011	244.42	13.48	13.50	0.02	230.94	--		
MW-58	2/18/2011	244.42	13.57	13.59	0.02	230.85	PS	0.106	
MW-58	3/4/2011	244.42	13.07	13.09	0.02	231.35	PS	0.132	
MW-58	3/22/2011	244.42	11.73	11.74	0.01	232.69	PS	0.003	
MW-58	4/13/2011	244.42		11.73		232.69	PS	0	
MW-58	4/20/2011	244.42	10.08	10.10	0.02	234.34	PS	0.003	
MW-58	4/29/2011	244.42		10.83		233.59	PS	0	
MW-58	5/13/2011	244.42	11.83	11.98	0.05	232.48	PS	0.003	
MW-58	5/20/2011	244.42	9.32	9.33	0.01	235.10	PS	0.003	
MW-58	5/26/2011	244.42	13.32	13.33	0.01	231.10	--		
MW-58	6/9/2011	244.42	12.44	12.49	0.05	231.97	PS	0.003	
MW-58	6/15/2011	244.42	12.79	12.88	0.09	231.62	PS	0.003	
MW-58	7/14/2011	244.42	13.79	13.80	0.01	230.63	PS	0.053	
MW-58	7/21/2011	244.42	13.72	13.77	0.05	230.69	PS	0.079	
MW-58	8/8/2011	244.42	14.40	14.51	0.11	230.01	--		
MW-58	8/17/2011	244.42	14.48	14.73	0.25	229.91	PS	0.053	
MW-58	8/24/2011	244.42	14.56	14.58	0.02	229.86	PS	0.132	
MW-58	9/1/2011	244.42	14.67	14.69	0.02	229.75	PS	0.04	
MW-58	9/14/2011	244.42	12.96	12.99	0.03	231.46	PS	0.003	
MW-58	10/6/2011	244.42		12.24		232.18	PP		
MW-58	10/25/2011	244.42	12.10	12.12	0.02	232.32	PS	0.001	
MW-58	11/15/2011	244.42	12.73	12.74	0.01	231.69	PS	0.003	
MW-58	12/15/2011	244.42	11.51	11.53	0.02	232.91	--		
MW-58	12/21/2011	244.42		11.75		232.67	--		
MW-58	1/6/2012	244.42	11.90	11.91	0.01	232.52	--		
MW-58	1/27/2012	244.42	11.81	11.82	0.01	232.61	--		
MW-58	2/7/2012	244.42	12.45	12.53	0.08	231.96	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-58	2/28/2012	244.42	13.19	13.25	0.06	231.22	--		
MW-58	3/3/2012	244.42	11.88	11.90	0.02	232.54	--		
MW-58	3/21/2012	244.42	12.51	12.58	0.07	231.90	--		
MW-58	4/13/2012	244.42	13.33	13.53	0.20	231.06	--		
MW-58	4/27/2012	244.42	13.25	13.41	0.16	231.15	--		
MW-58	5/25/2012	244.42	12.37	12.38	0.01	232.05	PS	0.026	
MW-58	6/7/2012	244.42		11.89		232.53	--		
MW-58	6/13/2012	244.42		12.22		232.20	--		
MW-58	7/18/2012	244.42	13.66	14.02	0.36	230.71	PS		
MW-58	8/1/2012	244.42	13.93	13.94	0.01	230.49	PS	0.053	
MW-58	8/16/2012	244.42	14.15	14.16	0.01	230.27	PS	0.053	
MW-58	9/7/2012	244.42	14.13	14.40	0.27	230.25	PS		
MW-58	9/24/2012	244.42	13.04	13.08	0.04	231.37	--		
MW-58	10/8/2012	244.42	13.11	13.12	0.01	231.31	PS	0.003	
MW-58	10/24/2012	244.42					PS	0.013	
MW-58	11/19/2012	244.42		11.70		232.72	--		
MW-58	12/14/2012	244.42	12.94	12.96	0.02	231.48	--		
MW-58	1/7/2013	244.42	12.28	12.29	0.01	232.14	AS	0.013	
MW-58	1/11/2013	244.42		12.27		232.15	--		
MW-58	2/6/2013	244.42		11.45		232.97	PS	0.026	
MW-58	3/1/2013	244.42		11.74		232.68	--		3.457
MW-59	3/21/2012	246.07		13.29		232.78	--		
MW-59	3/27/2012	246.07	13.60	13.64	0.04	232.46	--		
MW-59	4/13/2012	246.07	14.20	14.35	0.15	231.85	AS	0.159	
MW-59	4/27/2012	246.07	14.15	14.28	0.13	231.90	AS	0.132	
MW-59	5/25/2012	246.07	13.01	13.03	0.02	233.06	AS	0.172	
MW-59	6/7/2012	246.07	12.52	12.60	0.08	233.54	AS	0.145	
MW-59	6/13/2012	246.07	12.85	12.95	0.10	233.21	AS	0.198	
MW-59	6/21/2012	246.07	13.31	13.43	0.12	232.74	AS	0.198	
MW-59	7/18/2012	246.07	14.55	14.66	0.11	231.51	AS	0.449	
MW-59	8/16/2012	246.07	14.85	15.18	0.33	231.18	AS	0.66	
MW-59	9/24/2012	246.07	13.60	13.75	0.15	232.45	AS		
MW-59	10/8/2012	246.07	13.52	13.54	0.02	232.55	AS	0.185	
MW-59	10/24/2012	246.07	13.51	13.76	0.25	232.53	AS	0.159	
MW-59	11/19/2012	246.07	11.42	11.53	0.11	234.64	AS	0.185	
MW-59	12/14/2012	246.07	13.69	13.70	0.01	232.38	AS	0.145	
MW-59	1/7/2013	246.07	12.88	12.90	0.02	233.19	AS	0.145	
MW-59	1/11/2013	246.07		12.84		233.23	--		2.932
MW-60	3/21/2012	245.57	13.19	13.26	0.07	232.37	--		
MW-60	3/27/2012	245.57	13.48	13.53	0.05	232.08	--		
MW-60	4/13/2012	245.57	14.10	14.11	0.01	231.47	AS	0.159	
MW-60	4/27/2012	245.57	13.98	14.02	0.04	231.58	AS	0.119	
MW-60	5/25/2012	245.57		12.85		232.72	AS	0.066	
MW-60	6/7/2012	245.57		12.48		233.09	AS	0.106	
MW-60	6/13/2012	245.57		12.82		232.75	AS	0.132	
MW-60	6/21/2012	245.57		13.27		232.30	AS	0.04	
MW-60	7/18/2012	245.57	14.30	14.40	0.10	231.26	AS	0.304	
MW-60	8/16/2012	245.57	14.50	14.52	0.02	231.07	AS	0.317	
MW-60	9/24/2012	245.57	13.56	13.57	0.01	232.01	AS		
MW-60	10/8/2012	245.57	13.60	13.61	0.01	231.97	AS	0.132	
MW-60	10/24/2012	245.57	13.48	13.56	0.08	232.08	AS	0.159	
MW-60	11/19/2012	245.57	12.27	12.31	0.04	233.29	AS	0.159	
MW-60	12/14/2012	245.57	13.60	13.65	0.05	231.96	AS	0.476	
MW-60	1/7/2013	245.57	12.97	13.02	0.05	232.59	AS	0.211	
MW-60	1/11/2013	245.57		12.80		232.77	--		
MW-60	3/1/2013	245.57	12.36	12.46	0.10	233.20	AS	0.172	2.552
MW-61	3/21/2012	245.63		13.28		232.35	--		
MW-61	3/27/2012	245.63	13.59	13.60	0.01	232.04	--		
MW-61	4/13/2012	245.63		14.18		231.45	--		
MW-61	4/27/2012	245.63		14.15		231.48	AS		
MW-61	5/25/2012	245.63		13.06		232.57	--		
MW-61	6/7/2012	245.63		12.64		232.99	AS		
MW-61	6/13/2012	245.63		12.90		232.73	--		
MW-61	7/18/2012	245.63		14.33		231.30	--		
MW-61	8/16/2012	245.63		14.54		231.09	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-61	9/24/2012	245.63		13.63		232.00	--		
MW-61	10/8/2012	245.63		13.63		232.00	--		
MW-61	10/24/2012	245.63	13.55	13.56	0.01	232.08	--		
MW-61	11/19/2012	245.63		12.51		233.12	AS		
MW-61	12/14/2012	245.63		13.95		231.68	AS	0	
MW-61	1/7/2013	245.63		13.27		232.36	--		
MW-61	1/11/2013	245.63		13.05		232.58	--		
MW-61	3/1/2013	245.63		12.67		232.96	AS	0.007	0.007
MW-62	3/21/2012	246.08	13.45	15.89	2.44	232.31	--		
MW-62	3/27/2012	246.08	13.73	16.41	2.68	232.00	PP	2.404	
MW-62	4/13/2012	246.08	14.57	15.18	0.61	231.43	PS	0.793	
MW-62	4/27/2012	246.08	14.62	14.76	0.14	231.44	PS	0.793	
MW-62	5/11/2012	246.08	14.43	14.44	0.01	231.65	PS	0.476	
MW-62	5/25/2012	246.08	13.64	13.65	0.01	232.44	PS	0.066	
MW-62	6/7/2012	246.08		13.28		232.80	PS	0.007	
MW-62	6/13/2012	246.08		13.71		232.37	PS		
MW-62	6/21/2012	246.08	13.94	13.95	0.01	232.14	PS	0	
MW-62	7/3/2012	246.08	14.66	14.74	0.08	231.41	PS	0	
MW-62	7/18/2012	246.08	14.96	14.97	0.01	231.12	PS	0.225	
MW-62	8/16/2012	246.08	15.15	15.18	0.03	230.93	AS	0.251	
MW-62	9/24/2012	246.08	14.20	14.22	0.02	231.88	PS		
MW-62	10/8/2012	246.08	14.25	14.26	0.01	231.83	AS	0.132	
MW-62	10/24/2012	246.08	14.13	14.15	0.02	231.95	AS	0.145	
MW-62	11/19/2012	246.08		12.97		233.11	AS	0.04	
MW-62	12/14/2012	246.08		14.26		231.82	AS	0.026	
MW-62	1/7/2013	246.08		13.64		232.44	AS	0.092	
MW-62	1/11/2013	246.08		13.45		232.63	--		
MW-62	2/6/2013	246.08		12.44		233.64	AS	0.033	
MW-62	3/1/2013	246.08		13.06		233.02	AS	0.026	5.509
MW-63	3/21/2012	246.25	14.12	14.20	0.08	232.12	--		
MW-63	3/27/2012	246.25	14.38	14.77	0.39	231.82	--		
MW-63	4/13/2012	246.25	14.94	15.22	0.28	231.27	AS	0.317	
MW-63	4/27/2012	246.25	14.94	15.04	0.10	231.30	AS	0.159	
MW-63	5/25/2012	246.25		13.90		232.35	AS	0.185	
MW-63	6/7/2012	246.25	13.52	13.68	0.16	232.71	AS	0.528	
MW-63	6/13/2012	246.25	13.69	14.24	0.55	232.49	AS	0.211	
MW-63	6/21/2012	246.25	14.20	14.85	0.65	231.97	AS	1.169	
MW-63	7/3/2012	246.25	14.86	15.90	0.96	231.19	AS	0.132	
MW-63	7/18/2012	246.25	15.29	15.70	0.41	230.91	AS	0.766	
MW-63	8/1/2012	246.25	15.18	15.20	0.02	231.07	AS	0.793	
MW-63	8/16/2012	246.25	15.52	15.58	0.06	230.72	PS	0.059	
MW-63	9/7/2012	246.25	15.78	15.93	0.15	230.45	PS		
MW-63	9/24/2012	246.25	14.62	14.66	0.04	231.62	AS		
MW-63	10/8/2012	246.25	14.54	15.05	0.51	231.64	PS	0.026	
MW-63	10/24/2012	246.25	14.41	15.02	0.61	231.76	PS	0.66	
MW-63	11/19/2012	246.25	13.33	13.40	0.07	232.91	PS	0.726	
MW-63	12/14/2012	246.25	14.51	15.19	0.68	231.65	PS	0.793	
MW-63	1/7/2013	246.25	14.04	14.18	0.14	232.19	PS	0.793	
MW-63	1/11/2013	246.25		13.88		232.37	--		
MW-63	2/6/2013	246.25	12.79	13.39	0.60	233.38	PP	1.257	
MW-63	3/1/2013	246.25	13.28	13.96	0.68	232.88	PS	0.026	8.6
MW-64	3/21/2012	245.45		4.39		241.06	--		
MW-64	3/27/2012	245.45		4.57		240.88	--		
MW-64	4/13/2012	245.45		13.20		232.25	--		
MW-64	4/27/2012	245.45		8.45		237.00	--		
MW-64	5/25/2012	245.45		4.21		241.24	--		
MW-64	6/7/2012	245.45		4.19		241.26	--		
MW-64	6/13/2012	245.45		4.28		241.17	--		
MW-64	8/16/2012	245.45		12.24		233.21	--		
MW-64	9/24/2012	245.45		4.31		241.14	--		
MW-64	12/14/2012	245.45		7.25		238.20	--		
MW-64	1/11/2013	245.45		4.35		241.10	--		0
MW-65	3/21/2012	245.54		5.38		240.16	--		
MW-65	3/27/2012	245.54		5.61		239.93	--		
MW-65	4/13/2012	245.54		10.83		234.71	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
MW-65	4/27/2012	245.54					--		
MW-65	5/25/2012	245.54		5.49		240.05	--		
MW-65	6/7/2012	245.54		4.81		240.73	--		
MW-65	6/13/2012	245.54		4.74		240.80	--		
MW-65	8/16/2012	245.54		5.50		240.04	--		
MW-65	9/24/2012	245.54		4.64		240.90	--		
MW-65	12/14/2012	245.54		5.43		240.11	--		
MW-65	1/11/2013	245.54		5.42		240.12	--		0
MW-67	1/11/2013			13.27			--		
MW-67	3/1/2013			12.84			--		0
MW-68	1/11/2013			4.68			--		
MW-68	3/1/2013			4.56			--		0
MW-69	1/11/2013			12.96			--		
MW-69	3/1/2013			12.44			--		0
MW-70	1/11/2013			13.43			--		
MW-70	3/1/2013		12.89	12.97	0.08		AS	0.013	0.013
EW-1	7/22/2009	243.50		8.78		234.72	--		
EW-1	8/18/2009	243.50	13.04	13.05	0.01	230.46	PP	0.026	
EW-1	9/18/2009	243.50		8.59		234.91	--		
EW-1	10/6/2009	243.50		8.85		234.65	--		
EW-1	10/19/2009	243.50		9.79		233.71	--		
EW-1	11/5/2009	243.50		11.41		232.09	--		
EW-1	12/4/2009	243.50		11.49		232.01	--		
EW-1	1/20/2010	243.50		7.35		236.15	--		
EW-1	3/1/2010	243.50		10.20		233.30	--		
EW-1	4/5/2010	243.50		8.11		235.39	--		
EW-1	5/3/2010	243.50		6.19		237.31	--		
EW-1	5/26/2010	243.50		8.72		234.78	--		
EW-1	6/15/2010	243.50		8.33		235.17	--		
EW-1	7/30/2010	243.50		8.74		234.76	--		
EW-1	9/2/2010	243.50		15.12		228.38	--		
EW-1	9/21/2010	243.50		14.80		228.70	--		
EW-1	10/13/2010	243.50		8.90		234.60	--		
EW-1	11/4/2010	243.50					--		
EW-1	12/10/2010	243.50		7.39		236.11	--		
EW-1	2/14/2011	243.50		7.35		236.15	--		
EW-1	4/13/2011	243.50					--		
EW-1	5/26/2011	243.50		7.28		236.22	--		
EW-1	6/15/2011	243.50		7.37		236.13	--		
EW-1	7/14/2011	243.50		7.46		236.04	--		
EW-1	8/8/2011	243.50		7.71		235.79	--		
EW-1	9/14/2011	243.50		7.35		236.15	--		
EW-1	10/25/2011	243.50					--		
EW-1	12/15/2011	243.50					--		
EW-1	1/27/2012	243.50					--		
EW-1	2/7/2012	243.50					--		
EW-1	2/28/2012	243.50		7.78		235.72	--		
EW-1	3/21/2012	243.50		7.71		235.79	--		
EW-1	4/13/2012	243.50		7.82		235.68	--		
EW-1	5/25/2012	243.50		7.55		235.95	--		
EW-1	6/13/2012	243.50		7.59		235.91	--		
EW-1	8/16/2012	243.50		7.49		236.01	--		
EW-1	9/24/2012	243.50		7.31		236.19	--		
EW-1	12/14/2012	243.50		7.66		235.84	--		
EW-1	1/11/2013	243.50		7.43		236.07	--		
EW-1	3/1/2013	243.50		7.31		236.19	--		0.026
EW-2	7/22/2009	243.30		13.03		230.27	--		
EW-2	9/18/2009	243.30	13.49	13.50	0.01	229.81	AS	0.003	
EW-2	10/6/2009	243.30	13.71	13.73	0.02	229.59	AS		
EW-2	10/19/2009	243.30	12.99	13.02	0.03	230.31	AS	0.005	
EW-2	11/5/2009	243.30		12.09		231.21	--		
EW-2	12/4/2009	243.30		11.96		231.34	--		
EW-2	12/16/2009	243.30		11.10		232.20	--		
EW-2	1/20/2010	243.30		11.37		231.93	--		
EW-2	2/16/2010	243.30		11.90		231.40	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
EW-2	4/5/2010	243.30		10.44		232.86	--		
EW-2	5/3/2010	243.30		11.05		232.25	--		
EW-2	5/26/2010	243.30		10.93		232.37	--		
EW-2	6/15/2010	243.30		12.40		230.90	--		
EW-2	7/30/2010	243.30		13.92		229.38	--		
EW-2	9/2/2010	243.30		15.06		228.24	--		
EW-2	9/21/2010	243.30	14.63	14.64	0.01	228.67	AS	0.003	
EW-2	10/13/2010	243.30	13.39	13.40	0.01	229.91	AS	0.003	
EW-2	11/4/2010	243.30	12.99	13.00	0.01	230.31	AS	0.003	
EW-2	12/3/2010	243.30	13.04	13.05	0.01	230.26	AS	0.002	
EW-2	12/10/2010	243.30		12.53		230.77	--		
EW-2	1/28/2011	243.30		13.95		229.35	--		
EW-2	2/14/2011	243.30	12.82	12.83	0.01	230.48	--		
EW-2	3/4/2011	243.30		12.85		230.45	--		
EW-2	4/13/2011	243.30	10.93	10.94	0.01	232.37	AS	0.003	
EW-2	4/20/2011	243.30	9.10	9.11	0.01	234.20	--		
EW-2	4/29/2011	243.30		9.65		233.65	--		
EW-2	5/13/2011	243.30		11.15		232.15	--		
EW-2	5/26/2011	243.30		12.10		231.20	--		
EW-2	6/9/2011	243.30		11.72		231.58	--		
EW-2	6/15/2011	243.30		12.14		231.16	--		
EW-2	7/14/2011	243.30	12.95	12.96	0.01	230.35	--		
EW-2	8/8/2011	243.30	13.75	13.76	0.01	229.55	--		
EW-2	9/14/2011	243.30	12.08	12.10	0.02	231.22	AS	0.013	
EW-2	10/25/2011	243.30	10.98	10.99	0.01	232.32	AS	0.001	
EW-2	12/15/2011	243.30		9.77		233.53	--		
EW-2	1/6/2012	243.30		10.94		232.36	--		
EW-2	1/27/2012	243.30	10.77	10.78	0.01	232.53	--		
EW-2	2/7/2012	243.30		11.75		231.55	--		
EW-2	2/28/2012	243.30		12.52		230.78	--		
EW-2	3/21/2012	243.30		11.87		231.43	--		
EW-2	4/13/2012	243.30		12.69		230.61	--		
EW-2	4/27/2012	243.30		12.43		230.87	--		
EW-2	5/25/2012	243.30		11.05		232.25	--		
EW-2	6/7/2012	243.30		10.50		232.80	--		
EW-2	6/13/2012	243.30		10.89		232.41	--		
EW-2	7/18/2012	243.30		12.92		230.38	--		
EW-2	8/16/2012	243.30		13.05		230.25	--		
EW-2	9/24/2012	243.30		11.73		231.57	--		
EW-2	10/8/2012	243.30		11.62		231.68	--		
EW-2	11/19/2012	243.30		10.55		232.75	--		
EW-2	12/14/2012	243.30		12.21		231.09	--		
EW-2	1/7/2013	243.30		11.23		232.07	--		
EW-2	1/11/2013	243.30		11.29		232.01	--		
EW-2	3/1/2013	243.30		10.60		232.70	--		0.036
EW-3	7/16/2009	242.70	12.55	12.73	0.18	230.13	PP	0.238	
EW-3	7/22/2009	242.70	12.81	12.90	0.09	229.88	--		
EW-3	8/3/2009	242.70	12.13	12.38	0.25	230.54	PP	0.132	
EW-3	9/3/2009	242.70	12.80	13.30	0.50	229.84	PP	0.423	
EW-3	9/18/2009	242.70	13.35	13.60	0.25	229.32	PP	0.172	
EW-3	10/6/2009	242.70	13.60	13.95	0.35	229.05	PP	0.476	
EW-3	10/19/2009	242.70	12.91	13.06	0.15	229.77	AS	0.079	
EW-3	11/5/2009	242.70	12.32	12.33	0.01	230.38	AS	0.159	
EW-3	12/4/2009	242.70	12.03	12.23	0.20	230.64	AS	0.178	
EW-3	12/11/2009	242.70		10.95		231.75	--		
EW-3	12/16/2009	242.70		11.03		231.67	AS	0.053	
EW-3	1/20/2010	242.70		11.51		231.19	--		
EW-3	2/16/2010	242.70		11.17		231.53	--		
EW-3	3/8/2010	242.70	10.24	10.45	0.21	232.43	--		
EW-3	4/5/2010	242.70	10.40	10.65	0.25	232.27	PP	0.092	
EW-3	5/3/2010	242.70	11.11	11.50	0.39	231.54	PP	0.106	
EW-3	5/26/2010	242.70	10.69	11.13	0.44	231.95	PP	0.476	
EW-3	6/15/2010	242.70	12.31	12.73	0.42	230.34	--		
EW-3	6/18/2010	242.70	12.24	12.69	0.45	230.40	PP	0.317	
EW-3	7/30/2010	242.70	13.73	13.75	0.02	228.97	AS	0.013	

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
EW-3	9/2/2010	242.70	14.99	15.33	0.34	227.67	PP	0.159	
EW-3	9/21/2010	242.70	14.58	15.46	0.88	228.01	PP	0.317	
EW-3	10/13/2010	242.70	13.26	14.02	0.76	229.34	PP	0.951	
EW-3	11/4/2010	242.70	13.01	13.44	0.43	229.63	--		
EW-3	11/12/2010	242.70	13.01	13.48	0.48	229.64	PP	0.74	
EW-3	11/19/2010	242.70	12.86	13.31	0.45	229.78	PP	0.687	
EW-3	11/24/2010	242.70	12.93	13.57	0.64	229.69	PP	0.845	
EW-3	12/3/2010	242.70	12.14	12.27	0.13	230.54	--		
EW-3	12/10/2010	242.70	12.45	12.62	0.17	230.23	--		
EW-3	1/28/2011	242.70	13.82	14.30	0.48	228.82	PP	0.198	
EW-3	2/14/2011	242.70	12.75	13.20	0.45	229.89	--		
EW-3	3/4/2011	242.70	12.38	12.97	0.59	230.24	PP	0.819	
EW-3	4/13/2011	242.70	11.15	11.30	0.15	231.53	PP	0.185	
EW-3	4/20/2011	242.70	9.43	9.58	0.15	233.25	--		
EW-3	4/29/2011	242.70		10.35		232.35	AS	0.159	
EW-3	5/13/2011	242.70	11.35	11.36	0.01	231.35	AS	0.159	
EW-3	5/26/2011	242.70	12.99	13.04	0.05	229.70	--		
EW-3	6/9/2011	242.70	11.87	11.88	0.01	230.83	AS	0.079	
EW-3	6/15/2011	242.70		12.95		229.75	AS	0.053	
EW-3	7/14/2011	242.70	12.98	13.20	0.22	229.69	AS	0.053	
EW-3	7/21/2011	242.70	13.00	13.22	0.22	229.67	AS	0.396	
EW-3	8/8/2011	242.70	13.73	13.95	0.22	228.94	--		
EW-3	8/17/2011	242.70	14.71	14.73	0.02	227.99	AS	0.079	
EW-3	9/1/2011	242.70	14.09	14.35	0.26	228.58	AS	0.185	
EW-3	9/14/2011	242.70	12.50	12.59	0.09	230.19	AS	0.132	
EW-3	10/25/2011	242.70		11.60		231.10	AS	0.172	
EW-3	12/15/2011	242.70					--		
EW-3	12/21/2011	242.70		11.30		231.40	AS	0.053	
EW-3	1/27/2012	242.70					--		
EW-3	2/7/2012	242.70					--		
EW-3	2/28/2012	242.70					--		
EW-3	3/21/2012	242.70					--		
EW-3	4/13/2012	242.70	12.71	12.97	0.26	229.96	AS	0.026	
EW-3	4/27/2012	242.70	12.68	13.02	0.34	229.98	AS	0.026	
EW-3	5/25/2012	242.70	11.84	11.98	0.14	230.84	AS	0.211	
EW-3	6/13/2012	242.70	11.83	11.86	0.03	230.87	AS		
EW-3	7/18/2012	242.70	13.15	13.50	0.35	229.50	AS	0.132	
EW-3	8/16/2012	242.70	13.25	13.29	0.04	229.44	AS	0.119	
EW-3	9/24/2012	242.70	12.57	12.85	0.28	230.09	AS		
EW-3	10/8/2012	242.70	12.48	12.76	0.28	230.18	AS	0.172	
EW-3	11/19/2012	242.70	11.25	11.51	0.26	231.42	AS	0.251	
EW-3	12/14/2012	242.70	12.44	12.61	0.17	230.24	AS	0.277	
EW-3	1/7/2013	242.70	11.85	11.99	0.14	230.83	AS	0.291	
EW-3	1/11/2013	242.70	11.76	11.80	0.04	230.93	--		
EW-3	3/1/2013	242.70	11.19	11.26	0.07	231.50	AS	0.251	11.091
EW-4	7/22/2009	243.20		12.49		230.71	--		
EW-4	9/18/2009	243.20		12.79		230.41	--		
EW-4	10/6/2009	243.20		12.62		230.58	--		
EW-4	10/19/2009	243.20		8.26		234.94	--		
EW-4	11/5/2009	243.20		9.83		233.37	--		
EW-4	12/4/2009	243.20		3.23		239.97	--		
EW-4	1/20/2010	243.20		9.05		234.15	--		
EW-4	2/16/2010	243.20		11.75		231.45	--		
EW-4	4/5/2010	243.20		8.52		234.68	--		
EW-4	5/3/2010	243.20		8.85		234.35	--		
EW-4	5/26/2010	243.20		8.80		234.40	--		
EW-4	6/15/2010	243.20					--		
EW-4	7/30/2010	243.20		13.33		229.87	--		
EW-4	9/2/2010	243.20		14.98		228.22	--		
EW-4	9/21/2010	243.20		14.21		228.99	--		
EW-4	10/13/2010	243.20		11.95		231.25	--		
EW-4	11/4/2010	243.20					--		
EW-4	12/10/2010	243.20		10.17		233.03	--		
EW-4	1/28/2011	243.20		13.52		229.68	--		
EW-4	2/14/2011	243.20		10.86		232.34	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
EW-4	4/13/2011	243.20					--		
EW-4	5/26/2011	243.20		12.07		231.13	--		
EW-4	6/15/2011	243.20		11.20		232.00	--		
EW-4	7/14/2011	243.20					--		
EW-4	8/8/2011	243.20					--		
EW-4	9/14/2011	243.20		9.22		233.98	--		
EW-4	10/25/2011	243.20					--		
EW-4	12/15/2011	243.20					--		
EW-4	1/27/2012	243.20		10.07		233.13	--		
EW-4	2/28/2012	243.20		11.99		231.21	--		
EW-4	3/20/2012	243.20		11.15		232.05	--		
EW-4	4/13/2012	243.20		12.34		230.86	--		
EW-4	5/25/2012	243.20					--		
EW-4	6/13/2012	243.20		8.57		234.63	--		
EW-4	7/18/2012	243.20		11.95		231.25	--		
EW-4	8/16/2012	243.20		11.97		231.23	--		
EW-4	9/24/2012	243.20		10.07		233.13	--		
EW-4	12/14/2012	243.20		11.29		231.91	--		
EW-4	1/11/2013	243.20		10.32		232.88	--		0
EW-5	7/16/2009	243.60	13.35	13.36	0.01	230.25	PP		
EW-5	7/22/2009	243.60		13.65		229.95	--		
EW-5	8/3/2009	243.60		12.91		230.69	--		
EW-5	9/3/2009	243.60	13.70	13.81	0.11	229.89	PP	0.106	
EW-5	9/18/2009	243.60	14.08	14.25	0.17	229.50	PP	0.291	
EW-5	10/6/2009	243.60	14.40	14.50	0.10	229.19	AS		
EW-5	10/19/2009	243.60	13.65	13.76	0.11	229.94	AS	0.04	
EW-5	11/5/2009	243.60		12.85		230.75	--		
EW-5	12/4/2009	243.60	12.80	12.82	0.02	230.80	AS	0.145	
EW-5	12/16/2009	243.60		11.75		231.85	AS	0.013	
EW-5	1/20/2010	243.60		12.08		231.52	--		
EW-5	3/8/2010	243.60	11.05	11.06	0.01	232.55	--		
EW-5	4/5/2010	243.60	11.22	11.24	0.02	232.38	AS	0.026	
EW-5	5/3/2010	243.60	11.43	12.00	0.07	231.66	PP	0.053	
EW-5	5/26/2010	243.60	11.48	11.54	0.06	232.11	AS	0.106	
EW-5	6/15/2010	243.60		13.14		230.46	--		
EW-5	7/30/2010	243.60	14.58	14.73	0.15	229.00	AS	0.106	
EW-5	9/2/2010	243.60	15.36	15.49	0.13	228.22	PP	0.079	
EW-5	9/21/2010	243.60	15.30	15.70	0.40	228.25	PP	0.264	
EW-5	10/13/2010	243.60	14.12	14.50	0.38	229.43	PP	0.277	
EW-5	11/4/2010	243.60	13.81	13.95	0.14	229.77	AS	0.03	
EW-5	11/12/2010	243.60	13.52	13.55	0.03	230.08	AS	0.007	
EW-5	11/19/2010	243.60	13.61	13.71	0.10	229.98	AS	0.04	
EW-5	11/24/2010	243.60	13.75	13.95	0.20	229.82	PP	0.185	
EW-5	12/10/2010	243.60	13.30	13.35	0.50	230.69	--		
EW-5	1/28/2011	243.60	14.66	14.75	0.09	228.93	AS	0.053	
EW-5	2/14/2011	243.60	13.56	13.66	0.10	230.03	--		
EW-5	3/4/2011	243.60	13.20	13.27	0.07	230.39	AS	0.026	
EW-5	4/13/2011	243.60	11.89	12.03	0.14	231.69	PP	0.106	
EW-5	4/29/2011	243.60	10.93	11.12	0.19	232.65	--		
EW-5	5/13/2011	243.60		12.20		231.40	AS	0.225	
EW-5	5/26/2011	243.60	12.70	12.72	0.02	230.90	--		
EW-5	6/9/2011	243.60	12.61	12.62	0.01	230.99	PS	0.092	
EW-5	6/15/2011	243.60		12.19		231.41	AS	0.003	
EW-5	7/14/2011	243.60		13.78		229.82	--		
EW-5	7/21/2011	243.60		13.90		229.70	AS	0	
EW-5	8/8/2011	243.60	14.47	15.53	1.06	228.99	--		
EW-5	8/17/2011	243.60	13.88	14.18	0.30	229.68	AS	0.106	
EW-5	9/14/2011	243.60		13.20		230.40	AS	0.106	
EW-5	10/25/2011	243.60					--		
EW-5	12/15/2011	243.60					--		
EW-5	12/21/2011	243.60	11.95	11.98	0.03	231.65	AS	0.159	
EW-5	1/6/2012	243.60		12.17		231.43	--		
EW-5	1/27/2012	243.60		12.21		231.39	--		
EW-5	2/7/2012	243.60		12.78		230.82	AS	0.066	
EW-5	2/28/2012	243.60		13.35		230.25	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
EW-5	3/21/2012	243.60		12.88		230.72	--		
EW-5	4/13/2012	243.60		13.60		230.00	AS	0.066	
EW-5	4/27/2012	243.60		13.51		230.09	AS	0.013	
EW-5	5/25/2012	243.60		12.50		231.10	AS	0.003	
EW-5	6/13/2012	243.60	12.47	12.48	0.01	231.13	AS		
EW-5	7/18/2012	243.60		14.05		229.55	AS	0.079	
EW-5	8/16/2012	243.60		14.00		229.60	AS	0.053	
EW-5	9/24/2012	243.60	13.35	13.36	0.01	230.25	AS		
EW-5	10/8/2012	243.60	13.19	13.20	0.01	230.41	AS	0.159	
EW-5	11/19/2012	243.60	11.93	11.96	0.03	231.67	AS	0.145	
EW-5	12/14/2012	243.60		13.23		230.37	AS	0.079	
EW-5	1/7/2013	243.60		12.53		231.07	AS	0.053	
EW-5	1/11/2013	243.60		12.38		231.22	--		
EW-5	3/1/2013	243.60	11.89	11.90	0.01	231.71	AS	0.092	3.452
EW-6	7/22/2009	242.40		13.33		229.07	--		
EW-6	9/18/2009	242.40		13.86		228.54	--		
EW-6	10/6/2009	242.40		14.13		228.27	--		
EW-6	10/19/2009	242.40		13.40		229.00	--		
EW-6	11/5/2009	242.40		12.51		229.89	--		
EW-6	12/4/2009	242.40		12.42		229.98	--		
EW-6	1/20/2010	242.40		11.73		230.67	--		
EW-6	4/5/2010	242.40		10.86		231.54	--		
EW-6	5/3/2010	242.40		11.60		230.80	--		
EW-6	5/26/2010	242.40		11.15		231.25	--		
EW-6	6/15/2010	242.40		12.78		229.62	--		
EW-6	7/30/2010	242.40		14.30		228.10	--		
EW-6	9/2/2010	242.40		15.01		227.39	--		
EW-6	9/21/2010	242.40		5.10		237.30	--		
EW-6	10/13/2010	242.40		13.80		228.60	--		
EW-6	11/4/2010	242.40		14.49		227.91	--		
EW-6	12/10/2010	242.40		12.97		229.43	--		
EW-6	1/28/2011	242.40		14.35		228.05	--		
EW-6	2/14/2011	242.40		13.26		229.14	--		
EW-6	4/13/2011	242.40		11.37		231.03	--		
EW-6	5/26/2011	242.40		13.24		229.16	--		
EW-6	6/15/2011	242.40		12.60		229.80	--		
EW-6	7/14/2011	242.40		13.43		228.97	--		
EW-6	8/8/2011	242.40		14.20		228.20	--		
EW-6	9/14/2011	242.40		12.74		229.66	--		
EW-6	10/25/2011	242.40		11.82		230.58	--		
EW-6	12/15/2011	242.40		11.35		231.05	--		
EW-6	1/27/2012	242.40		11.68		230.72	--		
EW-6	2/28/2012	242.40		13.02		229.38	--		
EW-6	3/21/2012	242.40		12.43		229.97	--		
EW-6	4/13/2012	242.40		13.22		229.18	--		
EW-6	5/25/2012	242.40		12.12		230.28	--		
EW-6	6/13/2012	242.40		12.09		230.31	--		
EW-6	7/18/2012	242.40		13.54		228.86	--		
EW-6	8/16/2012	242.40		13.72		228.68	--		
EW-6	9/24/2012	242.40		12.93		229.47	--		
EW-6	11/19/2012	242.40		11.57		230.83	--		
EW-6	12/14/2012	242.40		12.83		229.57	--		
EW-6	1/11/2013	242.40		12.03		230.37	--		
EW-6	3/1/2013	242.40		11.59		230.81	--		0
EW-7	7/22/2009	243.20		13.22		229.98	--		
EW-7	9/18/2009	243.20		13.75		229.45	--		
EW-7	10/6/2009	243.20		14.05		229.15	--		
EW-7	10/19/2009	243.20		13.30		229.90	--		
EW-7	11/5/2009	243.20		12.51		230.69	--		
EW-7	12/4/2009	243.20		12.34		230.86	--		
EW-7	1/20/2010	243.20		11.72		231.48	--		
EW-7	4/5/2010	243.20		10.87		232.33	--		
EW-7	5/3/2010	243.20		11.57		231.63	--		
EW-7	5/26/2010	243.20		11.15		232.05	--		
EW-7	6/15/2010	243.20		12.71		230.49	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
EW-7	7/30/2010	243.20		14.20		229.00	--		
EW-7	9/2/2010	243.20		14.96		228.24	--		
EW-7	9/21/2010	243.20		15.00		228.20	--		
EW-7	10/13/2010	243.20		13.74		229.46	--		
EW-7	11/4/2010	243.20		13.49		229.71	--		
EW-7	12/10/2010	243.20		13.01		230.19	--		
EW-7	2/14/2011	243.20		13.29		229.91	--		
EW-7	4/13/2011	243.20		11.55		231.65	--		
EW-7	5/26/2011	243.20		13.17		230.03	--		
EW-7	6/15/2011	243.20		12.51		230.69	--		
EW-7	7/14/2011	243.20		13.34		229.86	--		
EW-7	8/8/2011	243.20		14.13		229.07	--		
EW-7	9/14/2011	243.20		12.78		230.42	--		
EW-7	10/25/2011	243.20					--		
EW-7	12/15/2011	243.20					--		
EW-7	1/27/2012	243.20					--		
EW-7	2/28/2012	243.20					--		
EW-7	3/20/2012	243.20		12.24		230.96	--		
EW-7	4/13/2012	243.20		13.13		230.07	--		
EW-7	5/25/2012	243.20		12.08		231.12	--		
EW-7	6/13/2012	243.20		11.98		231.22	--		
EW-7	7/18/2012	243.20		13.46		229.74	--		
EW-7	8/16/2012	243.20		13.65		229.55	--		
EW-7	9/24/2012	243.20		12.86		230.34	--		
EW-7	12/14/2012	243.20		12.78		230.42	--		
EW-7	1/11/2013	243.20		12.14		231.06	--		
EW-7	3/1/2013	243.20		11.52		231.68	--		0
CS-1	9/18/2009	239.38		9.83		229.55	--		
CS-1	10/6/2009	239.38		9.82		229.56	--		
CS-1	10/19/2009	239.38		9.26		230.12	--		
CS-1	11/5/2009	239.38		8.60		230.78	--		
CS-1	12/4/2009	239.38	9.55	9.57	0.02	229.83	AS	0.007	
CS-1	1/20/2010	239.38		8.45		230.93	--		
CS-1	4/5/2010	239.38		7.69		231.69	--		
CS-1	5/3/2010	239.38		8.24		231.14	--		
CS-1	5/26/2010	239.38		7.95		231.43	--		
CS-1	6/15/2010	239.38		9.41		229.97	--		
CS-1	7/30/2010	239.38		10.85		228.53	--		
CS-1	9/2/2010	239.38		10.31		229.07	--		
CS-1	9/21/2010	239.38		10.35		229.03	--		
CS-1	10/13/2010	239.38		9.65		229.73	--		
CS-1	11/4/2010	239.38		9.70		229.68	--		
CS-1	12/10/2010	239.38		9.14		230.24	--		
CS-1	1/28/2011	239.38		9.82		229.56	--		
CS-1	2/14/2011	239.38		9.16		230.22	--		
CS-1	4/13/2011	239.38		7.97		231.41	--		
CS-1	5/26/2011	239.38		7.76		231.62	--		
CS-1	6/15/2011	239.38		8.92		230.46	--		
CS-1	7/14/2011	239.38		9.40		229.98	--		
CS-1	8/8/2011	239.38		9.80		229.58	--		
CS-1	9/14/2011	239.38		8.89		230.49	--		
CS-1	10/25/2011	239.38		7.60		231.78	--		
CS-1	12/15/2011	239.38		7.33		232.05	--		
CS-1	12/21/2011	239.38		5.51		233.87	--		
CS-1	1/27/2012	239.38		8.14		231.24	--		
CS-1	2/28/2012	239.38		8.95		230.43	--		
CS-1	3/21/2012	239.38		8.44		230.94	--		
CS-1	4/13/2012	239.38		9.18		230.20	--		
CS-1	5/25/2012	239.38		8.29		231.09	--		
CS-1	6/13/2012	239.38		8.25		231.13	--		
CS-1	7/18/2012	239.38		9.41		229.97	--		
CS-1	8/16/2012	239.38		9.45		229.93	--		
CS-1	9/24/2012	239.38		8.69		230.69	--		
CS-1	12/14/2012	239.38		8.83		230.55	--		
CS-1	1/11/2013	239.38		8.21		231.17	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
CS-1	3/1/2013	239.38		7.75		231.63	--		0.007
CS-2	9/18/2009	236.90		7.50		229.40	--		
CS-2	10/6/2009	236.90		7.66		229.24	--		
CS-2	10/19/2009	236.90		6.81		230.09	--		
CS-2	11/5/2009	236.90		6.13		230.77	--		
CS-2	12/4/2009	236.90		6.09		230.81	--		
CS-2	1/20/2010	236.90		5.96		230.94	--		
CS-2	4/5/2010	236.90		5.22		231.68	--		
CS-2	5/3/2010	236.90		5.73		231.17	--		
CS-2	5/26/2010	236.90		5.45		231.45	--		
CS-2	6/15/2010	236.90		6.90		230.00	--		
CS-2	7/30/2010	236.90		8.38		228.52	--		
CS-2	9/2/2010	236.90		8.16		228.74	--		
CS-2	9/21/2010	236.90		8.22		228.68	--		
CS-2	10/13/2010	236.90		7.44		229.46	--		
CS-2	11/4/2010	236.90		7.20		229.70	--		
CS-2	12/10/2010	236.90		6.61		230.29	--		
CS-2	1/28/2011	236.90		7.42		229.48	--		
CS-2	2/14/2011	236.90		6.68		230.22	--		
CS-2	4/13/2011	236.90		5.47		231.43	--		
CS-2	5/26/2011	236.90		5.30		231.60	--		
CS-2	6/15/2011	236.90		6.42		230.48	--		
CS-2	7/14/2011	236.90		6.98		229.92	--		
CS-2	8/8/2011	236.90		7.48		229.42	--		
CS-2	9/14/2011	236.90		6.38		230.52	--		
CS-2	10/25/2011	236.90		5.32		231.58	--		
CS-2	12/15/2011	236.90					--		
CS-2	1/27/2012	236.90		5.63		231.27	--		
CS-2	2/28/2012	236.90		6.47		230.43	--		
CS-2	3/21/2012	236.90		6.01		230.89	--		
CS-2	4/13/2012	236.90		6.74		230.16	--		
CS-2	5/25/2012	236.90		5.85		231.05	--		
CS-2	6/13/2012	236.90		5.75		231.15	--		
CS-2	7/18/2012	236.90		7.00		229.90	--		
CS-2	8/16/2012	236.90		7.05		229.85	--		
CS-2	9/24/2012	236.90		6.27		230.63	--		
CS-2	12/14/2012	236.90		6.38		230.52	--		
CS-2	1/11/2013	236.90		5.74		231.16	--		
CS-2	3/1/2013	236.90		5.25		231.65	--		0
CS-3	9/18/2009	235.13		6.16		228.97	--		
CS-3	10/6/2009	235.13		6.25		228.88	--		
CS-3	10/19/2009	235.13		5.62		229.51	--		
CS-3	11/5/2009	235.13		5.29		229.84	--		
CS-3	12/4/2009	235.13		5.06		230.07	--		
CS-3	1/20/2010	235.13		4.85		230.28	--		
CS-3	4/5/2010	235.13		4.62		230.51	--		
CS-3	5/3/2010	235.13		5.00		230.13	--		
CS-3	5/26/2010	235.13		4.85		230.28	--		
CS-3	6/15/2010	235.13		5.92		229.21	--		
CS-3	7/30/2010	235.13		6.91		228.22	--		
CS-3	9/2/2010	235.13		6.43		228.70	--		
CS-3	9/21/2010	235.13		6.77		228.36	--		
CS-3	10/13/2010	235.13		5.99		229.14	--		
CS-3	11/4/2010	235.13		6.09		229.04	--		
CS-3	12/10/2010	235.13		5.80		229.33	--		
CS-3	1/28/2011	235.13		6.24		228.89	--		
CS-3	2/14/2011	235.13		5.86		229.27	--		
CS-3	4/13/2011	235.13		4.81		230.32	--		
CS-3	5/26/2011	235.13		4.87		230.26	--		
CS-3	6/15/2011	235.13		5.87		229.26	--		
CS-3	7/14/2011	235.13		6.08		229.05	--		
CS-3	8/8/2011	235.13		6.30		228.83	--		
CS-3	9/14/2011	235.13		6.00		229.13	--		
CS-3	10/25/2011	235.13		5.00		230.13	--		
CS-3	12/15/2011	235.13		4.86		230.27	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
CS-3	1/27/2012	235.13		5.00		230.13	--		
CS-3	2/28/2012	235.13		5.84		229.29	--		
CS-3	3/21/2012	235.13		5.30		229.83	--		
CS-3	4/13/2012	235.13		6.08		229.05	--		
CS-3	5/25/2012	235.13		5.60		229.53	--		
CS-3	6/13/2012	235.13		5.10		230.03	--		
CS-3	7/18/2012	235.13		6.25		228.88	--		
CS-3	8/16/2012	235.13		6.28		228.85	--		
CS-3	9/24/2012	235.13		5.89		229.24	--		
CS-3	12/14/2012	235.13		6.08		229.05	--		
CS-3	1/11/2013	235.13		5.32		229.81	--		
CS-3	3/1/2013	235.13		5.02		230.11	--		0
CS-4	9/18/2009	234.81		5.75		229.06	--		
CS-4	10/6/2009	234.81		5.83		228.98	--		
CS-4	10/19/2009	234.81		5.21		229.60	--		
CS-4	11/5/2009	234.81		4.89		229.92	--		
CS-4	12/4/2009	234.81		4.70		230.11	--		
CS-4	1/20/2010	234.81		4.50		230.31	--		
CS-4	4/5/2010	234.81		4.29		230.52	--		
CS-4	5/3/2010	234.81		4.65		230.16	--		
CS-4	5/26/2010	234.81		4.49		230.32	--		
CS-4	6/15/2010	234.81		5.53		229.28	--		
CS-4	7/30/2010	234.81		6.50		228.31	--		
CS-4	9/2/2010	234.81		6.21		228.60	--		
CS-4	9/21/2010	234.81		6.40		228.41	--		
CS-4	10/13/2010	234.81		5.73		229.08	--		
CS-4	11/4/2010	234.81		6.74		228.07	--		
CS-4	12/10/2010	234.81		5.47		229.34	--		
CS-4	1/28/2011	234.81		5.84		228.97	--		
CS-4	2/14/2011	234.81		5.50		229.31	--		
CS-4	4/13/2011	234.81		4.50		230.31	--		
CS-4	5/26/2011	234.81		4.52		230.29	--		
CS-4	6/15/2011	234.81		5.48		229.33	--		
CS-4	7/14/2011	234.81		5.73		229.08	--		
CS-4	8/8/2011	234.81		5.94		228.87	--		
CS-4	9/14/2011	234.81		5.63		229.18	--		
CS-4	10/25/2011	234.81		4.65		230.16	--		
CS-4	12/15/2011	234.81		4.48		230.33	--		
CS-4	1/27/2012	234.81		4.67		230.14	--		
CS-4	2/28/2012	234.81		5.49		229.32	--		
CS-4	3/21/2012	234.81		4.96		229.85	--		
CS-4	4/13/2012	234.81		5.75		229.06	--		
CS-4	5/25/2012	234.81		5.24		229.57	--		
CS-4	6/13/2012	234.81		4.73		230.08	--		
CS-4	7/18/2012	234.81					--		
CS-4	8/16/2012	234.81		5.90		228.91	--		
CS-4	9/24/2012	234.81		5.53		229.28	--		
CS-4	12/14/2012	234.81		5.71		229.10	--		
CS-4	1/11/2013	234.81		4.95		229.86	--		
CS-4	3/1/2013	234.81		4.66		230.15	--		0
CS-5	9/18/2009	232.45		4.57		227.88	--		
CS-5	10/6/2009	232.45		5.10		227.35	--		
CS-5	10/19/2009	232.45		2.87		229.58	--		
CS-5	11/5/2009	232.45		2.55		229.90	--		
CS-5	12/4/2009	232.45		2.33		230.12	--		
CS-5	1/20/2010	232.45		2.15		230.30	--		
CS-5	4/5/2010	232.45		1.91		230.54	--		
CS-5	5/3/2010	232.45		2.30		230.15	--		
CS-5	5/26/2010	232.45		2.10		230.35	--		
CS-5	6/15/2010	232.45		3.55		228.90	--		
CS-5	7/30/2010	232.45		3.47		228.98	--		
CS-5	9/2/2010	232.45		6.39		226.06	--		
CS-5	9/21/2010	232.45		7.45		225.00	--		
CS-5	10/13/2010	232.45		5.89		226.56	--		
CS-5	11/4/2010	232.45		4.82		227.63	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
CS-5	12/10/2010	232.45		3.31		229.14	--		
CS-5	1/28/2011	232.45		5.90		226.55	--		
CS-5	2/14/2011	232.45		4.15		228.30	--		
CS-5	4/13/2011	232.45		2.10		230.35	--		
CS-5	5/26/2011	232.45		2.15		230.30	--		
CS-5	6/15/2011	232.45		3.38		229.07	--		
CS-5	7/14/2011	232.45		5.20		227.25	--		
CS-5	8/8/2011	232.45		6.78		225.67	--		
CS-5	9/14/2011	232.45		3.49		228.96	--		
CS-5	10/25/2011	232.45		2.31		230.14	--		
CS-5	12/15/2011	232.45		2.15		230.30	--		
CS-5	1/27/2012	232.45		2.29		230.16	--		
CS-5	2/28/2012	232.45		3.25		229.20	--		
CS-5	3/21/2012	232.45		2.56		229.89	--		
CS-5	4/13/2012	232.45		3.67		228.78	--		
CS-5	5/25/2012	232.45		2.87		229.58	--		
CS-5	6/13/2012	232.45		2.35		230.10	--		
CS-5	7/18/2012	232.45		5.74		226.71	--		
CS-5	8/16/2012	232.45		5.98		226.47	--		
CS-5	9/24/2012	232.45		3.16		229.29	--		
CS-5	12/14/2012	232.45		3.74		228.71	--		
CS-5	1/11/2013	232.45		2.58		229.87	--		
CS-5	3/1/2013	232.45		2.26		230.19	--		0
01	6/15/2010	234.94		5.20		229.74	--		
01	9/21/2010	234.94		10.43		224.51	--		
01	12/10/2010	234.94		8.40		226.54	--		
01	2/14/2011	234.94		8.23		226.71	--		
01	5/26/2011	234.94		5.32		229.62	--		
01	8/8/2011	234.94		8.15		226.79	--		
01	12/15/2011	234.94		5.50		229.44	--		
01	3/20/2012	234.94		5.58		229.36	--		
01	6/13/2012	234.94		6.64		228.30	--		
01	9/24/2012	234.94		6.93		228.01	--		
01	1/11/2013	234.94		6.63		228.31	--		0
02	6/15/2010	237.19		5.78		231.41	--		
02	9/21/2010	237.19		8.36		228.83	--		
02	12/10/2010	237.19		6.32		230.87	--		
02	2/14/2011	237.19		6.69		230.50	--		
02	5/26/2011	237.19		4.35		232.84	--		
02	8/8/2011	237.19		7.27		229.92	--		
02	12/15/2011	237.19		4.31		232.88	--		
02	3/21/2012	237.19		5.62		231.57	--		
02	6/13/2012	237.19		5.28		231.91	--		
02	9/24/2012	237.19		6.25		230.94	--		
02	1/11/2013	237.19		5.04		232.15	--		0
03	6/15/2010	234.50		6.25		228.25	--		
03	9/21/2010	234.50		14.94		219.56	--		
03	12/10/2010	234.50		9.61		224.89	--		
03	2/14/2011	234.50		8.86		225.64	--		
03	5/26/2011	234.50		4.50		230.00	--		
03	8/8/2011	234.50		13.17		221.33	--		
03	12/15/2011	234.50		4.56		229.94	--		
03	3/20/2012	234.50		4.69		229.81	--		
03	6/13/2012	234.50		4.63		229.87	--		
03	9/24/2012	234.50		7.49		227.01	--		
03	1/11/2013	234.50		5.92		228.58	--		0
04	9/18/2009	238.50		8.55		229.95	--		
04	10/6/2009	238.50		8.80		229.70	--		
04	10/19/2009	238.50		8.08		230.42	--		
04	11/5/2009	238.50		7.25		231.25	--		
04	12/4/2009	238.50		7.07		231.43	--		
04	1/20/2010	238.50		6.49		232.01	--		
04	4/5/2010	238.50		5.80		232.70	--		
04	5/3/2010	238.50		6.34		232.16	--		
04	5/26/2010	238.50		5.98		232.52	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
04	6/15/2010	238.50		7.62		230.88	--		
04	7/30/2010	238.50		10.43		228.07	--		
04	9/2/2010	238.50		9.51		228.99	--		
04	9/21/2010	238.50		9.74		228.76	--		
04	10/13/2010	238.50		9.39		229.11	--		
04	11/4/2010	238.50		8.13		230.37	--		
04	12/10/2010	238.50		7.70		230.80	--		
04	1/28/2011	238.50		8.89		229.61	--		
04	2/14/2011	238.50		7.81		230.69	--		
04	4/13/2011	238.50		6.24		232.26	--		
04	5/26/2011	238.50		5.76		232.74	--		
04	6/15/2011	238.50		7.35		231.15	--		
04	7/14/2011	238.50		8.22		230.28	--		
04	8/8/2011	238.50		8.92		229.58	--		
04	9/14/2011	238.50		7.56		230.94	--		
04	10/25/2011	238.50		6.45		232.05	--		
04	12/15/2011	238.50		5.54		232.96	--		
04	1/27/2012	238.50		6.36		232.14	--		
04	2/28/2012	238.50		7.59		230.91	--		
04	3/21/2012	238.50		6.95		231.55	--		
04	4/13/2012	238.50		7.77		230.73	--		
04	5/25/2012	238.50		6.72		231.78	--		
04	6/13/2012	238.50		6.68		231.82	--		
04	7/18/2012	238.50		8.25		230.25	--		
04	9/24/2012	238.50		7.54		230.96	--		
04	12/14/2012	238.50		7.42		231.08	--		
04	1/11/2013	238.50		6.67		231.83	--		0
05	6/15/2010	235.69		8.99		226.70	--		
05	9/21/2010	235.69		10.83		224.86	--		
05	12/10/2010	235.69		9.18		226.51	--		
05	2/14/2011	235.69		10.00		225.69	--		
05	5/26/2011	235.69		6.20		229.49	--		
05	8/8/2011	235.69		10.28		225.41	--		
05	12/15/2011	235.69		6.83		228.86	--		
05	3/20/2012	235.69		7.63		228.06	--		
05	6/13/2012	235.69		7.94		227.75	--		
05	9/24/2012	235.69		9.68		226.01	--		
05	1/11/2013	235.69		7.92		227.77	--		0
10	6/15/2010	237.73		6.72		231.01	--		
10	9/21/2010	237.73		9.07		228.66	--		
10	12/10/2010	237.73		7.11		230.62	--		
10	2/14/2011	237.73		7.35		230.38	--		
10	5/27/2011	237.73		5.49		232.24	--		
10	8/8/2011	237.73		8.19		229.54	--		
10	12/15/2011	237.73		5.49		232.24	--		
10	3/21/2012	237.73		6.43		231.30	--		
10	6/13/2012	237.73		6.17		231.56	--		
10	9/24/2012	237.73		7.00		230.73	--		
10	1/11/2013	237.73		6.40		231.33	--		0
11	6/15/2010	234.40		0.60		233.80	--		
11	9/21/2010	234.40		5.75		228.65	--		
11	12/10/2010	234.40		3.72		230.68	--		
11	2/14/2011	234.40		4.04		230.36	--		
11	5/27/2011	234.40		1.77		232.63	--		
11	8/8/2011	234.40					--		
11	12/15/2011	234.40					--		
11	3/21/2012	234.40					--		
11	6/13/2012	234.40					--		
11	9/24/2012	234.40					--		0
12	6/15/2010	242.61		11.23		231.38	--		
12	9/21/2010	242.61		13.77		228.84	--		
12	12/10/2010	242.61		11.65		230.96	--		
12	2/14/2011	242.61		12.10		230.51	--		
12	5/27/2011	242.61		9.71		232.90	--		
12	8/8/2011	242.61		12.63		229.98	--		

Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)
12	12/15/2011	242.61		9.67		232.94	--		
12	3/21/2012	242.61		10.97		231.64	--		
12	6/13/2012	242.61		10.63		231.98	--		
12	9/24/2012	242.61		11.59		231.02	--		
12	1/11/2013	242.61		10.89		231.72	--		0
13	6/15/2010	234.72		12.35		222.37	--		
13	9/21/2010	234.72		15.13		219.59	--		
13	12/10/2010	234.72		13.70		221.02	--		
13	2/14/2011	234.72		13.30		221.42	--		
13	5/26/2011	234.72		9.51		225.21	--		
13	8/8/2011	234.72		14.49		220.23	--		
13	12/15/2011	234.72		9.55		225.17	--		
13	3/20/2012	234.72		10.35		224.37	--		
13	6/13/2012	234.72		12.15		222.57	--		
13	9/24/2012	234.72		13.50		221.22	--		
13	1/11/2013	234.72		11.85		222.87	--		0
14	6/15/2010	234.74		9.30		225.44	--		
14	9/21/2010	234.74		12.32		222.42	--		
14	12/10/2010	234.74		10.34		224.40	--		
14	2/14/2011	234.74		10.40		224.34	--		
14	5/26/2011	234.74		6.44		228.30	--		
14	8/8/2011	234.74		11.35		223.39	--		
14	12/15/2011	234.74		7.01		227.73	--		
14	3/20/2012	234.74		7.78		226.96	--		
14	6/13/2012	234.74		8.61		226.13	--		
14	9/24/2012	234.74		10.24		224.50	--		
14	1/11/2013	234.74		8.82		225.92	--		0
15	6/15/2010	234.38		7.53		226.85	--		
15	9/21/2010	234.38		13.02		221.36	--		
15	12/10/2010	234.38		8.78		225.60	--		
15	2/14/2011	234.38		8.96		225.42	--		
15	5/26/2011	234.38		6.14		228.24	--		
15	8/8/2011	234.38		11.79		222.59	--		
15	12/15/2011	234.38		6.11		228.27	--		
15	3/20/2012	234.38		6.16		228.22	--		
15	6/13/2012	234.38		5.43		228.95	--		
15	9/24/2012	234.38		7.51		226.87	--		
15	1/11/2013	234.38		7.14		227.24	--		0
16	6/15/2010	240.09		9.43		230.66	--		
16	9/21/2010	240.09		11.72		228.37	--		
16	12/10/2010	240.09		9.60		230.49	--		
16	2/14/2011	240.09		9.79		230.30	--		
16	5/27/2011	240.09		7.76		232.33	--		
16	8/8/2011	240.09		10.83		229.26	--		
16	12/15/2011	240.09		8.54		231.55	--		
16	3/21/2012	240.09		9.78		230.31	--		
16	6/13/2012	240.09		9.55		230.54	--		
16	9/24/2012	240.09		10.48		229.61	--		
16	1/11/2013	240.09		9.62		230.47	--		0
17	6/15/2010	242.71		15.60		227.11	--		
17	9/21/2010	242.71		18.65		224.06	--		
17	12/10/2010	242.71		16.37		226.34	--		
17	2/14/2011	242.71		16.51		226.20	--		
17	5/27/2011	242.71		13.14		229.57	--		
17	8/8/2011	242.71		17.22		225.49	--		
17	12/15/2011	242.71		13.62		229.09	--		
17	3/21/2012	242.71		14.65		228.06	--		
17	6/13/2012	242.71		15.16		227.55	--		
17	9/24/2012	242.71		16.45		226.26	--		
17	1/11/2013	242.71		15.10		227.61	--		0
							Total Cumulative LPH Recovered (Gallons)		**720.348**

Notes:
msl - mean sea level

SP - Skimmer pump

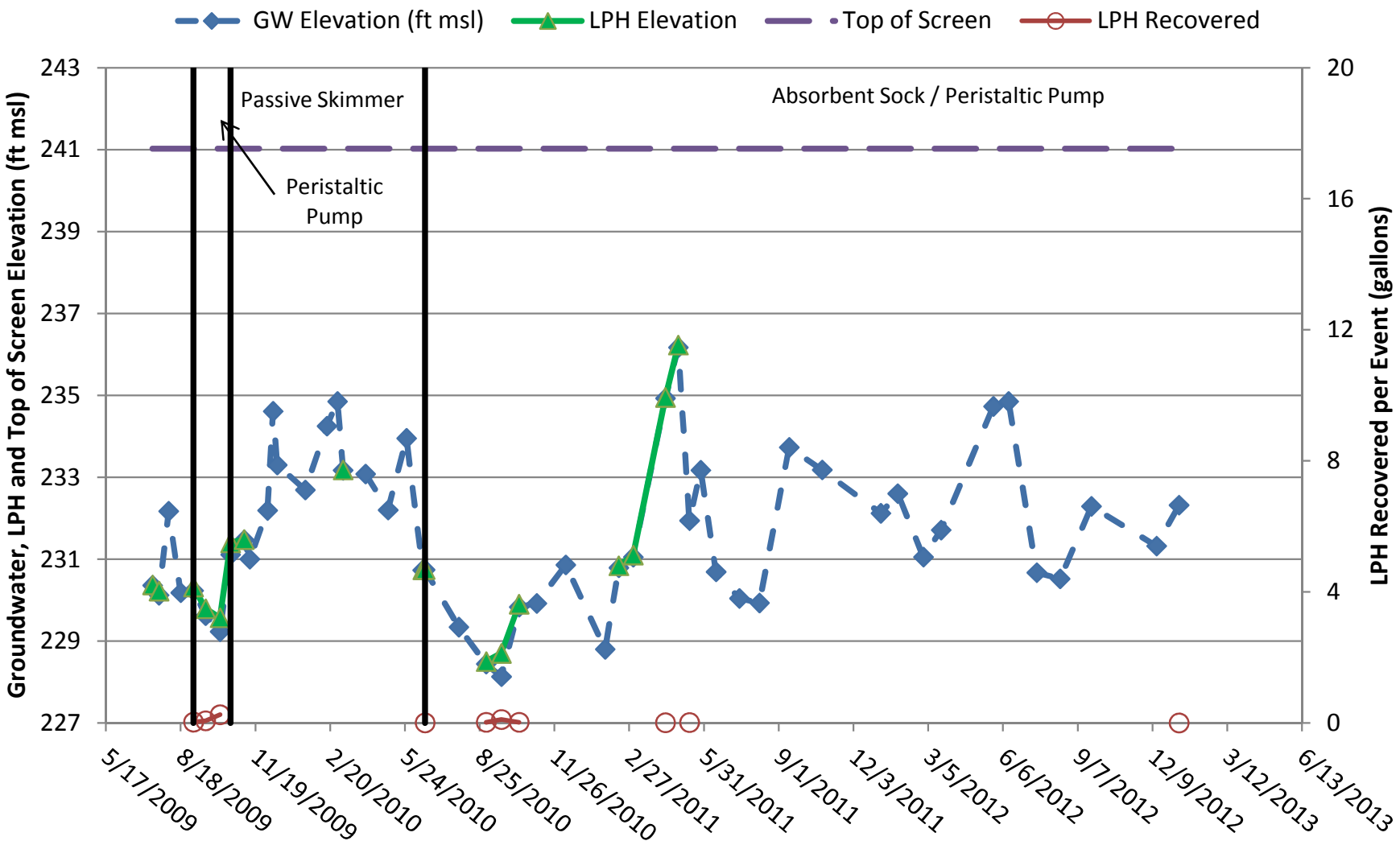
Appendix B-2
Historical Water Levels, LPH Thickness Measurements, and Volumes Recovered
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (ft msl)	DTLPH (ft TOC)	DTW (ft TOC)	LPH Thickness (feet)	Groundwater Elevation (ft msl)	LPH Recovery Method (SP,PS, PP, or AS)	LPH Recovered (gallons)	Total LPH Recovered Since July 2009 (gallons)

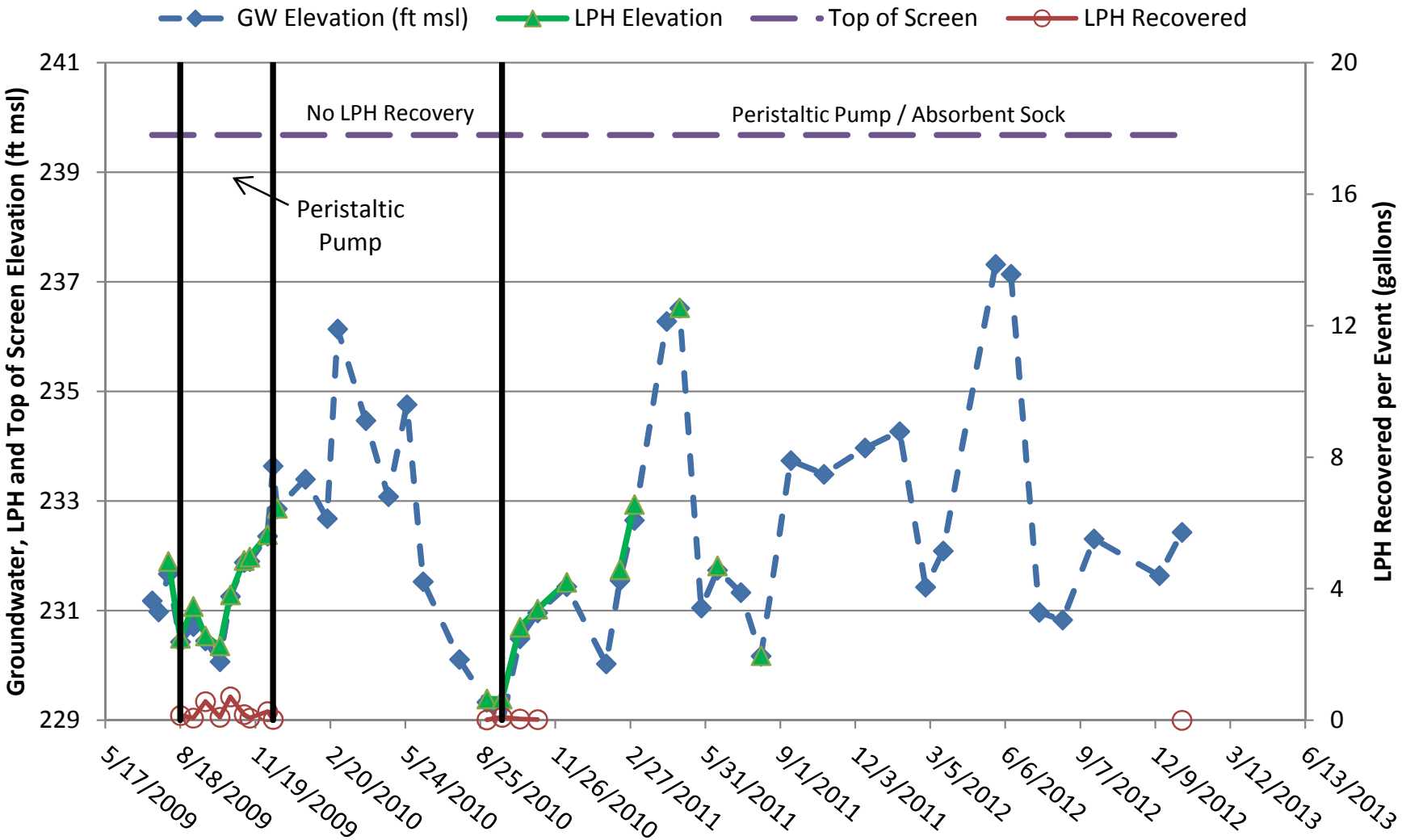
DTLPH- depth to liquid phase hydrocarbons
DTW - depth to water
ft TOC - feet from top of well casing
ND - not detected
NM - not measured
LPH - liquid phase hydrocarbon

PS - Passive skimmer
PP - Peristaltic pump
AS - Absorbent sock
*Groundwater elevations presented in table are adjusted for LPH thicknesses (density ratio 0.87).

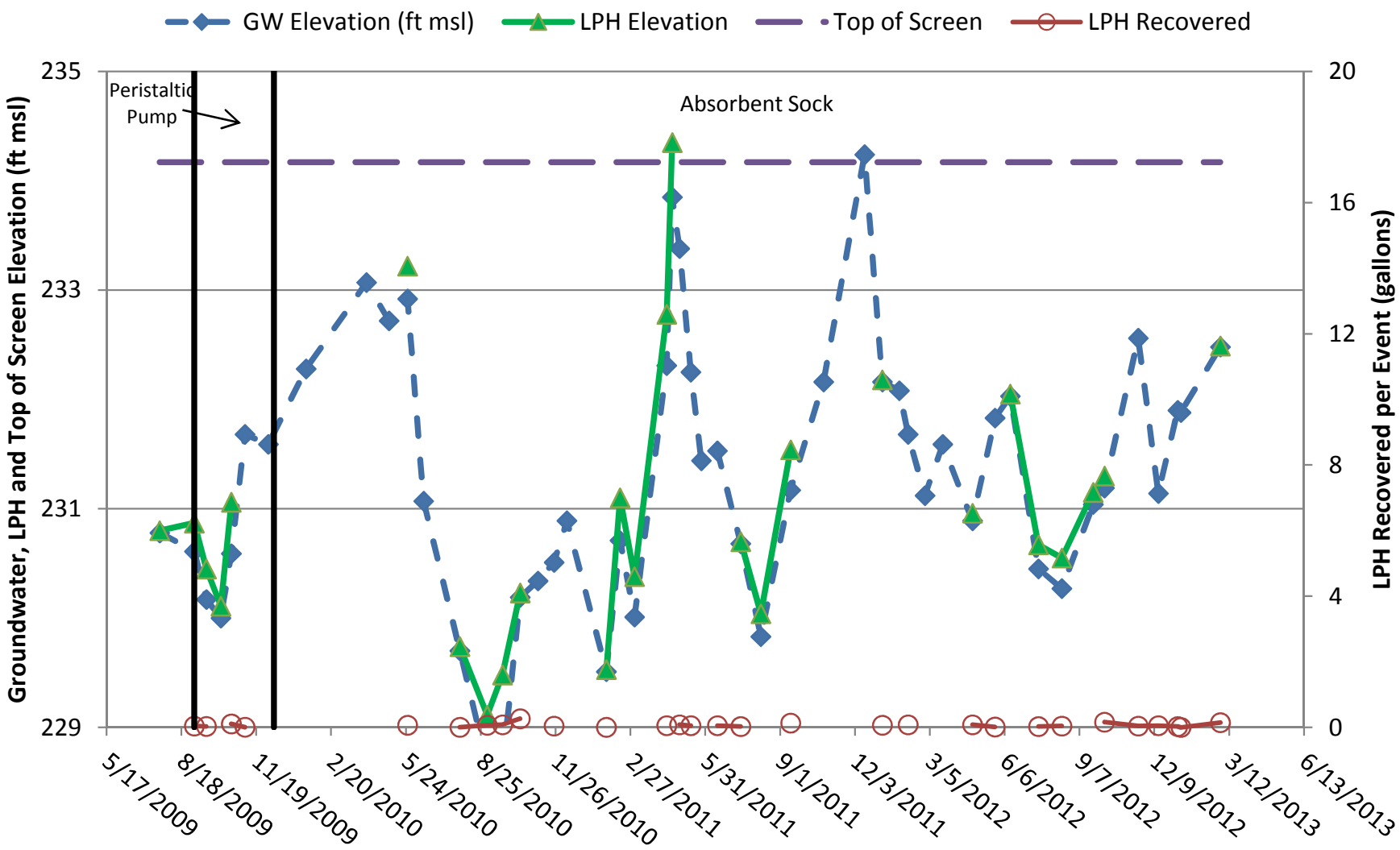
LPH and Groundwater Elevations and LPH Recovery: MW-2
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



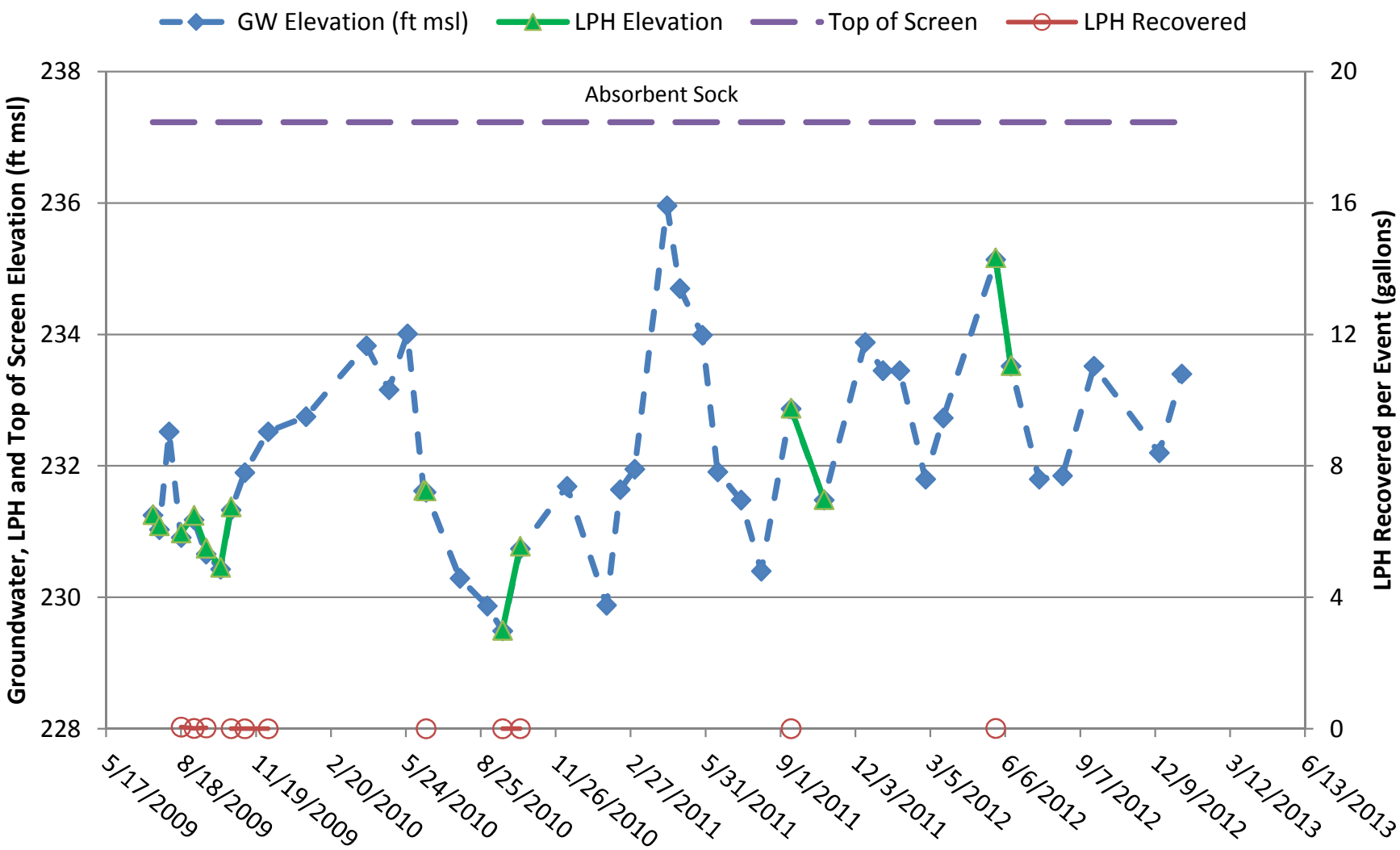
LPH and Groundwater Elevations and LPH Recovery: MW-4R
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



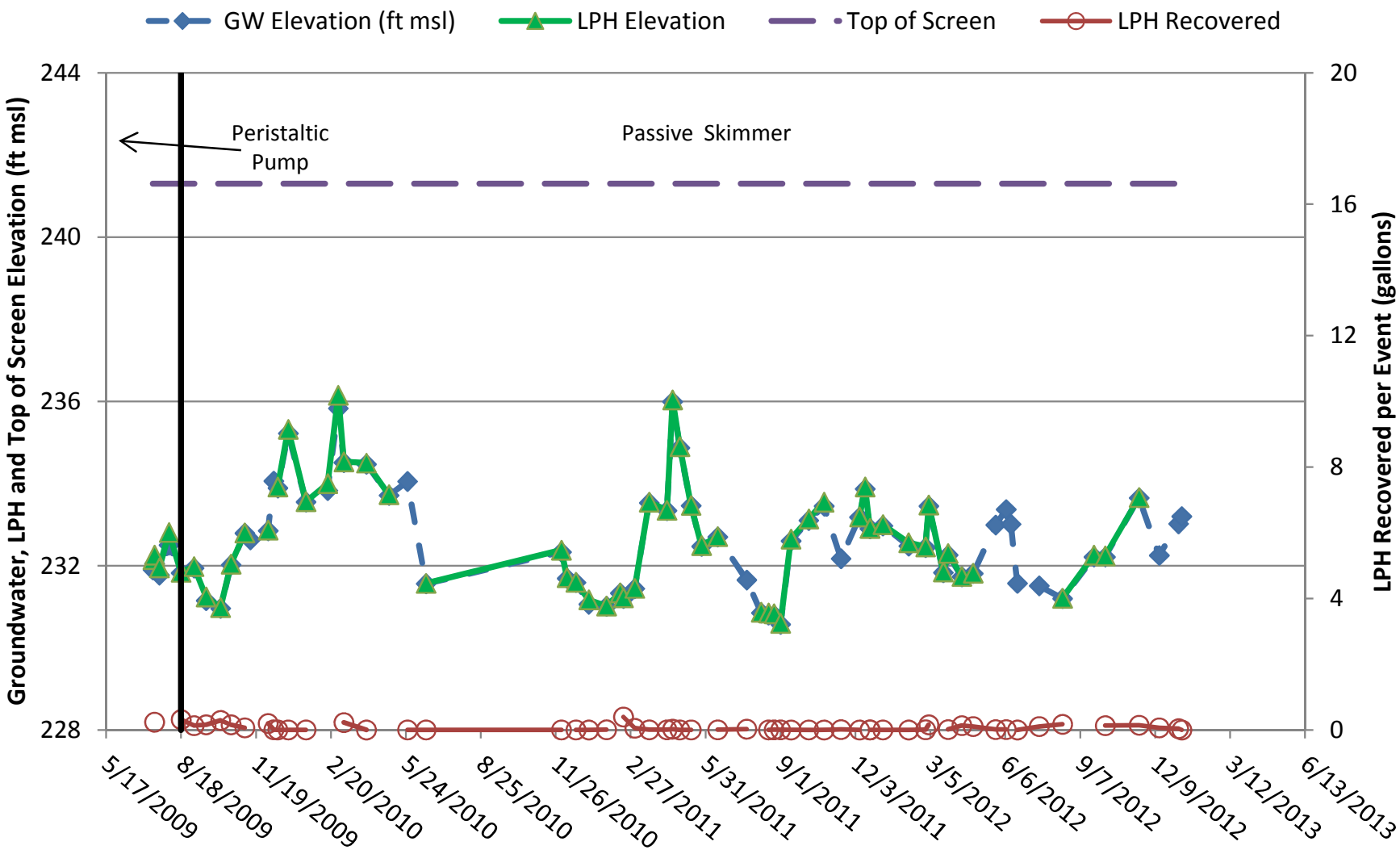
LPH and Groundwater Elevations and LPH Recovery: MW-26
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



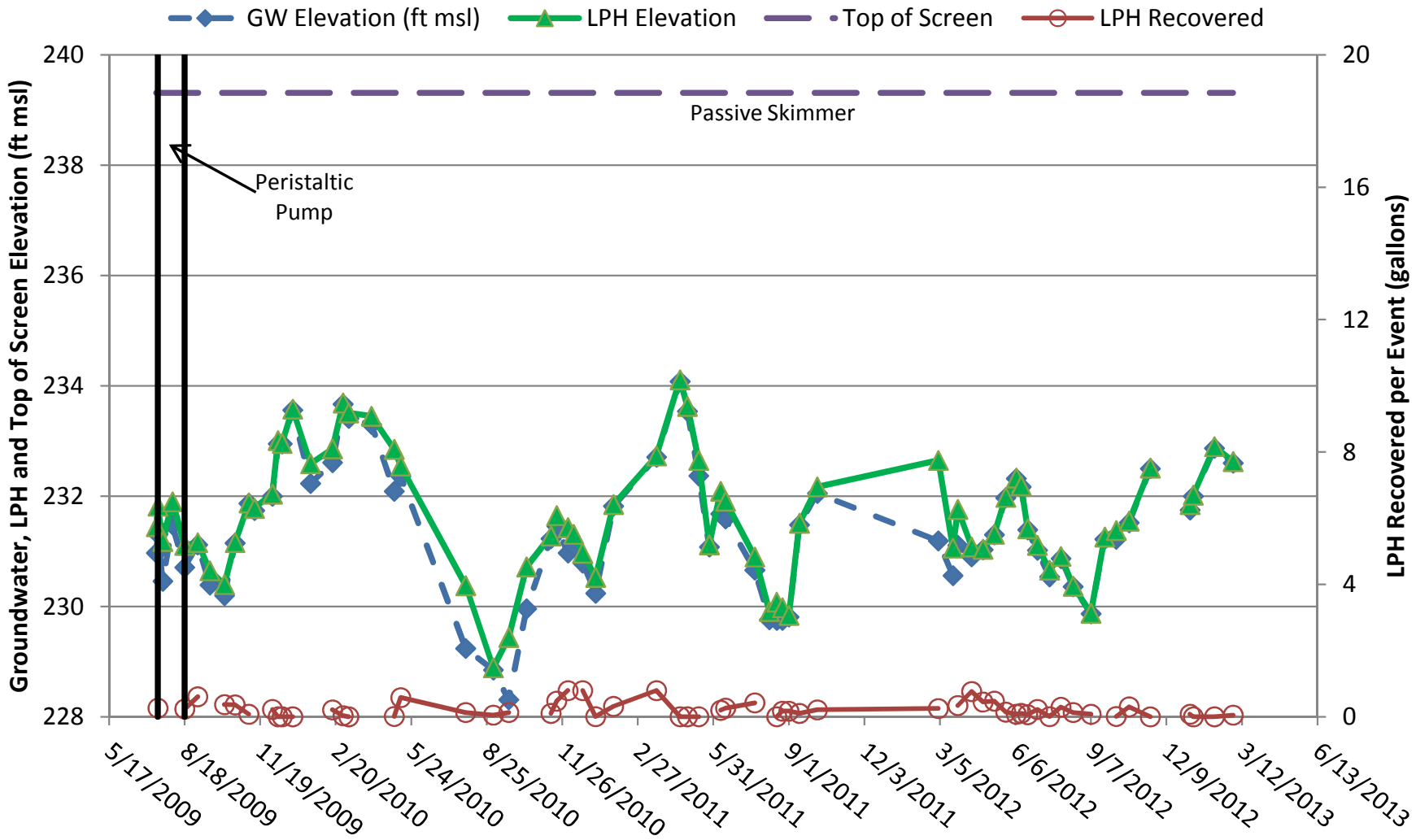
LPH and Groundwater Elevations and LPH Recovery: MW-28
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



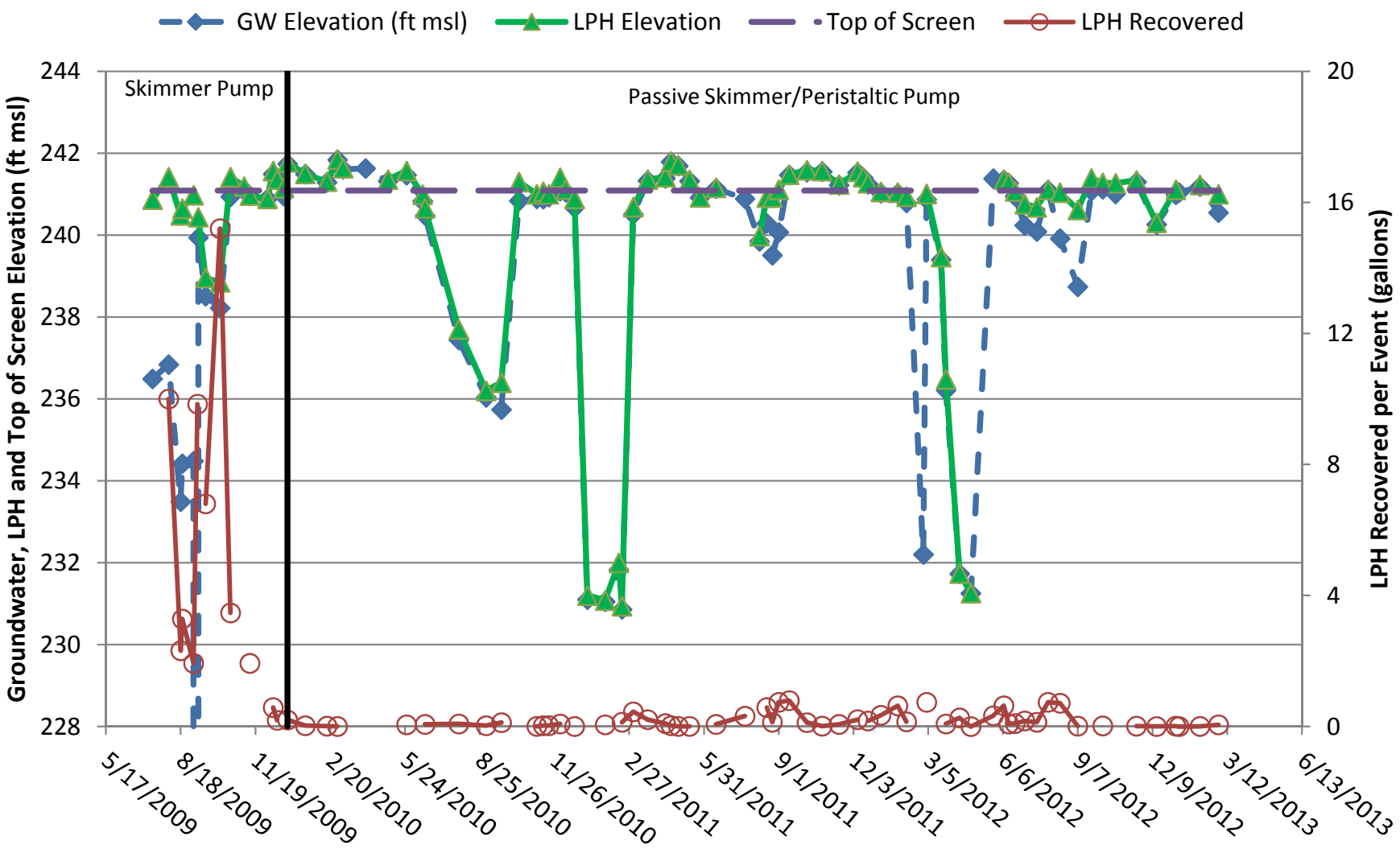
LPH and Groundwater Elevations and LPH Recovery: MW-32
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



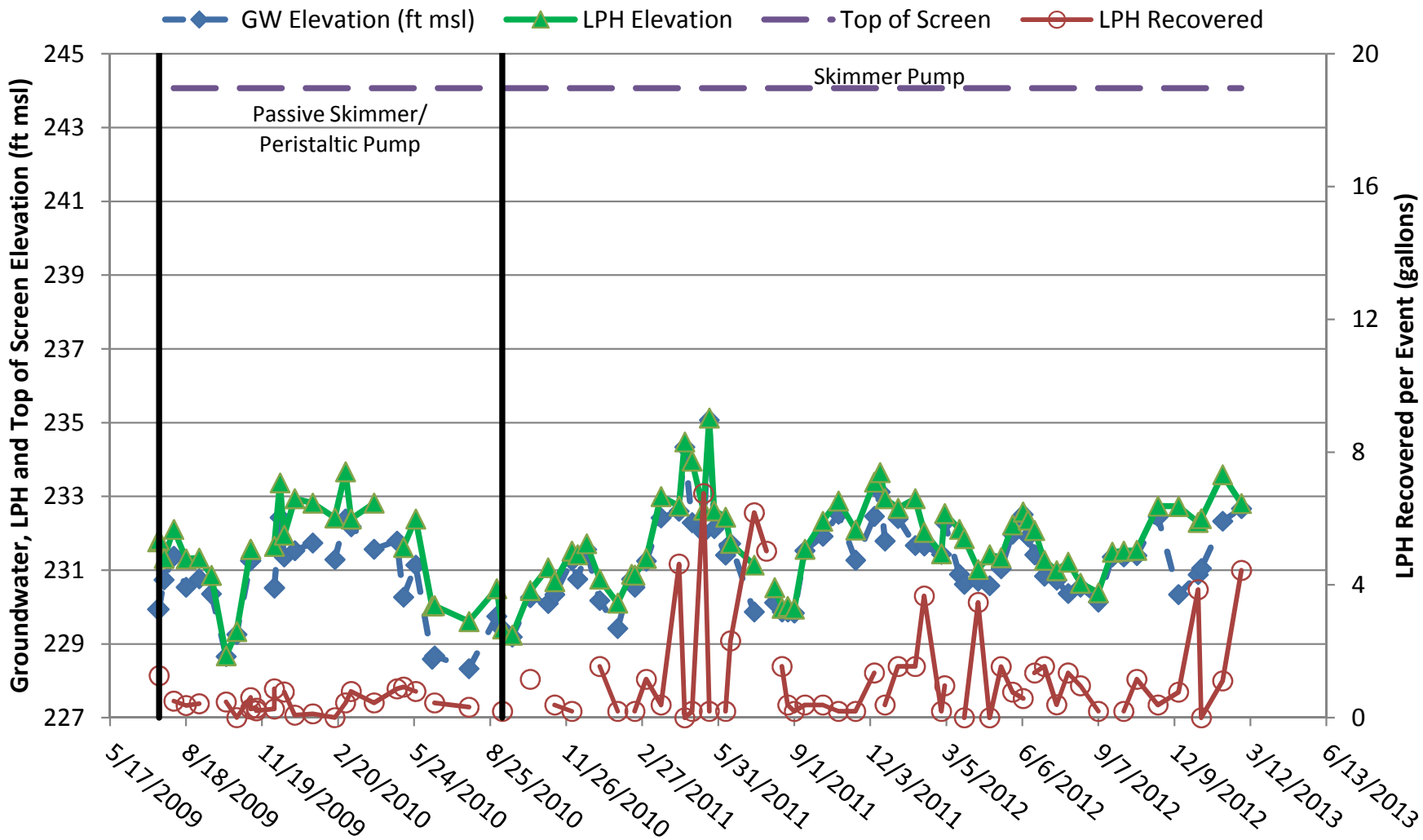
LPH and Groundwater Elevations and LPH Recovery: MW-37
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



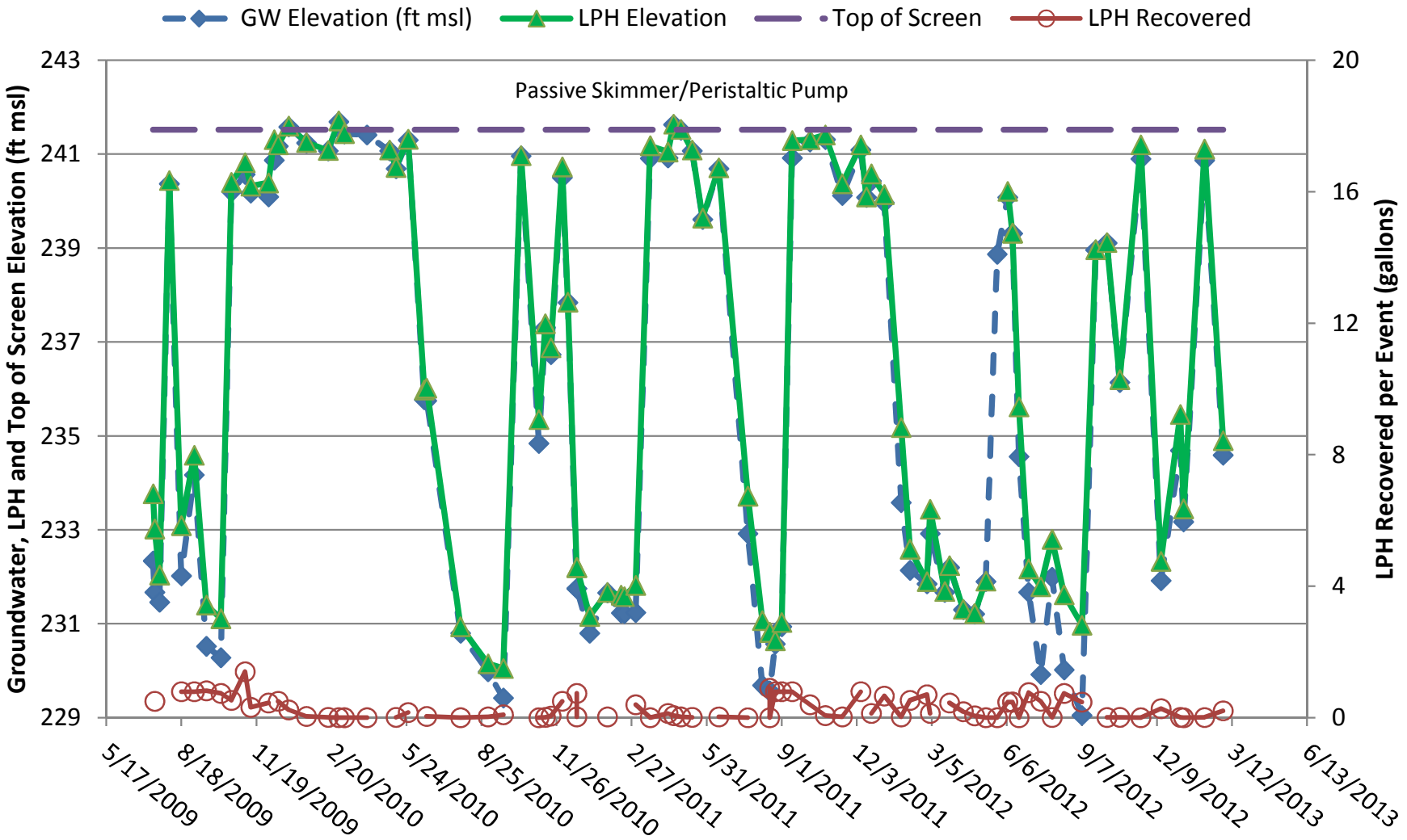
LPH and Groundwater Elevations and LPH Recovery: MW-38
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



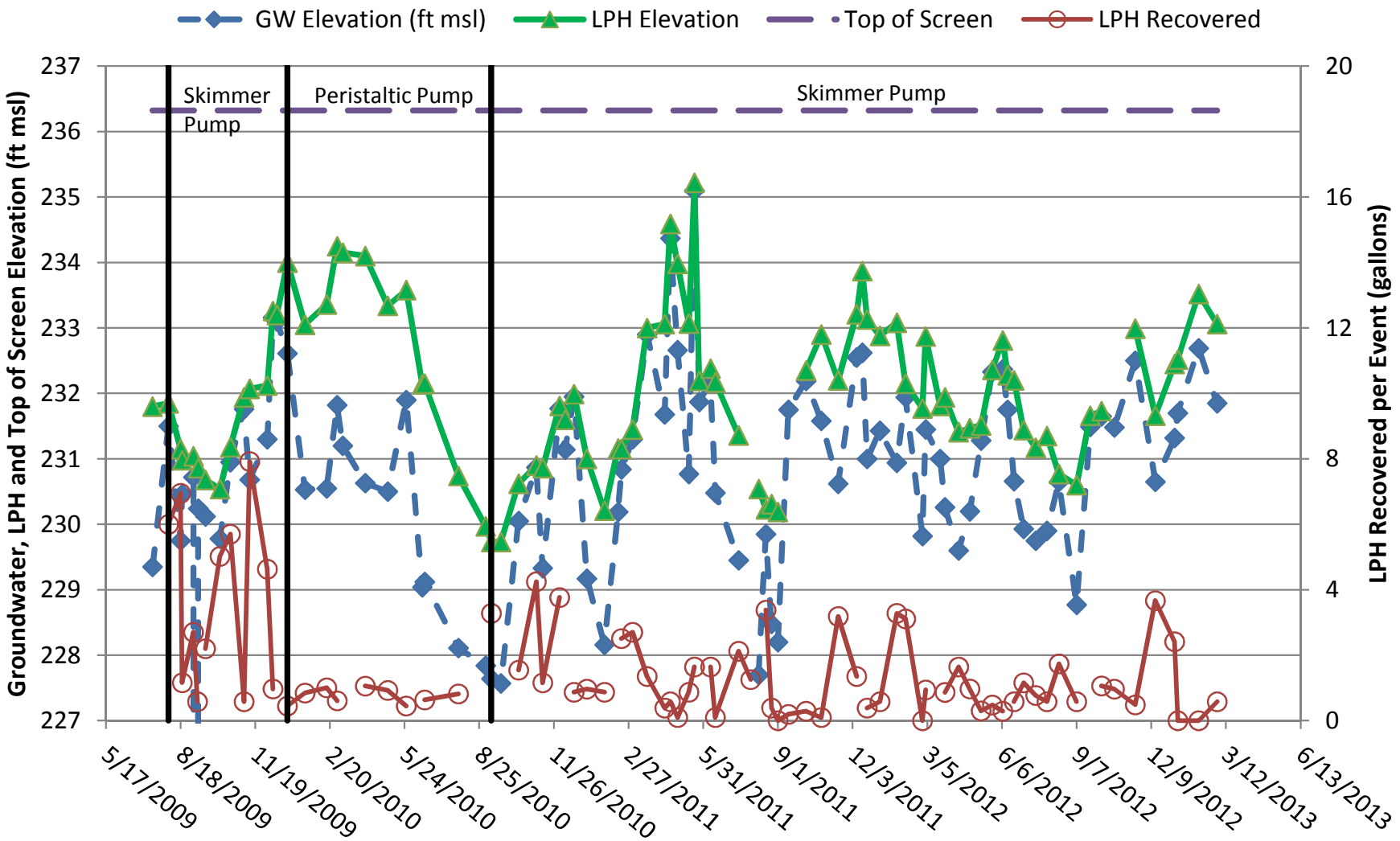
LPH and Groundwater Elevations and LPH Recovery: MW-41
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



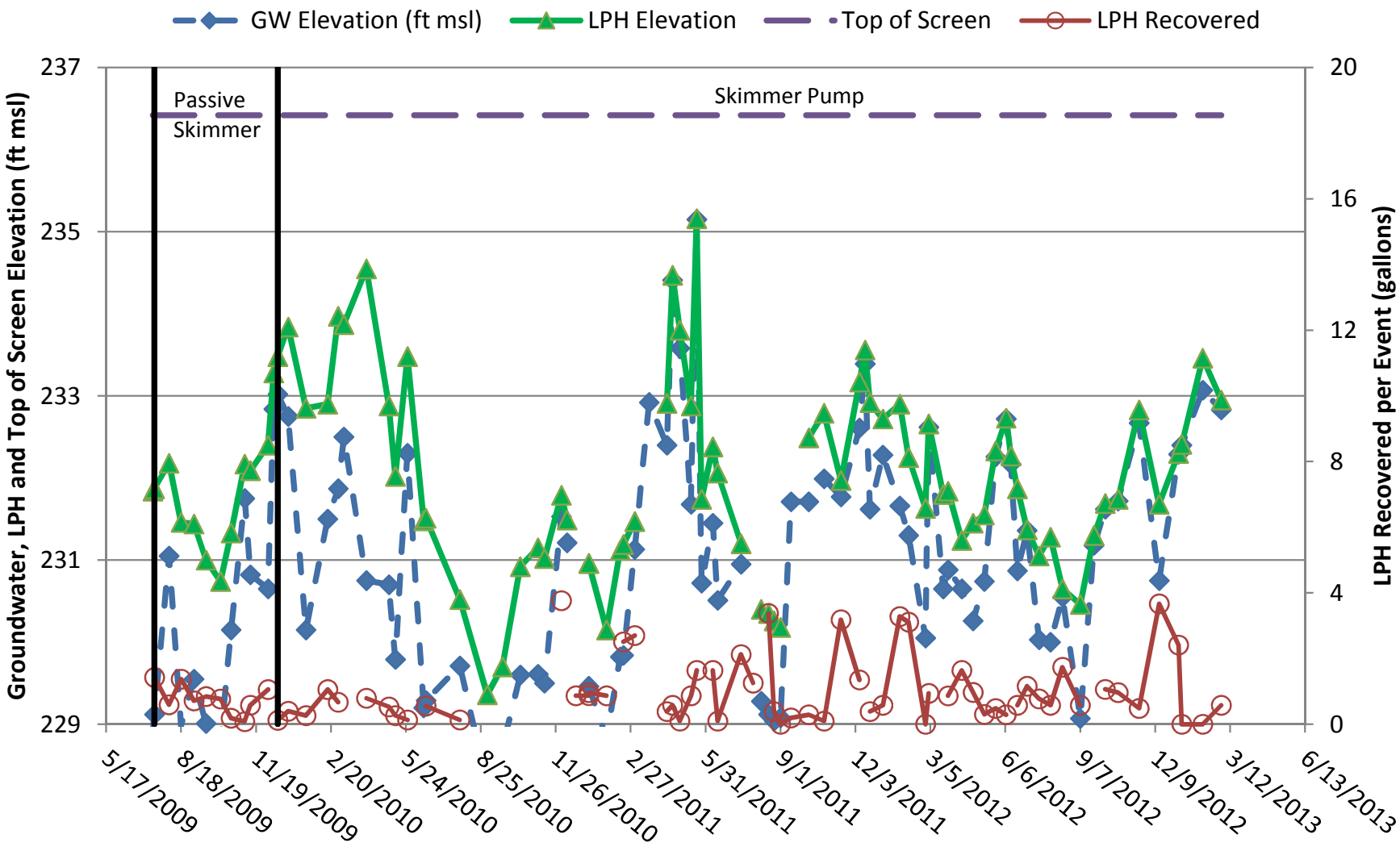
LPH and Groundwater Elevations and LPH Recovery: MW-49
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



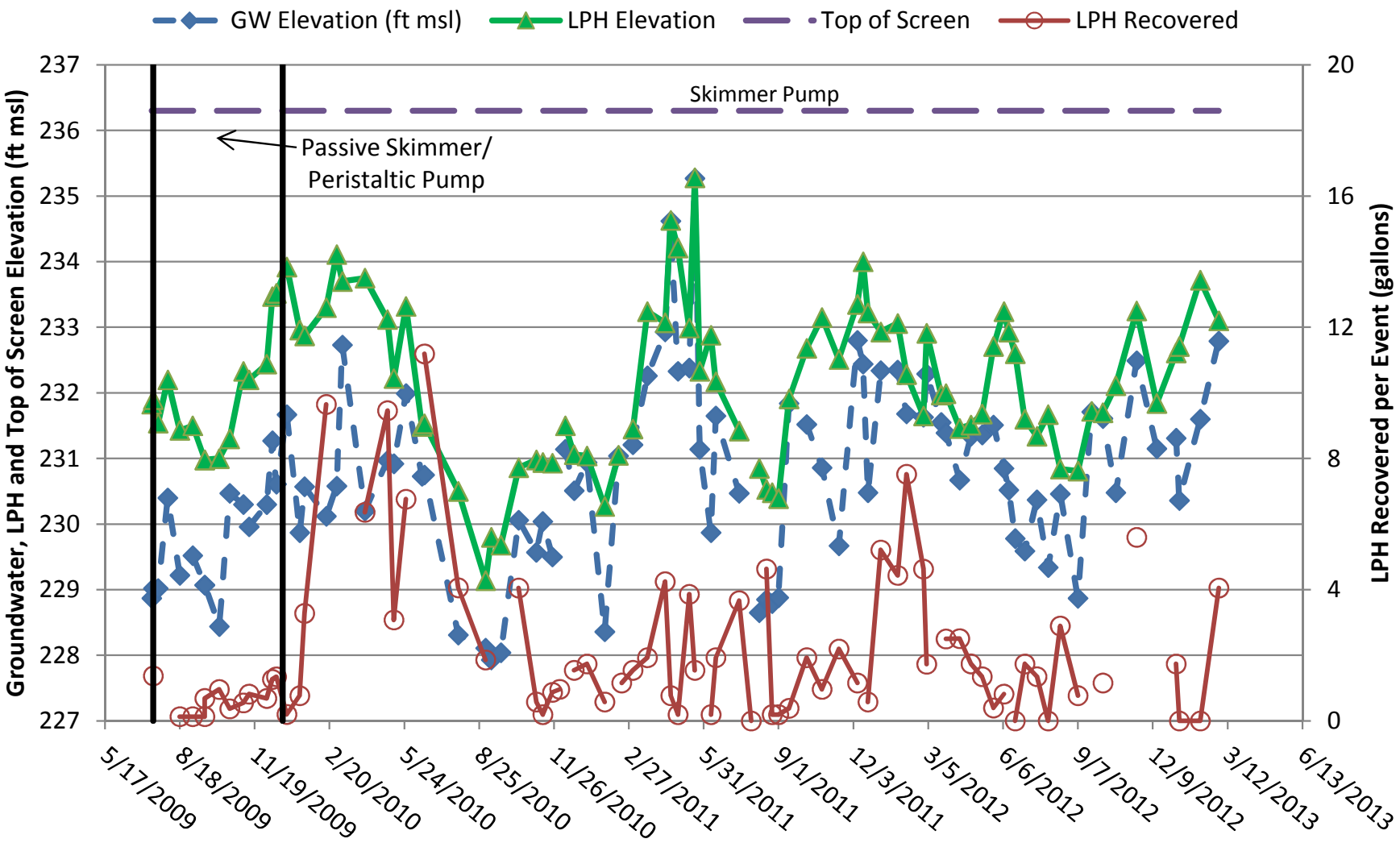
LPH and Groundwater Elevations and LPH Recovery: MW-53
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



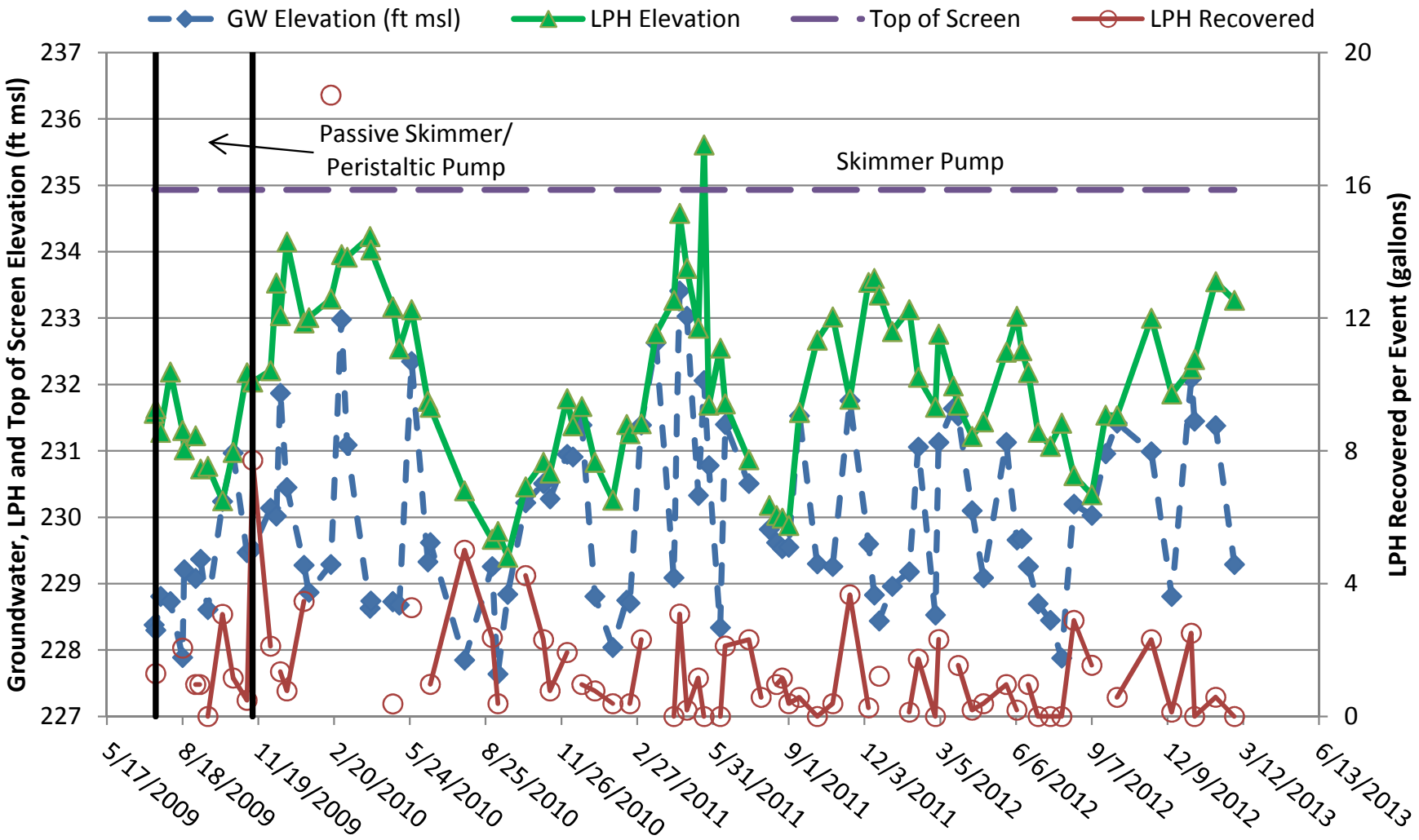
LPH and Groundwater Elevations and LPH Recovery: MW-54
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



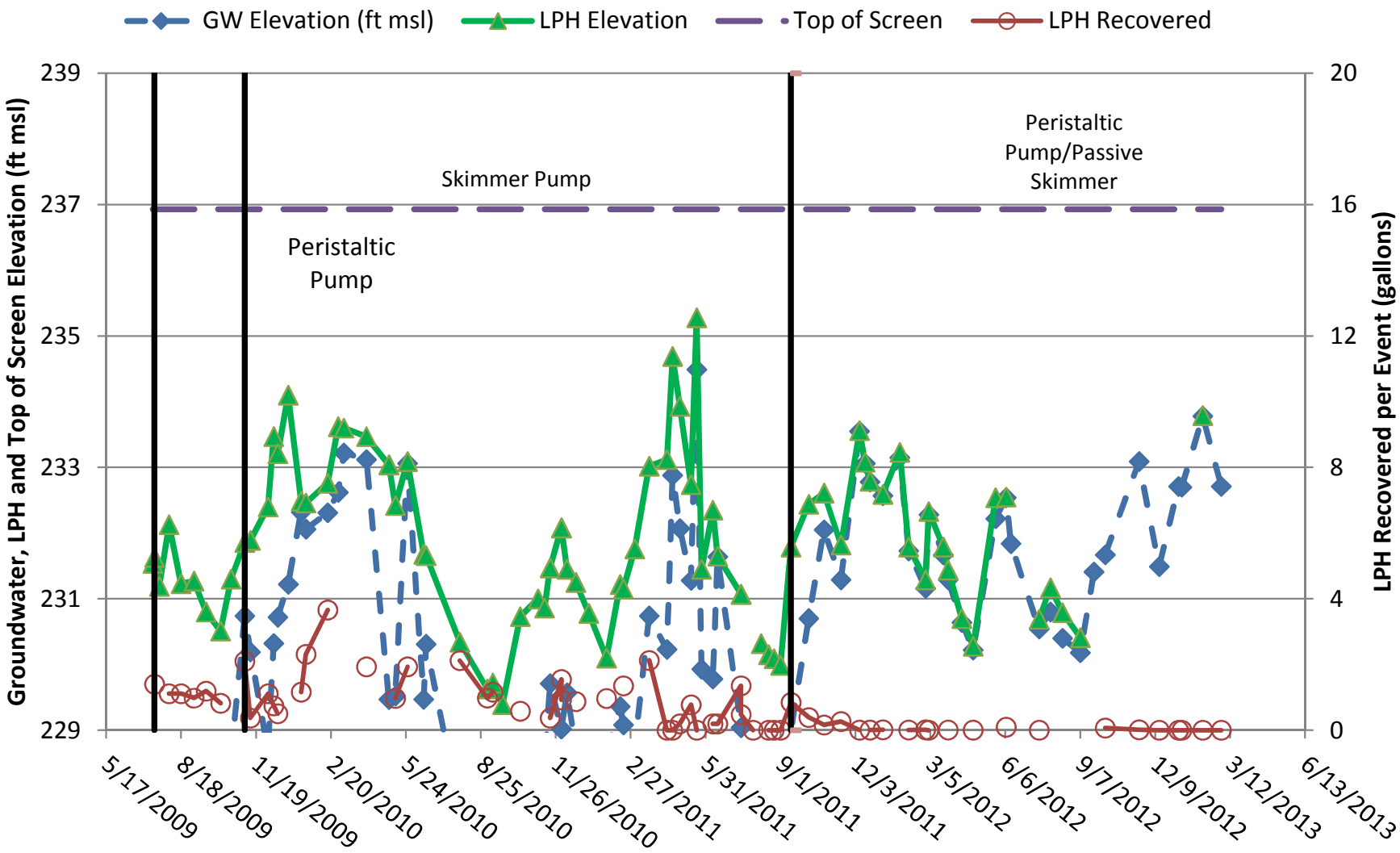
LPH and Groundwater Elevations and LPH Recovery: MW-55
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



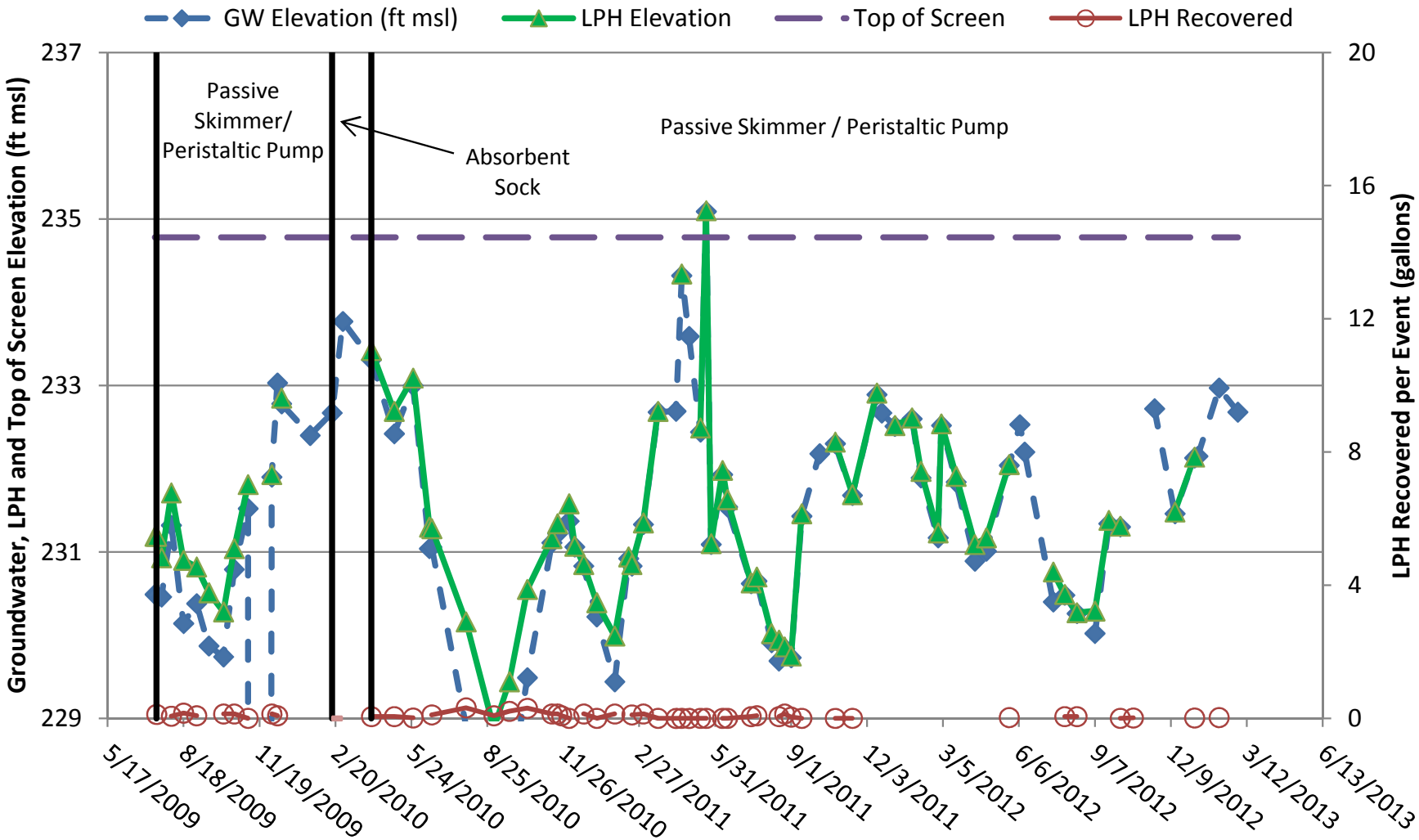
LPH and Groundwater Elevations and LPH Recovery: MW-56
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



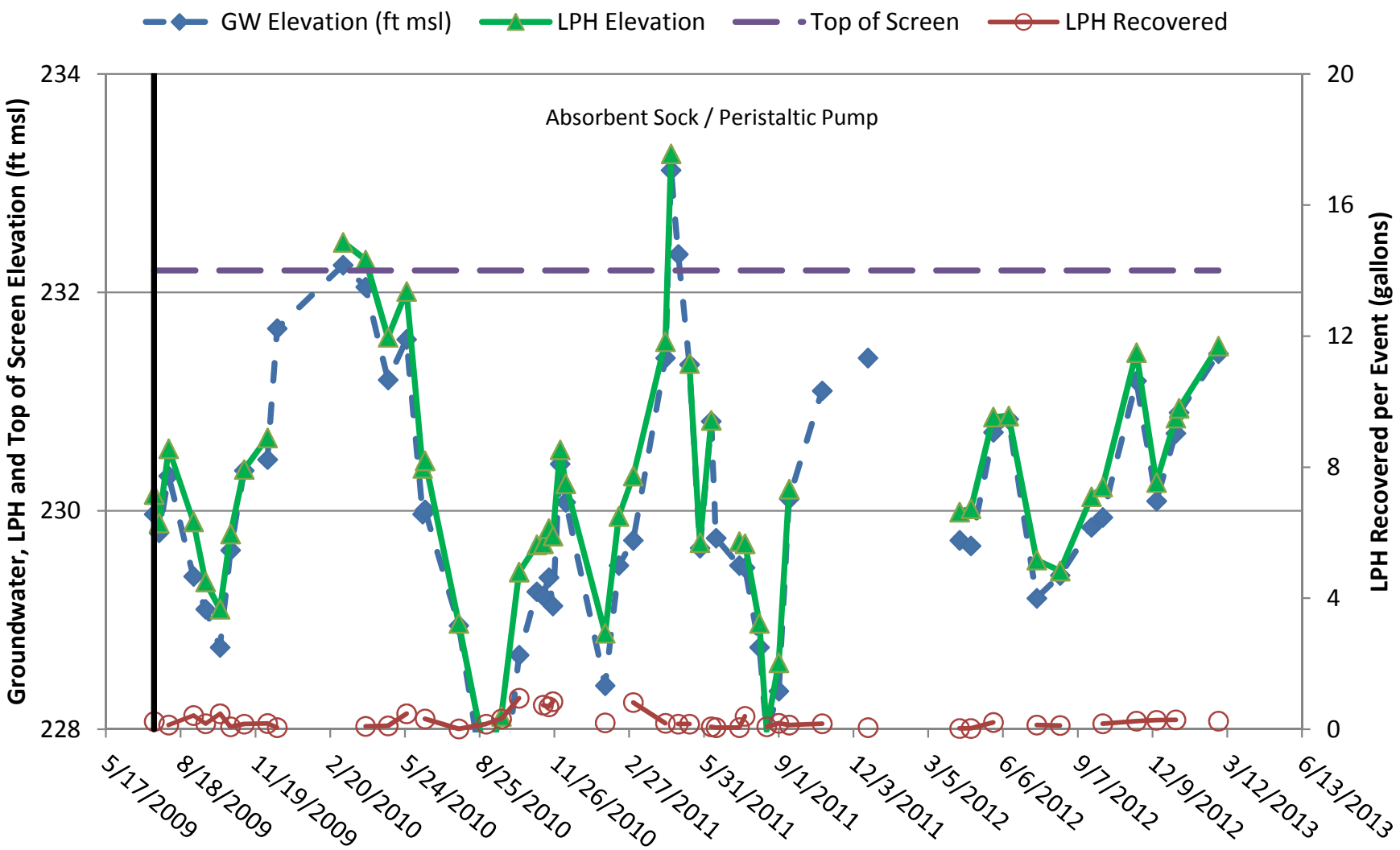
LPH and Groundwater Elevations and LPH Recovery: MW-57
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



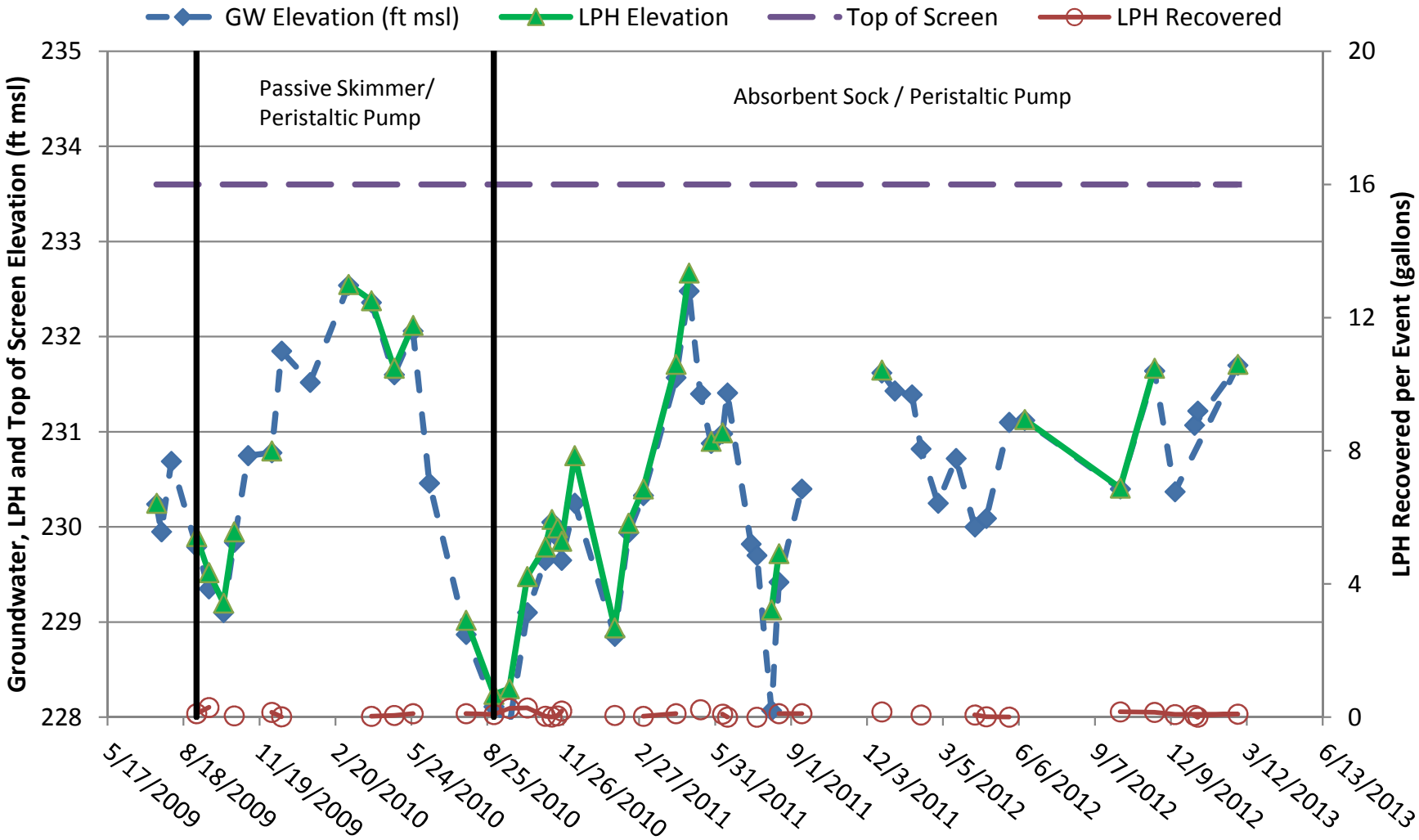
LPH and Groundwater Elevations and LPH Recovery: MW-58
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



LPH and Groundwater Elevations and LPH Recovery: EW-3
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



LPH and Groundwater Elevations and LPH Recovery: EW-5
July 12, 2009 through March 1, 2013
C&O Canal/Brunswick Rail Yard, Brunswick, Maryland



ARCADIS

Appendix C

Historical Groundwater Analytical Data and Graphs

Appendix C
Historical Groundwater Analytical Data
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

	Location ID	CSXT MW-01																			CSXT MW-02				
	Sample Date	7/5/1994	8/29/1995	3/10/1997	3/12/1998	11/9/1999	4/11/2000	5/7/2002	5/15/2003	5/7/2004	5/16/2005	6/6/2006	12/27/2006	3/5/2007	5/22/2007	8/9/2007	12/5/2007	2/28/2008	5/23/2008	8/6/2008	7/5/1994	5/7/2002	5/15/2003	5/6/2004	8/12/2008
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																								
	VOCs (µg/L)																								
71-43-2	Benzene	**2**	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.7 U	< 0.35 U	**31**	**13.3**	< 5 U	< 1 U	**0.70**
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.66 J**	**0.72**	**1.2**	< 0.17 U	NA	NA	NA	NA	< 0.17 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	< 0.6 U	< 1.2 U	< 0.6 U	NA	NA	NA	NA	< 0.6 U
1634-04-4	Methyl tert-butyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**97**	< 10 U	**210**	**210 E**	**160 D**	**280 D**	**160 D**	NA	NA	NA	NA	NA	< 0.28 U
91-20-3	Naphthalene	NA	< 10 U	< 1 U	< 10 U	**6**	< 1 U	< 10 U	< 8 U	< 1 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 5 U	< 1 U	**2.7**	< 0.87 U	< 0.43 U	NA	**63**	< 9 U	**10**	**7.0**
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**9.2**	**7.1**	**9.6**	**3.9**	NA	NA	NA	NA	< 0.53 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**24**	**10 B**	**42**	< 3.6 U	NA	NA	NA	NA	< 3.6 U
108-88-3	Toluene	< 1 U	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 1 U	< 0.51 U	**2**	**5.8**	**19.1**	< 1 U	**0.66**
1330-20-7	Xylenes, Total	< 3 U	< 10 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 10 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 1.9 U	< 0.93 U	**22**	**62.3**	**103**	< 2 U	< 0.93 U
	TPH (mg/L)																								
DROC10-C28	Diesel Range Organics	**9.7**	**19**	**13**	**25.7**	**7.56**	**9.58**	**37.3**	**2.51**	< 0.1 U	**0.75**	**11**	**12**	**11**	NA	**3.7**	**8.3**	**3.8**	**0.91**	**1.9**	**110**	**222**	**188**	**4.12**	**250**
PHC610GRO	Gasoline Range Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.69**	**0.068**	< 0.05 U	< 0.05 U	**0.16**	**0.17**	**0.24**	**0.10**	NA	NA	NA	NA	**0.12**

	Location ID	CSXT MW-03																														
	Sample Date	7/5/1994	8/29/1995	3/10/1997	3/12/1998	11/9/1999	4/11/2000	5/16/2001	5/7/2002	5/15/2003	5/6/2004	5/16/2005	6/6/2006	12/14/2006	3/5/2007	5/22/2007	8/9/2007	12/3/2007	12/3/2007	2/26/2008	5/21/2008	8/7/2008	3/3/2009	9/8/2009	3/9/2010	3/9/2010	9/23/2010	9/23/2010	2/16/2011	8/10/2011	3/22/2012	9/25/2012	1/14/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	FD	N	N	N	N	N	N
CAS No	Chemical Name																															
	VOCs (µg/L)																															
71-43-2	Benzene	< 1 U	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U*	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10 U	< 10 U	< 10 U	< 10 U	NA	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U
91-20-3	Naphthalene	NA	< 10 U	< 1 U	< 10 U	< 1 U	< 1 U	< 11 U	< 9 U	< 11 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 10 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20 U	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	< 1 U	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U
1330-20-7	Xylenes, Total	< 3 U	< 10 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
	TPH (mg/L)																															
DROC10-C28	Diesel Range Organics	**0.83**	< 0.6 U	**0.47**	< 0.1 U	**0.54**	< 0.1 U	< 0.1 U	< 0.1 U	< 0.11 U	< 0.1 U	< 0.095 U	< 0.1 U	< 0.094 U	< 0.097 U	< 0.096 U	**0.18**	< 0.098 U	< 0.098 U	**0.22**	< 0.04 U	< 0.043 U	< 0.47 U	**0.16**	**0.16**	**0.18**	**0.27**	**0.26**	**0.23**	**0.13**	**0.14**	< 0.1 U	**0.049 J***
PHC610GRO	Gasoline Range Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U

	Location ID	CSXT MW-04													CSXT MW-05																				
	Sample Date	7/5/1994	7/5/1994	3/12/1998	11/9/1999	4/11/2000	5/16/2001	5/7/2002	5/15/2003	5/6/2004	5/16/2005	6/6/2006	12/7/2007	8/29/1995	8/29/1995	3/10/1997	3/12/1998	4/11/2000	5/16/2001	5/7/2002	5/15/2003	5/6/2004	5/16/2005	5/16/2005	6/6/2006	12/14/2006	3/5/2007	5/22/2007	5/22/2007	8/9/2007	12/5/2007	2/26/2008	5/22/2008	8/6/2008
	Sample Type Code	FD	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	N	N
CAS No	Chemical Name																																	
	VOCs (µg/L)																																	
71-43-2	Benzene	**83**	**94**	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	**0.63 J**	< 5 U	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.65 J**	**0.69**	**0.40**	**0.79**
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U
1634-04-4	Methyl tert-butyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**110**	**52**	**47**	**39**	**140**	**84**	**58**	**5.2**	**9.2**
91-20-3	Naphthalene	NA	NA	< 10 U	**136000**	< 1 U	< 11 U	< 10 U	< 9 U	< 1 U	< 5 U	NA	< 1 U	**23**	**23**	< 1 U	< 10 U	< 1 U	< 11 U	< 9 U	< 9 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.78 J**	< 0.53 U	< 0.53 U	< 0.53 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.7 J**	< 3.6 U	< 3.6 U	< 3.6 U
108-88-3	Toluene	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	< 1 U	< 5 U	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U
1330-20-7	Xylenes, Total	**13**	**12**	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	NA	< 3 U	< 10 U	< 10 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U
	TPH (mg/L)																																	
DROC10-C28	Diesel Range Organics	**150**	**210**	**78.8**	**53.4**	**13.1**	**1.27**	**2.66**	< 0.08	< 0.11 U	**3.9**	NA	**6.7**	**4.3**	**4.3**	**1.16**	**77.3**	**28.9**	**13.9**	**36.7**	**8.22**	**2.31**	**11**	**20**	**21**	**14**	**9**	**1.5**	**1.5**	**2.5**	**3.4**	**10**	**6.2**	**14**
PHC610GRO	Gasoline Range Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.046 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.070**	**0.061**	**0.0082**	**0.018**

	Location ID	CSXT MW-06						CSXT MW-06R																										
	Sample Date	8/29/1995	11/9/1999	4/11/2000	5/16/2001	5/7/2002	5/15/2003	5/7/2004	5/16/2005	6/6/2006	12/15/2006	3/2/2007	5/23/2007	8/10/2007	12/7/2007	3/3/2008	5/27/2008	8/11/2008	8/11/2008	2/26/2009	9/3/2009	3/9/2010	9/23/2010	2/15/2011	2/15/2011	8/10/2011	8/10/2011	3/26/2012	3/26/2012	9/26/2012	9/26/2012	1/16/2013	
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	FD	N	FD	N	FD	N	
CAS No	Chemical Name																																
	VOCs (µg/L)																																
71-43-2	Benzene	< 5 U	**10**	**16.8**	**10.2**	**6.6**	**11.8**	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.2**	**0.82**	< 0.17 U	**0.58**	**0.56**	**0.77 J**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	**0.79**	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	NA	NA	NA	NA	NA	NA	NA	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**3.7**	**3.5**	< 0.28 U	**6.8**	**6.6**	**2.0**	< 5 U	**1.9 J**	< 5 U	< 5 U	< 5 U	< 1 U	**1.6**	< 1 U	< 1 U	**1.7**	**1.8**	< 1 U	< 1 U
91-20-3	Naphthalene	< 10 U	**20**	< 5 U	< 11 U	< 10 U	< 11 U	**9.9**	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	**0.46**	**0.58**	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**6.3 J**	**3.9**	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**29**	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	< 5 U	< 1 U	< 5 U	**3.8**	**6.2**	**54.3**	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1330-20-7	Xylenes, Total	< 10 U	< 2 U	< 10 U	**34.7**	**187**	**253**	< 2 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
	TPH (mg/L)																																
DROC10-C28	Diesel Range Organics	**6.8**	**251**	**79.4**	**45**	**150**	**250**	**15.4**	**24**	**2.2**	**5.1**	**2.4**	**1.3**	**2.5**	**2.2**	**1.5**	**1.9**	**2.4**	**14**	**4.0 J**	**3.9**	**4.2**	**2.4**	**11**	**11**	**4.8**	**3.5**	**13**	**11**	**2.0**	**2.0**	**7.7 ***	
PHC610GRO	Gasoline Range Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.14**	**0.067**	**0.05**	**0.064**	**0.039 J**	**0.055**	**0.13**	**0.10**	**0.11**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.059**	< 0.05 U	**0.13**	

Notes:
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
<1U - Concentration is less than the reporting limit
mg/L - milligrams per liter
ug/L - micrograms per liter
NA - Not Analyzed
J,* - Concentration is estimated
B - Constituent was detected in a laboratory method blank

Appendix C
Historical Groundwater Analytical Data
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

	Location ID	CSXT MW-08																					
	Sample Date	8/29/1995	3/10/1997	3/12/1998	11/9/1999	4/11/2000	5/16/2001	5/7/2002	5/15/2003	5/7/2004	5/16/2005	6/6/2006	6/6/2006	12/15/2006	2/28/2007	5/24/2007	8/9/2007	11/30/2007	2/27/2008	5/21/2008	8/7/2008	8/7/2008	1/15/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	FD	N	N
CAS No	Chemical Name																						
	VOCs (µg/L)																						
71-43-2	Benzene	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.0**	**1.5**	< 0.17 U	**1.8**	**1.4**	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.93 J**	**1.4**	**0.66**	**1.7**	**1.9**	< 1 U
1634-04-4	Methyl tert-butyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**38**	**17**	**21**	**37**	NA	**26**	**22**	**36**	**40**	**5.6**
91-20-3	Naphthalene	< 10 U	< 1 U	< 10 U	< 1 U	< 1 U	< 11 U	< 10 U	< 12	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.81 J**	**0.69**	< 0.53 U	**0.80**	**1.5**	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U
108-88-3	Toluene	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U
1330-20-7	Xylenes, Total	< 10 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U
	TPH (mg/L)																						
DROC10-C28	Diesel Range Organics	< 0.6 U	< 0.1 U	< 0.1 U	**0.42**	< 0.1 U	< 0.1 U	< 0.11 U	< 0.12	< 0.1 U	**0.14**	< 0.1 U	< 0.098	**0.097**	**0.15**	< 0.097 U	**0.19**	< 0.097 U	**0.14**	< 0.041 U	< 0.04 U	< 0.04 U	**0.039 J**
PHC610GRO	Gasoline Range Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.026 J**	**0.027**	**0.020**	**0.025**	**0.026**	< 0.05 U

	Location ID	CSXT MW-09																				CSXT MW-20				
	Sample Date	8/29/1995	3/10/1997	3/12/1998	11/9/1999	4/11/2000	5/16/2001	5/7/2002	5/15/2003	5/7/2004	5/16/2005	6/6/2006	12/18/2006	2/28/2007	5/24/2007	8/10/2007	11/30/2007	2/27/2008	5/21/2008	8/7/2008	1/15/2013	12/7/2007	3/3/2008	5/27/2008	8/11/2008	1/16/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																									
	VOCs (µg/L)																									
71-43-2	Benzene	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.5**	< 0.17 U	**0.99**	< 1 U	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	< 0.6 U	**0.85**	< 1 U	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U
1634-04-4	Methyl tert-butyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10 U	< 10 U	< 10 U	< 10 U	NA	**7.0**	**4.6**	**4.4**	**1.3**	**1.0**	**0.50**	< 0.28 U	< 0.28 U	< 1 U
91-20-3	Naphthalene	< 10 U	< 1 U	< 10 U	< 1 U	< 1 U	< 11 U	< 10 U	< 17	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 1 U	< 0.43 U	< 0.43 U	**0.47**	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 100 U	**4.9 B**	< 3.6 U	< 3.6 U	< 5 U	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U
108-88-3	Toluene	< 5 U	< 1 U	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U
1330-20-7	Xylenes, Total	< 10 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 15 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U
	TPH (mg/L)																									
DROC10-C28	Diesel Range Organics	< 0.6 U	< 0.1 U	< 0.1 U	**1.5**	**1.69**	< 0.1 U	< 0.1 U	< 0.12	< 0.11 U	**0.38**	**0.16**	**0.39**	**0.68**	**0.56**	**0.48**	< 0.097 U	**0.15**	< 0.041 U	< 0.039 U	**0.15**	< 0.098 U	< 0.039 U	< 0.038 U	< 0.044 U	**0.036 J***
PHC610GRO	Gasoline Range Organics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.0073 J**	**0.0094**	**0.0079**	**0.0074**	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	**0.065**

	Location ID	CSXT MW-21							CSXT MW-22																CSXT MW-23		
	Sample Date	6/26/2007	8/8/2007	12/5/2007	2/26/2008	5/23/2008	8/6/2008	1/17/2013	6/25/2007	8/9/2007	12/5/2007	2/26/2008	5/22/2008	8/7/2008	3/3/2009	9/4/2009	3/9/2010	9/23/2010	2/16/2011	8/11/2011	3/26/2012	9/25/2012	1/15/2013	2/28/2008	5/27/2008	8/8/2008
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																										
	VOCs (µg/L)																										
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 4 U	< 1.4 U	< 1.4 U	< 1.4 U	**0.22 J**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	**1.1**
108-20-3	Diisopropy Ether	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	NA	NA	< 4 U	< 0.67 U	< 0.67 U	< 0.67 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U	NA	NA	< 4 U	< 2.4 U	< 2.4 U	< 2.4 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 1 U	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	< 10 U	< 10 U	< 4 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.28 U	< 0.28 U	< 0.28 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	**1.0 J**	**16**	< 5 U	**3.0 J**	**2.6**	< 1.7 U	**4.0**	**2.5**	< 5 U	**1.2 J**	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	**7.0**	< 0.43 U	**61**
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	NA	NA	< 4 U	< 2.1 U	< 2.1 U	< 2.1 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U
75-65-0	Tert-Butyl Alcohol	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U	NA	NA	< 80 U	< 14 U	< 14 U	< 14 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 3.6 U	< 3.6 U	< 3.6 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	**4**	< 1 U	< 4 U	< 2 U	< 2 U	< 2 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U	< 2 U	< 2 U	< 12 U	< 3.7 U	< 3.7 U	< 3.7 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 0.93 U	< 0.93 U	< 0.93 U
	TPH (mg/L)																										
DROC10-C28	Diesel Range Organics	**2.2**	NA	**5.0**	**0.57**	**1.8**	**1.7**	**0.6 ***	**17**	**9.1**	**8.5**	**8.0**	**6.0**	**3.3**	**7.5**	**8.4**	**6.8**	**7.6**	**7.3**	**5.7**	**7.3**	**4.8**	**4.1**	**6.1**	**0.54**	NA
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	**0.065**	< 0.0042 U	**0.0082**	**0.0082**	< 0.05 U	**0.2**	< 0.05 U	**0.027 J**	**0.026**	**0.019**	**0.017**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	**0.019 J**	**0.021**	< 0.0042 U	**0.054**

	Location ID	CSXT MW-24												CSXT MW-25													
	Sample Date	6/25/2007	12/6/2007	2/28/2008	5/27/2008	8/11/2008	3/3/2009	9/8/2009	3/9/2010	2/16/2011	8/11/2011	3/27/2012	9/25/2012	6/25/2007	8/8/2007	12/4/2007	2/26/2008	5/22/2008	8/8/2008	3/3/2009	9/8/2009	3/9/2010	9/23/2010	2/16/2011	8/10/2011	3/21/2012	9/25/2012	1/14/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																											
	VOCs (µg/L)																											
71-43-2	Benzene	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1.4 U	< 1.4 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-20-3	Diisopropy Ether	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	NA	< 1 U	NA	NA	< 1 U	< 0.67 U	< 0.67 U	< 0.17 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 1 U	NA	< 1 U	NA	NA	< 1 U	< 2.4 U	< 2.4 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 1 U	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	NA	< 1 U	< 10 U	< 10 U	NA	< 1.1 U	< 1.1 U	< 0.28 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	NA	< 1 U	< 5 U	< 5 U	< 1 U	< 1.7 U	< 1.7 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 10 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	NA	< 1 U	NA	NA	< 1 U	< 2.1 U	< 2.1 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	NA	< 5 U	NA	NA	< 20 U	< 14 U	< 14 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	**3.3**	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 2 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 10 U	< 2 U	< 2 U	< 3 U	< 3.7 U	< 3.7 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
	TPH (mg/L)																											
DROC10-C28	Diesel Range Organics	< 0	**2.0**	**0.26**	**0.26**	**0.31**	**0.58**	**0.63**	**0.25**	**0.62**	**2.3**	**2.1**	**1.3**	**3.8**	**3**	**0.79**	**2.0**	**1.9**	**1.8**	**2.0**	**8.0**	**5.5**	**7.1**	**5.5**	**3.8**	**3.4**	**4.9**	**1.2 ***
PHC610GRO	Gasoline Range Organics	**0.056**	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	**0.0083**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	**0.023 J**

Notes:
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
<1U - Concentration is less than the reporting limit
mg/L - milligrams per liter
ug/L - micrograms per liter
NA - Not Analyzed
J,* - Concentration is estimated
B - Constituent was detected in a laboratory method blank

Appendix C
Historical Groundwater Analytical Data
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

CAS No	Location ID	CSXT MW-26				CSXT MW-27						CSXT MW-28		CSXT MW-29												CSXT MW-30			CSXT MW-31				CSXT MW-32			CSXT MW-33	
	Sample Date	6/25/2007	8/9/2007	12/6/2007	3/4/2009	6/26/2007	12/7/2007	2/28/2008	2/28/2008	5/27/2008	8/7/2008	2/28/2008	8/8/2008	12/5/2007	2/26/2008	5/23/2008	8/6/2008	3/3/2009	9/4/2009	9/22/2010	2/16/2011	8/10/2011	3/26/2012	9/25/2012	1/24/2013	12/6/2007	8/6/2008	3/3/2009	12/6/2007	2/28/2008	5/27/2008	8/6/2008	12/5/2007	2/25/2008	5/27/2008	12/5/2007	2/27/2008
	Sample Type Code	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Chemical Name																																			
	VOCs (µg/L)																																			
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	**11**	**3.6**	< 4 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 1 U	**2.3 J**	**18**	< 0.35 U	< 0.35 U	< 4 U	< 1.4 U	< 0.35 U	< 4 U	< 0.35 U
108-20-3	Diisopropy Ether	NA	NA	< 1 U	< 1 U	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 4 U	< 0.17 U	**0.39**	< 0.17 U	**0.82 J**	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	**1.2**	< 0.17 U	< 1 U	< 4 U	< 0.17 U	< 0.17 U	< 0.17 U	< 4 U	< 0.67 U	< 0.17 U	< 4 U	< 0.17 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	< 1 U	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 4 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.6 U	NA	< 4 U	< 0.6 U	< 0.6 U	< 0.6 U	< 4 U	< 2.4 U	< 0.6 U	< 4 U	< 0.6 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 1 U	< 1 U	< 10 U	< 1 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.28 U	**1.9**	< 0.28 U	**90**	**59**	**88**	**160 D**	**160 J**	**140**	**66**	**61**	**31**	**15**	**2.0**	**3.8**	**350 E**	**7.3**	**51**	< 4 U	< 0.28 U	< 0.28 U	< 0.28 U	< 4 U	< 1.1 U	< 0.28 U	< 4 U	< 0.28 U
91-20-3	Naphthalene	< 5 U	< 5 U	**0.58 J**	**1.4**	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	**79**	**61**	< 4 U	< 0.43 U	< 0.43 U	< 0.43 U	**1.9**	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.43 U	< 1 U	**3.1 J**	**2.8**	< 0.43 U	< 0.43 U	< 4 U	< 1.7 U	**2.7**	**2.6 J**	< 0.43 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	< 1 U	< 1 U	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	**4.4**	**3.4**	**2.7**	**5.1**	**3.9**	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	**15**	< 0.53 U	**1.1**	< 4 U	< 0.53 U	< 0.53 U	< 0.53 U	< 4 U	< 2.1 U	< 0.53 U	< 4 U	< 0.53 U
75-65-0	Tert-Butyl Alcohol	NA	NA	< 20 U	< 20 U	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 80 U	< 3.6 U	< 3.6 U	**4.5**	**18 J**	**12**	< 5 U	< 5 U	< 5 U	**20**	< 5 U	< 5 U	**45**	< 3.6 U	< 20 U	< 80 U	< 3.6 U	< 3.6 U	< 3.6 U	< 80 U	**37**	< 3.6 U	< 80 U	< 3.6 U
108-88-3	Toluene	**1.1**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 0.51 U	< 4 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 1 U	< 4 U	< 0.51 U	< 0.51 U	< 0.51 U	< 4 U	< 2 U	< 0.51 U	< 4 U	< 0.51 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 3 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 12 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 3 U	< 0.93 U	< 2 U	< 12 U	< 0.93 U	< 0.93 U	< 0.93 U	< 12 U	< 3.7 U	< 0.93 U	< 12 U	< 0.93 U
	TPH (mg/L)																																			
DROC10-C28	Diesel Range Organics	**5.4**	**13**	**15**	**1000 J**	**6.8**	**1.5**	**0.94**	**0.68**	**0.36**	**0.96**	**62**	**160**	**7.1**	**4.1**	**5.7**	**5.9**	**18**	**2.8**	**5.9**	**23**	**2.1**	**2.0**	**2**	**18 B**	**2.7**	**4.7**	**1.9**	**2.2**	**1.4**	**0.38**	**1.0**	**190**	**14**	**7.1**	**12**	**9.7**
PHC610GRO	Gasoline Range Organics	**0.13**	**1.1**	**0.16 J**	NA	< 0.05 U	**0.016 J**	**0.0070**	**0.0082**	< 0.0042 U	**0.0070**	**0.19**	**0.26**	**0.12**	**0.066**	**0.090**	**0.16**	NA	NA	NA	NA	NA	NA	< 0.05 U	**0.025 J**	**0.28**	**0.0073**	NA	**0.10**	**0.20**	< 0.0042 U	**0.023**	**0.23 J**	**0.047**	**0.026**	**0.064 J**	**0.017**

CAS No	Location ID	CSXT MW-35				CSXT MW-37				CSXT MW-38	CSXT MW-39			CSXT MW-43															CSXT MW-49	CSXT MW-50			
	Sample Date	12/4/2007	2/26/2008	5/22/2008	8/8/2008	2/6/2013	12/4/2007	5/28/2008	5/28/2008	12/5/2007	12/4/2007	2/26/2008	5/21/2008	8/7/2008	12/7/2007	12/7/2007	2/29/2008	5/23/2008	8/11/2008	3/4/2009	9/3/2009	3/9/2010	9/22/2010	2/15/2011	8/9/2011	3/23/2012	9/26/2012	1/16/2013	12/5/2007	12/4/2007	2/25/2008	5/21/2008	8/11/2008
	Sample Type Code	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Chemical Name																																
	VOCs (µg/L)																																
71-43-2	Benzene	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 4 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U
108-20-3	Diisopropy Ether	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 1 U	< 0.17 U	< 0.17 U	< 4 U	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 1 U	< 0.17 U	< 0.17 U	**0.26**	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U
637-92-3	Ethyl-t-butyl ether (ETBE)	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U	< 1 U	< 0.6 U	< 0.6 U	< 4 U	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U
1634-04-4	Methyl tert-butyl ether	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	NA	< 0.28 U	< 0.28 U	< 4 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	**57**	**58**	**34**	**56**	**85 D**	**40**	**62**	**17**	**17**	< 5 U	**2.0**	< 1 U	< 1 U	< 1 U	< 5 U	NA	< 0.28 U	< 0.28 U	< 0.28 U
91-20-3	Naphthalene	**7.2**	**0.70**	**2.5**	**0.54**	< 1 U	**2.1**	< 0.43 U	**3.0**	< 4 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 5 U	**0.72 J**	< 0.43 U	< 0.43 U	< 0.43 U
994-05-8	tert-Amyl Methyl Ether (TAME)	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 1 U	< 0.53 U	< 0.53 U	< 4 U	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 1 U	**0.57**	**0.95**	**1.3**	**0.53 J**	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U
75-65-0	Tert-Butyl Alcohol	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U	< 20 U	< 3.6 U	< 3.6 U	< 80 U	**3.6 J**	**6.6**	< 3.6 U	< 3.6 U	< 20 U	< 20 U	< 3.6 U	**4.6**	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 100 U	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U
108-88-3	Toluene	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	**0.61 J**	< 0.51 U	< 0.51 U	< 4 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U
1330-20-7	Xylenes, Total	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U	< 3 U	< 0.93 U	< 0.93 U	< 12 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 3 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 15 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U
	TPH (mg/L)																															
DROC10-C28	Diesel Range Organics	**0.50**	**0.57**	**0.40**	**0.28**	**0.69**	**31**	**23**	**8.3**	**8.5**	**0.92**	**0.33**	**0.15**	< 0.043 U	**2.6**	**3.3**	**0.93**	**0.83**	**0.84**	**0.55 B**	**1.4**	**1.1**	**1.1**	**3.9**	**0.89**	**1.5**	**2.6**	**0.980***	**7.9**	**5.4**	**0.27**	< 0.041 U	**0.29**
PHC610GRO	Gasoline Range Organics	**0.013 J**	**0.0084**	**0.0076**	**0.0082**	< 0.05 U	**0.077**	**0.056**	**0.062**	**0.061 J**	**0.010 J**	**0.0054**	< 0.0042 U	< 0.0042 U	**0.071 J**	**0.052 J**	**0.029**	**0.053**	**0.069**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	**0.16 J**	**0.031 J**	< 0.0042 U	< 0.0042 U	< 0.0042 U

CAS No	Location ID	CSXT MW-51														CSXT MW-52				CSXT MW-59	CSXT MW-61			CSXT MW-64			CSXT MW-65						CSXT MW-67	CSXT MW-68	SXT MW-6	CSXT MW-70
	Sample Date	12/6/2007	2/25/2008	5/28/2008	8/8/2008	3/4/2009	9/8/2009	3/9/2010	9/23/2010	2/16/2011	8/10/2011	3/26/2012	9/25/2012	1/14/2013	12/6/2007	2/25/2008	5/28/2008	8/8/2008	1/14/2013	6/14/2012	9/26/2012	1/14/2013	4/3/2012	6/14/2012	9/26/2012	4/3/2012	4/3/2012	6/14/2012	6/14/2012	9/26/2012	1/17/2013	1/15/2013	1/17/2013	1/17/2013	1/17/2013	1/17/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	FD	N	N	N	N	N	N	N	N
	Chemical Name																																			
	VOCs (µg/L)																																			
71-43-2	Benzene	< 1 U	< 0.35 U	**1.0**	**10**	< 1 U	< 1 U	< 1 U	**1.0**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**0.53 J**
108-20-3	Diisopropy Ether	**3.6**	**6.8**	**2.8**	**4.7**	**3.2**	< 5 U	< 5 U	< 5 U	< 5 U	**1.8**	**1.8**	**1.0**	**1.1**	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	**1.2**	**2.8**	**1.3**	**4.2**	NA	< 5 U	< 5 U*	< 5 U	< 5 U	**1.2**	**1.4**	< 1 U	**1.2**	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	**790 E**	< 0.28 U	**1200 D**	**1400 D**	**1100 J**	**69**	**9.6**	**30**	**26**	**34**	**27**	**18**	**12**	**0.85 J**	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**2.1**	< 1 U	< 1 U	< 1 U
91-20-3	Naphthalene	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	**1.1**	**1.0**	< 1 U	**0.65 J**	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**6.8**	< 1 U	**1.6**
994-05-8	tert-Amyl Methyl Ether (TAME)	**32**	**56**	**24**	**44**	**22**	< 5 U	< 5 U	< 5 U	< 5 U	**1.1**	**1.0**	< 1 U	**0.65 J**	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 1 U	**6.3**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	**75**	< 3.6 U	**54**	**88**	**110**	**410**	< 5 U*	**6.9**	< 5 U	**120**	**110**	**26**	**53**	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**1.0**
1330-20-7	Xylenes, Total	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**13**
	TPH (mg/L)																																			
DROC10-C28	Diesel Range Organics	**0.64**	**0.37**	**0.38**	< 0.045 U	**0.17 J, B**	**0.49**	**0.22**	**0.61**	**0.48**	**0.30**	**0.31**	**0.56**	**0.120***	**0.90**	**1.2**	**1.1**	**0.34**	**150***	**18**	**18**	**100 ***	**15**	**7.6**	**13**	**14**	**13**	**9.2**	**9.6**	**8.0**	**4***	**5.6**	**6.0***	**2.3***	**0.460***	
PHC610GRO	Gasoline Range Organics	**0.70**	**1.5**	**0.84**	**0.47**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	**0.029 J**	< 0.05 U	**0.0058**	< 0.0042 U	< 0.0042 U	**0.16**	NA	**0.12**	**0.16**	NA	NA	< 0.05 U	NA	NA	NA	NA	**0.085**	**0.092**	**0.086**	**0.05**	**0.063**	**0.091**	

CAS No	Location ID	NPS MW-01																	NPS MW-02																	
	Sample Date	12/18/2006	2/28/2007	5/24/2007	8/9/2007	11/29/2007	3/3/2008	5/21/2008	8/7/2008	2/26/2009	9/4/2009	3/10/2010	9/22/2010	2/15/2011	8/9/2011	3/23/2012	9/25/2012	1/15/2013	12/14/2006	3/1/2007	5/25/2007	8/10/2007	12/3/2007	2/27/2008	5/22/2008	8/12/2008	3/4/2009	3/4/2009	9/3/2009	9/3/2010	9/22/2010	2/15/2011	8/9/2011	3/23/2012	9/26/2012	1/16/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	N	N
	Chemical Name																																			
	VOCs (µg/L)																																			
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 4 J	< 4 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	**1.6**	**0.86**	< 0.17 U	**1.6**	**0.91 J**	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 4 J	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	**1.2**	**0.88**	**0.74**	**1.8**	NA	< 5 U	**1.0 J***	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	NA	< 5 U	< 5 U	< 5 U*	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	NA	**2.7**	**2.8**	**2.8**	**2.3**	< 5 U	**1.7 J**	< 5 U	< 5 U	< 1 U	**1.2**	**1.5**	**1.9**	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 4 J	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 4 J	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 4 J	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	**8.4**	**5.4**	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 80 J	< 80 J	< 5 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 4 J	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 8 J	< 8 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
	TPH (mg/L)																																			
DROC10-C28	Diesel Range Organics	**0.18**	**0.45**	**0.25**	**0.24**	< 0.098 U	**1.8**	**0.16**	< 0.039 U	< 0.52 U	**0.57**	**0.62**	**0.42**	**1.1**	**0.34**	**1.0**	**0.38**	**0.13**	**0.93**	**1.4**	**0.81**	**0.67**	< 0.096 U	**0.30**	**0.64**	**0.46**	**0.49 B**	**0.42 J, B**	**1.3**	**1.4**	**1.5**	**1.3**	**1.2**	**0.94**	**1.2**	**1.1**	**0.280***
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.0073 J**	**0.0064**	**0.0056**	**0.0054**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	NA	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U

Notes:
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
<1U - Concentration is less than the reporting limit
mg/L - milligrams per liter
ug/L - micrograms per liter
NA - Not Analyzed
J,* - Concentration is estimated
B - Constituent was detected in a laboratory method blank

Appendix C
Historical Groundwater Analytical Data
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

	Location ID	NPS MW-03									NPS MW-04																
	Sample Date	12/15/2006	2/27/2007	5/23/2007	8/8/2007	11/30/2007	2/29/2008	5/20/2008	8/11/2008	1/15/2013	5/16/2005	6/6/2006	12/18/2006	3/2/2007	5/23/2007	3/3/2008	5/27/2008	8/12/2008	3/4/2009	9/3/2009	3/9/2010	9/23/2010	2/15/2011	8/10/2011	3/23/2012	9/26/2012	1/16/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																										
	VOCs (µg/L)																										
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**6.1**	**16**	**12**	< 4 J	**2.1**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	NA	NA	NA	NA	NA	< 0.67 U	< 0.17 U	< 0.17 U	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U	NA	NA	NA	NA	NA	< 2.4 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	NA	NA	< 10 U	< 10 U	< 10 U	< 1.1 U	< 0.28 U	< 0.28 U	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1.7 U	< 0.43 U	**0.89**	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	NA	NA	NA	NA	NA	< 2.1 U	< 0.53 U	< 0.53 U	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U	NA	NA	NA	NA	NA	< 14 U	< 3.6 U	< 3.6 U	< 80 J	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 0.51 U	< 0.51 U	< 4 J	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3.7 U	< 0.93 U	< 0.93 U	< 8 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
	TPH (mg/L)																										
DROC10-C28	Diesel Range Organics	**0.19**	**0.34**	**0.17**	**0.29**	< 0.097 U	< 0.038 U	< 0.04 U	< 0.043 U	**0.071 J**	**30**	**21**	**10**	**33**	**3.2**	**9.6**	**11**	**2.0**	**6.1 B**	**4.5**	**5.4**	**3.0**	**12**	**3.2**	**2.9**	**5.4**	**17***
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	< 0.05 U	NA	NA	**0.17**	**0.092**	< 0.05 U	**0.058**	**0.11**	**0.11**	NA	NA	NA	NA	NA	NA	NA	**0.050**	**0.088**

	Location ID	NPS MW-05										NPS MW-10									
	Sample Date	12/15/2006	2/28/2007	2/28/2007	5/23/2007	8/9/2007	11/29/2007	3/3/2008	3/3/2008	5/20/2008	5/20/2008	8/7/2008	2/26/2009	9/4/2009	3/10/2010	9/22/2010	2/15/2011	8/9/2011	3/23/2012	9/25/2012	1/15/2013	12/15/2006	3/1/2007	5/22/2007	8/10/2007	12/3/2007	2/29/2008	5/22/2008	8/12/2008	1/16/2013
	Sample Type Code	N	FD	N	N	N	N	FD	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																													
	VOCs (µg/L)																													
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	< 5 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	< 5 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	**1.8**	**1.8**	< 0.28 U	**6.9**	**7.0**	**3.2**	**6.6**	**4.2 J**	< 5 U	< 5 U	**1.1**	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	< 5 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	< 100 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 15 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U
	TPH (mg/L)																													
DROC10-C28	Diesel Range Organics	**0.9**	**1.3**	**1.1**	**0.83**	**0.91**	< 0.094 U	**0.42**	**0.26**	< 0.039 U	**0.25**	< 0.044 U	< 0.51 U	**1.2**	**0.82**	**1.1**	**0.89**	**0.70**	**0.62**	**0.82**	**0.16**	**0.41**	**0.7**	**0.51**	**0.66**	< 0.098 U	**0.50**	**0.28**	< 0.047 U	**0.320 ***
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	**0.0066**	**0.0054**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	< 0.05 U

	Location ID	NPS MW-11								NPS MW-12									NPS MW-13																				
	Sample Date	12/15/2006	3/1/2007	5/22/2007	8/10/2007	12/3/2007	2/27/2008	5/27/2008	8/12/2008	2/14/2006	3/1/2007	5/25/2007	8/10/2007	11/30/2007	2/27/2008	5/22/2008	8/12/2008	1/16/2013	12/21/2006	2/27/2007	5/23/2007	8/9/2007	11/29/2007	2/29/2008	5/20/2008	8/12/2008	2/26/2009	9/4/2009	3/10/2010	9/22/2010	2/15/2011	8/9/2011	3/22/2012	9/25/2012	1/15/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																																					
	VOCs (µg/L)																																					
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	NA	NA	NA	NA	< 20 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
	TPH (mg/L)																																					
DROC10-C28	Diesel Range Organics	**0.43**	**0.77**	**0.37**	**0.41**	< 0.095 U	< 0.04 U	< 0.038 U	< 0.048 U	**0.59**	**0.93**	**0.61**	**0.56**	< 0.097 U	**0.38**	**0.25**	**0.43**	**0.260 ***	**0.53**	**0.65**	**0.42**	**0.56**	< 0.099 U	**0.26**	**0.30**	< 0.042 U	**0.28 J, B**	**0.74**	**0.57**	**0.71**	**0.79**	**0.45**	**0.53**	**0.65**	**0.21**
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.0042 U	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U

	Location ID	NPS MW-14																		NPS MW-15								
	Sample Date	12/14/2006	12/14/2006	3/2/2007	5/23/2007	8/9/2007	11/29/2007	2/29/2008	5/27/2008	8/11/2008	2/26/2009	9/4/2009	3/10/2010	9/22/2010	2/15/2011	8/9/2011	3/22/2012	9/25/2012	1/15/2013	12/18/2006	3/2/2007	5/23/2007	8/9/2007	11/30/2007	2/27/2008	5/20/2008	8/7/2008	1/15/2013
	Sample Type Code	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																											
	VOCs (µg/L)																											
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 5 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 5 U	< 0.6 U	< 0.6 U	< 0.6 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	**0.54**	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 0.28 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	**0.61**	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 5 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA	NA	< 100 U	< 3.6 U	< 3.6 U	< 3.6 U	< 5 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 15 U	< 0.93 U	< 0.93 U	< 0.93 U	< 10 U
	TPH (mg/L)																											
DROC10-C28	Diesel Range Organics	**2.3**	**1.7**	**2.4**	**1.8**	**1**	< 0.096 U	**0.90**	**0.88**	**0.71**	**0.64 B**	**2.5**	**2.0**	**1.2**	**3.4**	**1.0**	**1.7**	**2.4**	**0.7**	**1.8**	**1.8**	**1**	**1.5**	**1.0**	**0.76**	**1.1**	**0.59**	**0.49**
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.012**	**0.020**	**0.0082**	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	**0.03 J**	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.029 J**	**0.028**	**0.021**	**0.027**	**0.053**

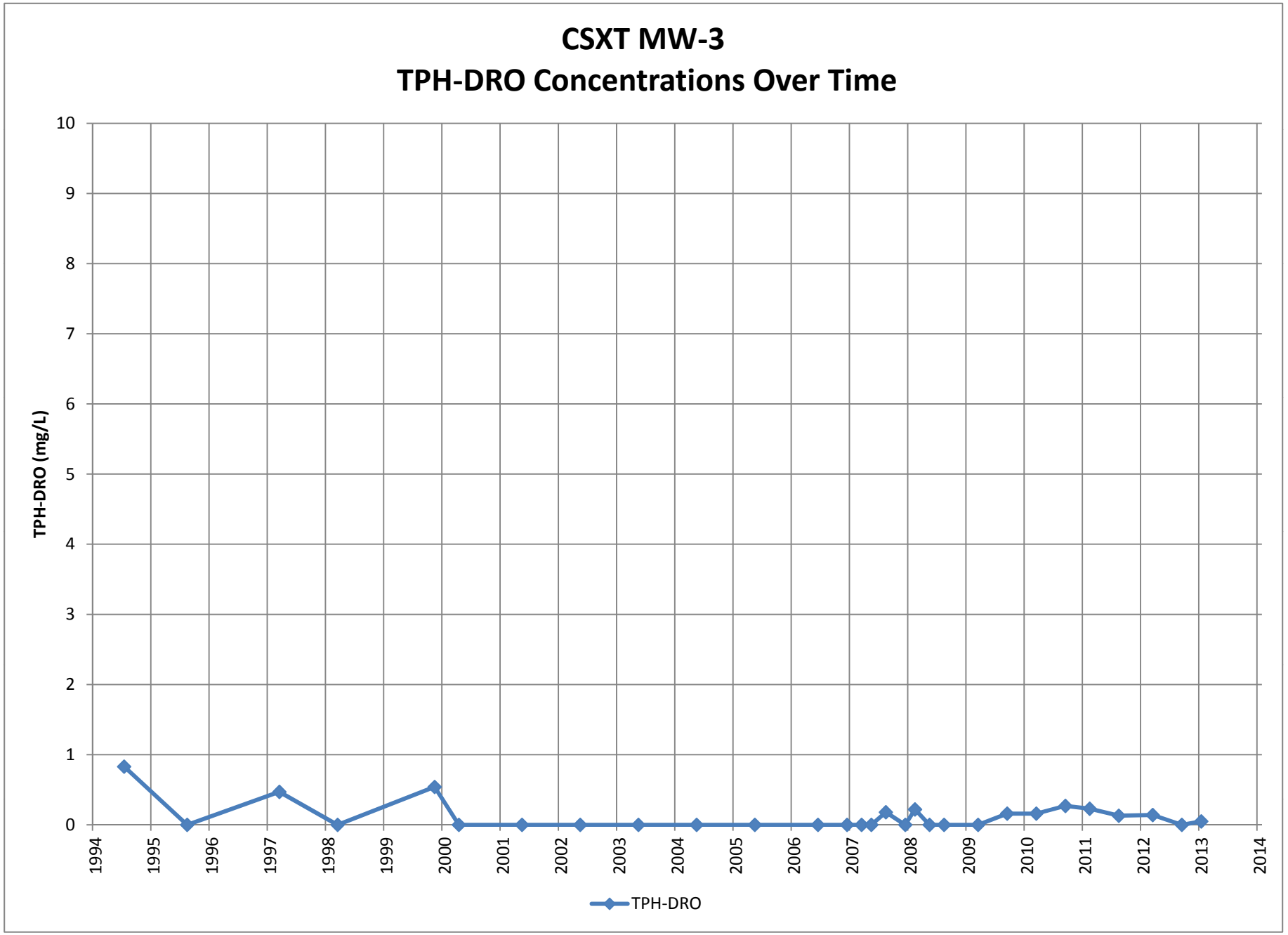
Notes:
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
<1U - Concentration is less than the reporting limit
mg/L - milligrams per liter
ug/L - micrograms per liter
NA - Not Analyzed
J,* - Concentration is estimated
B - Constituent was detected in a laboratory method blank

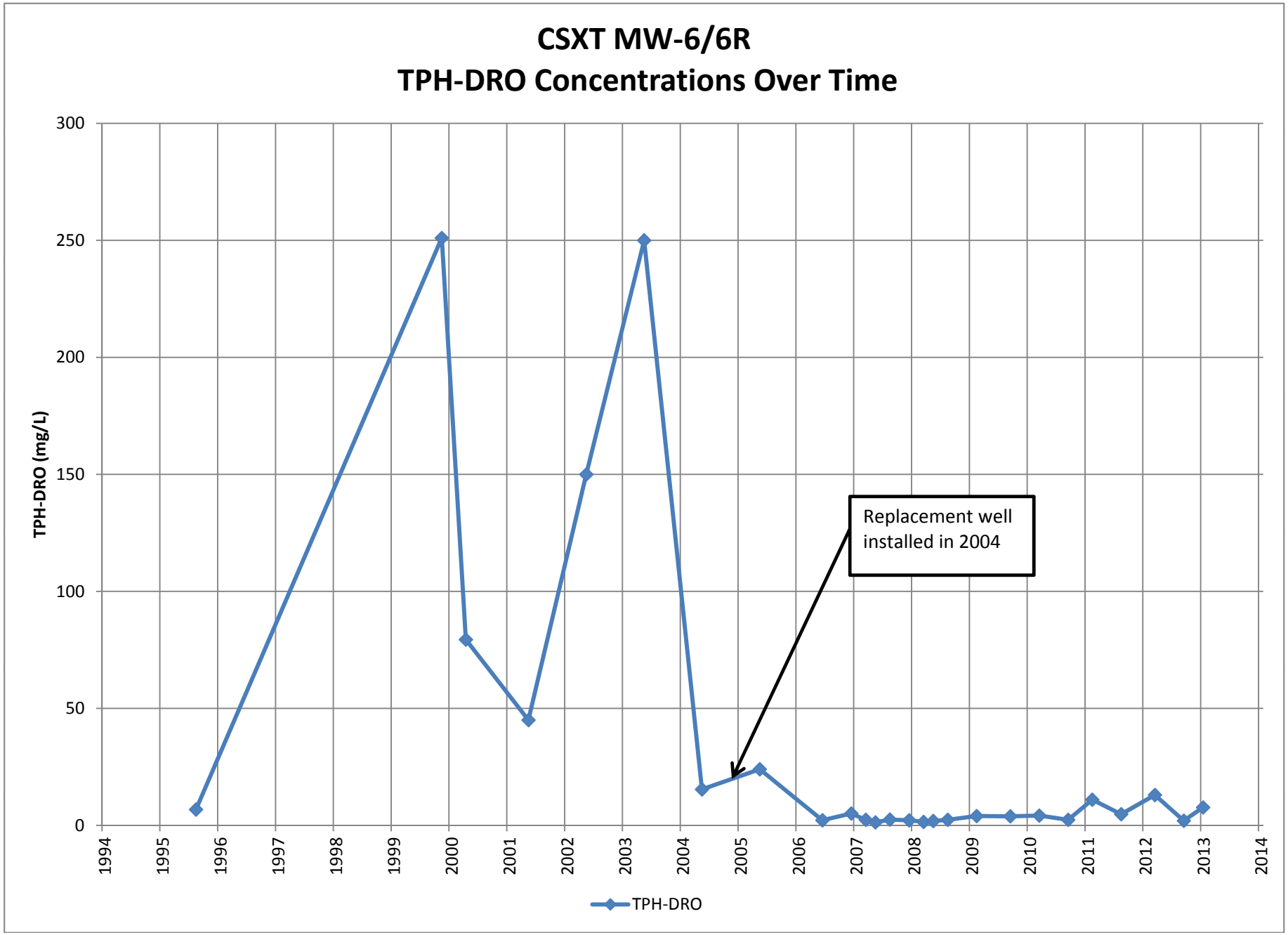
Appendix C
Historical Groundwater Analytical Data
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

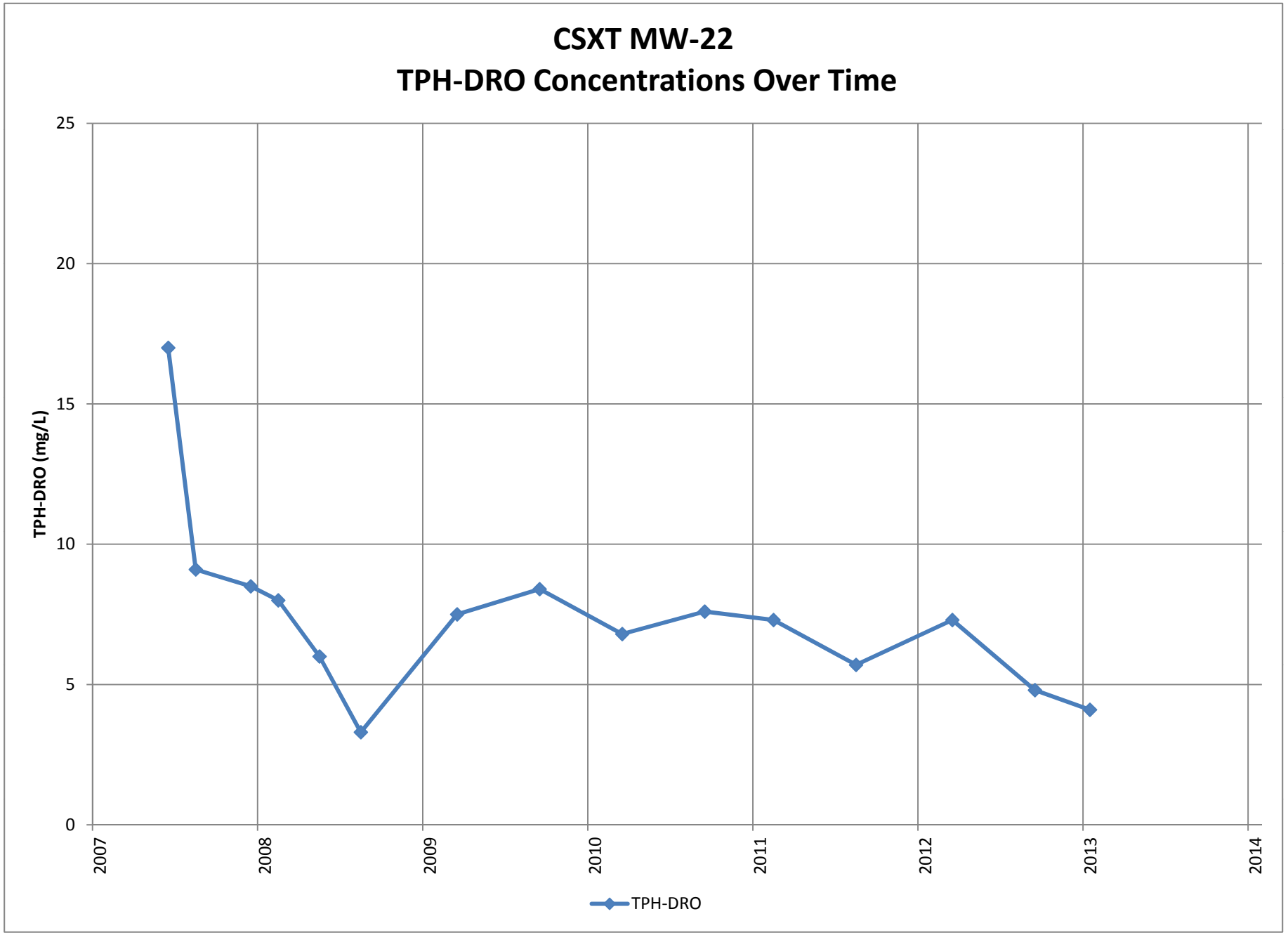
	Location ID	NPS MW-16																		NPS MW-17							
	Sample Date	12/15/2004	3/2/2007	5/25/2007	8/10/2007	11/30/2007	2/29/2008	5/22/2008	5/23/2008	8/12/2008	3/4/2009	9/3/2009	3/9/2010	9/22/2010	2/15/2011	8/9/2011	3/23/2012	9/26/2012	1/16/2013	12/14/2004	3/1/2007	5/24/2007	8/10/2007	11/30/2007	2/27/2008	8/12/2008	1/16/2013
	Sample Type Code	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CAS No	Chemical Name																										
	VOCs (µg/L)																										
71-43-2	Benzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.35 U	< 0.35 U	< 1 U
108-20-3	Diisopropy Ether	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.17 U	< 0.17 U	< 1 U
637-92-3	Ethyl-t-butyl ether (ETBE)	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.6 U	NA	< 5 U	< 5 U*	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.6 U	< 0.6 U	< 1 U
1634-04-4	Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	NA	**0.57**	< 0.28 U	**0.50**	**0.69**	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 10 U	NA	< 0.28 U	< 0.28 U	< 1 U
91-20-3	Naphthalene	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 0.43 U	< 0.43 U	< 1 U
994-05-8	tert-Amyl Methyl Ether (TAME)	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA	NA	< 1 U	< 0.53 U	< 0.53 U	< 1 U
75-65-0	Tert-Butyl Alcohol	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 3.6 U	< 3.6 U	< 20 U	< 5 U	< 5 U*	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA	NA	< 20 U	< 3.6 U	< 3.6 U	< 5 U
108-88-3	Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 0.51 U	< 0.51 U	< 1 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.51 U	< 0.51 U	< 1 U
1330-20-7	Xylenes, Total	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 2 U	< 2 U	< 2 U	< 2 U	< 3 U	< 0.93 U	< 0.93 U	< 10 U
	TPH (mg/L)																										
DROC10-C28	Diesel Range Organics	**1.3**	**1.4**	**1.4**	**1.3**	< 0.097 U	**0.28**	**0.12**	**0.57**	**0.46**	**0.58 B**	**0.88**	**1.9**	**1.5**	**0.53**	**0.91**	**0.96**	**0.56**	**0.280 ***	**0.12**	**0.21**	**0.13**	**0.17**	< 0.097 U	< 0.038 U	< 0.044 U	**0.1 ***
PHC610GRO	Gasoline Range Organics	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	**0.0043**	< 0.0042 U	< 0.0042 U	< 0.0042 U	NA	NA	NA	NA	NA	NA	NA	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.0042 U	< 0.0042 U	< 0.05 U

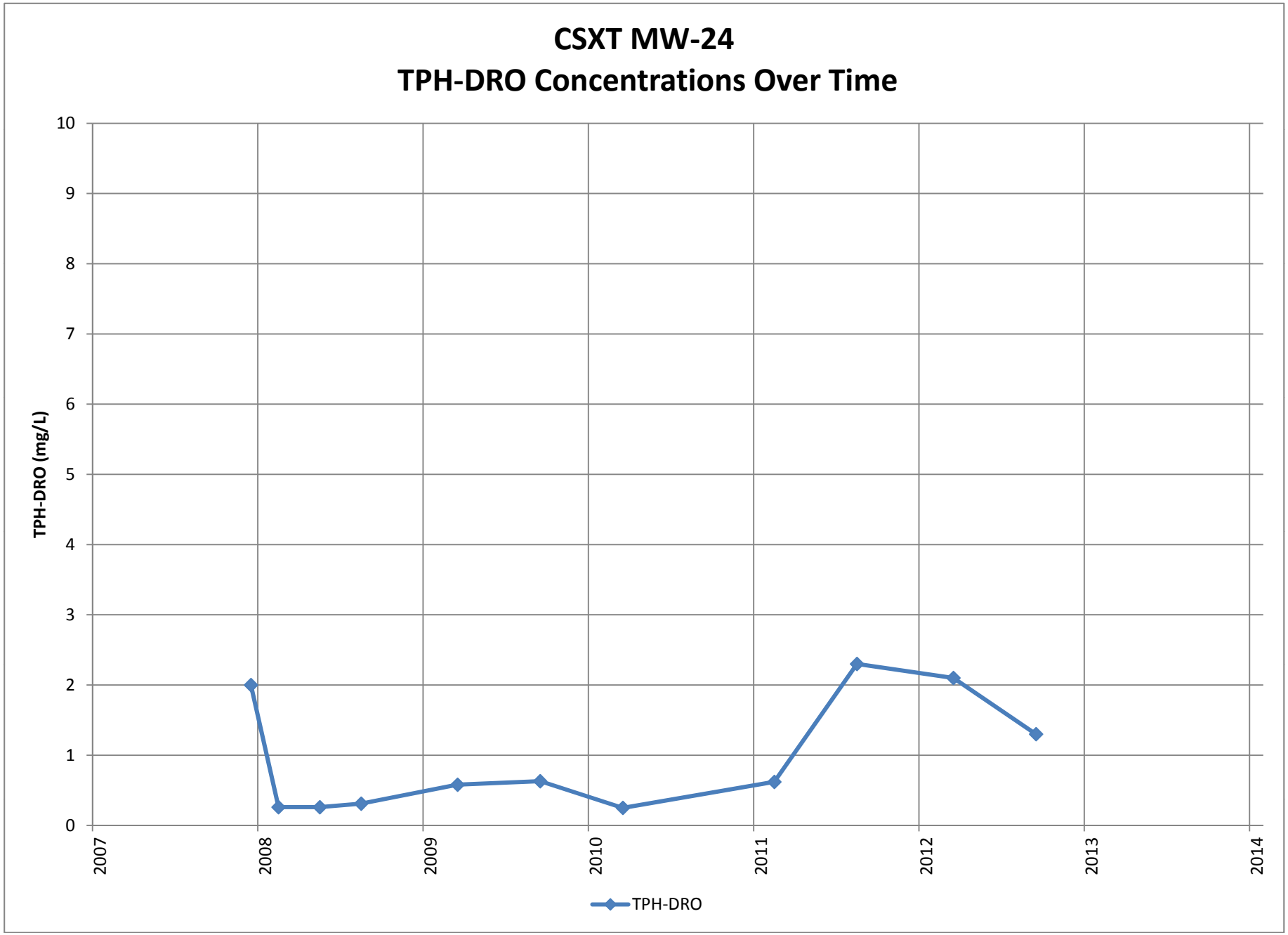
Notes:

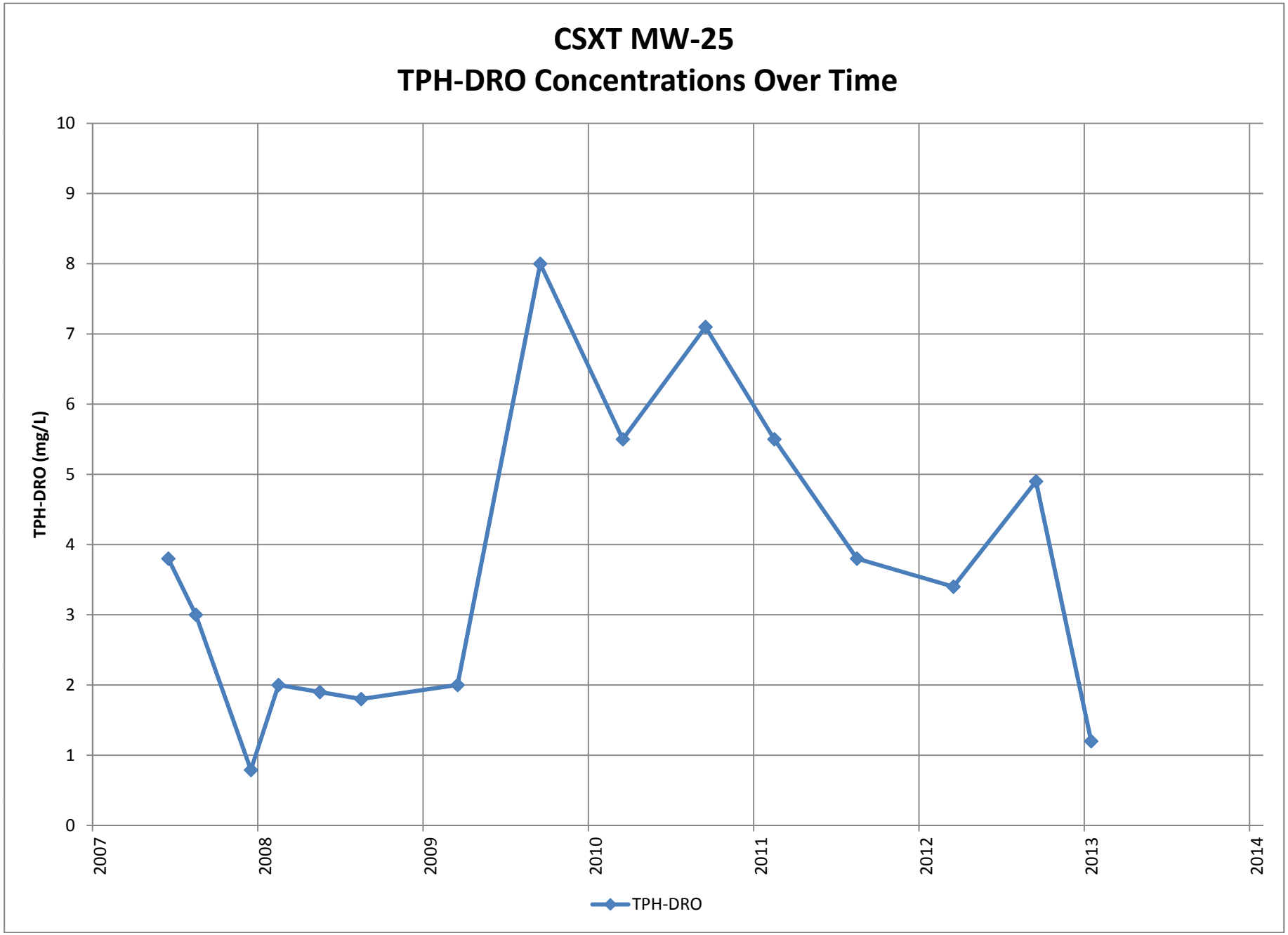
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compounds
<1U - Concentration is less than the reporting limit
mg/L - milligrams per liter
ug/L - micrograms per liter
NA - Not Analyzed
J - Concentration is estimated
B - Constituent was detected in a laboratory method blank

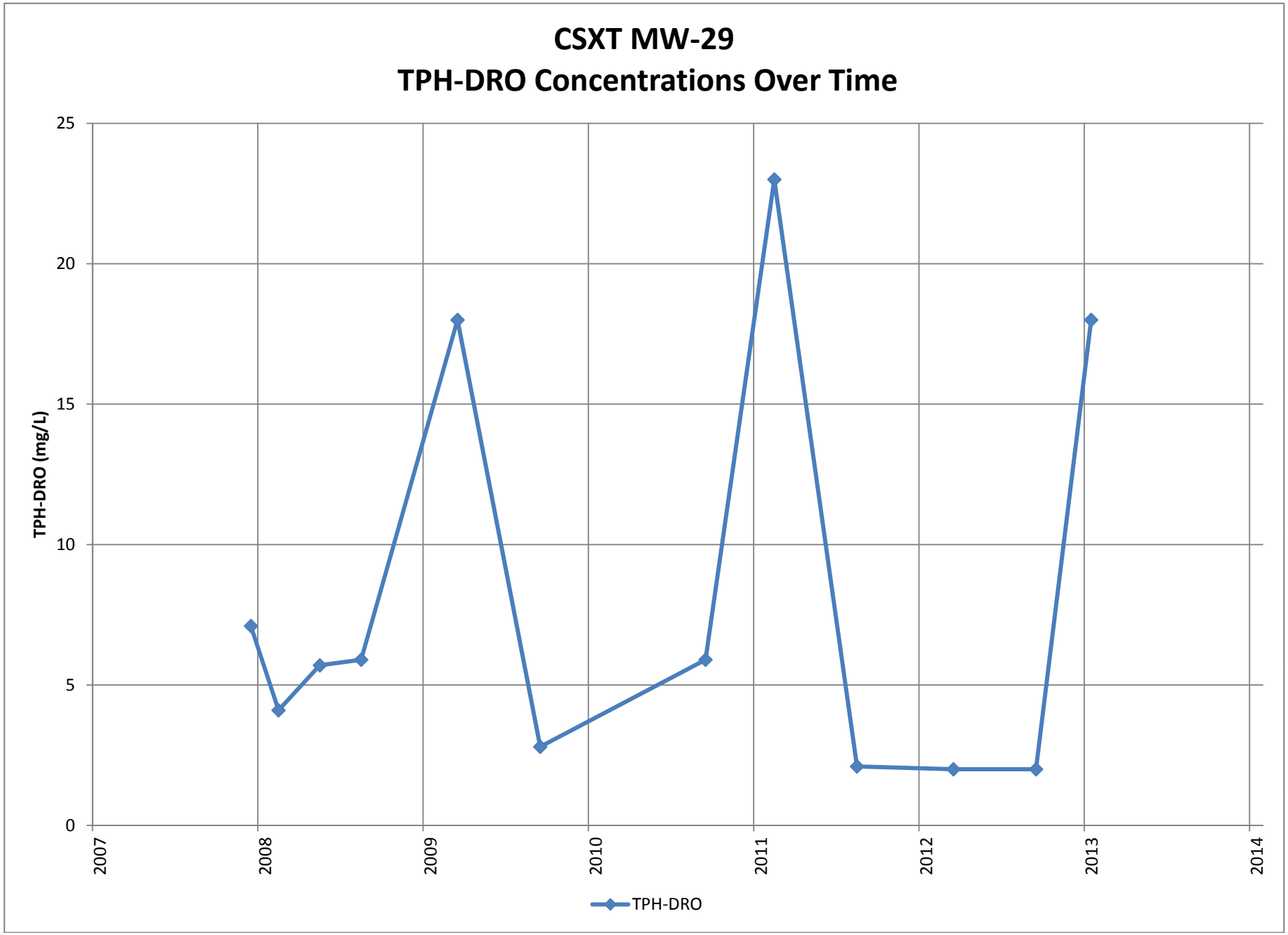

CSXT MW-3
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

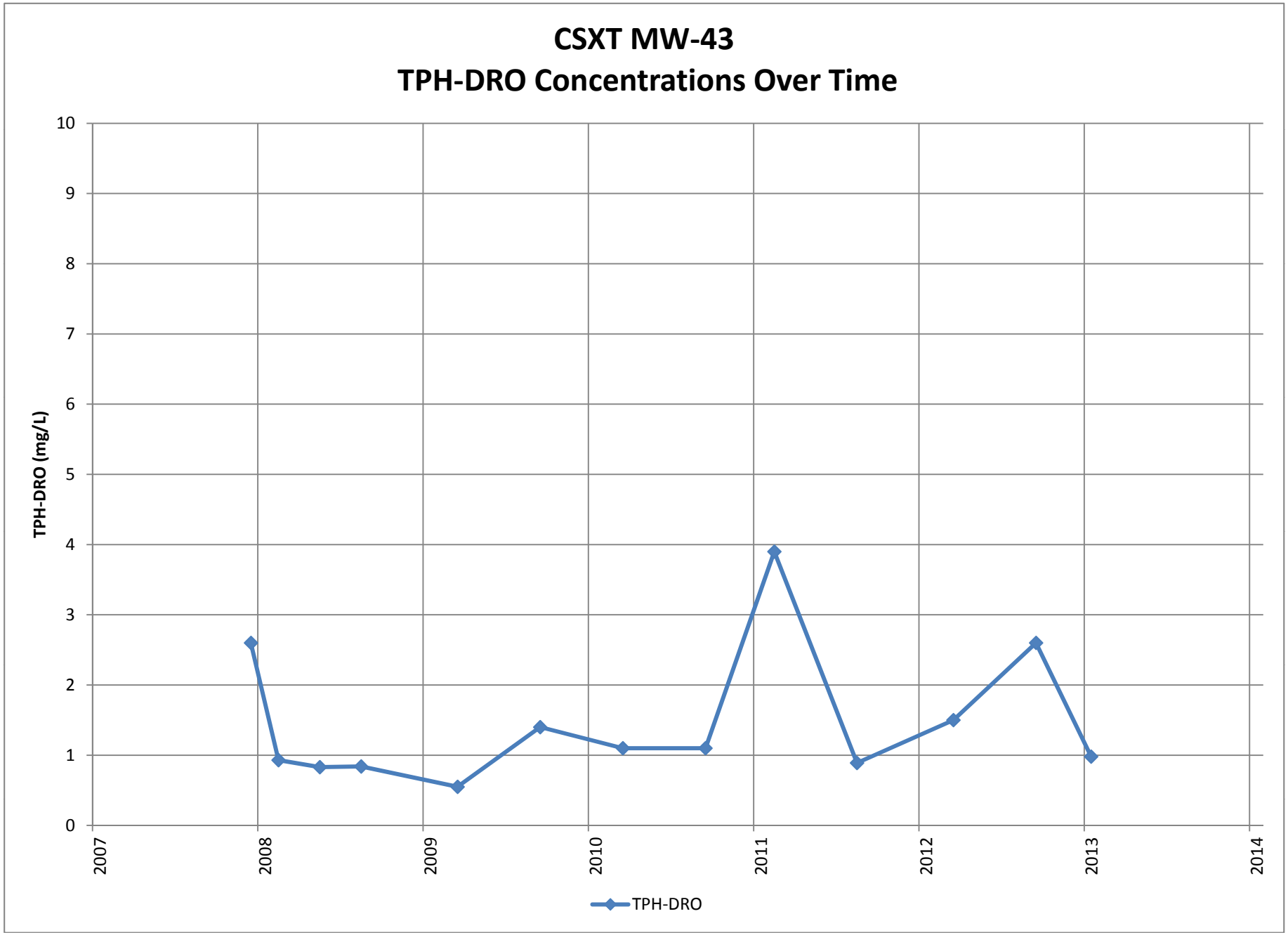

CSXT MW-6/6R
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
300
250
200
150
100
50
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Replacement well installed in 2004
TPH-DRO

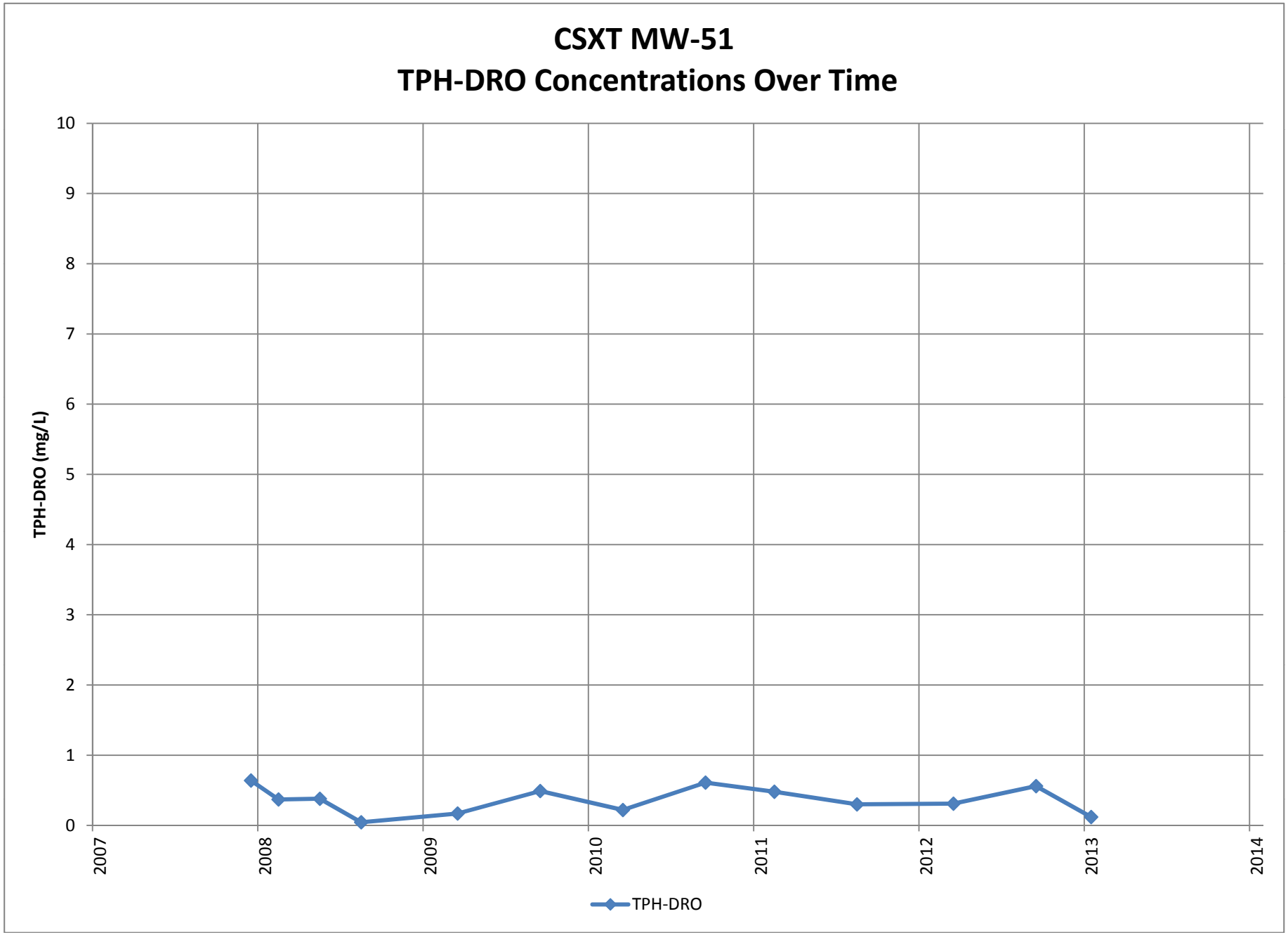

CSXT MW-22
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
25
20
15
10
5
0
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

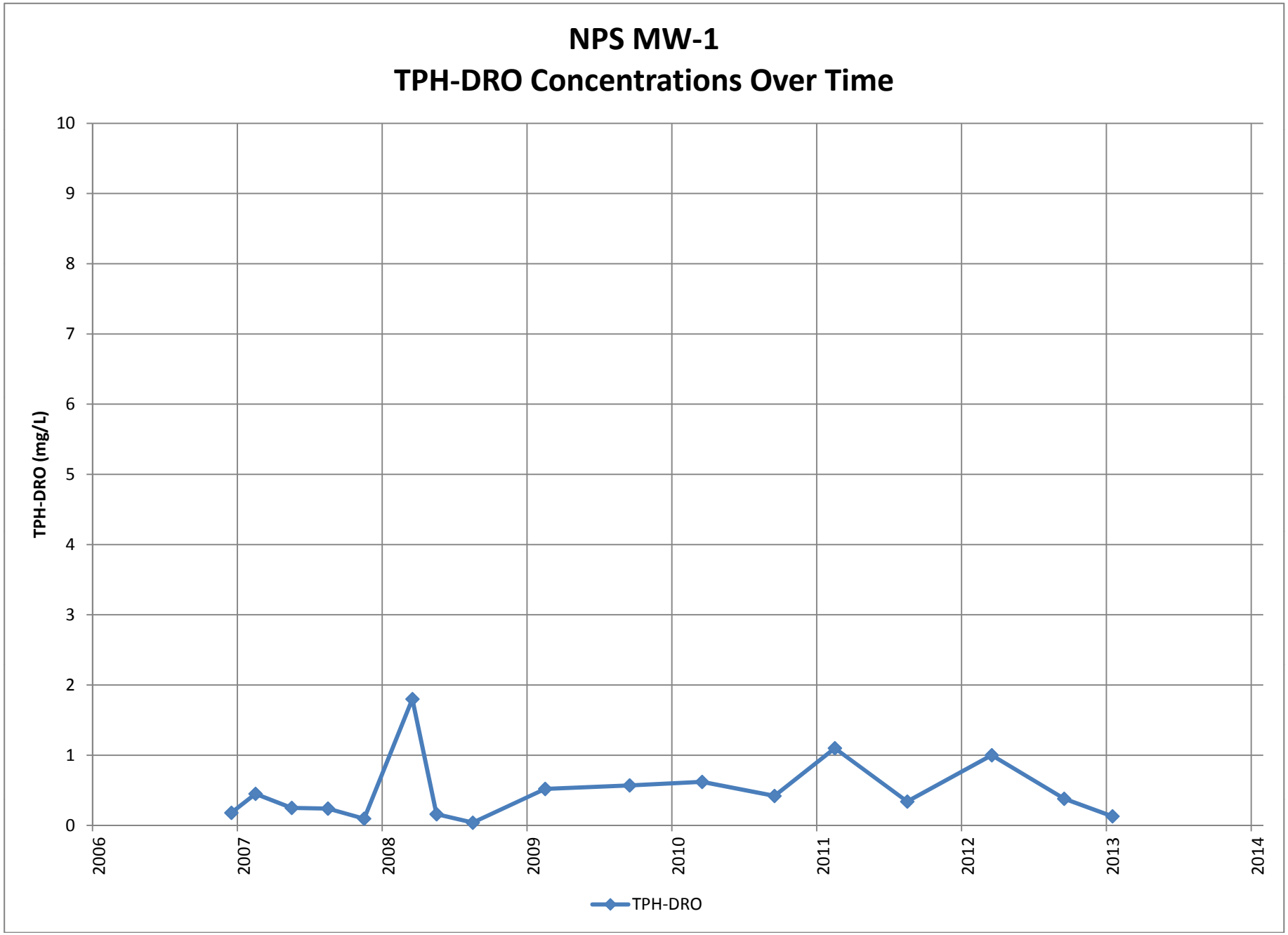

CSXT MW-24
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

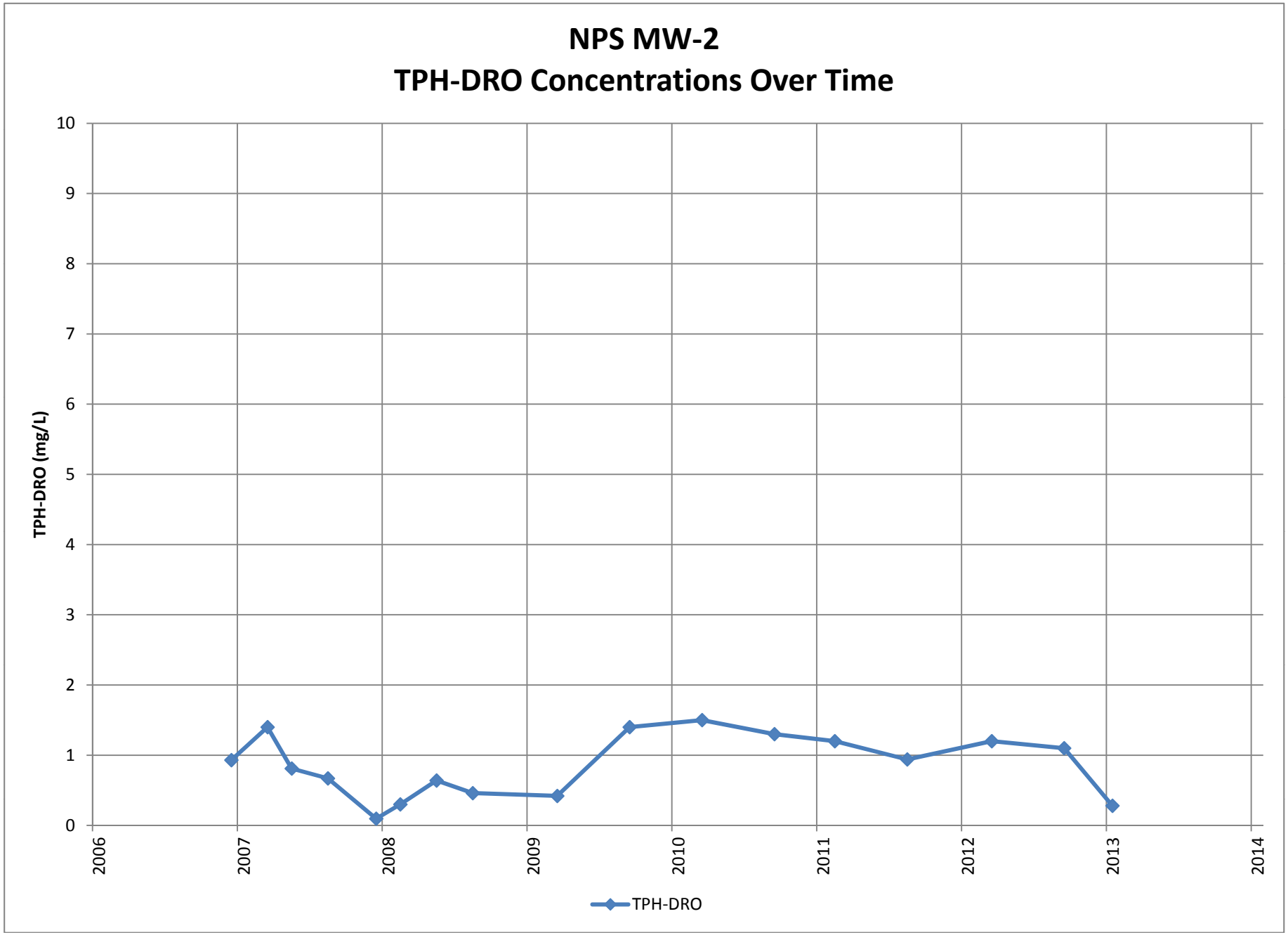

CSXT MW-25
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

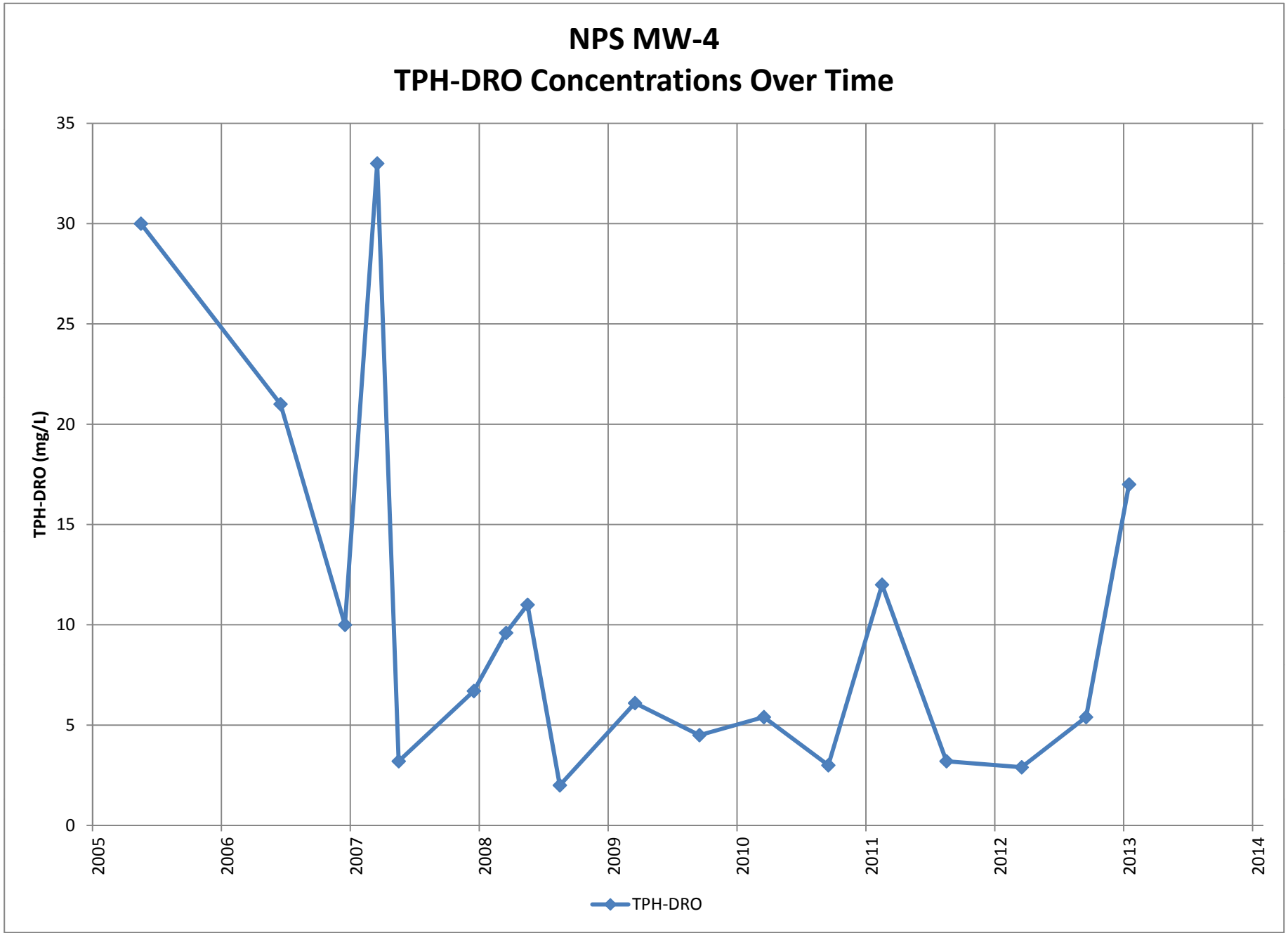

CSXT MW-29
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
25
20
15
10
5
0
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

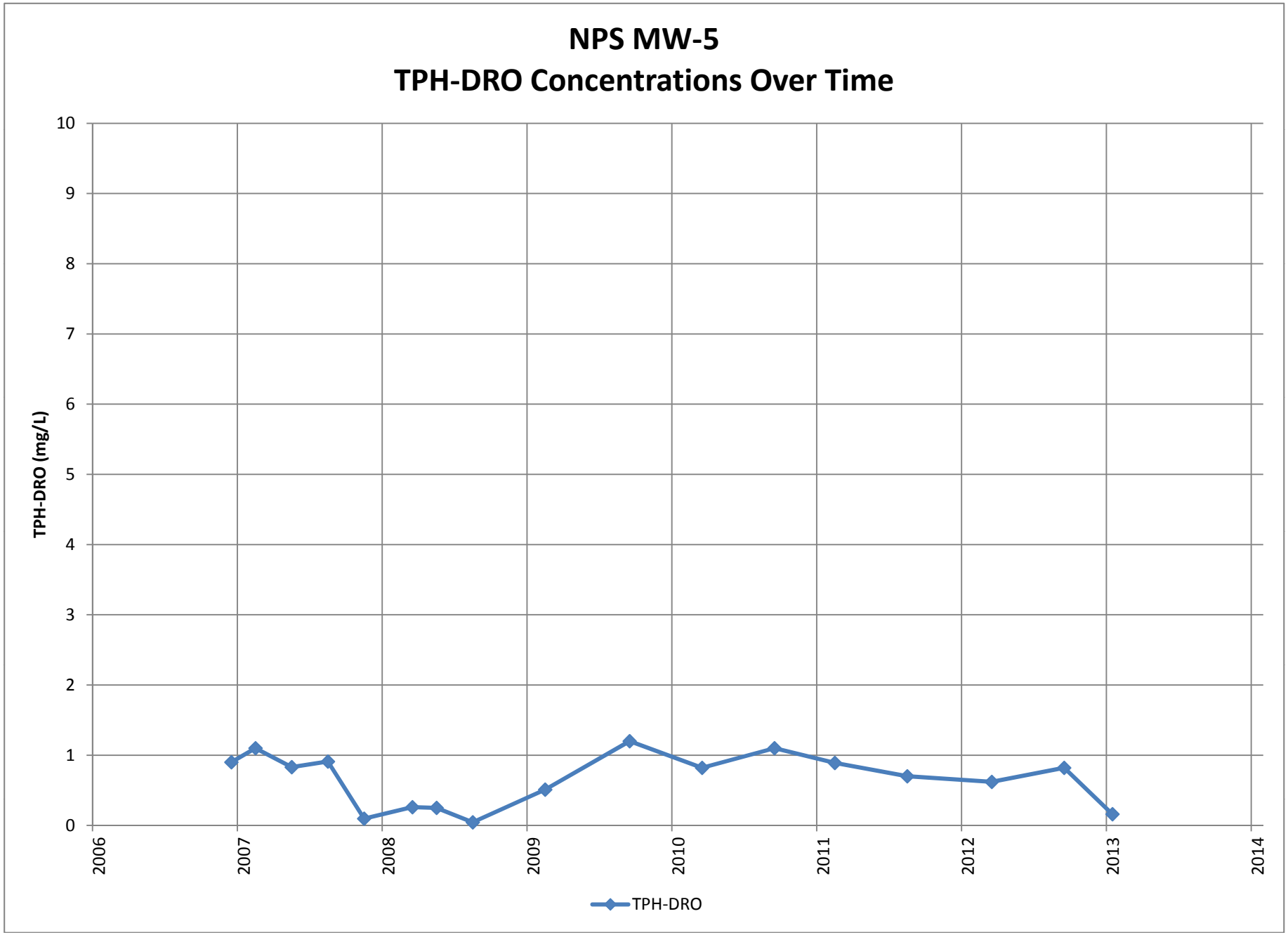

CSXT MW-43
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

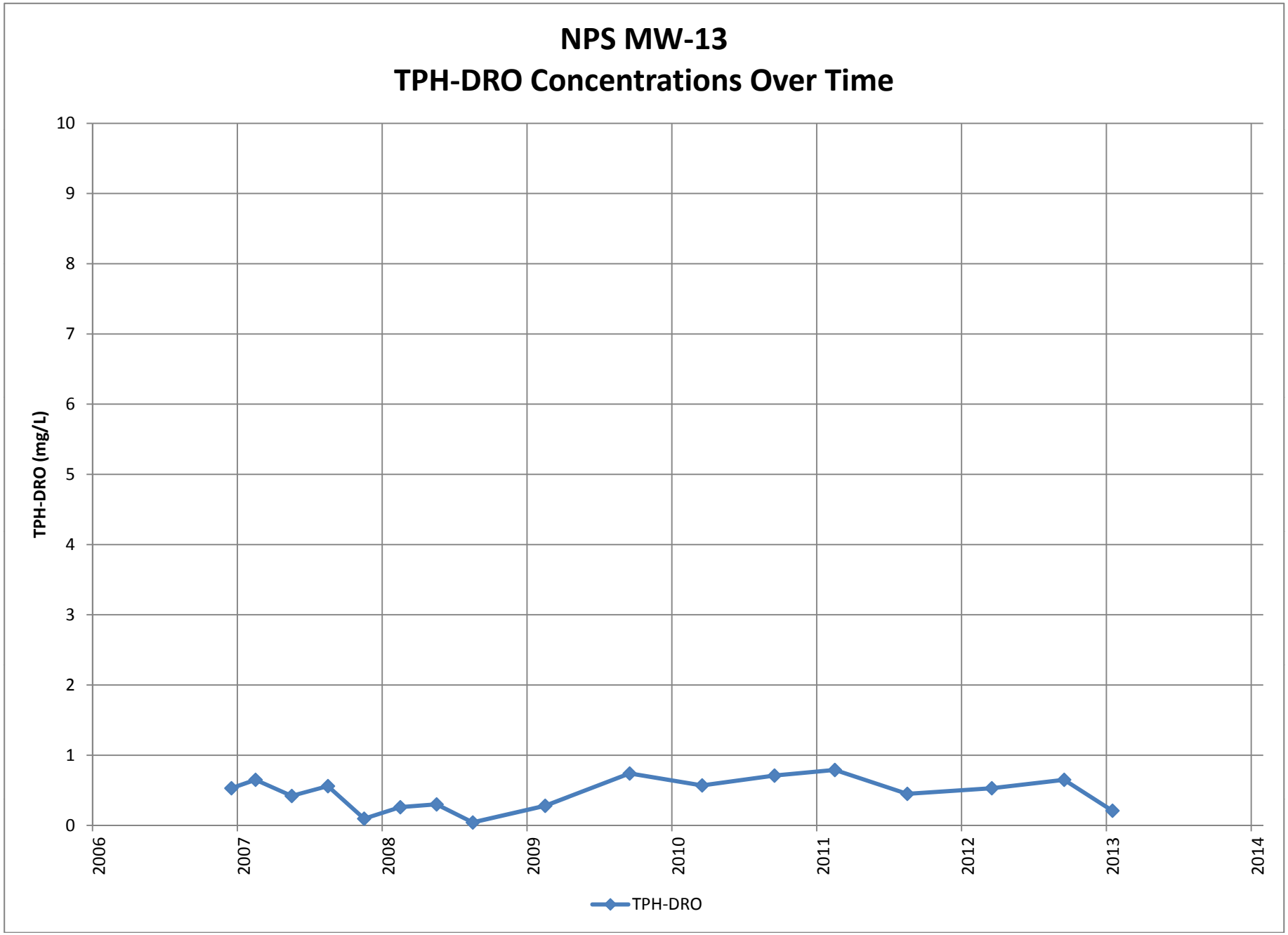

CSXT MW-51
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

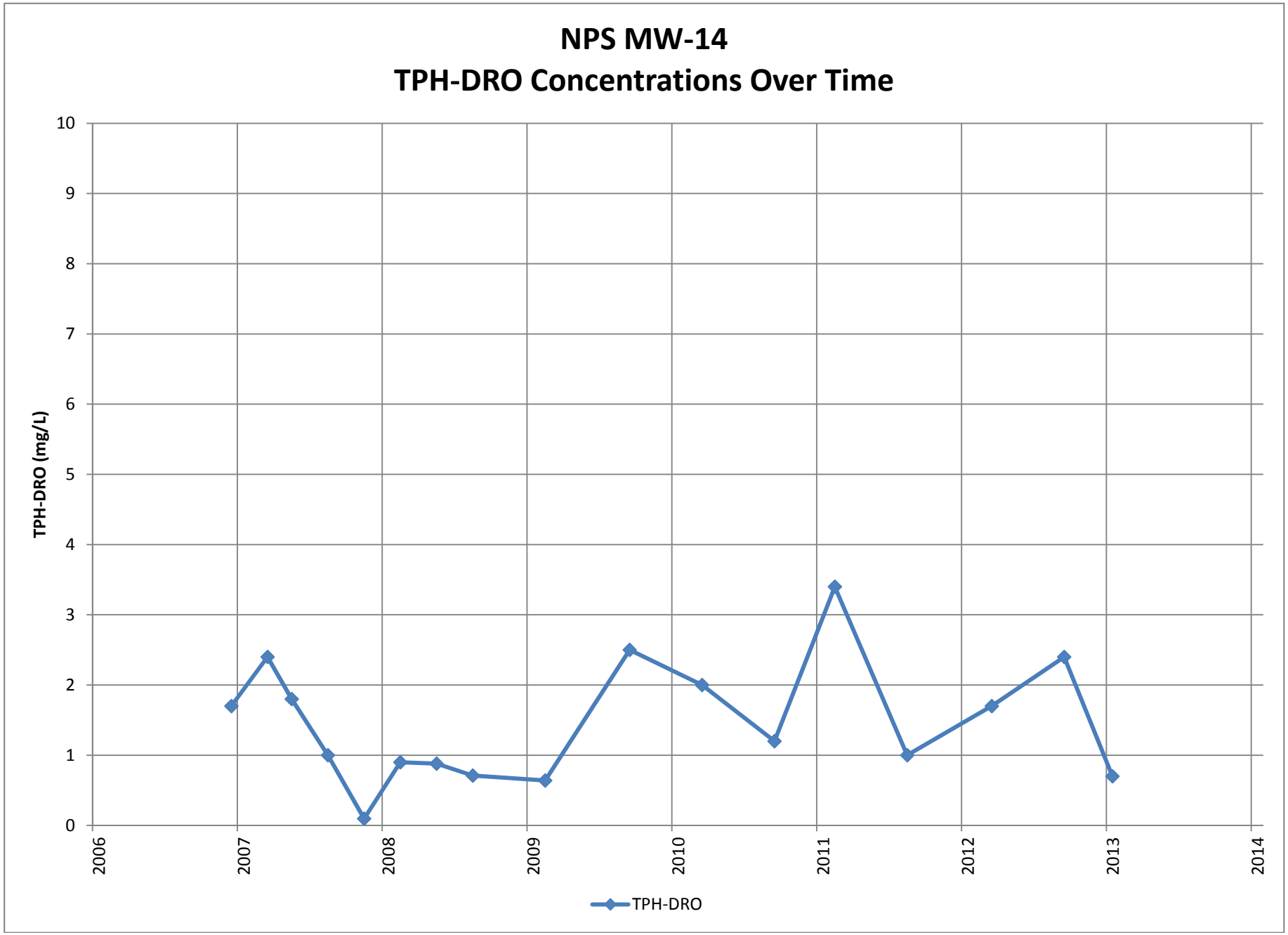

NPS MW-1
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

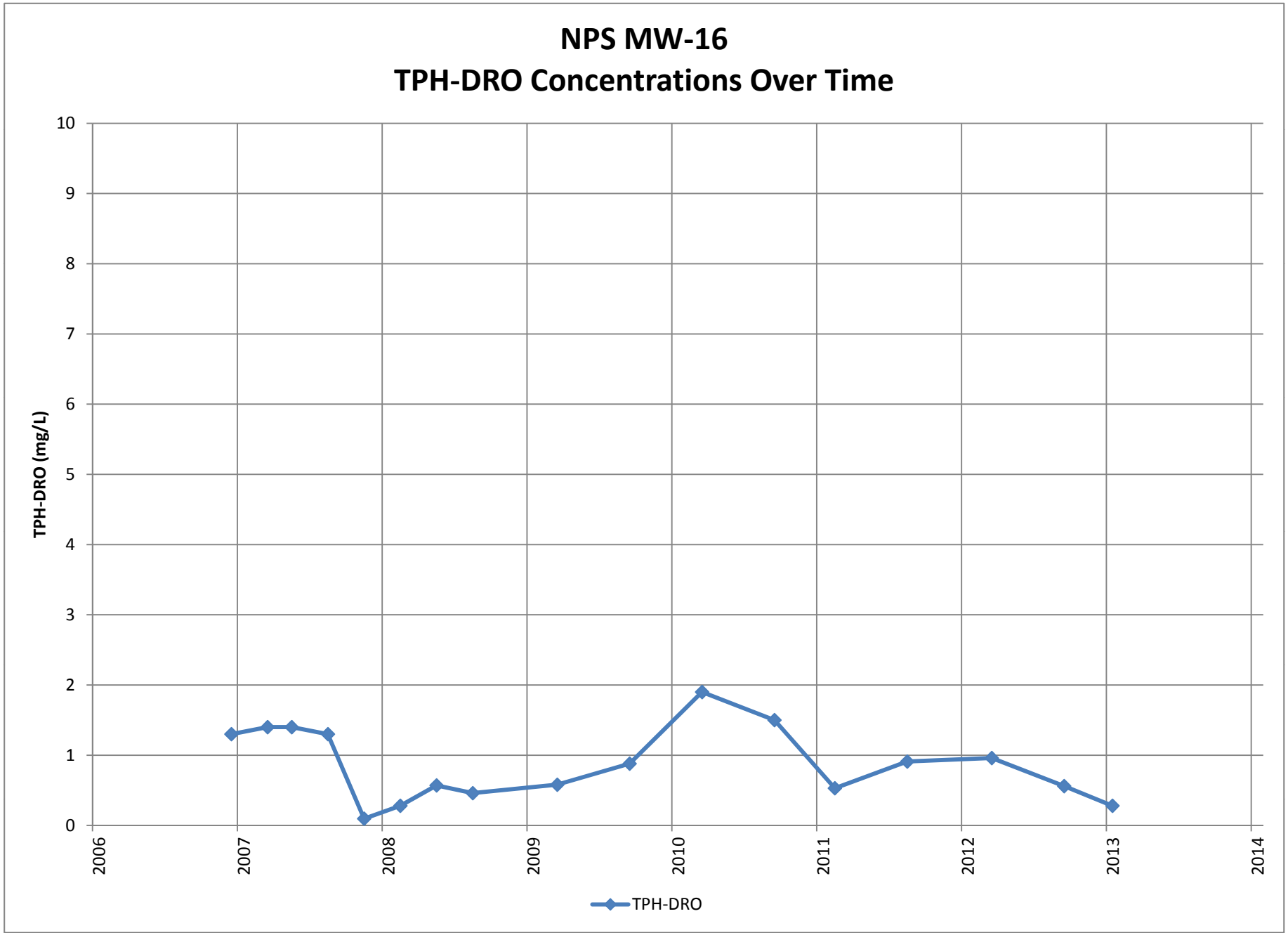

NPS MW-2
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO


NPS MW-4
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
35
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO


NPS MW-5
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO


NPS MW-13
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO


NPS MW-14
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO


NPS MW-16
TPH-DRO Concentrations Over Time
TPH-DRO (mg/L)
10
9
8
7
6
5
4
3
2
1
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
TPH-DRO

Appendix D

LPH Recovery Data

Appendix D
LPH Recovery Data
C and O Canal/Brunswick Rail Yard, Brunswick, Maryland

First Quarter 2013 LPH Recovery by Recovery Method		
LPH Recovery Method	**LPH Recovered January-March, 2013* (gallons)**	**Cumulative LPH Recovered Since July 2009* (gallons)**
Skimmer pumps	22.582	568.219
Passive skimmers	1.282	58.798
Peristaltic pump	2.948	73.321
Absorbent Sock	1.610	20.010
Totals:	**28.422**	**720.348**

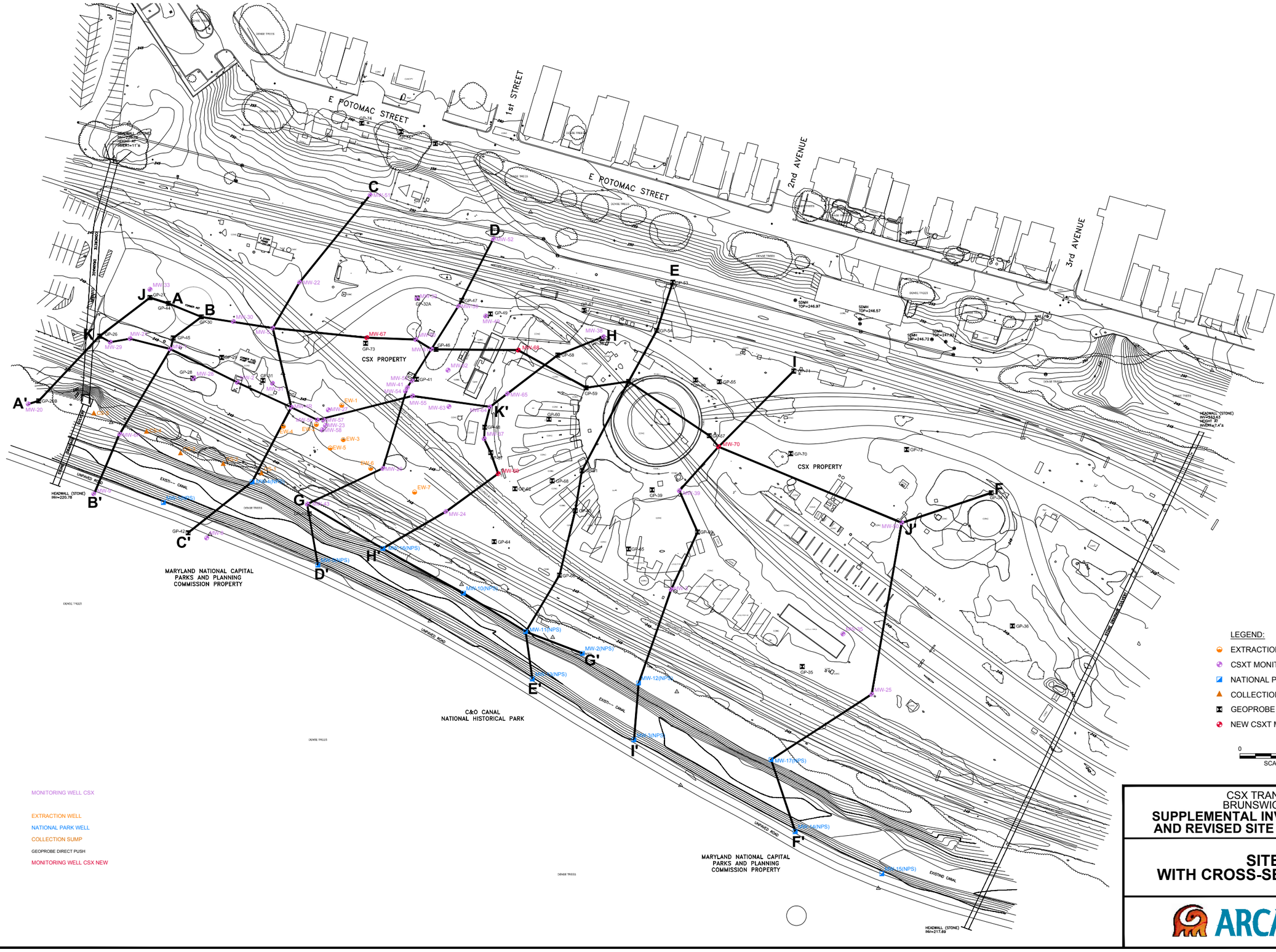
*Data are summarized for January 1 - March 1, 2013

First Quarter 2013 LPH Recovery with Skimmer Pump Systems				
Well	**Pump Installed**	**LPH Recovered January-March 2013* (gallons)**	**Cumulative LPH Recovery Since July 2009 (gallons)**	**Notes**
MW-38	7/15/2009	0.000	55.740	No skimmer pump
MW-41	9/2/2010	8.299	66.780	Pump operational
MW-53	7/14/2009	2.992	112.407	Pump operational
MW-54	9/2/2010	2.992	56.408	Pump operational
MW-55	12/16/2009	5.790	150.516	Pump operational
MW-56	11/5/2009	2.509	98.786	Pump operational
MW-57	12/29/2009	0.000	27.582	No skimmer pump
Totals:			**568.219**	

*Data are summarized for January 1 - March 1, 2013

Appendix E

Geologic Cross Sections



CSX TRANSPORTATION
BRUNSWICK, MARYLAND

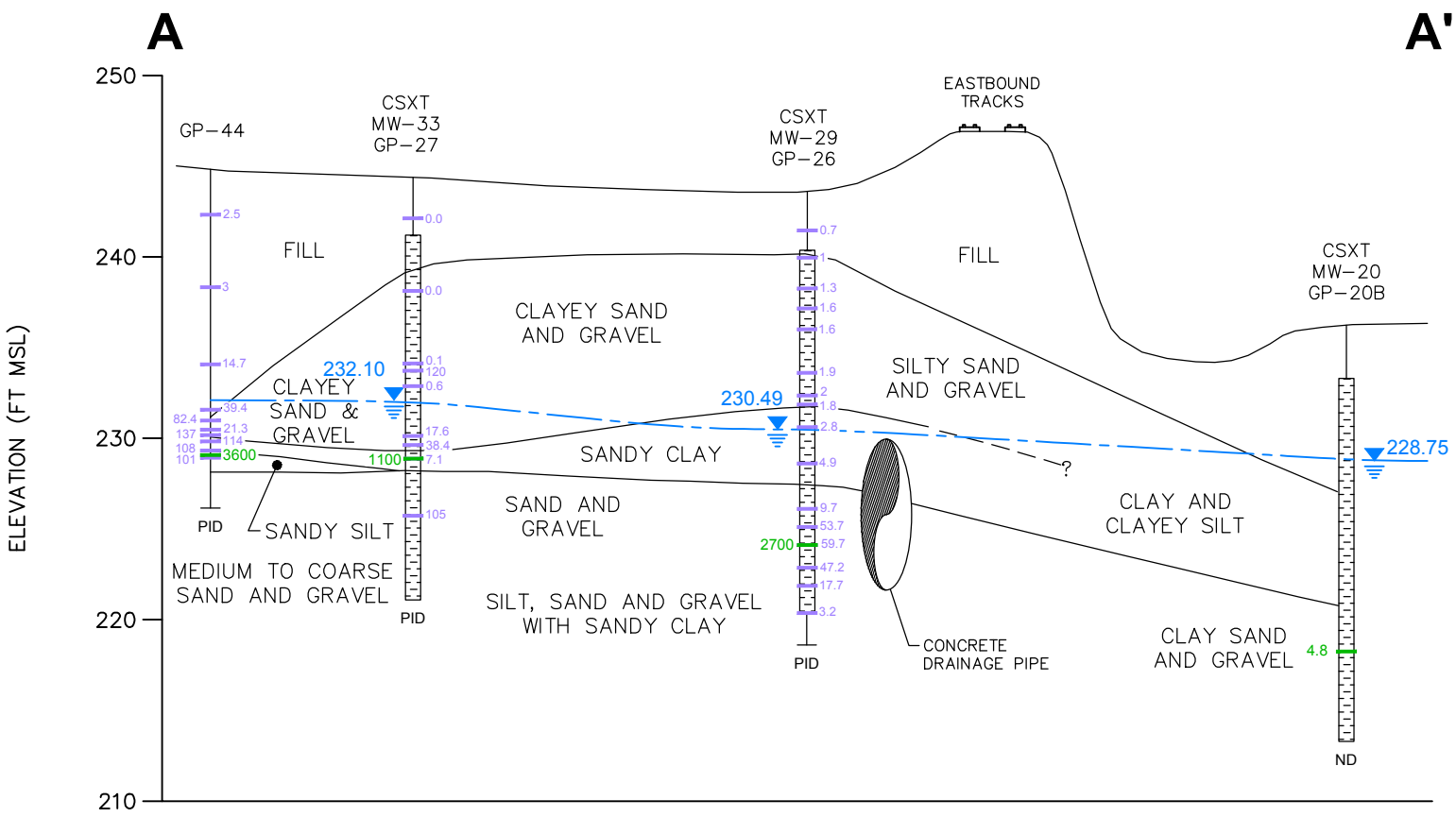
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SITE PLAN WITH CROSS-SECTION LOCATION

ARCADIS

FIGURE
E-1

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-2 SAVED: 4/5/2013 9:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:10 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----



HORIZONTAL SCALE: FEET
0 20 40

VERTICAL SCALE: FEET
0 5 10

LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

101 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

2700 — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

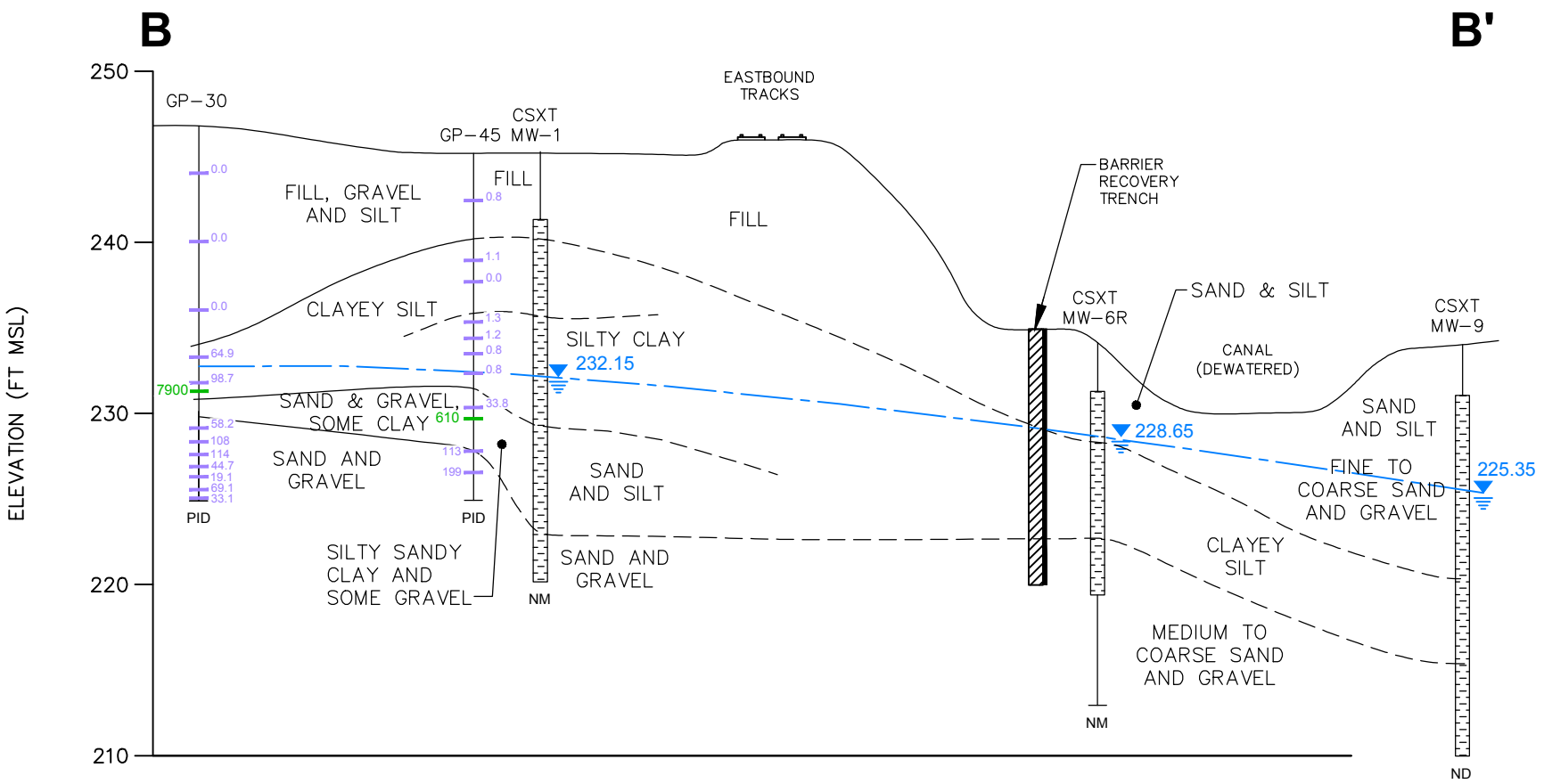
CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION A-A'

ARCADIS

FIGURE
E-2

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-3 SAVED: 4/5/2013 9:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:09 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----



0 20 40
HORIZONTAL SCALE: FEET
0 5 10
VERTICAL SCALE: FEET

LEGEND:

GROUNDWATER ELEVATION
(FT AMSL, JANUARY 11, 2013)

33.1 — SOIL SCREENING CONCENTRATION, PPM
(PHOTOIONIZATION DETECTOR [PID],
FLAME IONIZATION DETECTOR [FID],
ORGANIC VAPOR ANALYZER [OVA])

610 — TOTAL PETROLEUM HYDROCARBON DIESEL
RANGE ORGANICS (TPH-DRO)
CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION B-B'

ARCADIS

FIGURE
E-3

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-4 SAVED: 4/5/2013 9:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:09 PM BY: SANCHEZ, ADRIAN
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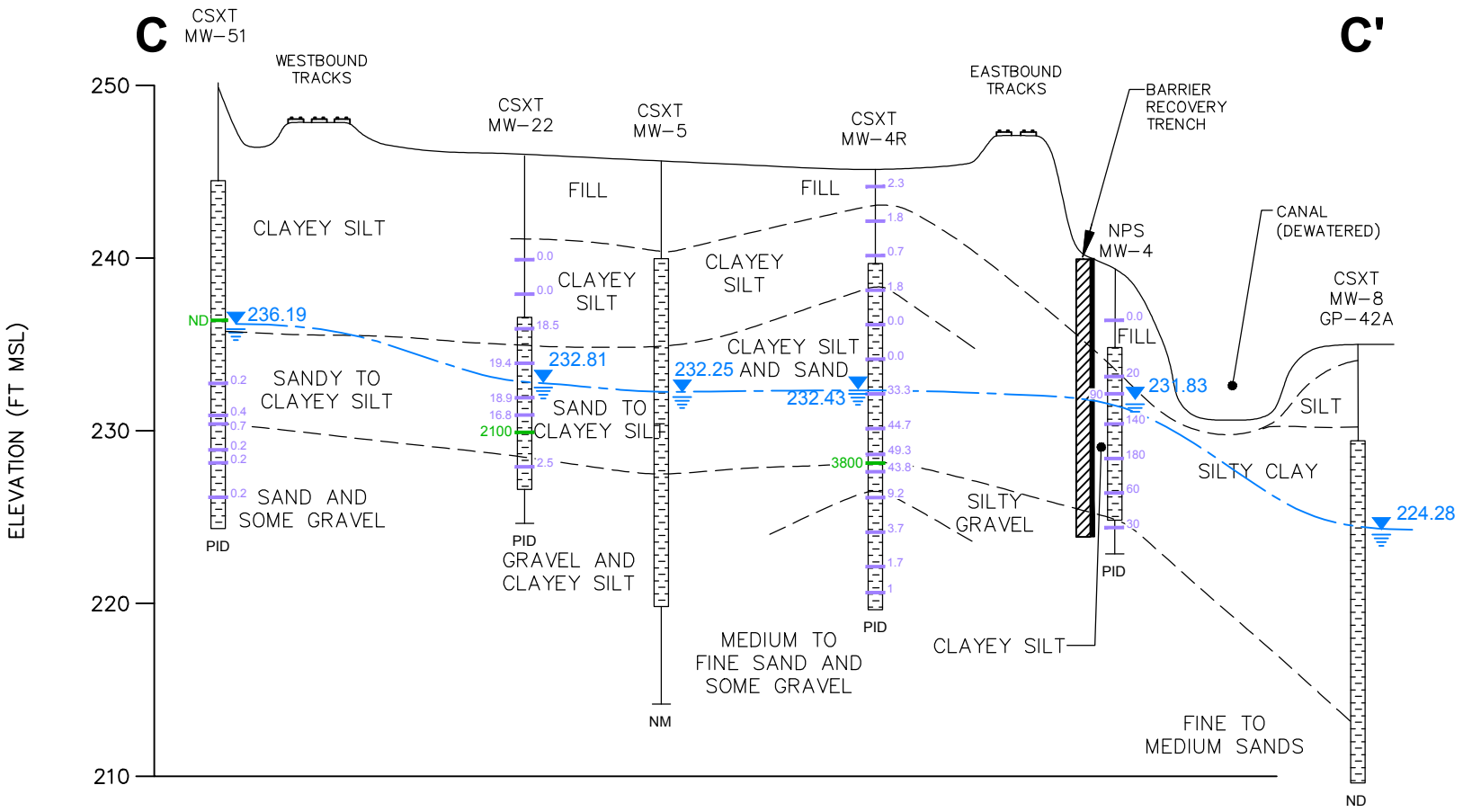


LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

2.5 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

2100 — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

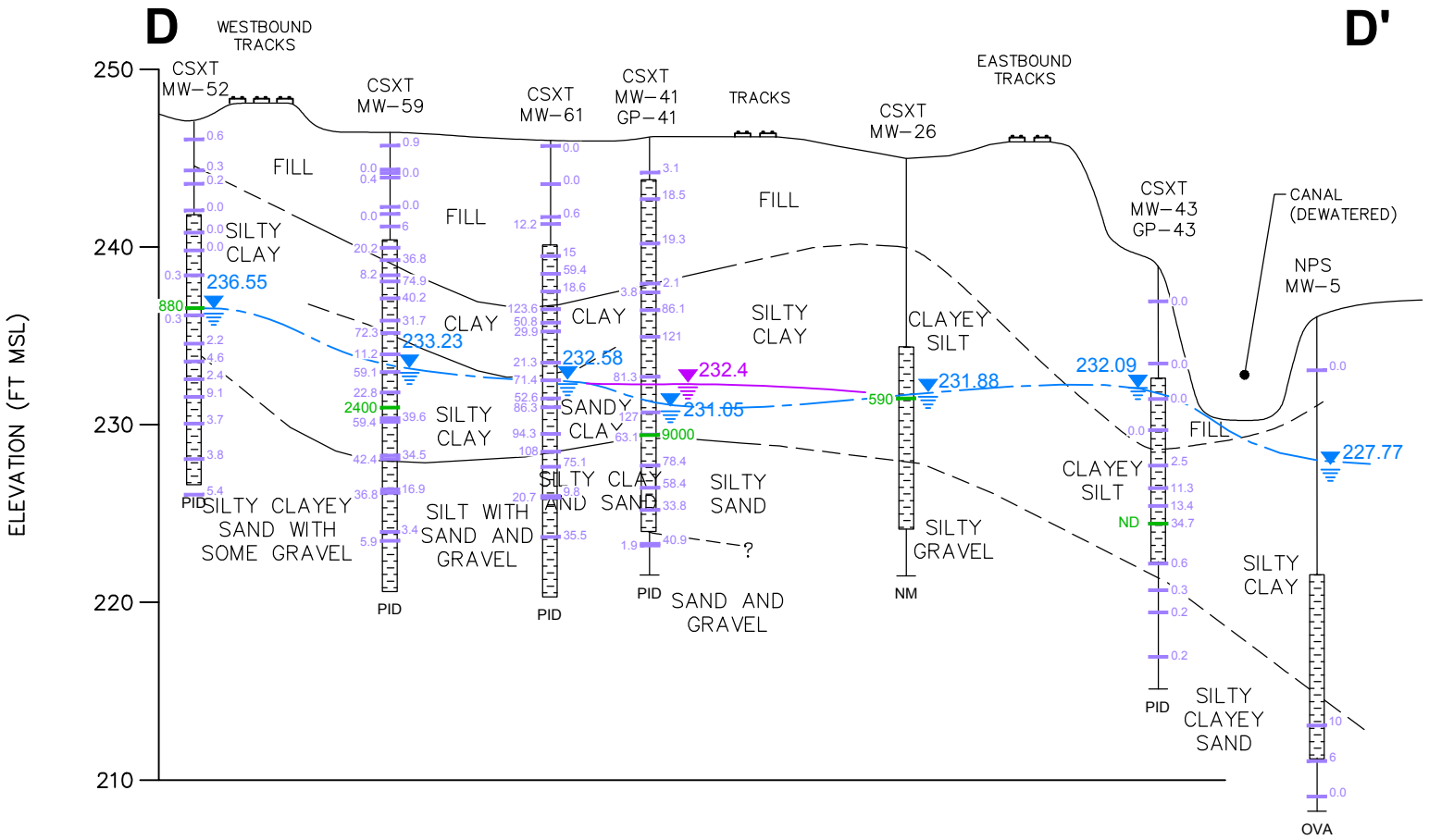
CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION C-C'

ARCADIS

FIGURE
E-4

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-5 SAVED: 4/5/2013 9:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:09 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----



LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

LIQUID PHASE HYDROCARBON ELEVATION (FT AMSL, JANUARY 11, 2013)

5.9 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

880 — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

0 40 80
HORIZONTAL SCALE: FEET
0 5 10
VERTICAL SCALE: FEET

NOTES:

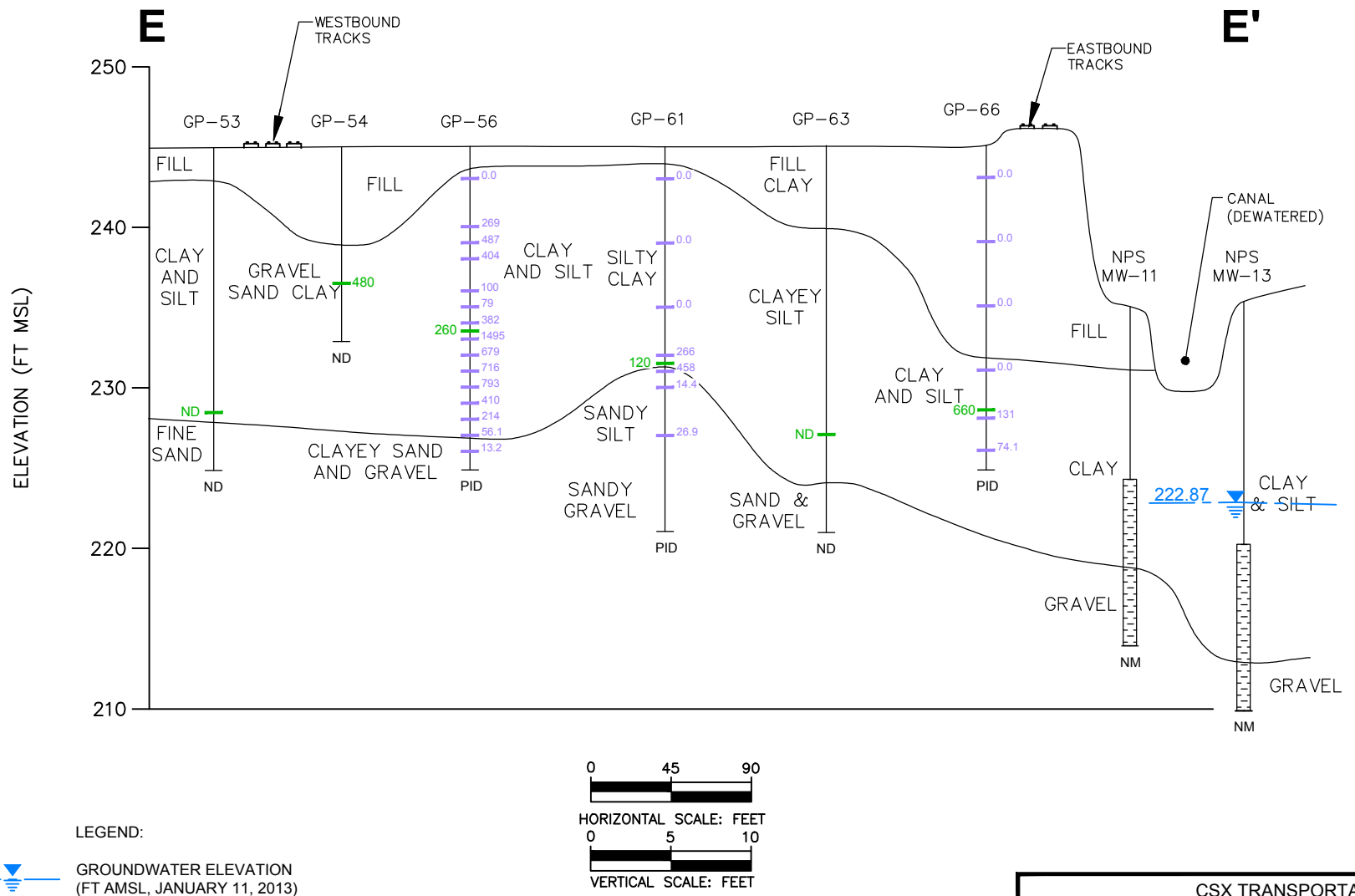
1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION D-D'

ARCADIS

FIGURE
E-5



0 45 90
HORIZONTAL SCALE: FEET
0 5 10
VERTICAL SCALE: FEET

LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

382 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

480 — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

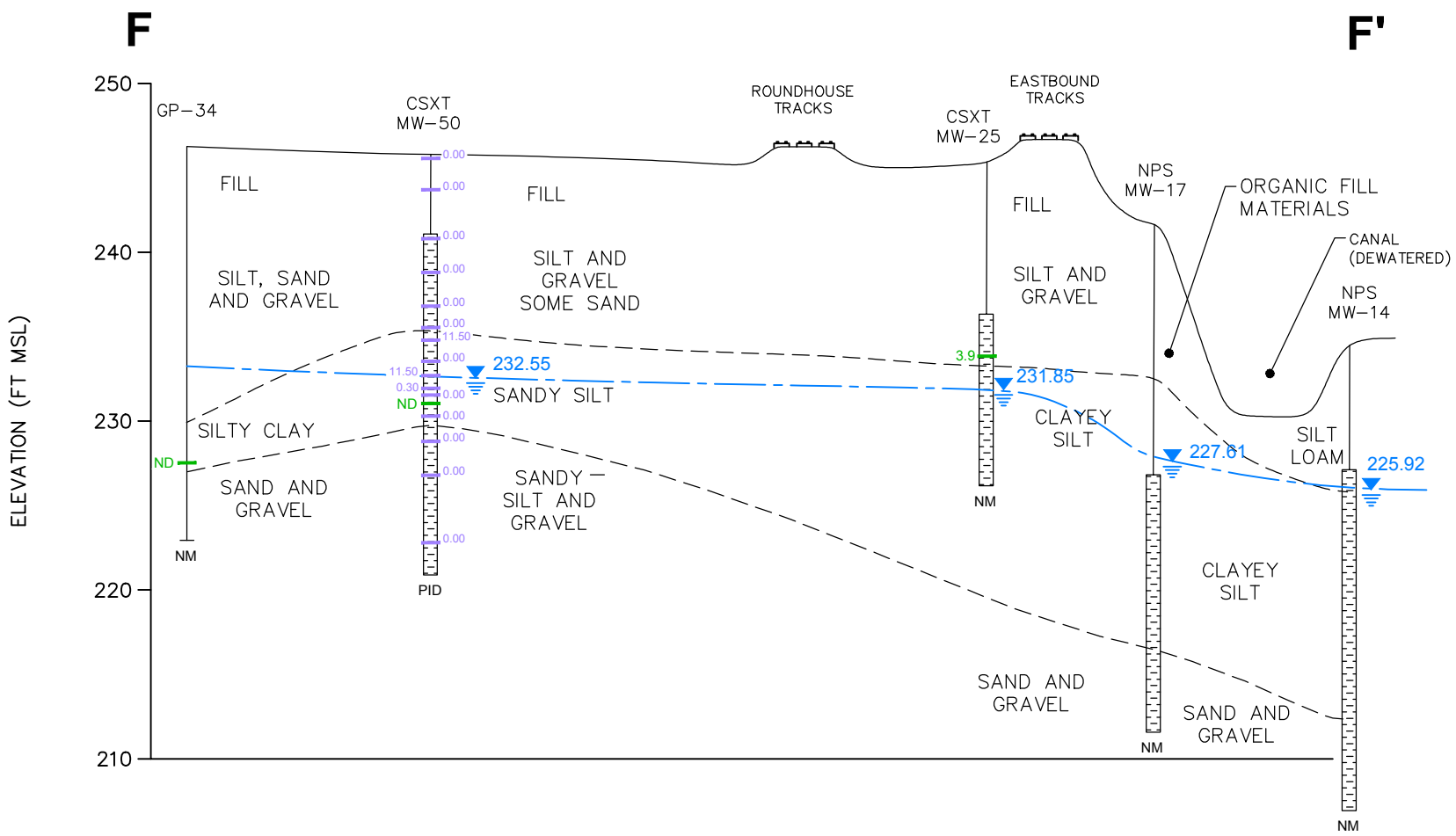
CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION E-E'

ARCADIS

FIGURE
E-6

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-7 SAVED: 4/5/2013 9:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:09 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----



LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

0.0 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

3.9 — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

0 40 80
HORIZONTAL SCALE: FEET
0 5 10
VERTICAL SCALE: FEET

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

CSX TRANSPORTATION
BRUNSWICK, MARYLAND

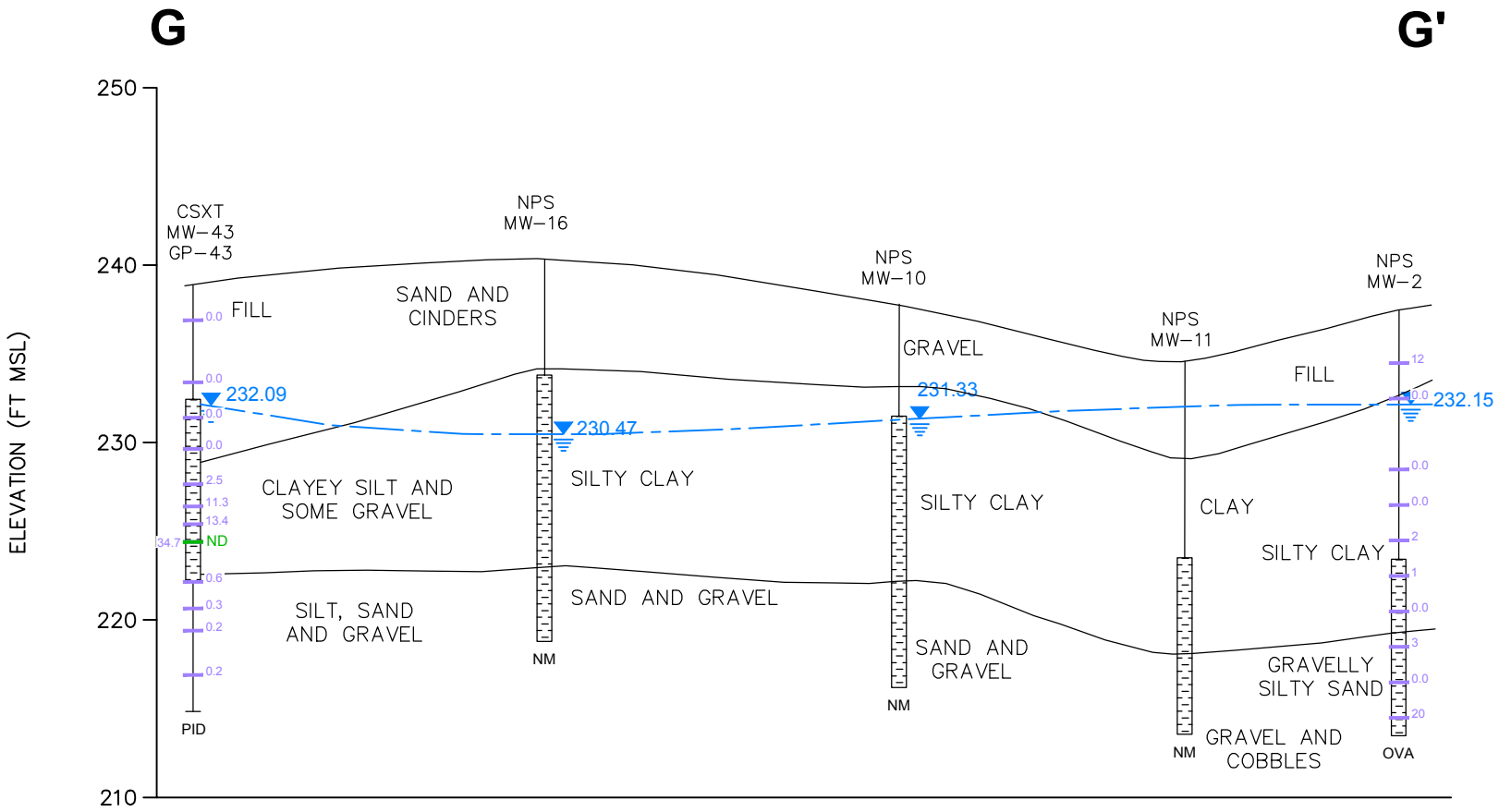
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION F-F'

ARCADIS

FIGURE
E-7

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-8 SAVED: 4/5/2013 9:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:08 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----



LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

11.3 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

ND — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

0 30 60
HORIZONTAL SCALE: FEET
0 5 10
VERTICAL SCALE: FEET

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

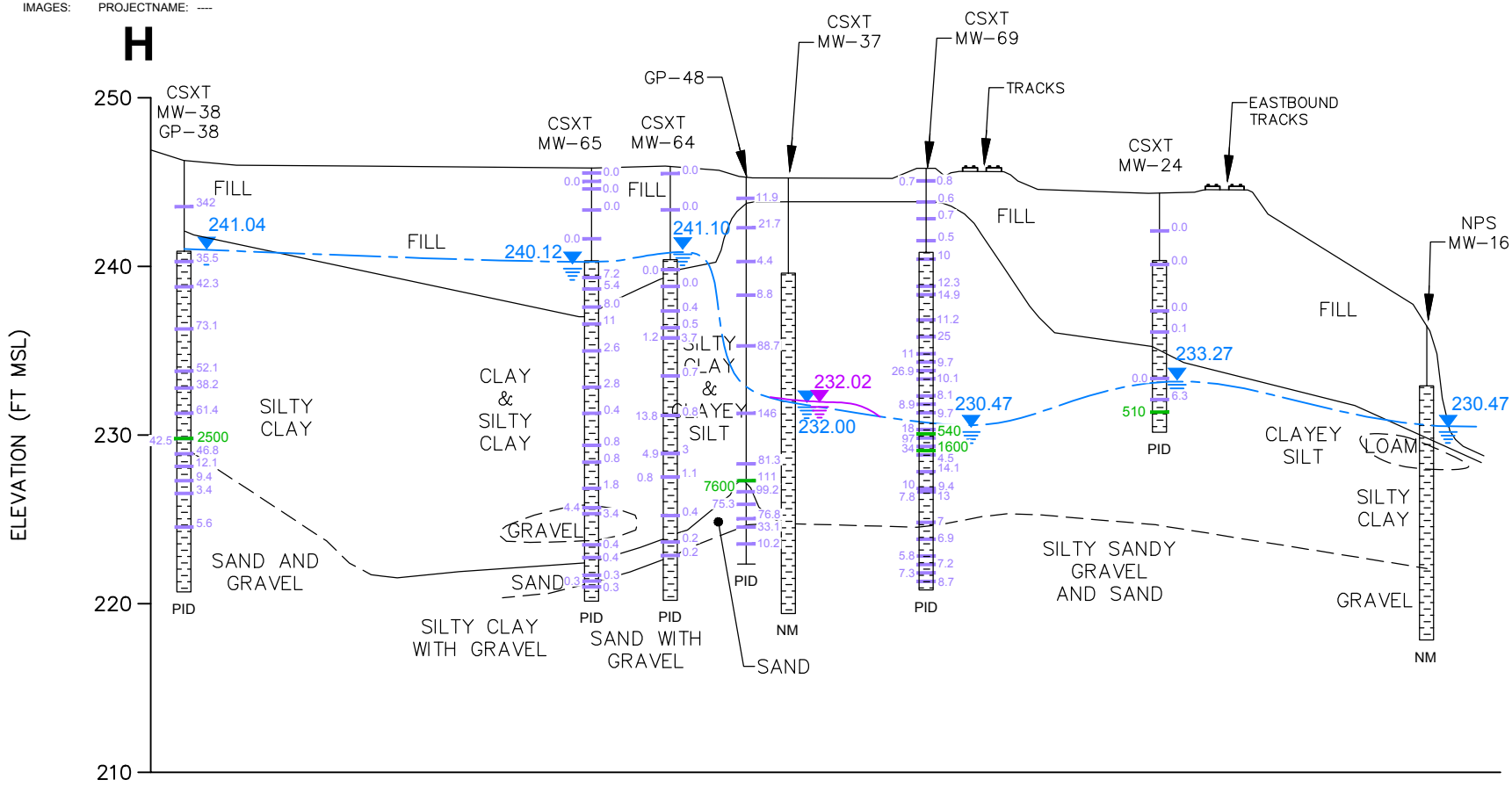
CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION G-G'

ARCADIS

FIGURE
E-8

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\MD000843\0011\00006\MD843_11_6 FB02-BC09.dwg LAYOUT: B-9 SAVED: 4/5/2013 4:10 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/9/2013 2:51 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----



LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

LIQUID PHASE HYDROCARBON ELEVATION (FT AMSL, JANUARY 11, 2013)

61.4 — SOIL SCREENING CONCENTRATION, PPM (PHOTOIONIZATION DETECTOR [PID], FLAME IONIZATION DETECTOR [FID], ORGANIC VAPOR ANALYZER [OVA])

2500 — TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

HORIZONTAL SCALE: FEET
0 30 60

VERTICAL SCALE: FEET
0 5 10

NOTES:

1. ND = PID/FID/OVA READING AT 0.0 PPM, DURING BORING
2. NM = PID/FID/OVA READINGS NOT COLLECTED DURING BORING
3. PPM = PARTS PER MILLION

CSX TRANSPORTATION
BRUNSWICK, MARYLAND

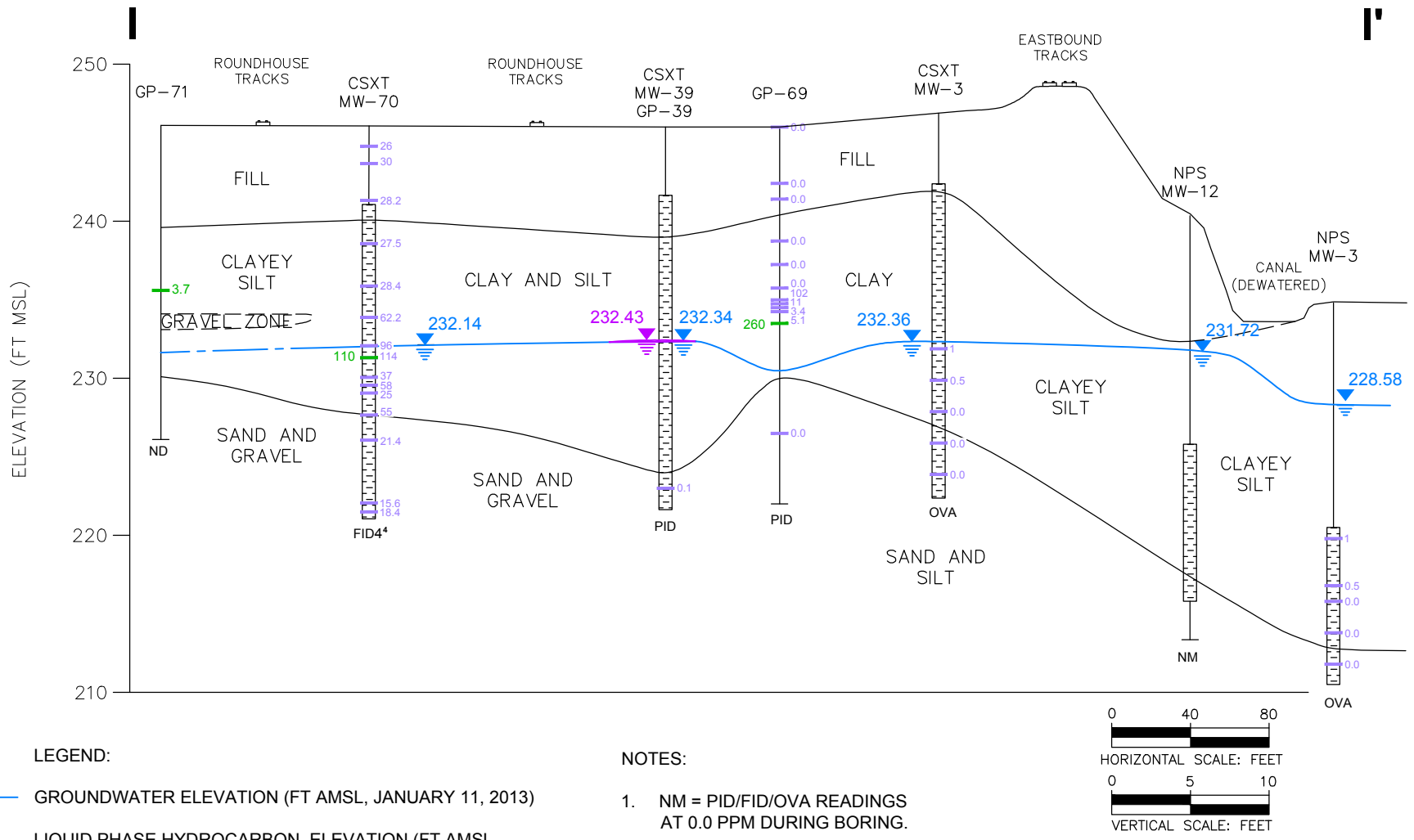
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION H-H'

ARCADIS

FIGURE
E-9

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\HOUSTON\RETURN-TO\Syracuse-NY\MD000843\0011\00006\MD843_11_6 FC10-C12.dwg LAYOUT: B-10 SAVED: 4/5/2013 4:31 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:32 PM BY: INNISS, HAYDEN
XREFS: IMAGES: PROJECTNAME: ----



LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

LIQUID PHASE HYDROCARBON ELEVATION (FT AMSL, JANUARY 11, 2013)

SELECTED SOIL SCREENING CONCENTRATION, PPM:
5.10 PHOTOIONIZATION DETECTOR [PID]
5.10 FLAME IONIZATION DETECTOR [FID]
5.10 ORGANIC VAPOR ANALYZER [OVA]

3.70 TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

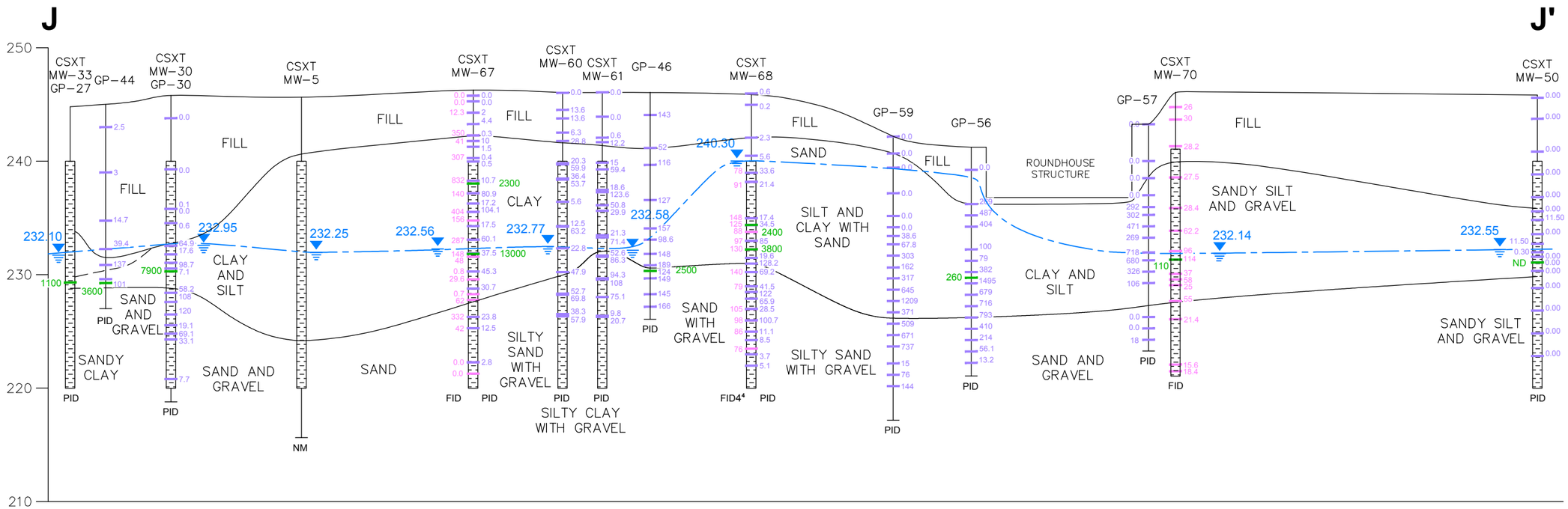
1. NM = PID/FID/OVA READINGS AT 0.0 PPM DURING BORING.
2. NM = PID/FID/OVA READING NOT COLLECTED DURING BORING.
3. PPM = PARTS PER MILLION.
4. FID CONCENTRATIONS MEASURED AT MW-70 SHOULD BE CONSIDERED QUALITATIVE DUE TO OUT-OF-RANGE AMBIENT AIR CALIBRATION.

CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION I-I'

ARCADIS

FIGURE
E-10



LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

LIQUID PHASE HYDROCARBON ELEVATION (FT AMSL, JANUARY 11, 2013)

SELECTED SOIL SCREENING CONCENTRATION, PPM:
5.10 PHOTOIONIZATION DETECTOR [PID]
5.10 FLAME IONIZATION DETECTOR [FID]
5.10 ORGANIC VAPOR ANALYZER [OVA]

3.70 TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. NM = PID/FID/OVA READINGS AT 0.0 PPM DURING BORING.
2. NM = PID/FID/OVA READING NOT COLLECTED DURING BORING.
3. PPM = PARTS PER MILLION.
4. FID CONCENTRATIONS MEASURED AT MW-68 SHOULD BE CONSIDERED QUALITATIVE DUE TO OUT-OF-RANGE AMBIENT AIR CALIBRATION.

0 40 80
HORIZONTAL SCALE: FEET
0 5 10
VERTICAL SCALE: FEET

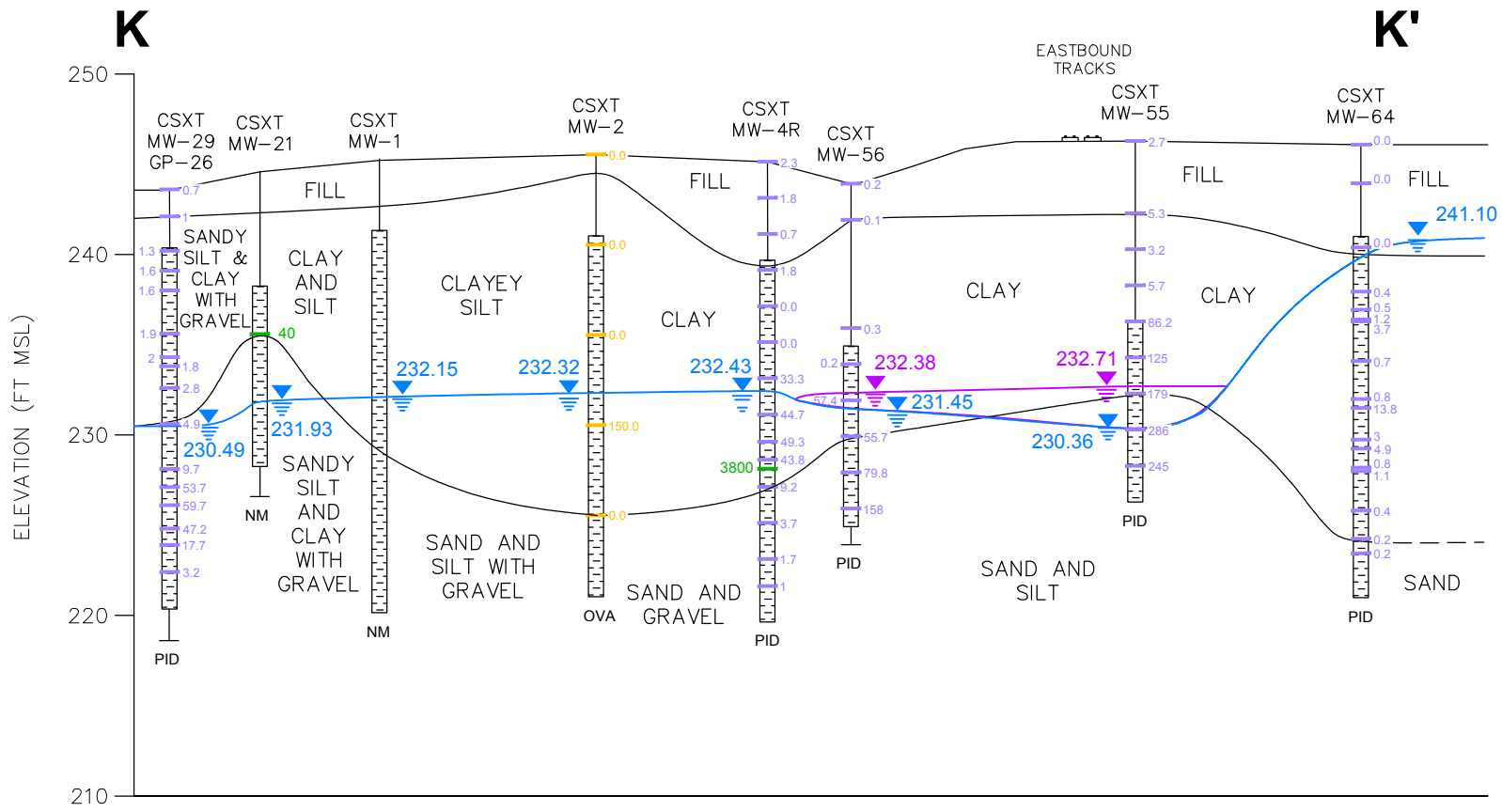
CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SECTION J-J'

ARCADIS

FIGURE
E-11

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\HOUSTON\RETURN-TO\Syracuse-NY\MD000843\0011\00006\MD843_11_6 FC10-C12.dwg LAYOUT: B-12 SAVED: 4/5/2013 4:31 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/5/2013 4:35 PM BY: INNISS, HAYDEN
XREFS: IMAGES: PROJECTNAME: ----



0 40 80
HORIZONTAL SCALE: FEET

0 5 10
VERTICAL SCALE: FEET

LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

LIQUID PHASE HYDROCARBON ELEVATION (FT AMSL, JANUARY 11, 2013)

SELECTED SOIL SCREENING CONCENTRATION, PPM:
5.10 PHOTOIONIZATION DETECTOR [PID]
5.10 FLAME IONIZATION DETECTOR [FID]
5.10 ORGANIC VAPOR ANALYZER [OVA]

3.70 TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. NM = PID/FID/OVA READINGS AT 0.0 PPM DURING BORING.
2. NM = PID/FID/OVA READING NOT COLLECTED DURING BORING.
3. PPM = PARTS PER MILLION.

CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

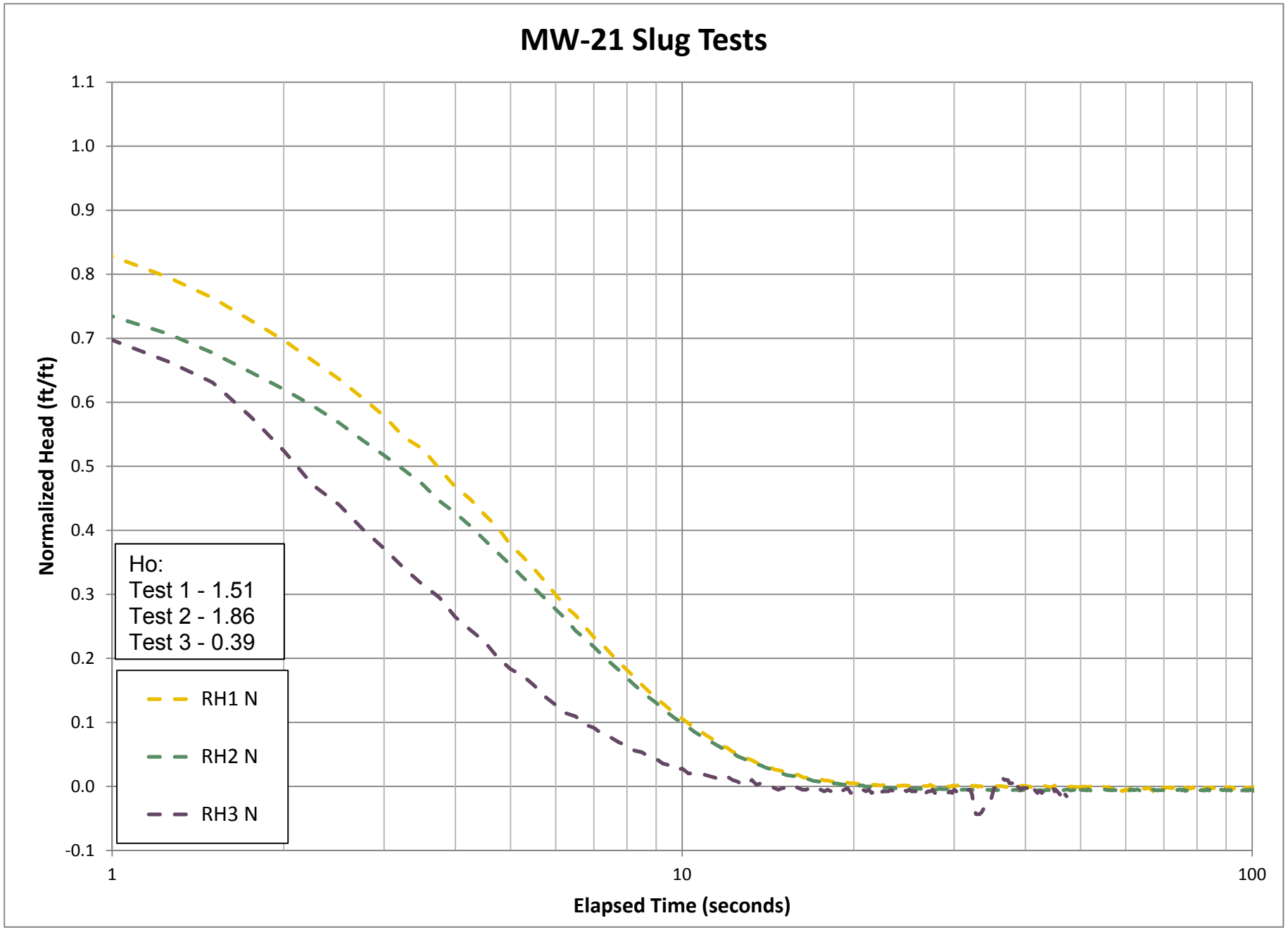
SECTION K-K'

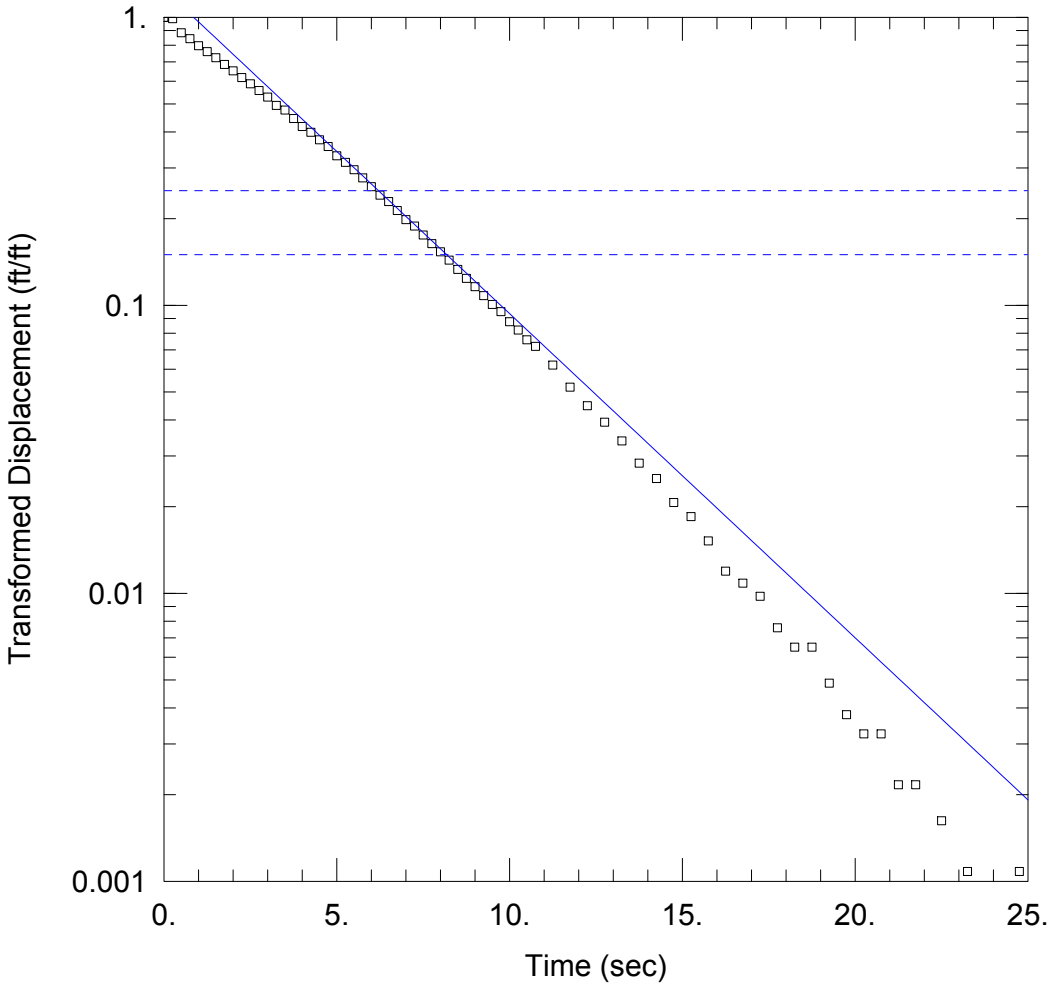
ARCADIS

FIGURE
E-12

Appendix F

Slug Test Data


MW-21 Slug Tests
Normalized Head (ft/ft)
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
1
10
100
Elapsed Time (seconds)
Ho:
Test 1 - 1.51
Test 2 - 1.86
Test 3 - 0.39
RH1 N
RH2 N
RH3 N



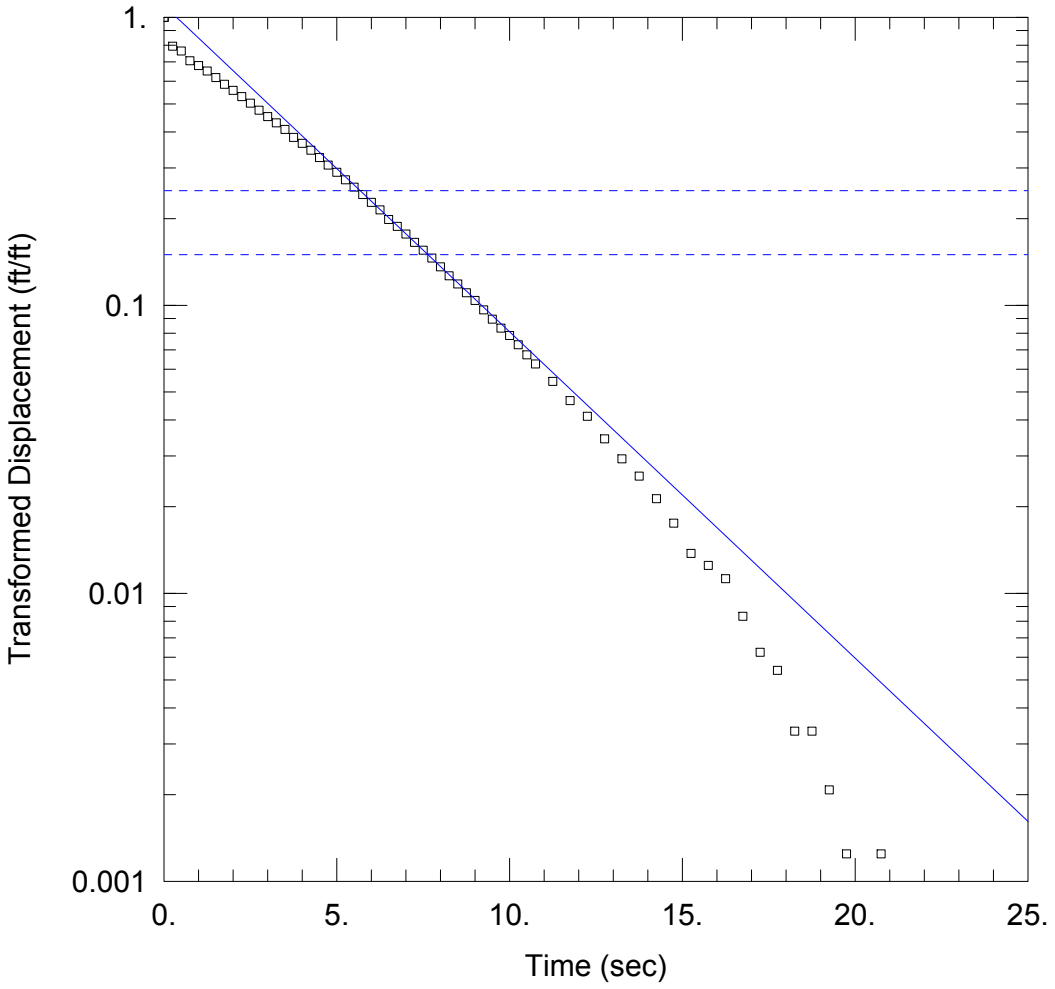
MW-21 RH1

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-21
Test Date: 1/24/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Dagan
K = 145. ft/day
y0 = 1.8 ft



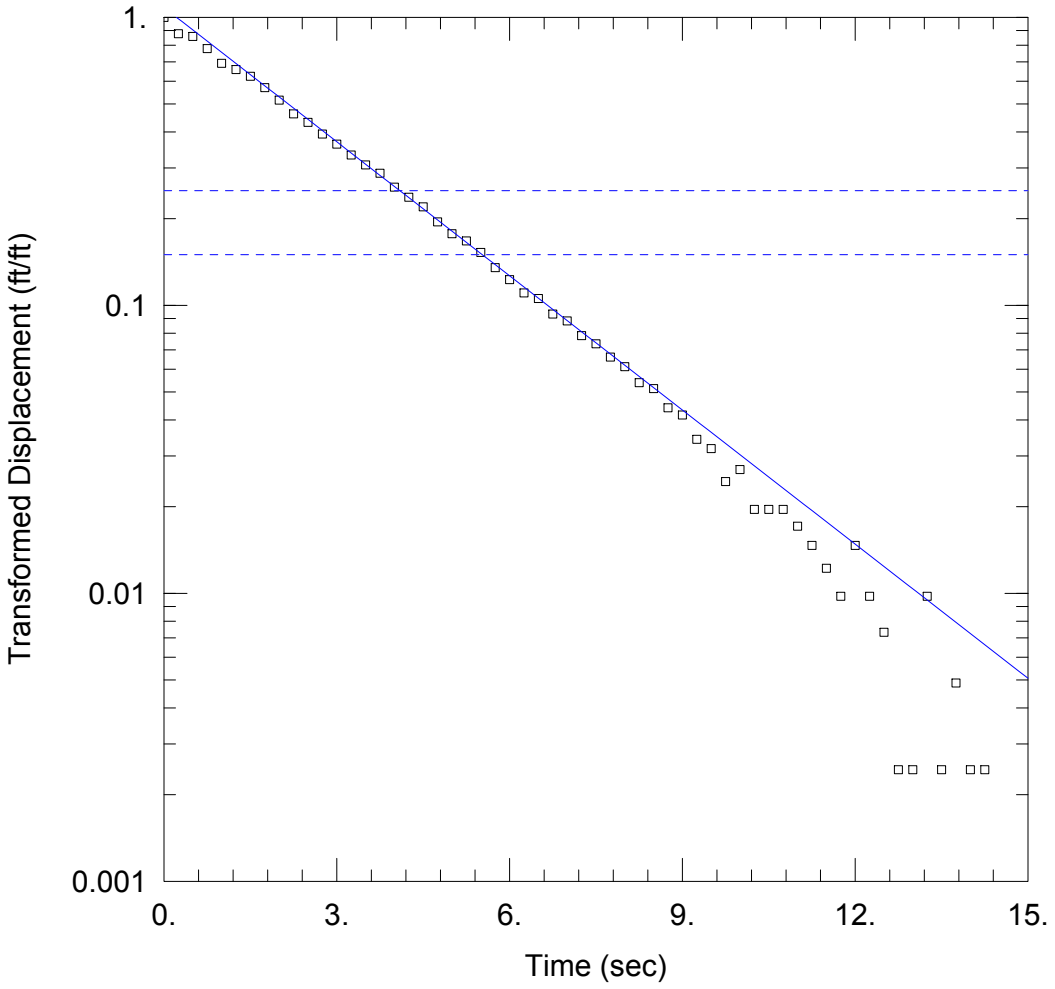
MW-21 RH2

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-21
Test Date: 1/24/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Dagan
K = 146. ft/day
y0 = 2. ft



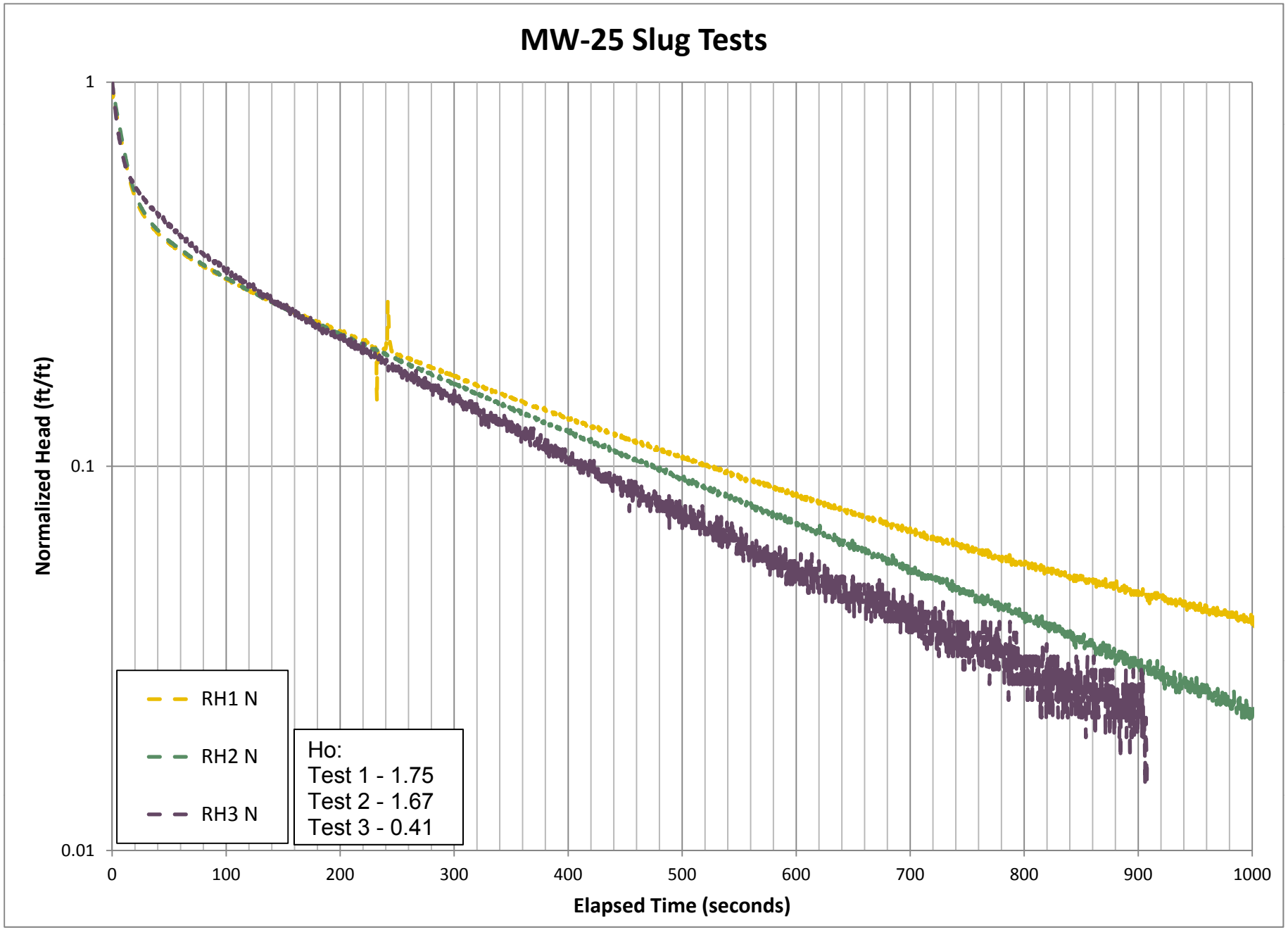
MW-21 RH3

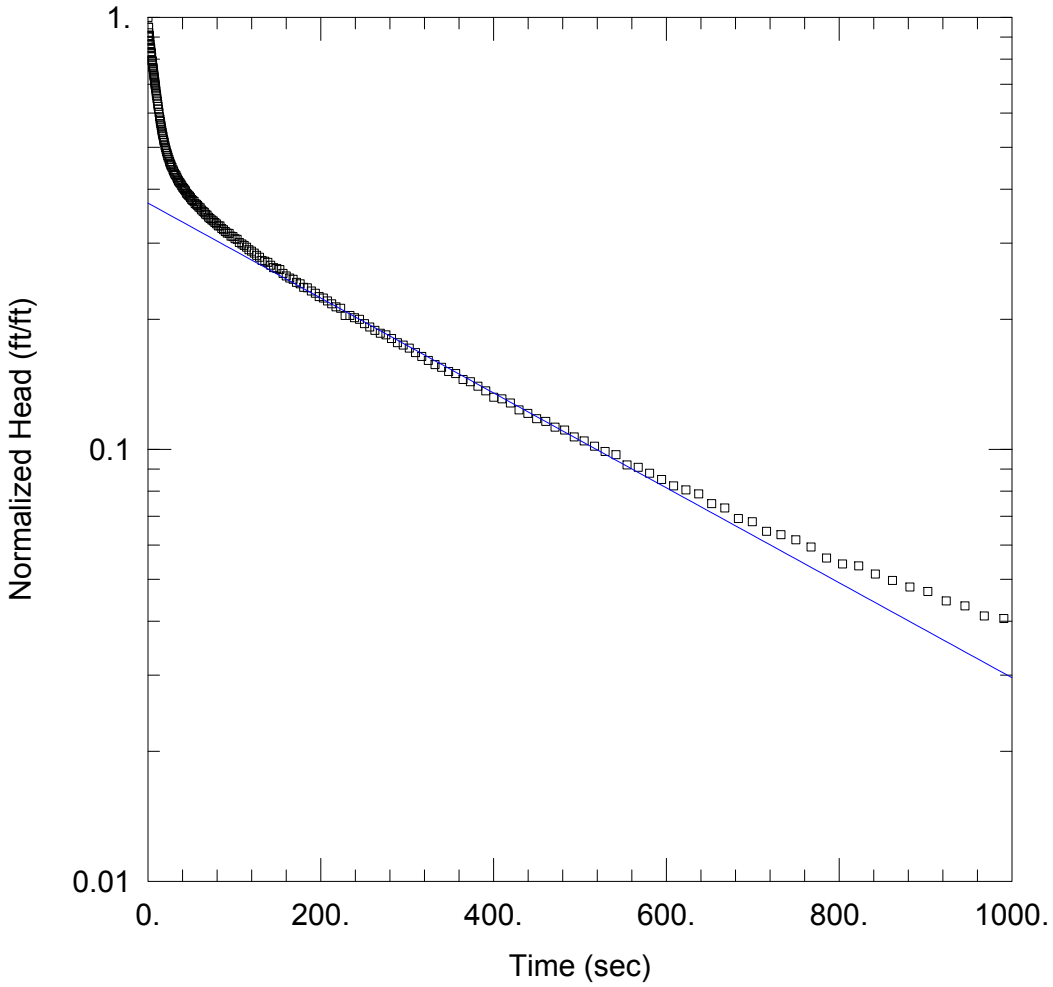
PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-21
Test Date: 1/24/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Dagan
K = 200. ft/day
y0 = 0.42 ft


MW-25 Slug Tests
Normalized Head (ft/ft)
1
0.1
0.01
0
100
200
300
400
500
600
700
800
900
1000
Elapsed Time (seconds)
RH1 N
RH2 N
RH3 N
Ho:
Test 1 - 1.75
Test 2 - 1.67
Test 3 - 0.41



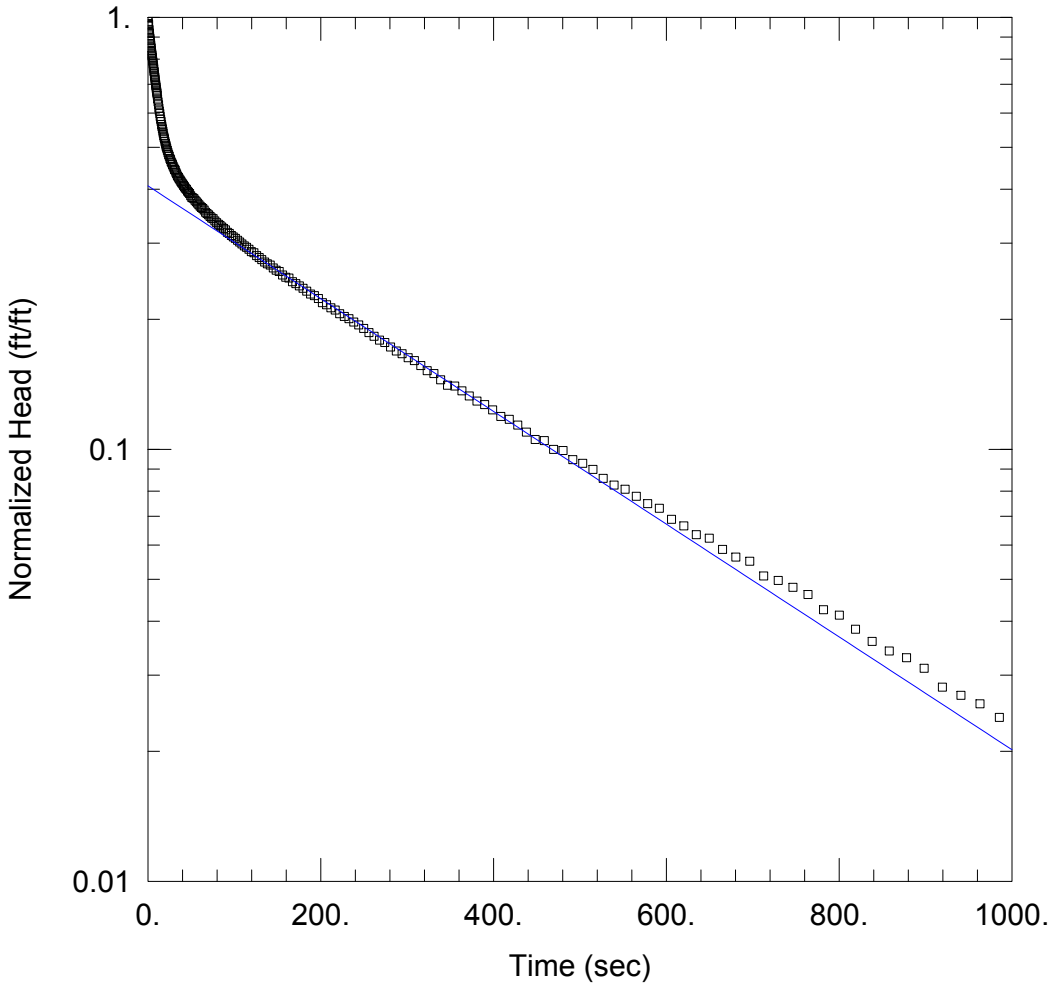
MW-25 RH1

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-25
Test Date: 1/22/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.58 ft/day
y0 = 0.65 ft



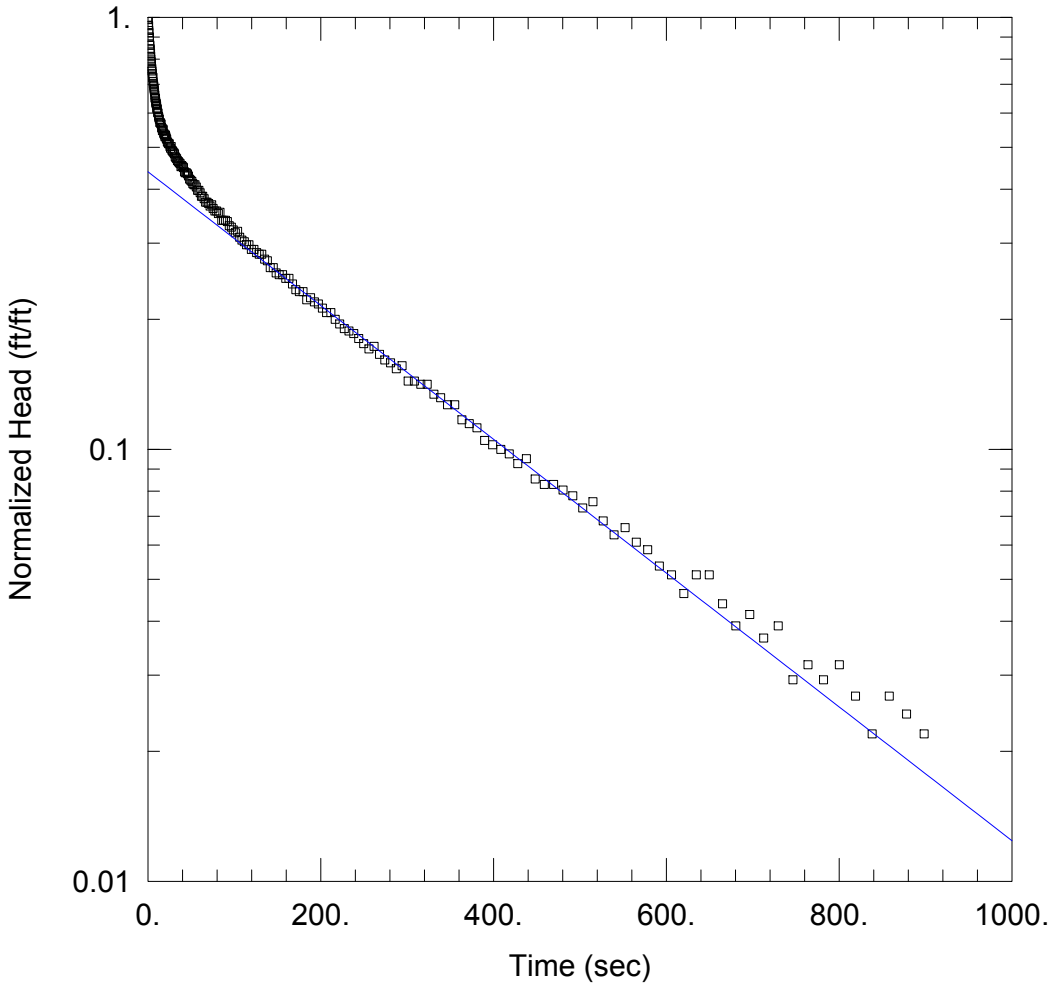
MW-25 RH2

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-25
Test Date: 1/22/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.93 ft/day
y0 = 0.68 ft



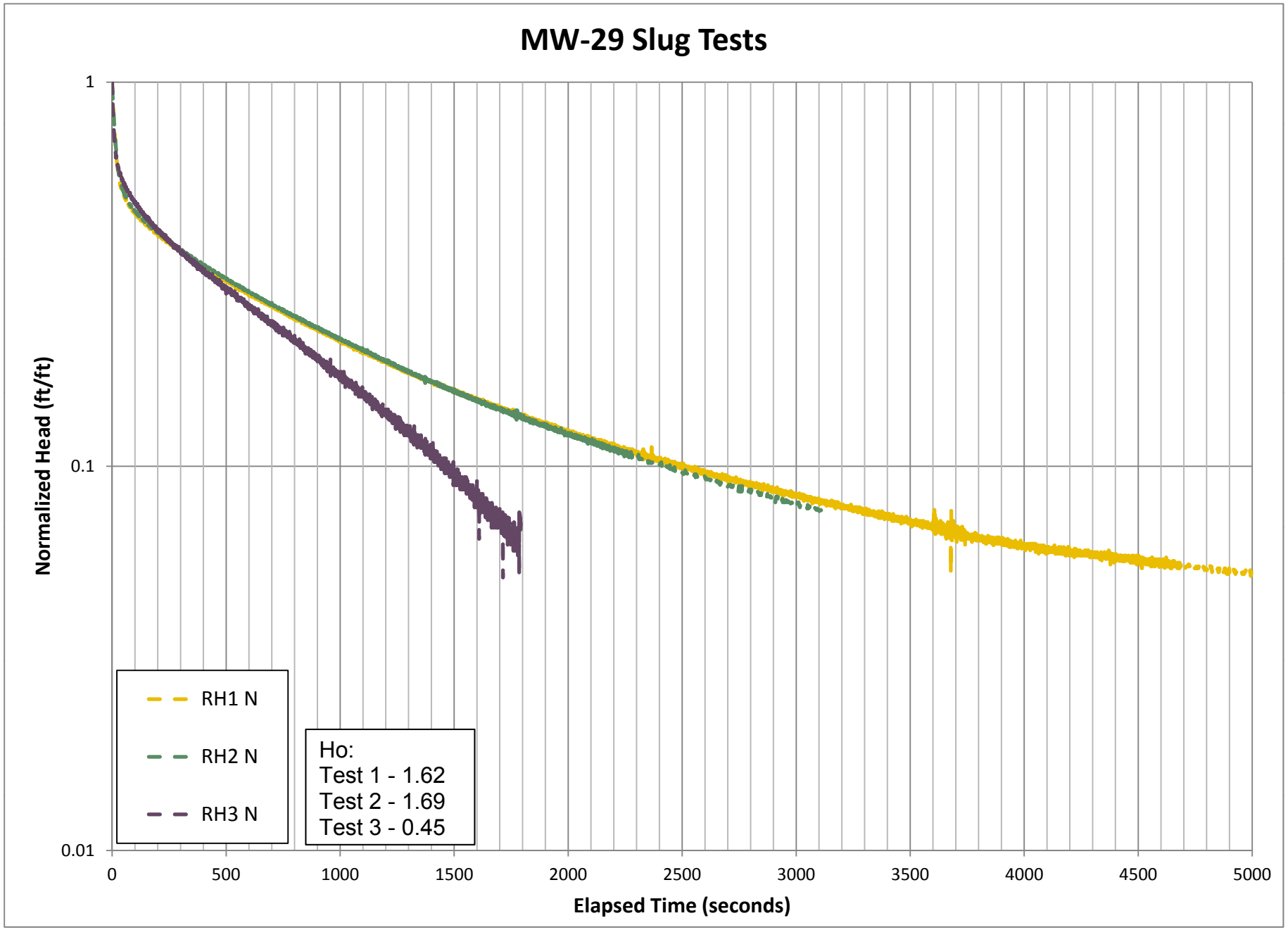
MW-25 RH3

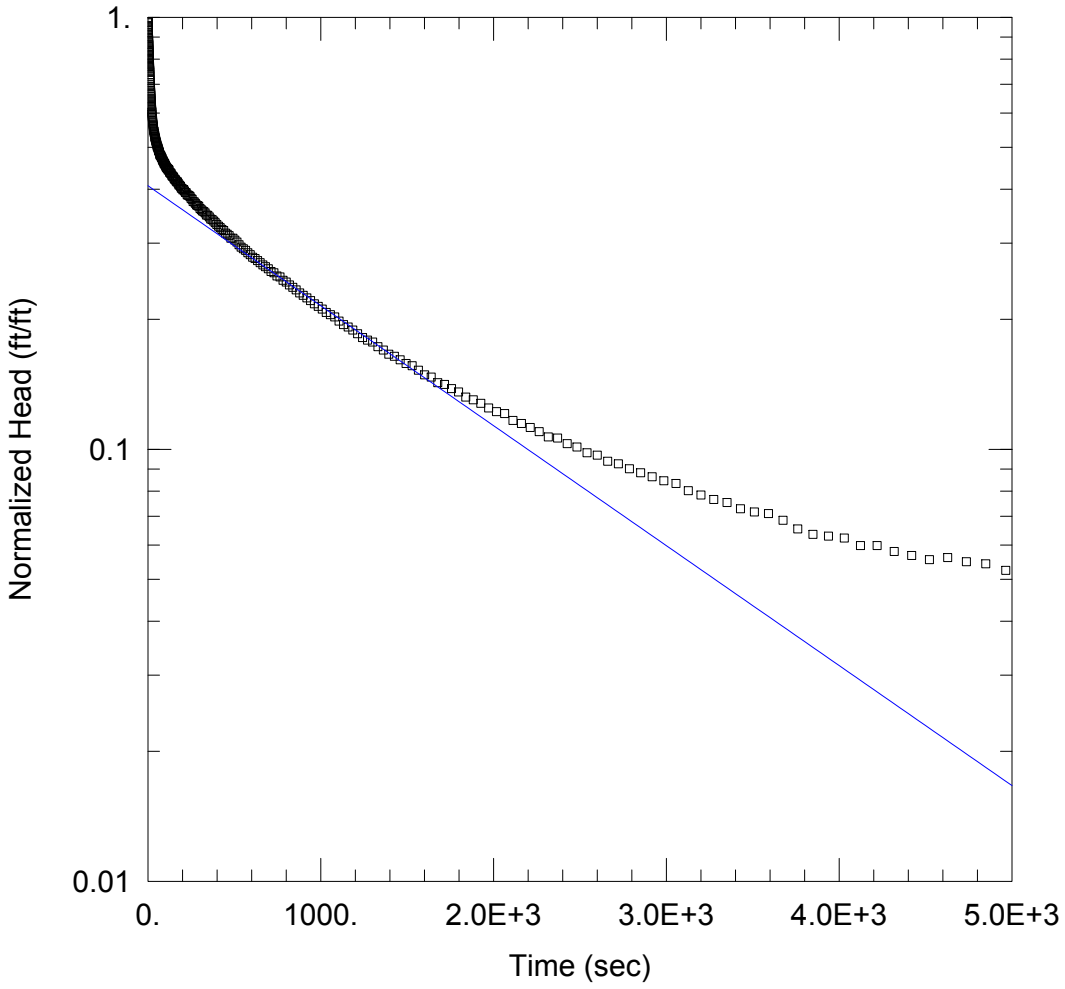
PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-25
Test Date: 1/22/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.09 ft/day
y0 = 0.18 ft


MW-29 Slug Tests
Normalized Head (ft/ft)
1
0.1
0.01
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Elapsed Time (seconds)
RH1 N
RH2 N
RH3 N
Ho:
Test 1 - 1.62
Test 2 - 1.69
Test 3 - 0.45



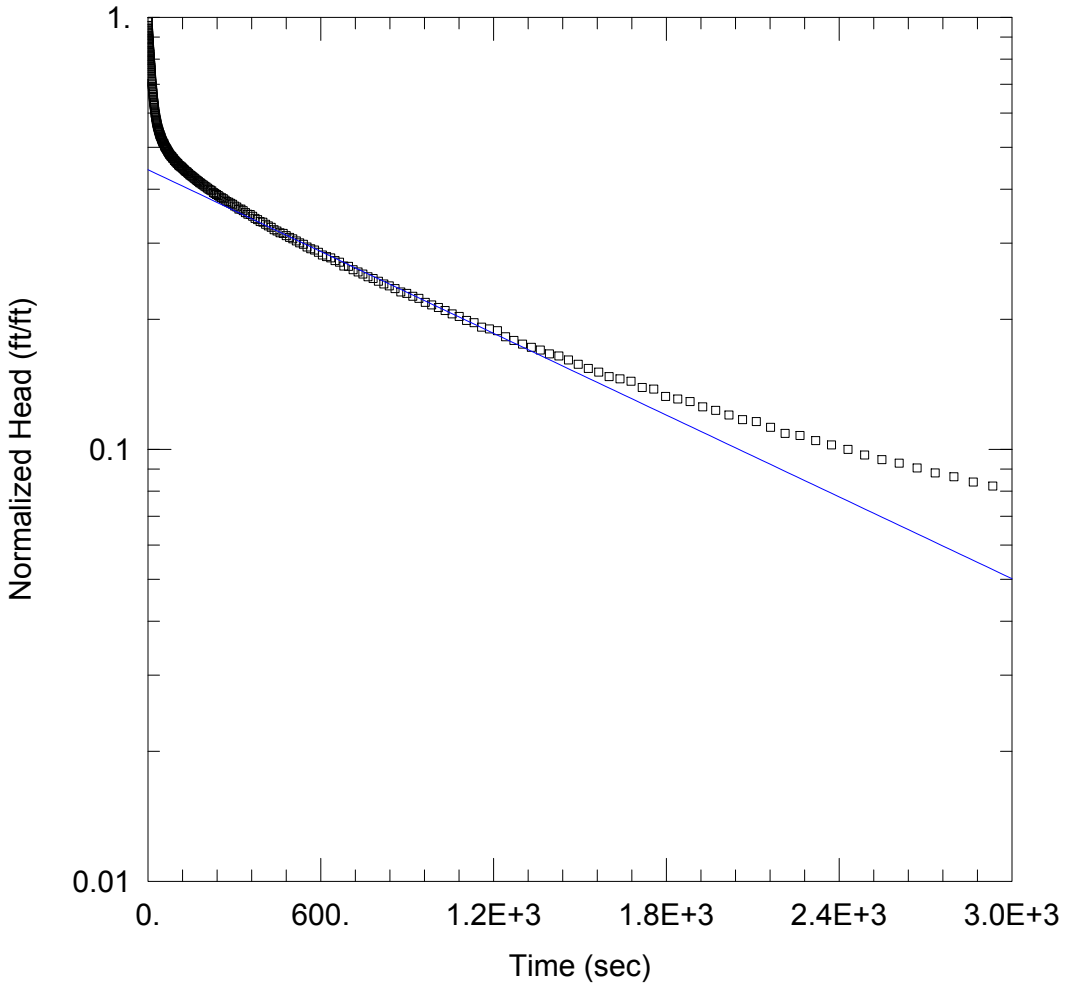
MW-29 RH1

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-29
Test Date: 1/23/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.45 ft/day
y0 = 0.66 ft



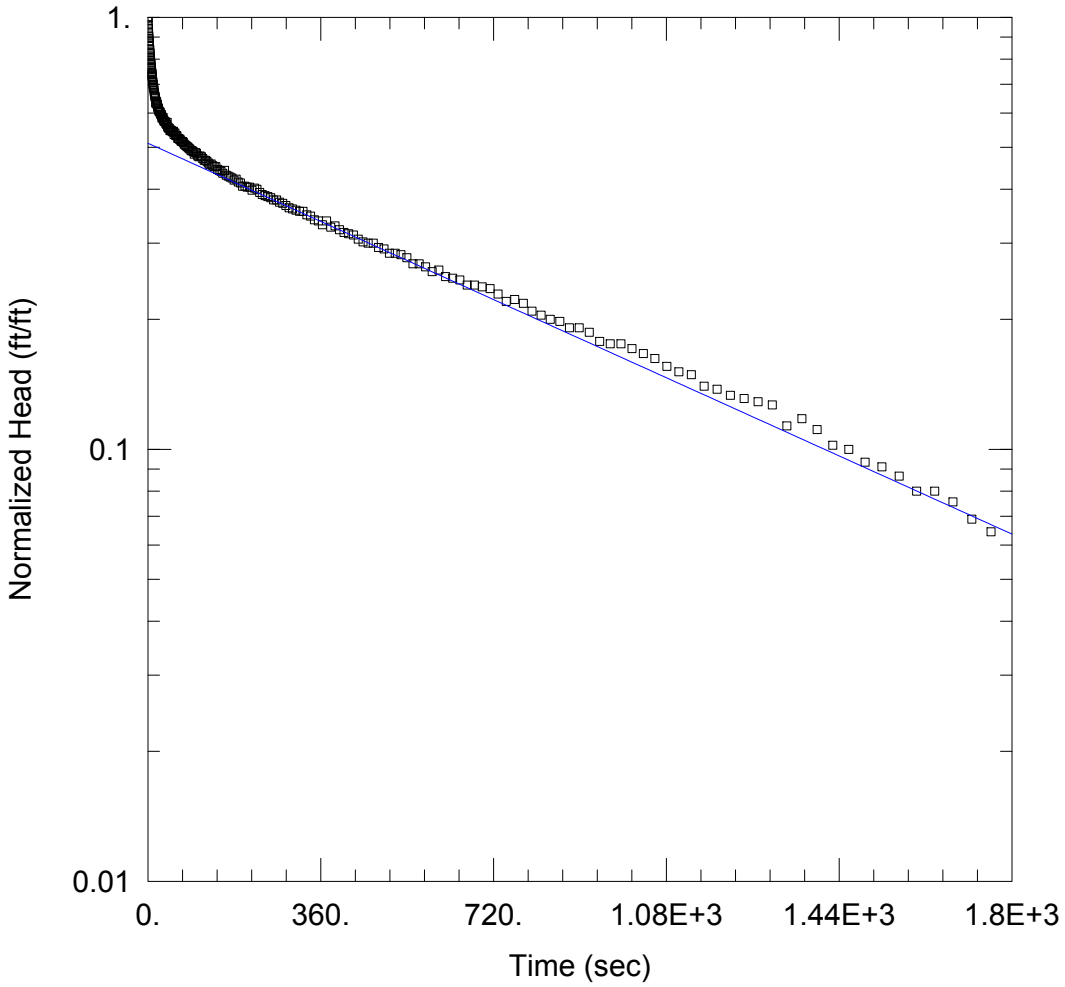
MW-29 RH2

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-29
Test Date: 1/23/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.45 ft/day
y0 = 0.75 ft



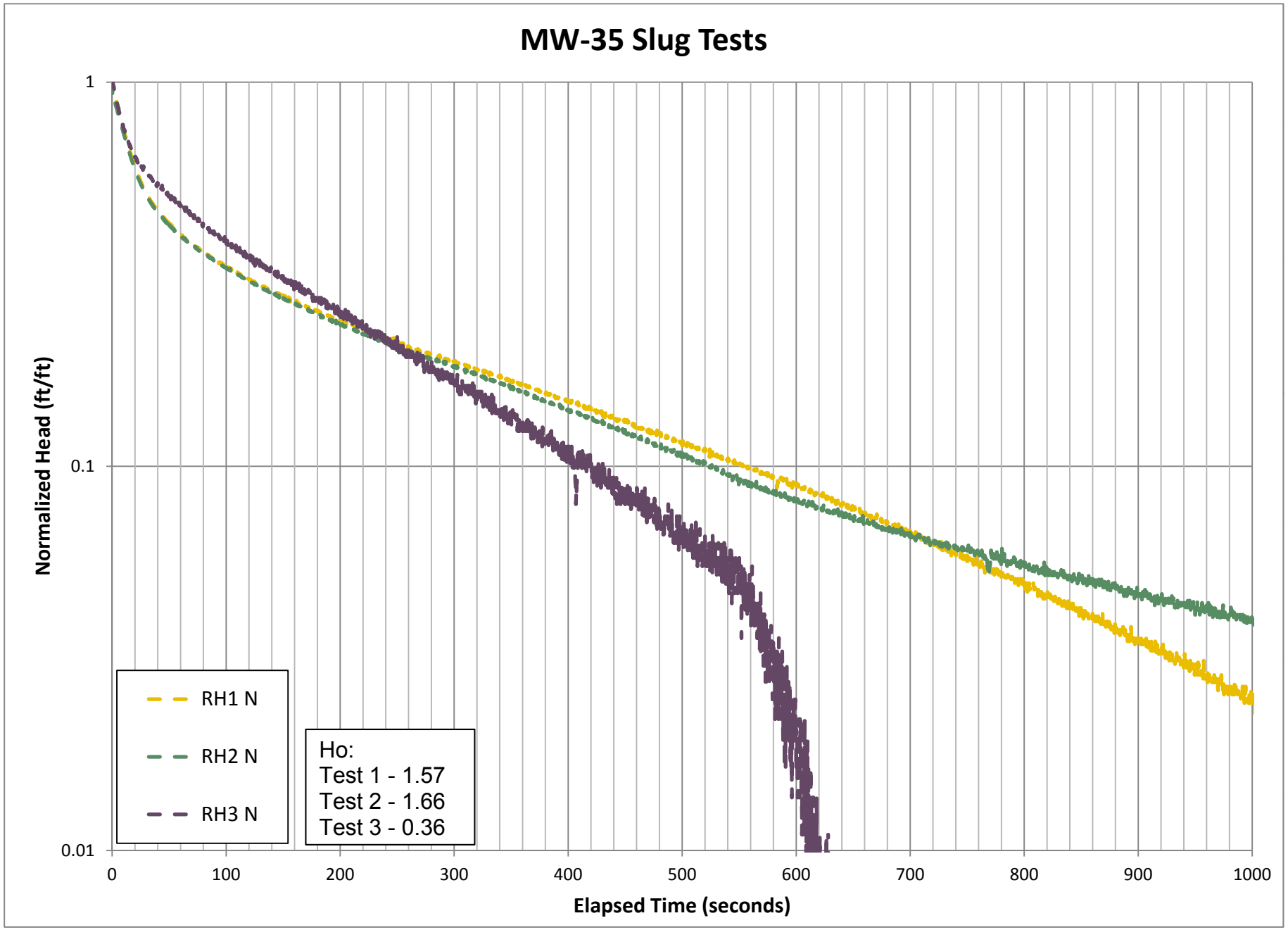
MW-29 RH3

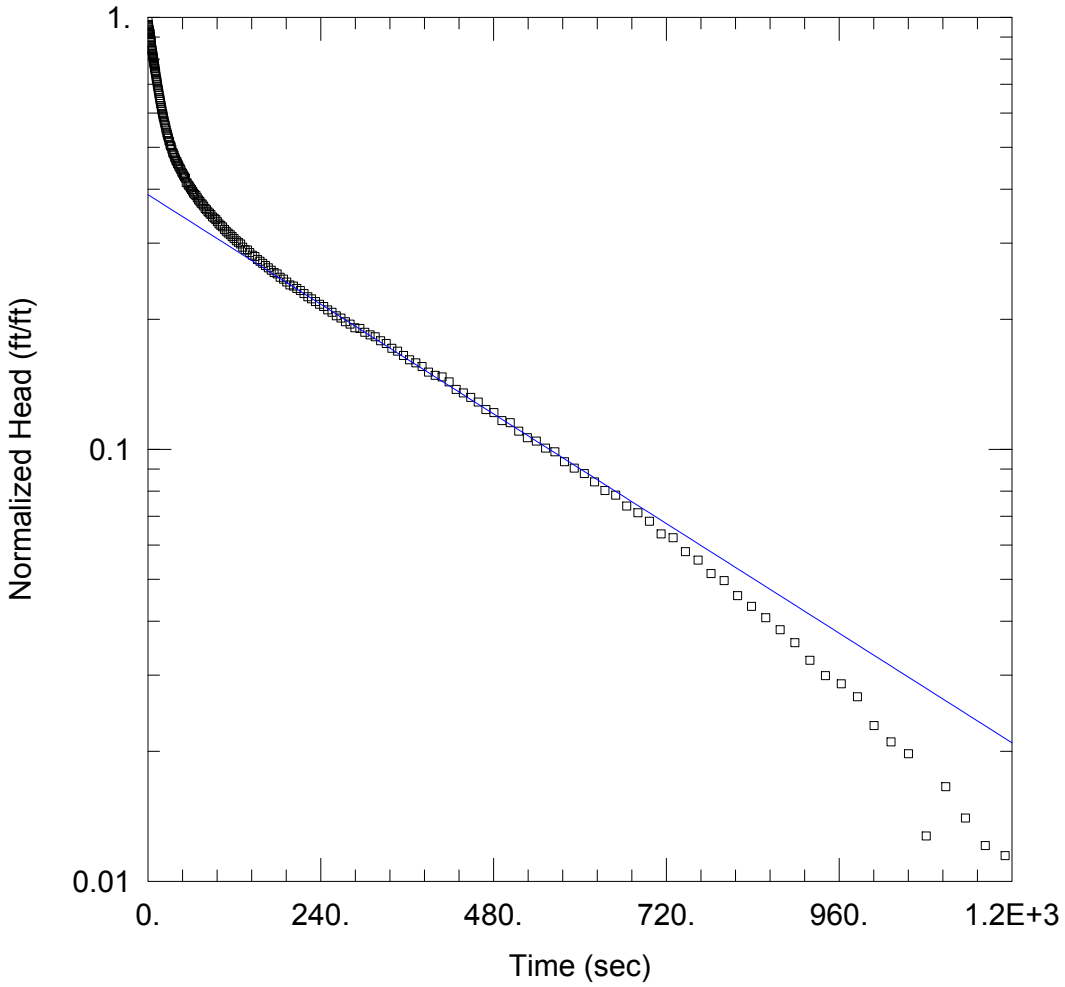
PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-29
Test Date: 1/23/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.55 ft/day
y0 = 0.23 ft


MW-35 Slug Tests
Normalized Head (ft/ft)
1
0.1
0.01
0
100
200
300
400
500
600
700
800
900
1000
Elapsed Time (seconds)
RH1 N
RH2 N
RH3 N
Ho:
Test 1 - 1.57
Test 2 - 1.66
Test 3 - 0.36



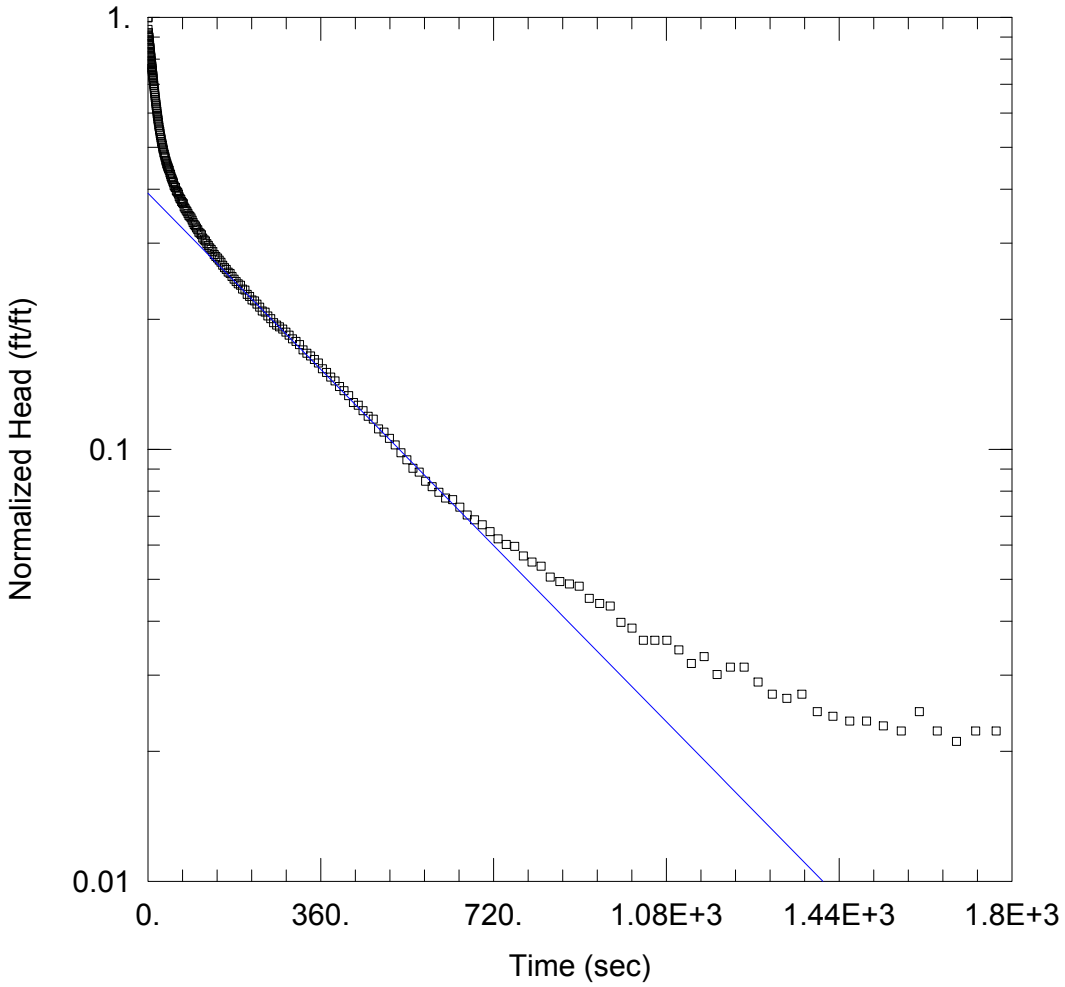
MW-35 RH1

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-35
Test Date: 1/22/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.85 ft/day
y0 = 0.61 ft



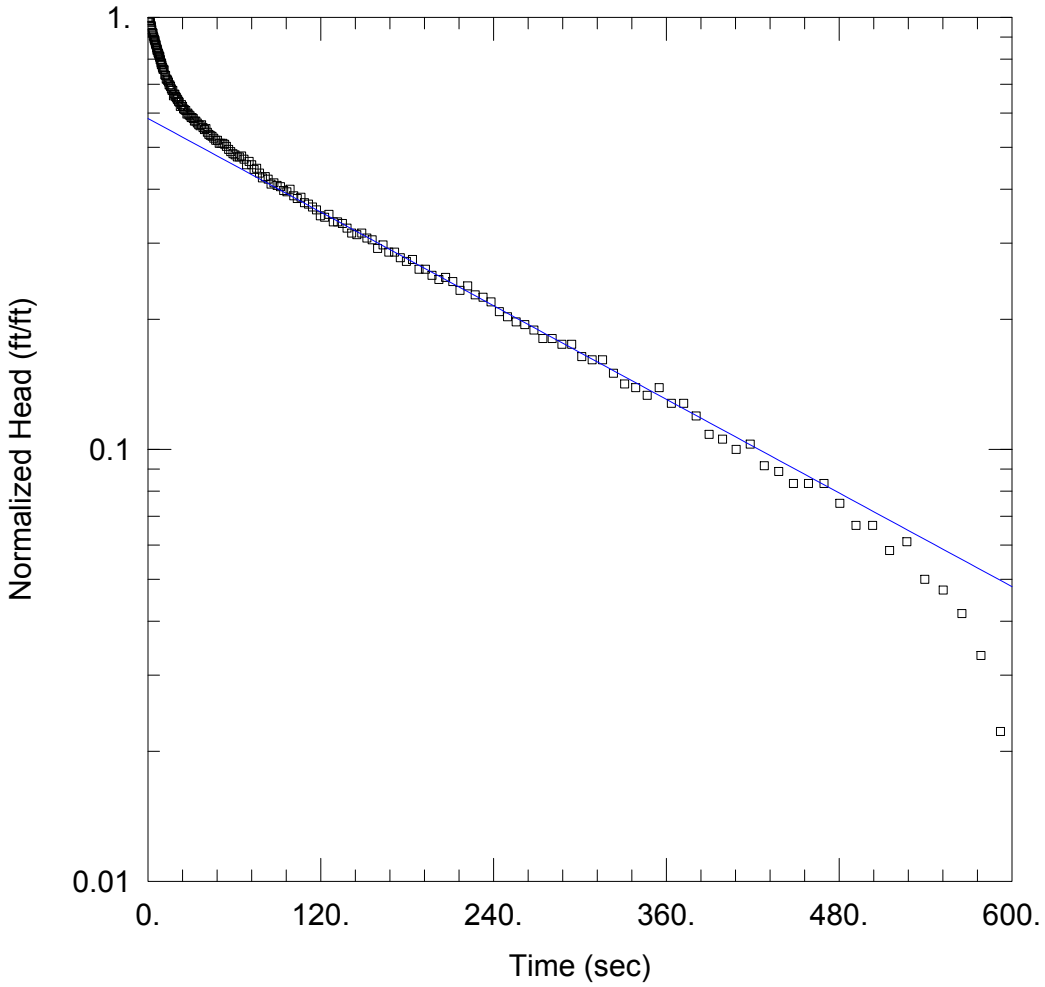
MW-35 RH2

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-35
Test Date: 1/22/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.86 ft/day
y0 = 0.65 ft



MW-35 RH3

PROJECT INFORMATION

Company: ARCADIS
Client: CSX
Project: MD000843.0011.00003
Location: Brunswick, MD
Test Well: MW-35
Test Date: 1/22/13

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.16 ft/day
y0 = 0.21 ft

Appendix G

LPH Analysis Data Package

PTS Laboratories, Inc.

8100 Secura Way • Santa Fe Springs, CA 90670
Telephone (562) 347-2500 • Fax (562) 907-3610

March 27, 2013

Megan Kellner
ARCADIS
1114 Benfield Boulevard, Suite A
Millersville, MD 21108

Re: PTS File No: 43166
Physical Properties Data
CSX Brunswick; MD000843.0011.00003

Dear Ms. Kellner:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your CSX Brunswick; MD000843.0011.00003 project. All analyses were performed by applicable ASTM, EPA, or API methodologies. An electronic version of the report has previously been sent to your attention via the internet. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please contact Rachel Spitz at (562) 347-2504.

Sincerely,
PTS Laboratories

Michael Mark Brady, P.G.
District Manager

Encl.

PTS Laboratories

Project Name: CSX Brunswick
Project Number: MD000843.0011.00003

PTS File No: 43166
Client: ARCADIS

TEST PROGRAM - 20130313

FLUID ID	Date	Time	Fluid Type	Fluid Properties Pkg.	Fluid Cleaning		Notes
Method:				ASTM D1481, 445, 971	Proprietary		
Date Received: 20130313							
MW-41 LPH	20130206	0952	LNAPL	X	X		
MW-41 H_2O	20130206	0952	Water				
MW-56 LPH	20130206	1011	LNAPL	X	X		
MW-56 H_2O	20130206	1011	Water				
MW-63 LPH	20130206	0918	LNAPL	X	X		
MW-63 H_2O	20130206	0918	Water				
TOTALS:				3	3		3

Laboratory Test Program Notes

Standard TAT for basic analysis is 10 business days.

Fluid Properties Package - LNAPL & Water: Includes dynamic viscosity and fluid density at three temperatures (70, 100, 130°F), surface tension for each fluid, and interfacial tensions (three phase pairs; oil/water, oil/air, and water/air (at ambient laboratory temperature)). May change 70°F point to more closely match site conditions. Additional charges may apply.

PTS File No: 43166
Client: ARCADIS

PTS Laboratories

VISCOSITY, DENSITY, and SPECIFIC GRAVITY DATA

(METHODOLOGY: ASTM D445, ASTM D1481, API RP40)

PROJECT NAME: CSX Brunswick
PROJECT NO: MD000843.0011.00003

SAMPLE ID	MATRIX	TEMPERATURE, °F	SPECIFIC GRAVITY	DENSITY, g/cc	VISCOSITY	
					centistokes	centipoise
MW-41 H_2O	Water	70	1.000	0.9984	1.03	1.03
		100	1.002	0.9953	0.715	0.712
		130	1.004	0.9895	0.565	0.559
MW-41 LPH	NAPL	70	0.8755	0.8738	4.98	4.35
		100	0.8695	0.8634	3.21	2.77
		130	0.8606	0.8486	2.29	1.94
MW-56 H_2O	Water	70	1.000	0.9982	1.04	1.04
		100	1.002	0.9951	0.712	0.709
		130	1.003	0.9889	0.574	0.567
MW-56 LPH	NAPL	70	0.8715	0.8697	4.67	4.07
		100	0.8647	0.8587	3.03	2.60
		130	0.8531	0.8411	2.15	1.81
MW-63 H_2O	Water	70	1.001	0.9985	1.04	1.04
		100	1.002	0.9954	0.714	0.711
		130	1.003	0.9887	0.588	0.581
MW-63 LPH	NAPL	70	0.8740	0.8722	5.15	4.49
		100	0.8673	0.8613	3.31	2.85
		130	0.8554	0.8434	2.37	2.00

PTS File No: 43166
Client: ARCADIS

PTS Laboratories

INTERFACIAL / SURFACE TENSION DATA

(METHODOLOGY: DuNuoy Method - ASTM D971)

PROJECT NAME: CSX Brunswick
PROJECT NO: MD000843.0011.00003

PHASE PAIR		TEMPERATURE,	INTERFACIAL TENSION,
SAMPLE ID / PHASE	SAMPLE ID / PHASE	°F	Dynes/centimeter
MW-41 H2O	Air	70.3	63.7
MW-41 LPH	Air	70.7	29.4
MW-41 H2O	MW-41 LPH	70.3	18.1
MW-56 H2O	Air	70.9	62.9
MW-56 LPH	Air	71.2	29.0
MW-56 H2O	MW-56 LPH	71.1	20.8
MW-63 H2O	Air	71.6	63.0
MW-63 LPH	Air	71.6	28.8
MW-63 H2O	MW-63 LPH	71.6	17.7

QUALITY CONTROL DATA

PHASE PAIR:	DIWATER / AIR
TEMPERATURE, °F:	70.2
IFT, MEASURED:	72.1
IFT, PUBLISHED:	72.6
RPD:	-0.64

DATE **PTS FILE#** **CHAIN OF CUSTODY RECORD** 43166 **PAGE** **OF**

COMPANY				ANALYSIS REQUEST																							PO#
ARCADIS				PHYSICAL PROPERTIES PACKAGE, API RP40	MOISTURE CONTENT, ASTM D2216	POROSITY, API RP40	GRAIN DENSITY, API RP40	BULK DENSITY, API RP40	AIR PERMEABILITY, API RP40	SPECIFIC RETENTION/YIELD ASTM D425	CAPILLARY PRESSURE, ASTM D425M	SOIL pH, EPA 9045	GRAIN SIZE: DRY; 400 MESH	GRAIN SIZE: SIEVE & LASER	GRAIN SIZE: LASER; 1 MICRON	HYDRAULIC CONDUCTIVITY, EPA 9100, API RP40	TOC: WALKLEY-BLACK	HYDRAULIC CONDUCTIVITY PACKAGE	ATTERBERG LIMITS, ASTM D4318	TNRCC PROPERTIES PACKAGE					NUMBER OF SAMPLES	SPECIAL HANDLING 24 HOURS 5 DAYS 72 HOURS (NORMAL) OTHER
ADDRESS 1114 Benfield Blvd Ste A Millersville MD 21108																											SAMPLE CONDITIONS RECEIVED ON ICE YES/NO SEALED YES/NO OTHER YES/NO
PROJECT MANAGER Megan Kellner 410-923-7814																											COMMENTS
PROJECT NAME / PHONE NUMBER CSX Brunswick 410-987-4392																											
PROJECT NUMBER / FAX NUMBER MD000843.0011.00003																											
SITE LOCATION CSX - Brunswick																											
SAMPLER SIGNATURE Josh Wilson																											
	SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT																							
✓	MW-41 LPH	2/6/13	0952		X	1																					viscosity, density, specific gravity, interfacial tension
✓	MW-41 H2O	2/6/13	0952		X																						
✓	MW-56 LPH	2/6/13	1011		X																						
✓	MW-56 H2O	2/6/13	1011		X																						
✓	MW-63 LPH	2/6/13	0918		X																						
✓	MW-63 H2O	2/6/13	0918		X																						

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
COMPANY Arcadis 1600	COMPANY Fed Ex Tracking # 794929726256	COMPANY	COMPANY PTS LABS
DATE / TIME 3/11/2013	DATE / TIME 3/11/2013 1600	DATE / TIME	DATE / TIME 3/13/13 15:50

PTS GeoLabs, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 907-3607 • Fax (562) 907-3610
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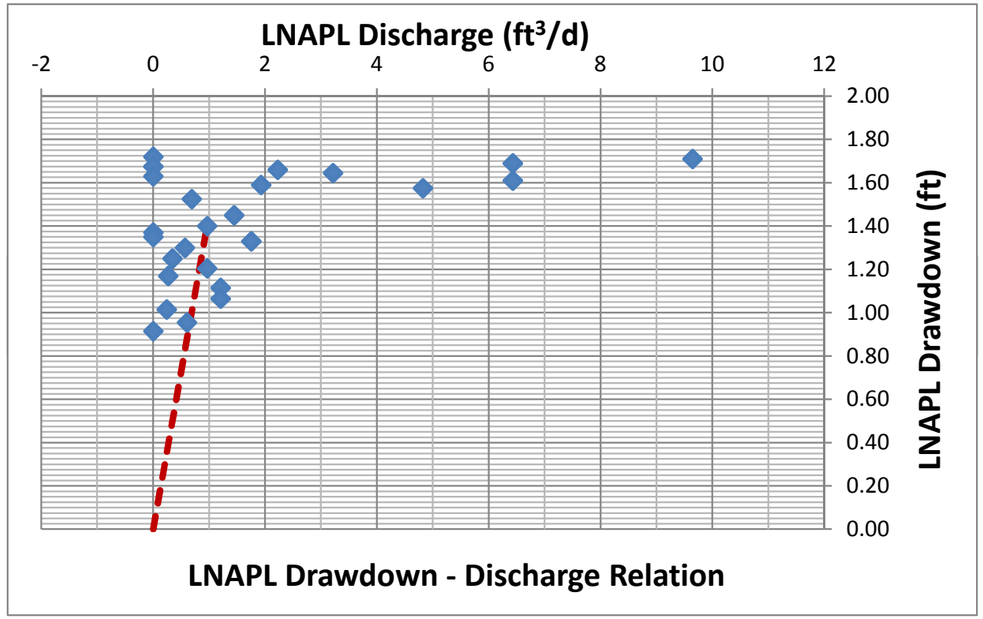
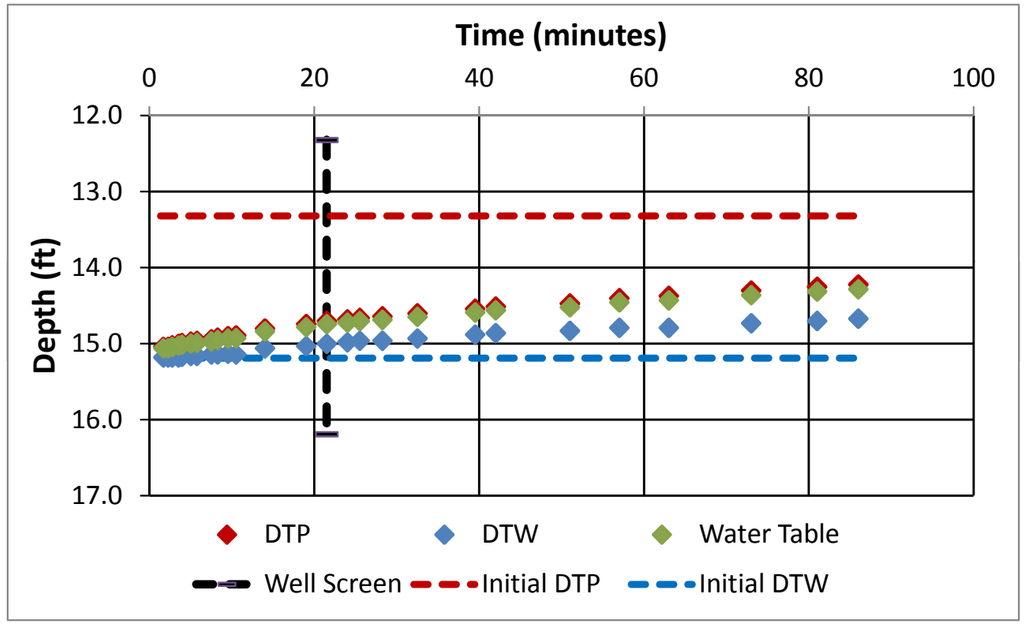
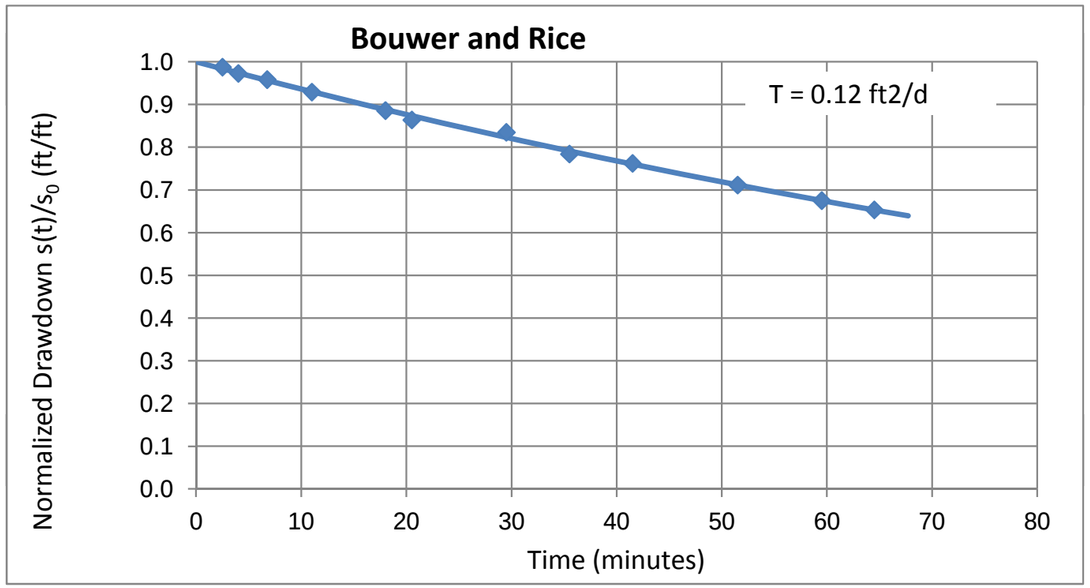
Appendix H

LPH Baildown Test Data

MW-41 01/23/2013







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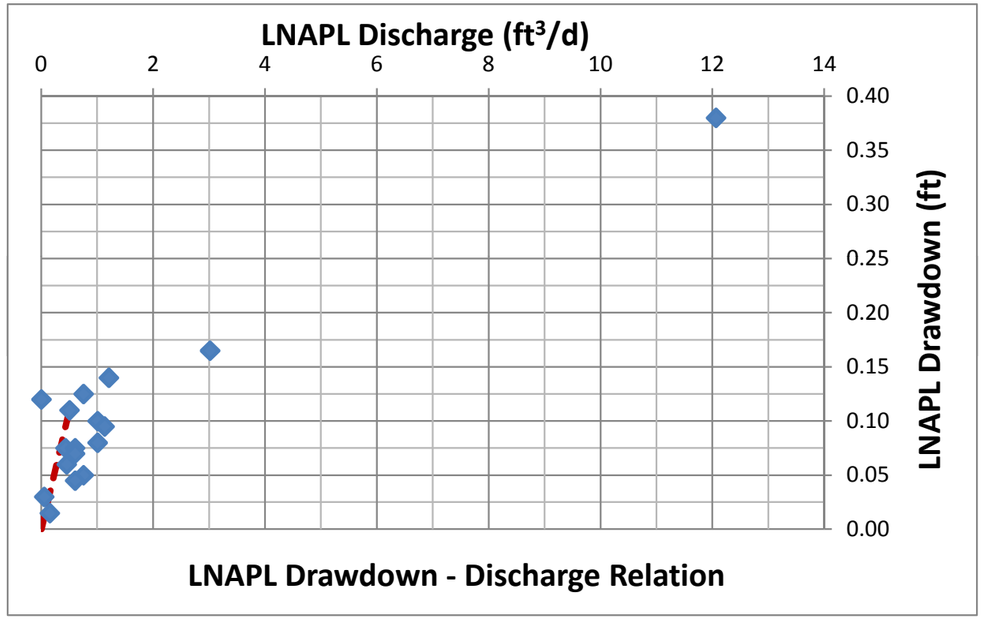
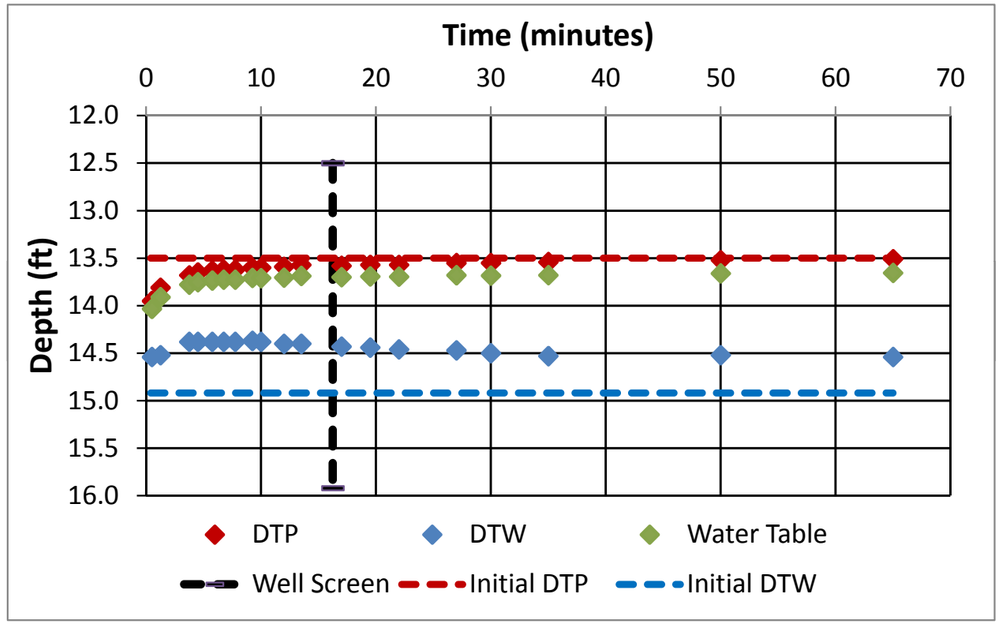
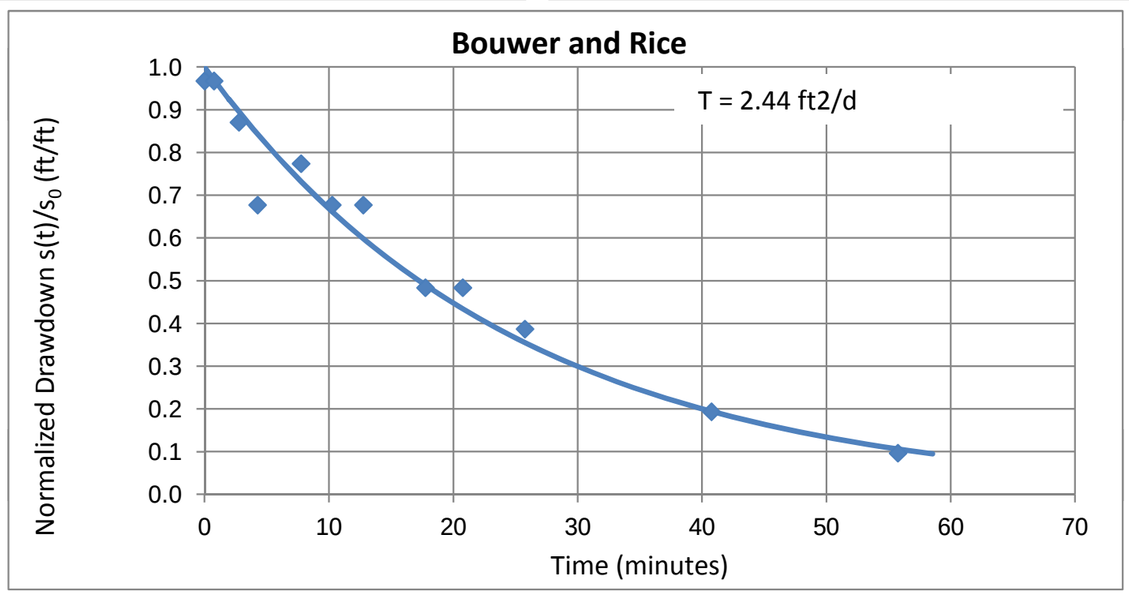
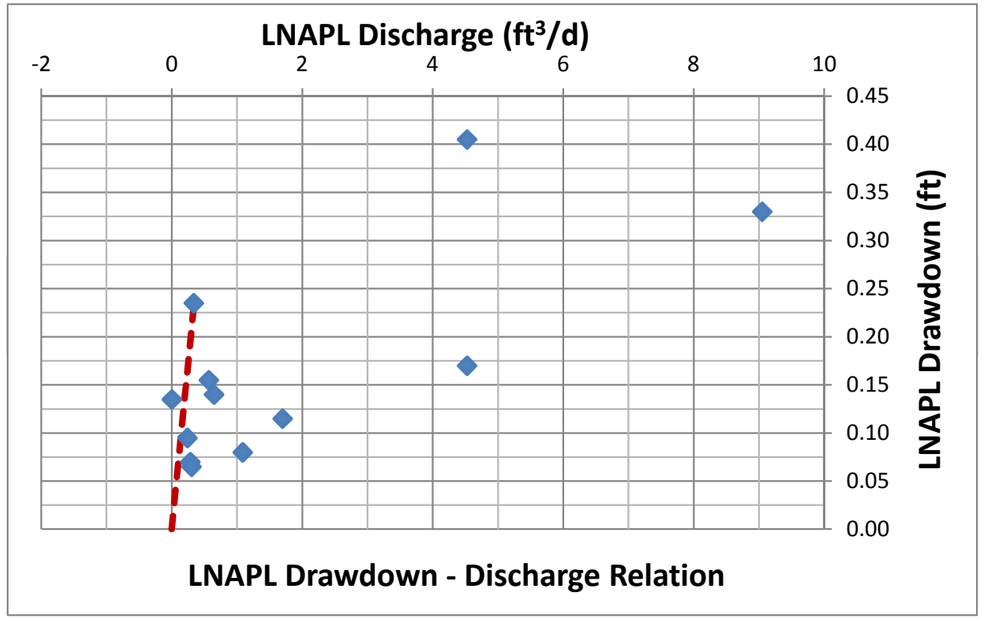
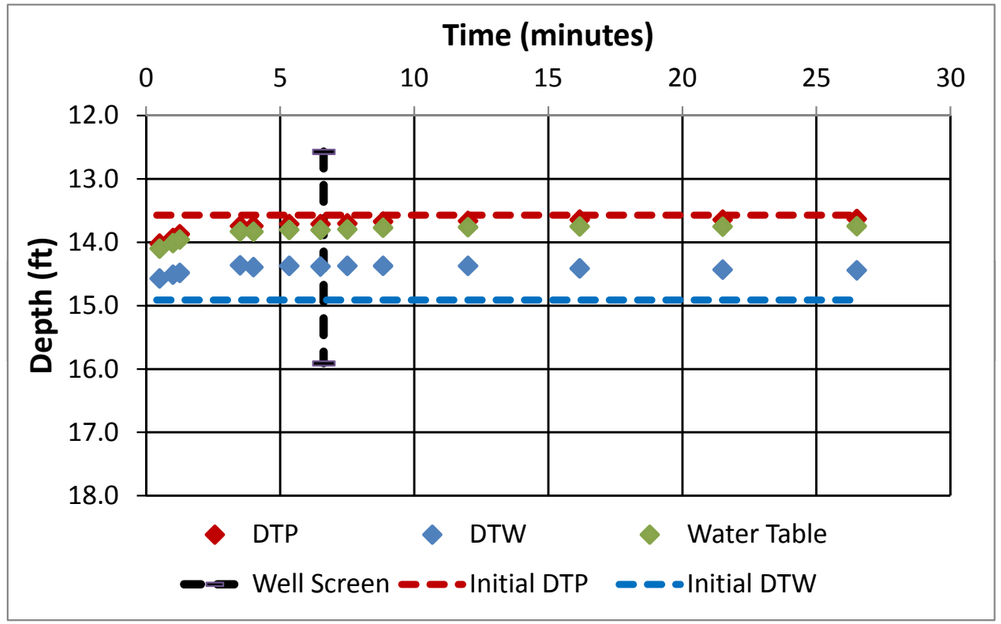


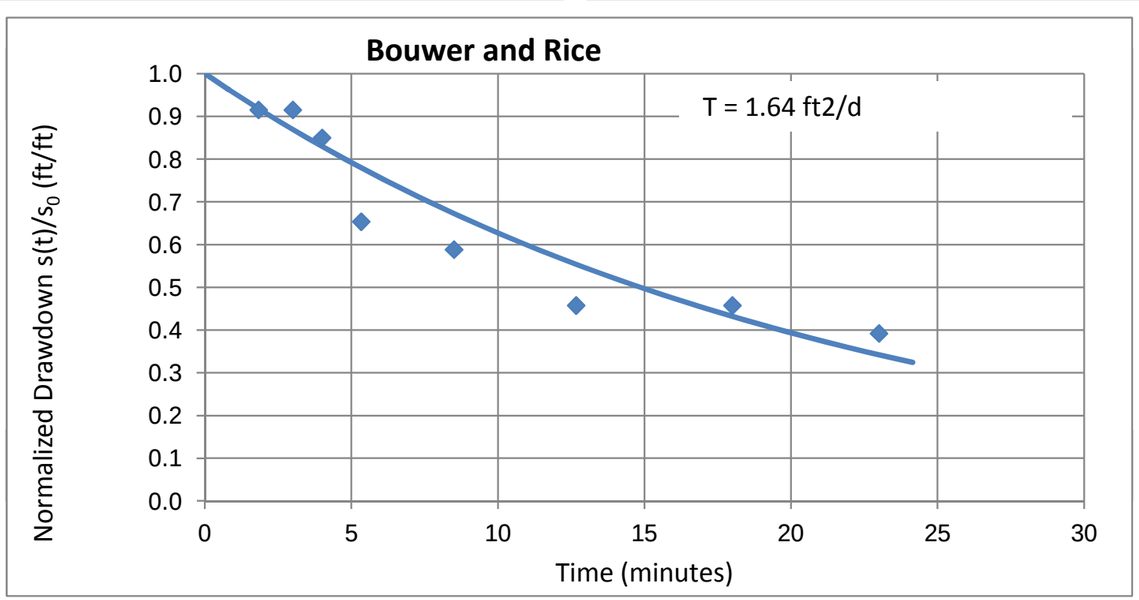




MW-53 01/24/2013 (TEST 2)







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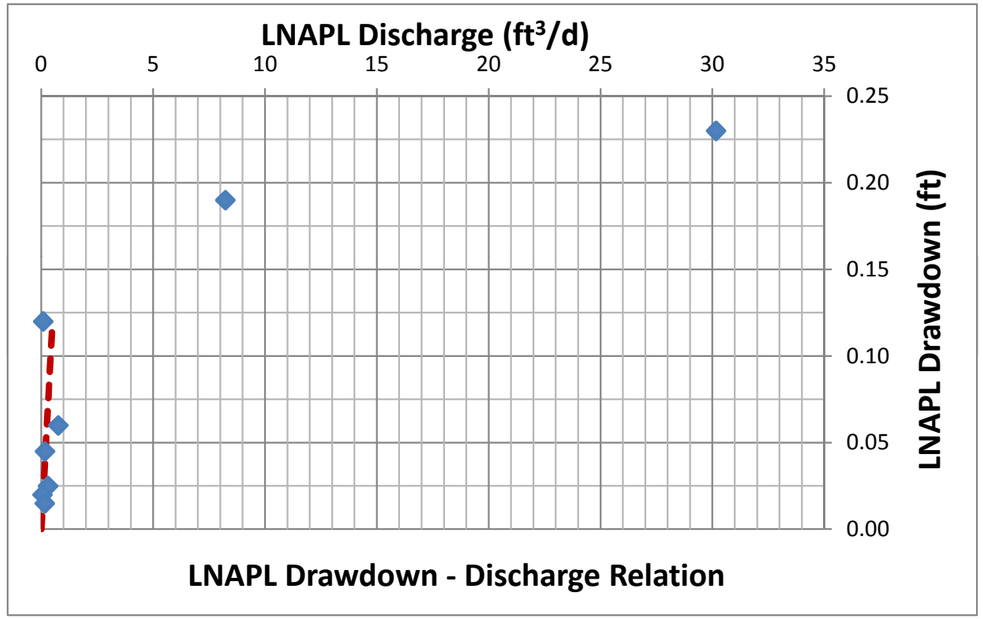

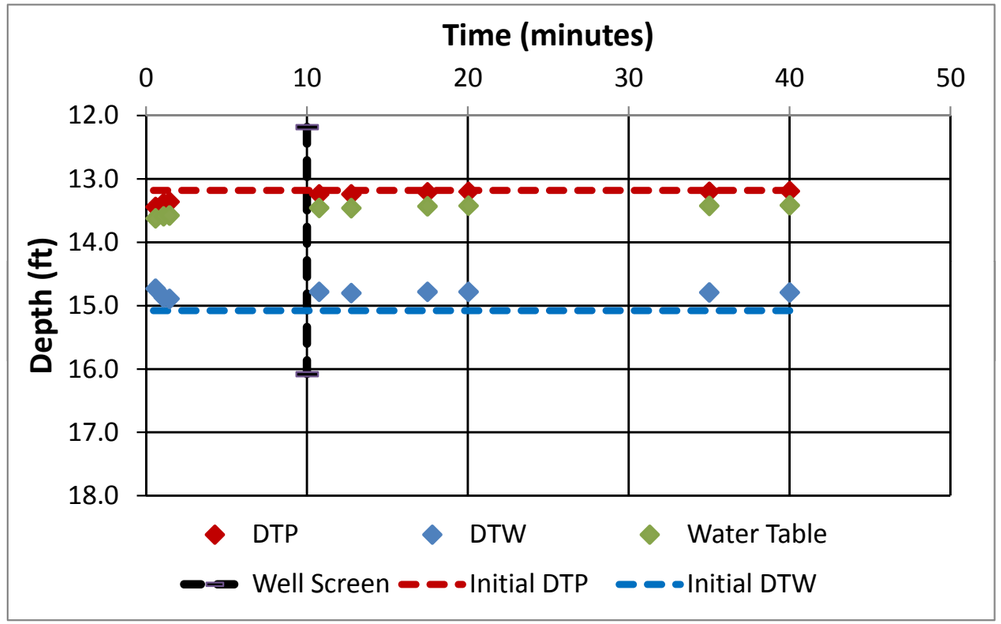

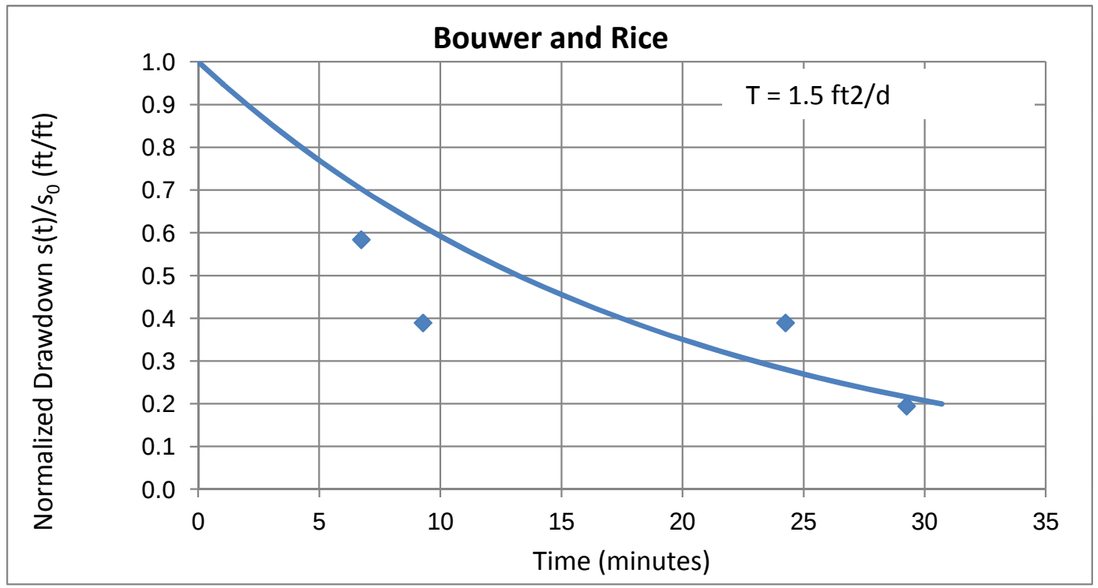

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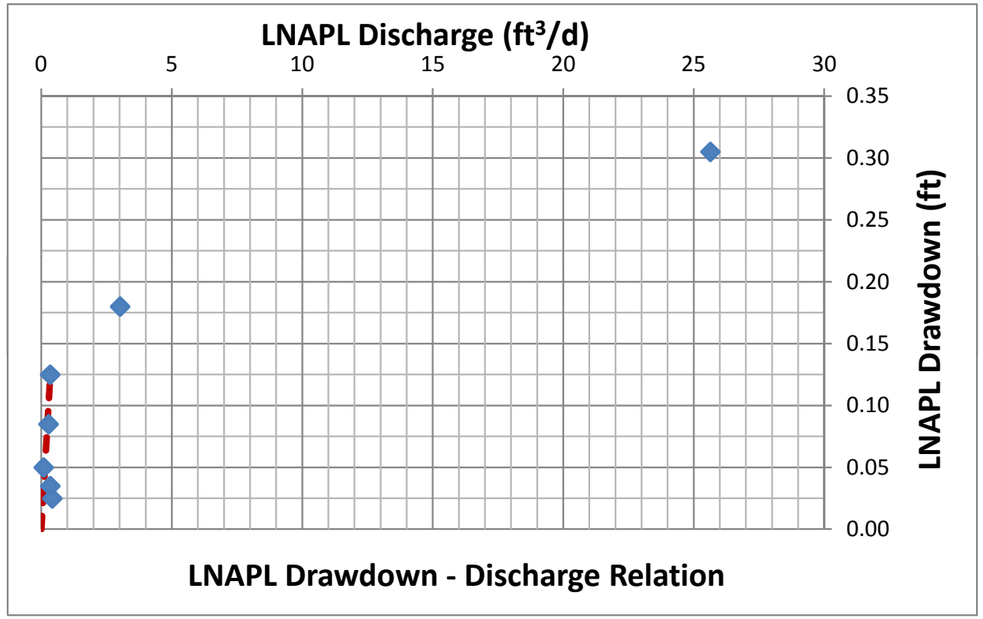

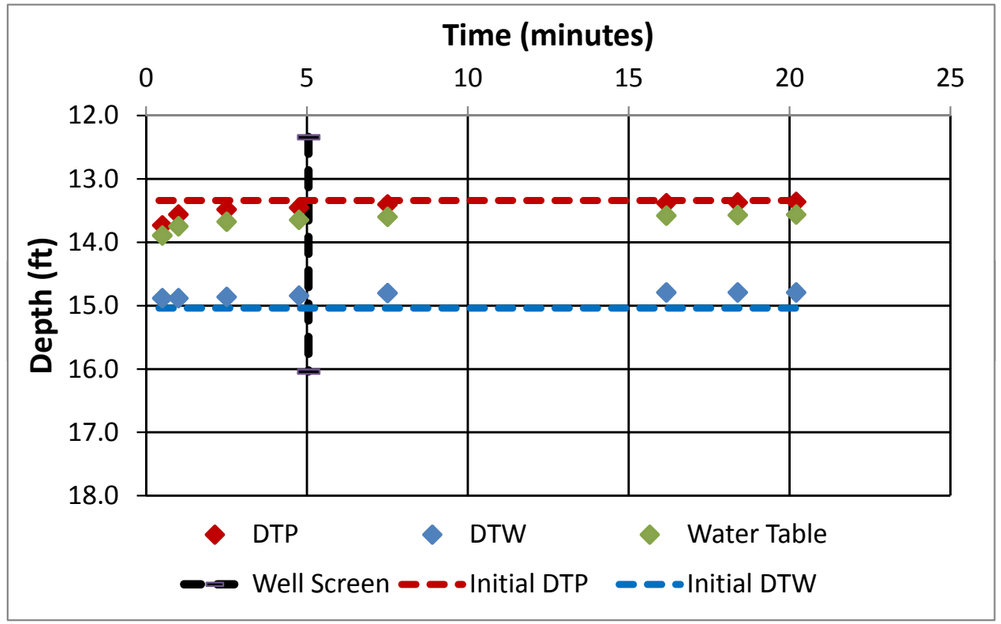

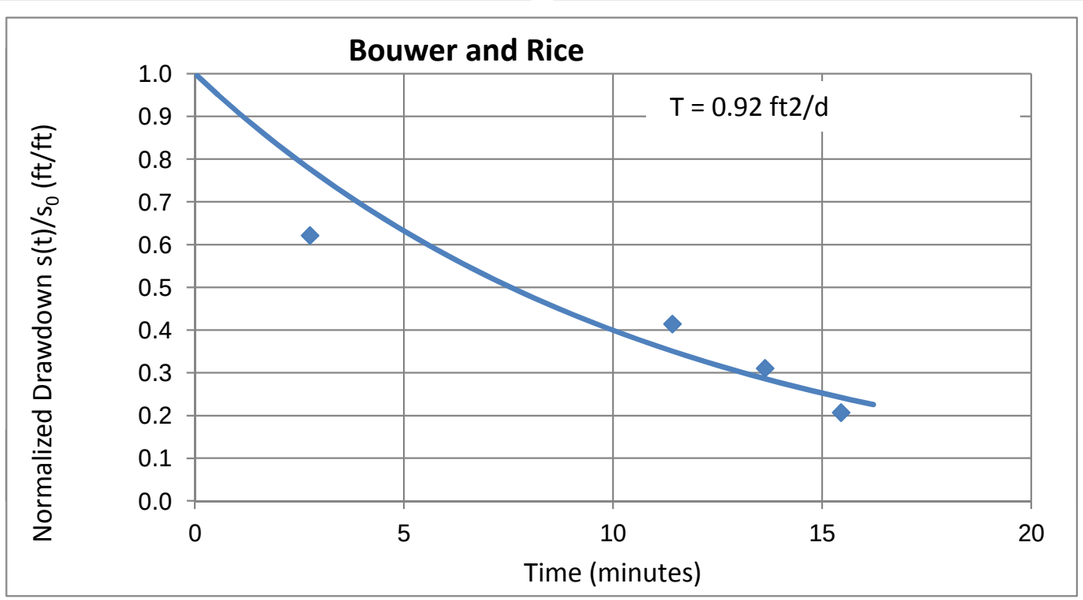

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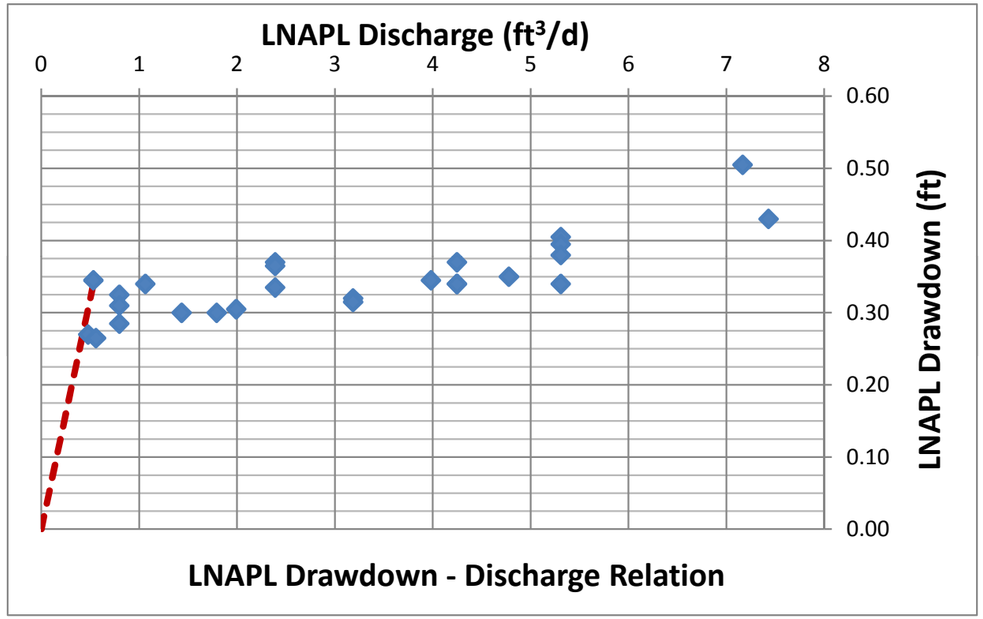

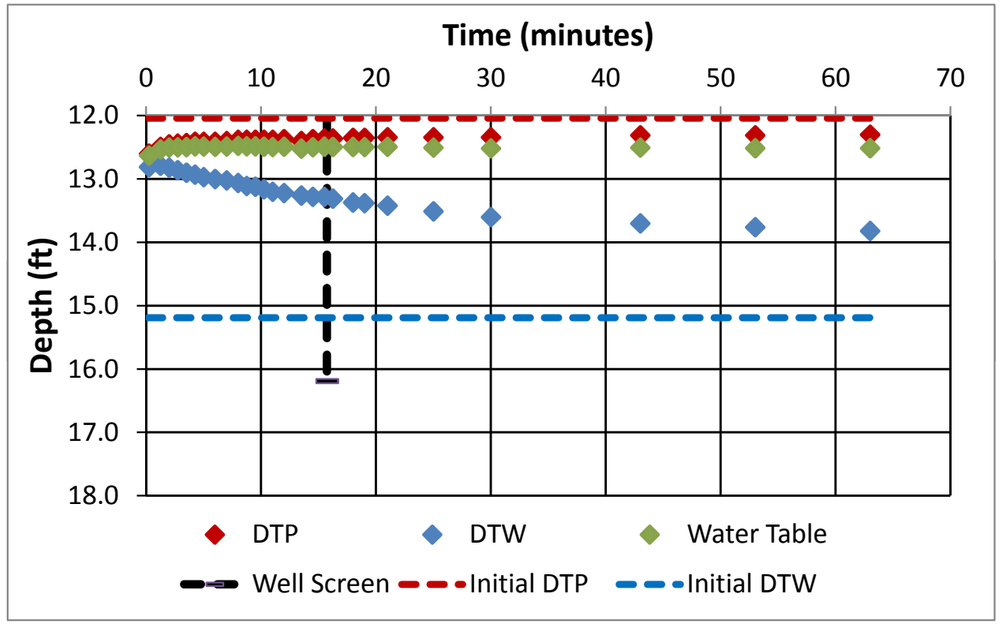

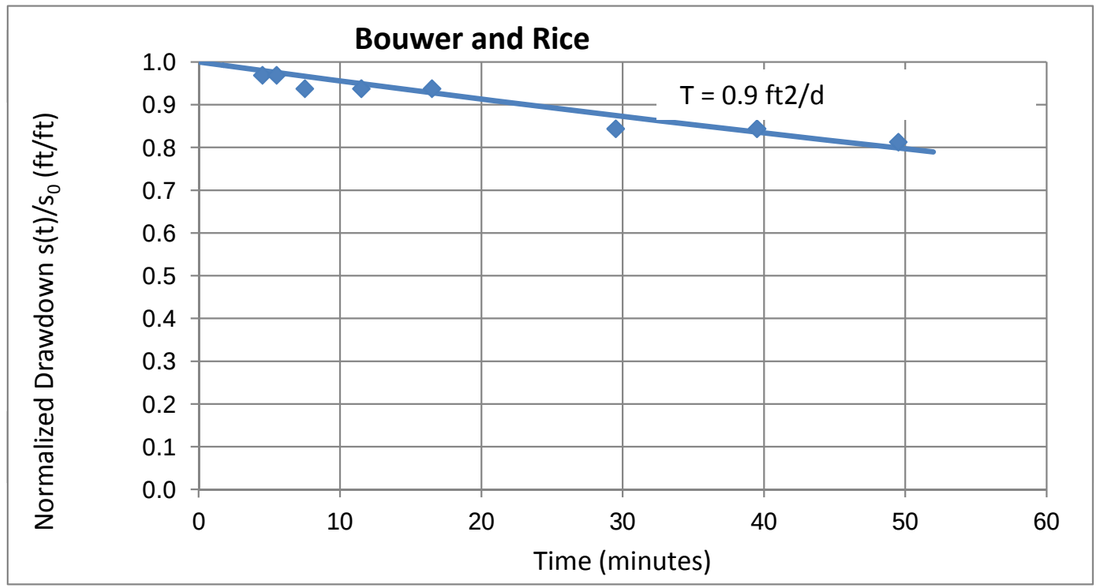

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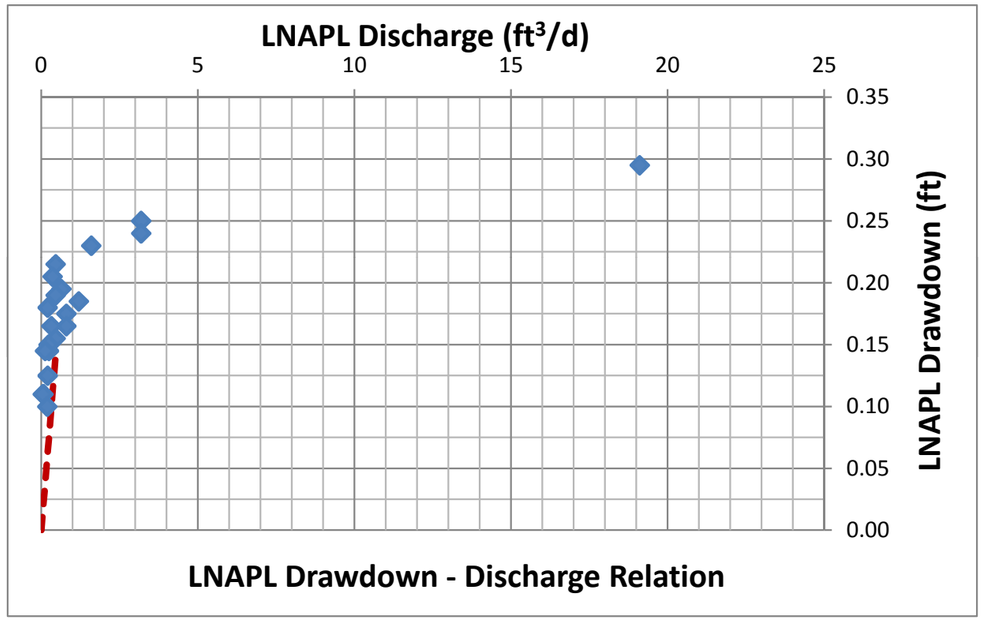

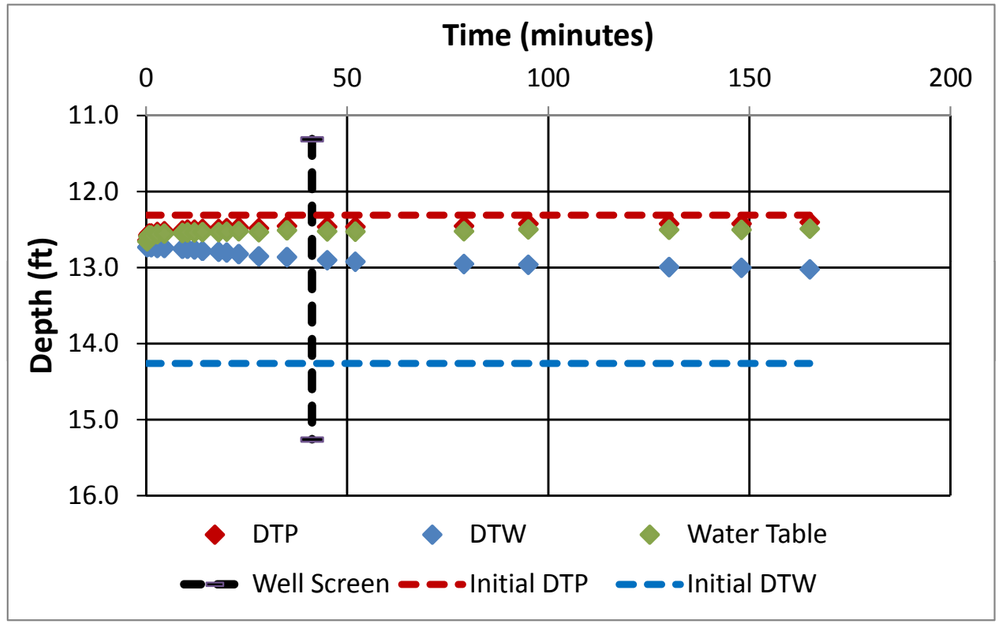

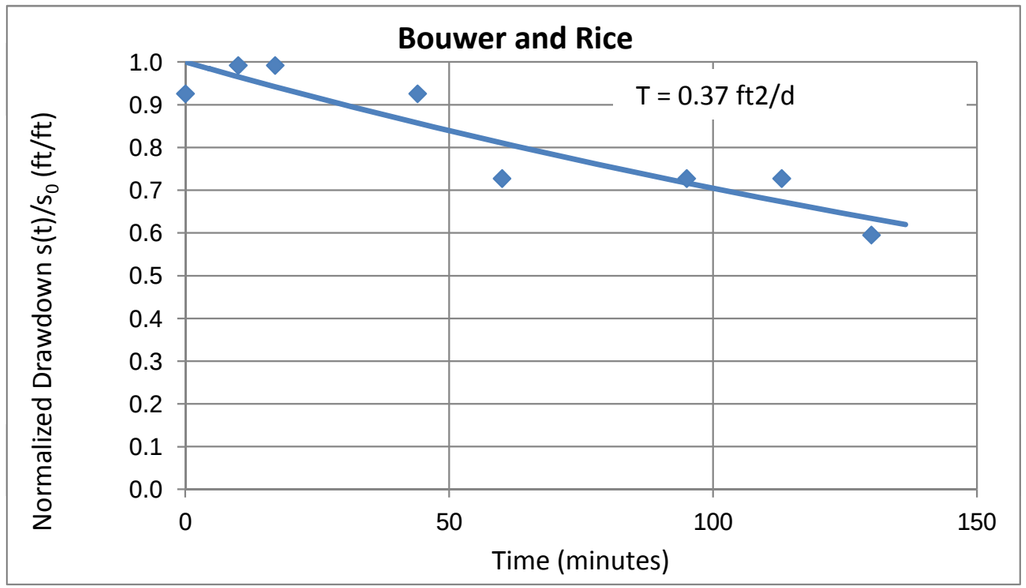

Appendix I

LPH Assessment

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CSX Transportation, Inc.

Appendix I

LPH Mobility and Recovery Assessment

C&O Canal/Brunswick Rail Yard, Brunswick, Maryland

April 18, 2013

ARCADIS

Katie Moran
Geologist 2

Kayleigh Lim
Staff Geologist

Steve Gaito
Senior Environmental Specialist

Appendix I
LPH Mobility and Recovery Assessment

C&O Canal/Brunswick Rail Yard, Brunswick, Maryland

Prepared for:
CSX Transportation, Inc.

Prepared by:
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Our Ref.:
MD000843.0011.00006

Date:
April 18, 2013

ARCADIS

Table of Contents

Tables

Figures

Attachments

1. Introduction

A comprehensive liquid phase hydrocarbons (LPH) mobility assessment was completed as part of the Supplemental Investigation at the C&O Canal/CSX Brunswick Rail Yard (the Site), Figure I-1. The overall objective of the Supplemental Investigation was to collect additional information to evaluate the nature and extent of contamination at the Site and fully characterize potential impacts to the adjacent C&O Canal National Historical Park property.

Results of the LPH mobility and recoverability assessment indicate LPH at the site is mobile within the interior of the LPH extent; however, it is not migrating outside the LPH footprint. Mobile LPH is capable of moving laterally and vertically at the soil media pore scale, meaning the LPH can enter a well, but has insufficient mobility at the pore scale to cause expansion of the LPH footprint. In summary, results of the LPH mobility assessment demonstrate the LPH extent is not expected to expand beyond the currently defined footprint.

2. LPH Mobility Assessment

A comprehensive LPH assessment uses multiple lines of evidence to determine LPH mobility and the potential for future LPH migration. Immobile LPH is functionally locked in pore spaces, while mobile LPH is capable of moving laterally and vertically within the existing LPH footprint. Migrating LPH moves outside the existing LPH location, thereby causing expansion of the footprint. The following lines of evidence were used to assess LPH delineation, mobility, and migration potential at the site:

- LPH delineation and characterization
- LPH presence in monitoring wells
- LPH pore velocity
- Dissolved-phase plume stability

The following sections describe the specific methodology for each of the lines of evidence used in this assessment.

2.1 LPH Delineation and Characterization

Based on site conditions and knowledge of historic operations, two potential source areas for LPH appear to be the former aboveground storage tank (AST) system on the western portion of the site, (which included a fuel pump house and a 500,000-gallon diesel fuel AST), and a current fueling area located north of the former roundhouse (Figure I-2).

Historic LPH presence and maximum LPH thicknesses measured at each location are presented on Figure I-2. As shown, LPH has been detected at various times across much of the eastern/central portion of the Site, extending from the western side of the roundhouse structure to the location of the former AST. Figure I-3 presents LPH thicknesses measured on January 13, 2013. Comparison of these figures indicates the current extent of measured LPH in monitoring wells is reduced in size from historical extents, and has not migrated beyond previously delineated LPH locations. Recent detections of LPH in CSXT MW-70 and CSXT MW-39 appear to be due to a recent release not associated with historic Site activities. Investigation of this new LPH area is ongoing at this time. Comprehensive LPH thicknesses and groundwater elevations measured since 2009 are compiled and presented in Attachment A.

Vertically, LPH has mostly been measured at elevations corresponding to the upper silty clay semi-confining unit. At well locations CSXT MW-55, and CSXT MW-54, the transition between the upper silty-clay unit and the underlying sand and gravel layer is within the range of groundwater elevation fluctuations measured at these wells (Figure I-4), indicating the vertical location of LPH may vary between the two geologic units.

2.2 LPH Observations in Monitoring Wells

Hydrographs of corrected groundwater elevation and measured LPH thickness were compiled for monitoring wells with historically observed LPH. The graphs were visually examined for trends in groundwater elevation and LPH thickness. LPH is potentially migrating when temporal fluid level gauging indicates the following:

- Clear trend of increasing thickness of LPH in monitoring wells through time, not attributable to seasonal water-table fluctuations.

- Advancement of LPH across a portion of the monitoring well network previously lacking measureable LPH, suggesting the LPH zone is expanding in that area.

As presented in the hydrographs in Attachment A, all monitoring wells that currently or historically had LPH observations have shown stable to decreasing LPH accumulations. Fluid levels at most of the LPH monitoring wells have been measured since 2009. CSXT MW-59, CSXT MW-60 and CSXT MW-63 were installed in 2012, and have been gauged since March 2012. Although they have been monitored for a shorter period of time, these wells do not show an indication of increasing LPH thicknesses. LPH has not been measured in upgradient monitoring wells MW-51 and MW-52. LPH has not been measured in CSXT monitoring wells located directly south or downgradient of the source area, CS-2 through CS-5, MW-6R, MW-8, MW-9, MW-20, MW-43, and all National Park Service (NPS) monitoring wells (NPS-MW-1 through NPS-MW-15). Additionally, monitoring wells crossgradient (CSXT MW-21, CSXT MW-24, CSXT MW-29, CSXT MW-64 and CSXT MW-65) of wells with observed LPH consistently had no accumulation of LPH. In general, LPH thicknesses have remained within historical ranges or decreased and were limited to the vicinity of the current fueling system.

LPH recovery in the form of skimmer pumps, periodic pumping, and absorbent socks have been conducted at all monitoring wells with the measured LPH. Recovery rates have declined over the past four years of corrective measure activities (Attachment B). Although active recovery can mask increasing trends in LPH thickness, the stable to decreasing LPH thicknesses are coupled with decreasing recovery rates indicating the LPH footprint is stable. Further, active LPH recovery has not occurred at CSXT monitoring and extraction wells MW-02, MW-04R, MW-23, MW-28, MW-33, and EW-2 since approximately 2010. LPH has not been measured in these wells at thicknesses greater than 0.03 feet since 2010, indicating the LPH footprint is not expanding.

LPH mobility at the pore-scale is dependent upon the presence of a sufficient driving head and hydraulic gradient. Therefore, accumulation of LPH in monitoring wells is not a stand-alone indicator of LPH mobility. The stable and decreasing LPH accumulation in monitoring wells within the current LPH footprint is a strong indication the plume is stable. The lack of LPH accumulation in downgradient wells demonstrates the LPH is not migrating.

2.3 LPH Pore Velocity

ASTM International's (ASTM's) E2531-06e1 Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Non-Aqueous Phase Liquids (ASTM 2006) suggests an LPH mobility of less than 1×10^{-6} centimeters per second (cm/s) indicates LPH in the formation is functionally immobile. When mobility

exceeds this criterion, indicating LPH is mobile at the pore scale and capable of moving vertically or laterally within the formation. In this case, additional analyses are needed to assess whether the current LPH footprint is expanding due to LPH migration.

LPH pore velocity is calculated using Darcy's Law, which relates fluid flow to the permeability of the aquifer, the fluid properties, the applied head, and the fluid-filled porosity. In the case of multiphase flow, the presence of more than one fluid within the porous media results in equivalent permeability reductions for each of the fluids in the system. For a two-phase LPH and groundwater system, the relative permeability of the formation to the fluids has a direct relationship to the saturation of the respective fluids (i.e., as the saturation of LPH increases, the relative permeability of the formation to LPH increases).

Two methods are generally used to determine a site-specific LPH relative permeability. The first uses petrophysical data on fluid saturation and capillary properties to calculate LPH relative permeability. The second employs field testing of LPH recharge within monitoring wells to jointly measure LPH hydraulic conductivity and LPH relative permeability. In this assessment, the second method is used and is discussed in details in section below.

The LPH pore velocity calculations represent a potential rate of LPH movement and alone are not indicative of LPH movement and/or LPH expansion. The LPH gradient is often insufficient to overcome pore-entry pressures at the fringes of an LPH footprint, resulting in no movement even when an LPH velocity is calculated for the interior of the LPH extent.

Field-Derived LPH Liquid Relative Permeability

LPH baildown testing is commonly used to measure LPH transmissivity. LPH baildown testing and analysis methodology is described in detail in section 2.5.2 of the report text. The LPH transmissivity determined through baildown testing can be converted to an LPH conductivity value by dividing the measured transmissivity by the equilibrium thickness of LPH accumulation in the well at the time of testing. The baildown test-derived LPH conductivity value incorporates the LPH relative permeability term because LPH transmissivity measured using baildown testing reflects the relative permeability of LPH in the formation, as shown in Equation 1.

$$K_{n(BDT)} = K_n \cdot k_{r\,n} \qquad \text{Equation 1}$$

Where:

$K_{n(BDT)}$ = LPH hydraulic conductivity from baildown testing, cm/s

Kn = LPH hydraulic conductivity, cm/s

kr n = relative permeability, dimensionless

Darcy's Law is used to calculate the LPH pore velocity from field-derived LPH relative permeability, as shown in Equation 2.

$$V_{n(BDT)} = K_{n(BDT)} \left(\frac{J_n}{\eta \cdot S_n} \right) \qquad \text{Equation 2}$$

Where:

V_n = LPH pore velocity, cm/s

η = porosity, dimensionless

Jn = LPH gradient, dimensionless

Sn = LPH saturation, dimensionless

LPH pore velocity was calculated using a field-derived LPH relative permeability from baildown testing at CSXT monitoring wells MW-41, MW-53, MW-55 and MW-56. The assumed porosity of 0.3 is used to represent the sand and silt lithology observed in CSXT MW-53, CSXT MW-55 and CSXT MW-56; and porosity of 0.35 is used to represent the silt and clay lithology observed in CSXT MW-41. LPH saturation was calculated using an approximate soil bulk density and TPH concentrations from a soil sample collected from GP-41 at approximately 15 to 17 feet below ground surface (bgs) is used in the calculation because LPH were generally observed within similar depth intervals at CSXT well locations MW-41, MW-53, MW-55 and MW-56. Using equations 1 and 2 above, pore velocities range from 3.23×10^{-7} to 8.67×10^{-6} cm/s was calculated. LPH pore velocities are provided on Table I-1. Table I-2 contains the results of the field-derived LPH relative permeability from baildown testing.

ASTM suggests LPH pore velocities less than 1×10^{-6} cm/s indicate LPH in the formation is functionally immobile. LPH pore velocities determined using field-derived LPH relative permeability are below the ASTM functional-immobility criterion, at CSXT MW-41.

The LPH velocities at CSXT MW-53, CSXT MW-55 and CSXT MW-56 range from 1.4×10^{-6} to 8.67×10^{-6} cm/s, which exceed the ASTM criterion for mobility. These results indicate LPH is able to move vertically or laterally within the formation at the pore scale at these locations within the existing LPH footprint.

3. Dissolved-Phase Plume Stability

Statistical trending of dissolved-phase constituent concentrations at locations where separate-phase LPH is not observed in the well can be used to assess the dissolved-phase plume stability. Stable or decreasing groundwater concentrations of dissolved LPH compounds indicate the LPH extent is stable or decreasing in size.

The Air Force Center for Engineering and the Environment created the program MAROS (Monitoring and Remediation Optimization System), which includes tools for non-parametric statistical concentration trend analyses using the Mann-Kendall statistical test. Groundwater concentrations of indicator constituents, selected based on LPH fluid type or available historical analytical data for a site, are analyzed in MAROS using Mann-Kendall to determine the stability of the groundwater plume.

Stable or decreasing groundwater concentrations of dissolved LPH compounds indicate the LPH source is stable or decreasing in size. The results of the Mann-Kendall statistical analysis using MAROS provide groundwater trends from which conclusions on dissolved-phase plume stability can be drawn. Dissolved-phase trends of DRO as a result of Mann-Kendall statistical analysis of MAROS are summarized on Attachment B.

Analytical data of 33 monitoring wells from July 1994 through January 2013 were used in this analysis to evaluate current site trends. The plume stability evaluation did not include wells if measured LPH was historically present. MAROS requires a minimum of four sampling events to complete a statistically valid analysis. If 50 percent or more sampling events returned non-detectable results, then trends resulting from MAROS were nullified. Groundwater samples from several monitoring wells (CSXT MW-3, CSXT MW-8 and CSXT MW-20) had fewer than 50 percent detectable results for DRO

during the sampling period analyzed; these results are indicated with "N/A" in Attachment B.

Results of the Mann-Kendall statistical analysis performed on groundwater sampling data from 32 monitoring wells are presented in Attachment B. Monitoring wells located downgradient of the source areas (NPS monitoring wells) exhibit stable to decreasing trends across the Site, with the exception of NPS-MW-1, NPS-MW-2 and NPS-MW-13 where no trend could be defined.

In general, concentrations of DRO are not increasing at any monitoring well with the exception of CSXT MW-24, and the majority show stable or decreasing trends. A review of historical data shows that concentrations at CSXT MW-24 well fluctuate from approximately 0.26 to 2.3 milligrams per liter (mg/L) and concentrations have been decreasing since August 2011. Also, concentrations at an upgradient monitoring well, CSXT MW-65 are decreasing and concentrations at downgradient monitoring well NPS-MW-16 are stable. These trends indicate that benzene concentrations in groundwater at the site are stable despite the trend seen in CSXT MW-24.

The prevalence of stable to decreasing trends, especially in monitoring wells located downgradient of areas where LPH is present, demonstrates the dissolved-phase plume is stable, which indicates the LPH footprint is also stable.

4. LPH Recoverability Assessment

If it is determined that LPH is vertically and laterally mobile within the subsurface, the recoverability of the LPH is evaluated to determine the practicality of extracting LPH from the subsurface. LPH recoverability is defined as physically removing LPH without reliance on phase change and includes manual removal via a bailer, vacuum truck events, LPH skimming, or dual phase extraction. The following lines of evidence were used to evaluate LPH recoverability.

- LPH transmissivity
- Decline curve analysis

The following sections describe the specific methodology for each of the lines of evidence used in this assessment.

4.1 LPH Field Transmissivity

LPH transmissivity is commonly characterized using short-term duration LPH stress testing, also called LPH baildown testing. An LPH baildown test is initiated by quickly removing LPH from a well, making it analogous to a groundwater rising-head slug test. The rate of LPH flow into the well after initial removal is a function of LPH saturation, permeability of the surrounding formation to LPH, physical properties of the LPH (density, viscosity, interfacial tension between LPH and water), and magnitude of the initial hydraulic gradient toward the well developed during LPH removal.

LPH baildown tests having sufficient LPH recharge into the well (recovery) during the test can be quantitatively analyzed to determine site LPH bulk transport conditions, and to characterize LPH recoverability. LPH recovery using hydraulic methods (e.g., dual-phase extraction, skimmer pumping, vacuum truck operations) is typically not effective for areas where LPH transmissivity is less than 0.1 to 0.8 square feet per day (ft^2/day) (ITRC 2009). Baildown test methods are documented in section 2.5.3 of the report and summarized in Table I-2.

LPH recovery using hydraulic methods yields negligible LPH when the LPH transmissivity is less than 0.1 to 0.8 ft^2/day, (ITRC 2009). The calculated transmissivity for the monitoring wells CSXT MW-53, CSXT MW-55 and CSXT MW-56 are above this transmissivity criterion range, indicating LPH recovery via hydraulic methods is practical and would produce sufficient LPH to beneficially reduce the overall LPH mass around these locations. The calculated transmissivity for the monitoring well CSXT MW-41 range between the transmissivity criterion of 0.1 to 0.8 ft^2/day, indicating while not optimum, LPH recovery at this well location may be practicable.

Transmissivity was not quantified at CSXT MW-49 and CSXT MW-54 due to limited LPH discharge and fluctuating fluid levels, respectively. However, a qualitative assessment of the LPH baildown test at CSXT MW-49 suggests limited LPH transmissivity because LPH thicknesses did not recover to their respective initial values, a maximum of 0.53 foot, over 22 hours. Recovery at CSXT MW-54 was consistent with recovery observed at CSXT MW-53, CSXT MW-55, and CSXT MW-56 indicating LPH recovery at this location may be practicable.

4.1.1 Decline Curve Analysis

Recoverable LNAPL volume can be estimated based on an evaluation of historical recovery operations at a site using a decline curve analysis to predict the likely

remaining LNAPL recovery from the system. Monthly volumes of recovered LNAPL are graphed against the cumulative LNAPL volume recovered for a given site, and the data trend is analyzed using linear regression. The trend line intersects the x-axis at the anticipated cumulative recoverable LNAPL volume possible for the site.

$$V_{recovered} = \text{slope} \cdot V_{R_n} + \text{intercept} \qquad \text{Equation 3}$$

Where,

$V_{recovered}$	=	Monthly LNAPL Volume Recovered (gal)
slope	=	Slope of the linear trend line (1/gal)
intercept	=	Value where the linear trend line intersects the y-axis (gal)

A decline curve analysis was performed using product recovery data presented in Attachment C. Recovery data were summarized as monthly total LPH removed from the five active skimming wells, covering the past twenty nine months of active skimming at CSXT wells MW-41, MW-53, MW-54, MW-55, and MW-56. The equation shown in Attachment C was used to populated the slope and intercept variables in Equation 3. These wells contribute approximately 80 percent of the LPH recovered to date and the total remaining recoverable LNAPL volume was adjusted as such. The total recoverable LPH volume is approximately 1,500 gallons and the anticipated remaining recoverable LPH volume is 800 gallons using the decline curve analysis. This remaining recoverable volume is likely an overestimation of actual recovery because recovery decreases to impracticable rates prior to reaching the total recoverable volume. This assessment indicates the final 70 gallons of LPH would be recovered at approximately 1 gallon per month from the combined six skimmers. Therefore, an additional 3 to 6 years of active skimming is anticipated to approach asymptotic recovery.

5. Summary and Conclusions

The vertical and horizontal extent of LPH is delineated based on the observed in-well LPH accumulation monitoring and soil boring data. LPH is likely sourced from the former AST System on the western portion of the site and the current fueling area located north of the former roundhouse.

5.1 LPH Mobility

LPH is mobile at the pore scale near the source areas, but is not migrating at the plume-scale. These findings are supported by multiple LPH mobility and migration potential analyses. The results of these analyses are summarized as follows:

- In general, LPH accumulations in monitoring wells have decreased. Stable accumulation within the footprint of the LPH and the absence of LPH accumulation in monitoring wells downgradient of the LPH footprint indicates LPH is stable and not migrating.

- Pore velocity potentials calculated using field-derived LPH relative permeability from baildown testing performed in monitoring well MW-41 resulted in pore velocities below the ASTM mobility criterion of 1×10^{-6} cm/s indicating LPH is functionally immobile in the vicinity of this location.

- Dissolved-phase concentrations of diesel fuel indicator constituents generally have decreasing trends. These results indicate the dissolved-phase plume is stable, which indicates at the site-wide scale, the LPH source is also stable.

Although LPH is stable and not migrating, LPH is mobile at the pore scale. Mobile LPH is observed within the existing LPH footprint. These findings are supported by the following LPH mobility assessment lines of evidence:

- LPH is observed in monitoring wells near the source areas, indicating LPH is mobile at the pore scale adjacent to the monitoring well.

- Pore velocity potentials calculated using field-derived LPH relative permeability from baildown testing performed in monitoring wells CSXT MW-53, CSXT MW-55 and CSXT MW-56 exceeded the ASTM mobility criterion of 1×10^{-6} cm/s. LPH mobility within the existing LPH footprint is minimal, demonstrated by pore velocities ranging from 1.4×10^{-6} to 8.67×10^{-6} cm/s, and the degree the mobility criterion is exceeded.

- Baildown testing and periodic LPH recovery indicates LPH accumulates in monitoring wells after LPH has been removed.

5.2 LNAPL Recoverability

Baildown tests at CSXT wells MW-53, MW-54, MW-55, and MW-56 indicate LPH at the Site is recoverable within the existing LPH footprint. Based on LPH decline curve analysis, projected Site LPH removal is estimated to approach asymptotic recovery in approximately 3 to 6 years.

In conclusion, LPH at the site is mobile within the interior of the LPH extent; however it is not migrating outside the LPH footprint. Mobile LPH is capable of moving laterally and vertically at the soil media pore-scale, meaning the LPH can enter a well, but has insufficient mobility at the pore-scale to cause expansion of the LPH footprint.

6. References

ASTM International. 2006. Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Nonaqueous-Phase Liquids Released to the Subsurface. Document: E 2531-06.

ASTM International. 2012. Standard Guide for Estimation of LNAPL Transmissivity. Document: E 2856-11.

American Petroleum Institute. 2012. DRAFT API LNAPL Transmissivity Workbook: User Guide, Regulatory and Scientific Affairs Department, American Petroleum Institute (API), Technical Publication. January 2012.

Interstate Technology & Regulatory Council. 2009. Evaluating LNAPL Remedial Technologies for Achieving Project Goals. LNAPL-2. Washington, D.C.: Interstate Technology & Regulatory Council, LNAPLs Team. www.itrcweb.org.

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Tables

Table I-1
LPH Pore Velocity Calculations using Field-Derived Permeability

Supplemental Investigation Report and Revised Site Conceptual Model
CSX Transportation
Brunswick, Maryland

Baildown Test at Well	LPH Hydraulic Gradient[1] J_n	Porosity[2] η	LPH Saturation[3] S_n	LPH Hydraulic Conductivity[4] $K_{n\ (BDT)}$	LPH Hydraulic Conductivity $K_{n\ (BDT)}$	LPH Pore Velocity $V_{n\ (BDT)}$
				ft/day	cm/sec	cm/sec
Report Equation:						2
MW-41	0.0230	35	0.0460	0.06	0.000023	3.23E-07
MW-53	0.0230	30	0.0460	1.47	0.000520	**8.67E-06**
MW-55	0.0230	30	0.0460	0.67	0.000236	**3.93E-06**
MW-56	0.0230	30	0.0460	0.24	0.000084	**1.40E-06**

[1] Values for J_n were derived from groundwater elevation results from Jannuary 2013

[2] Porosity is the assumed porosity of the sand \observed in site borings

[3] LNAPL saturation is the DRO analytical result from a nearby soil sample collected in known LPH smear zone (GP-41)

[4] LPH Hydraulic onductivity is the average value from LPH baildown test results from Table I-2

Bold Pore velocity exceeds functionally immobile criteria of 1×10^{-6} cm/s.

Acronyms and Abbreviations:
cm/sec = centimeters per second
ft/day = foot (or feet) per day
LPH = Liquid Phase Hydrocarbon

Table I-2
LPH Baildown Test Results
C & O Canal/Brunswick Rail Yard, Brunswick, Maryland

Test Well ID	Date	Initial LPH Thickness (feet)	Test Duration (minutes)	Final LNAPL Thickness (feet)	LPH Transmissivity ($feet^2$/day)	LPH Hydraulic Conductivity (feet/day)	Average LPH Transmissivity ($feet^2$/day)
					Bouwer & Rice		
MW-41	1/23/2013	1.87	2559	0.93	0.12	0.06	0.12
MW-49	1/24/2013	0.53	1345	0.22	NA[1]	NA	NA
	1/25/2013	0.22	153	0.16	NA[2]	NA	
MW-53	1/23/2013	1.42	1392	1.34	**2.44**	1.72	2.05
	1/24/2013	1.34	1510	1.2	**1.65**	1.23	
MW-54	1/23/2013	0.39	238	0.3	NA[3]	NA	NA
	1/23/2013	0.3	1578	0.52	NA[3]	NA	
MW-55	1/22/2013	1.9	1003	1.7	**1.50**	0.79	1.22
	1/23/2013	1.7	182	1.48	**0.93**	0.55	
	1/23/2013	1.48	385	1.32	NA[3]	NA	
MW-56	1/24/2013	3.15	1394	1.95	**0.90**	0.29	0.64
	1/25/2013	1.95	165	0.62	0.37	0.19	

Acronyms and Abbreviations:

Bold Exceeds 0.1 to 0.8 ft^2/day lower criterion range to produce sufficient LNAPL recoverability (ITRC 2009a).

Bouwer & Rice = Bouwer & Rice modified slug test analysis method

LNAPL = light non-aqueous phase liquid

NA = not analyzed for the following reasons:

1. Filter pack drainage dominated recovery period
2. LPH discharge to the monitoring well was too limited to quantify with testing methods
3. Fluid levels during the test fluctuated and poor LNAPL discharge to the monitoring well

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Figures

E POTOMAC STREET
1st STREET
2nd AVENUE
3rd AVENUE
FORMER FUEL PUMP HOUSE
FORMER AST
FORMER ROUNDHOUSE
CSXT PROPERTY
MARYLAND NATIONAL CAPITAL PARKS AND PLANNING COMMISSION PROPERTY
C&O CANAL NATIONAL HISTORICAL PARK
EXISTING CANAL
UNPAVED ROAD
STONE DRAINAGE GALLERY
HEADWALL (STONE) INV=220.78
HEADWALL (STONE) INV=217.69
HEADWALL (STONE) INV=223.63 HEIGHT: 5' INVERT=7.4'±
SDMH TOP=246.97
SDMH TOP=246.57
SDMH TOP=247.82
SDMH TOP=246.72
DENSE TREES

LEGEND:
- EW-1 EXTRACTION WELL
- MW-1 CSXT MONITORING WELL
- MW-1(NPS) NATIONAL PARK SERVICE MONITORING WELL
- CS-1 COLLECTION SUMP LOCATION
- GP-31 GEOPROBE DIRECT PUSH
- MW-67 NEW CSXT MONITORING WELL

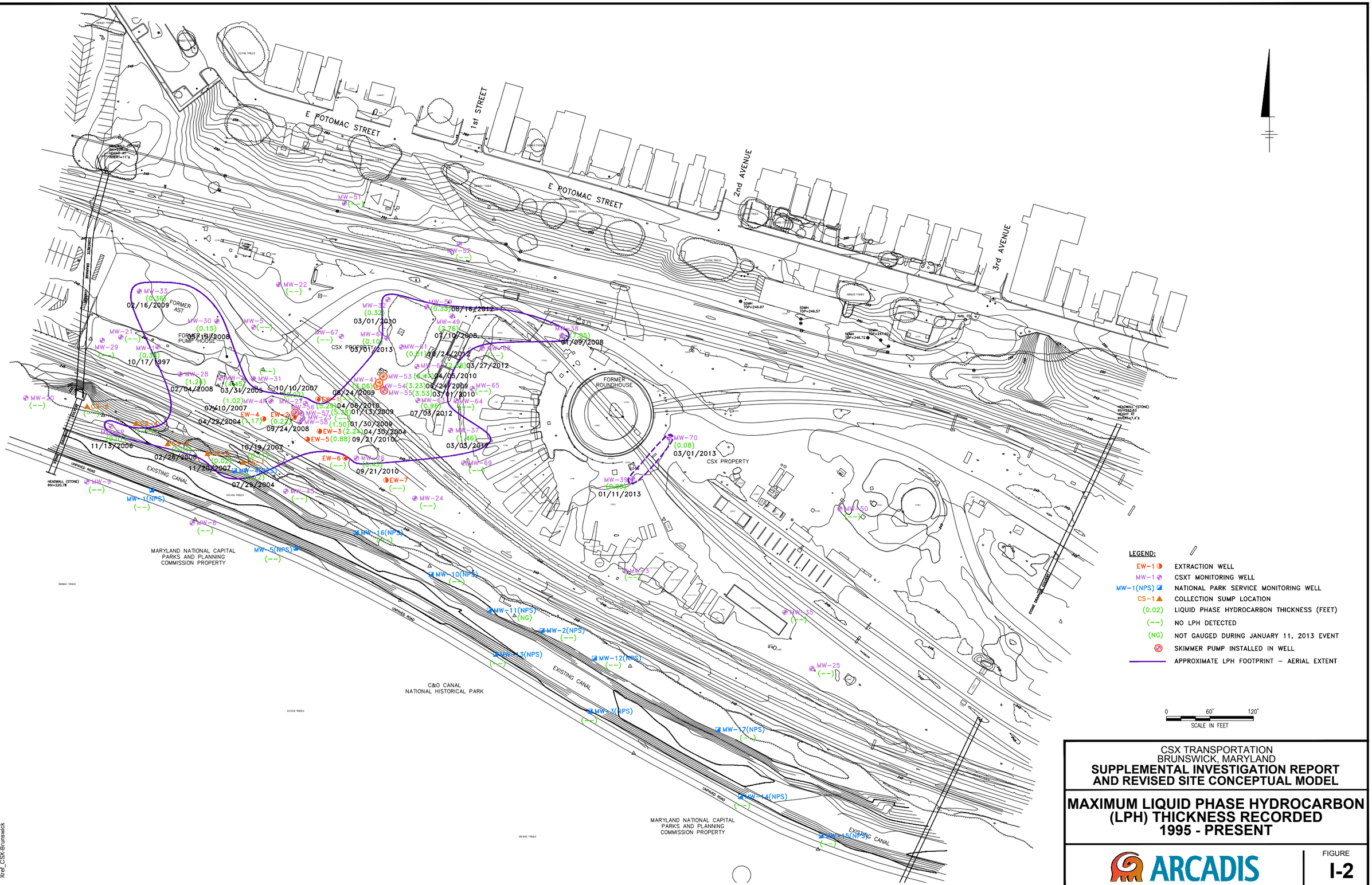
0 60' 120'
SCALE IN FEET

CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

SITE PLAN

ARCADIS

FIGURE
I-1



CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

MAXIMUM LIQUID PHASE HYDROCARBON (LPH) THICKNESS RECORDED 1995 - PRESENT

ARCADIS

FIGURE
I-2

CITY:(Req'd) DIV/GROUP:(Req'd) DB:(Req'd) LD:(Opt) PIC:(Opt) PM:(Req'd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\MD000843\0011\00006\MD843_11_6 F06.dwg LAYOUT: 6 SAVED: 4/8/2013 4:37 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: TOPO.CTB PLOTTED: 4/18/2013 10:16 AM BY: SANCHEZ, ADRIAN
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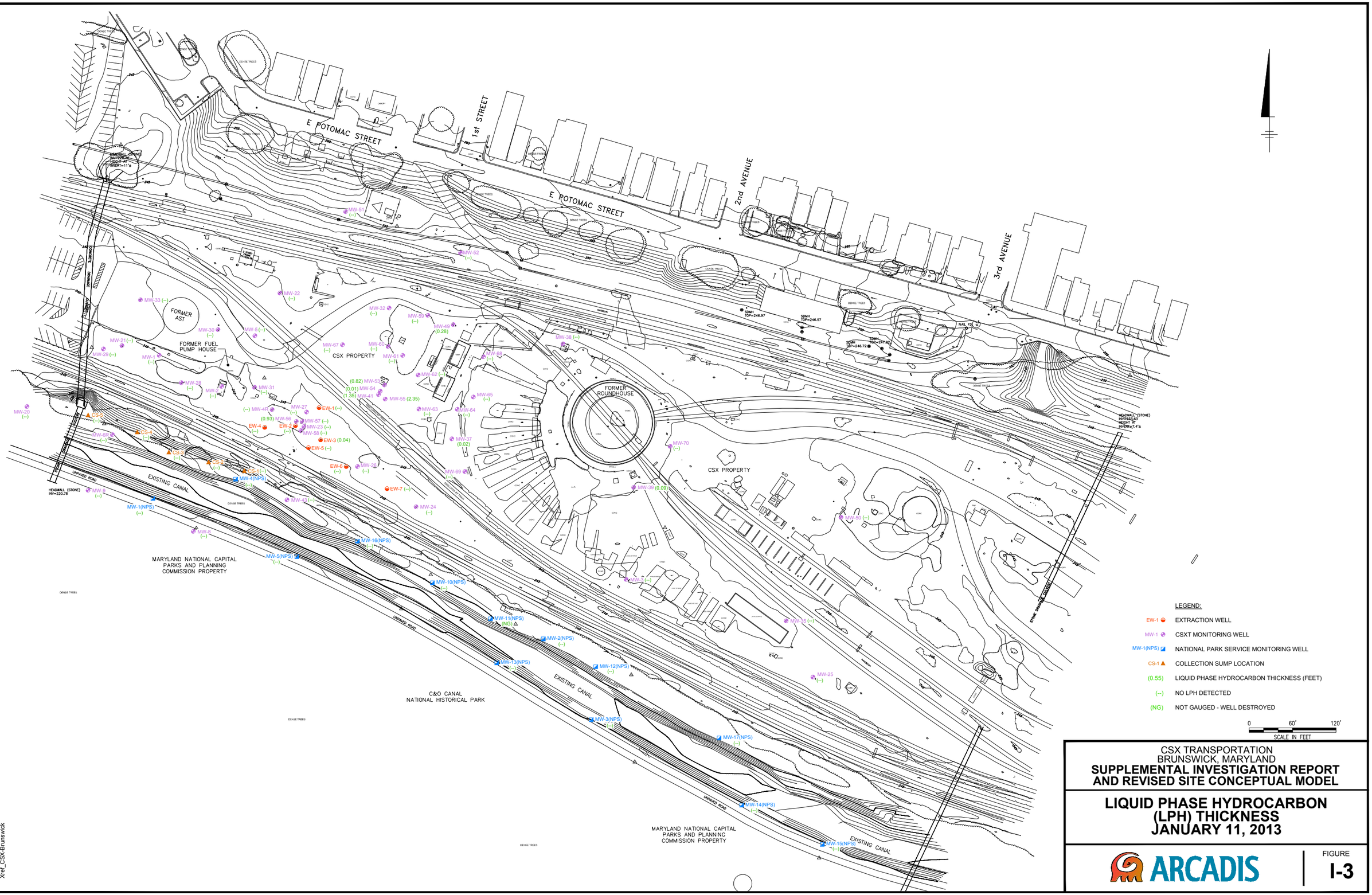

LEGEND:

- EW-1 — EXTRACTION WELL
- MW-1 — CSXT MONITORING WELL
- MW-1(NPS) — NATIONAL PARK SERVICE MONITORING WELL
- CS-1 — COLLECTION SUMP LOCATION
- (0.55) — LIQUID PHASE HYDROCARBON THICKNESS (FEET)
- (--) — NO LPH DETECTED
- (NG) — NOT GAUGED - WELL DESTROYED

0 60' 120'
SCALE IN FEET

CSX TRANSPORTATION
BRUNSWICK, MARYLAND

SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

LIQUID PHASE HYDROCARBON (LPH) THICKNESS JANUARY 11, 2013

ARCADIS

FIGURE
I-3

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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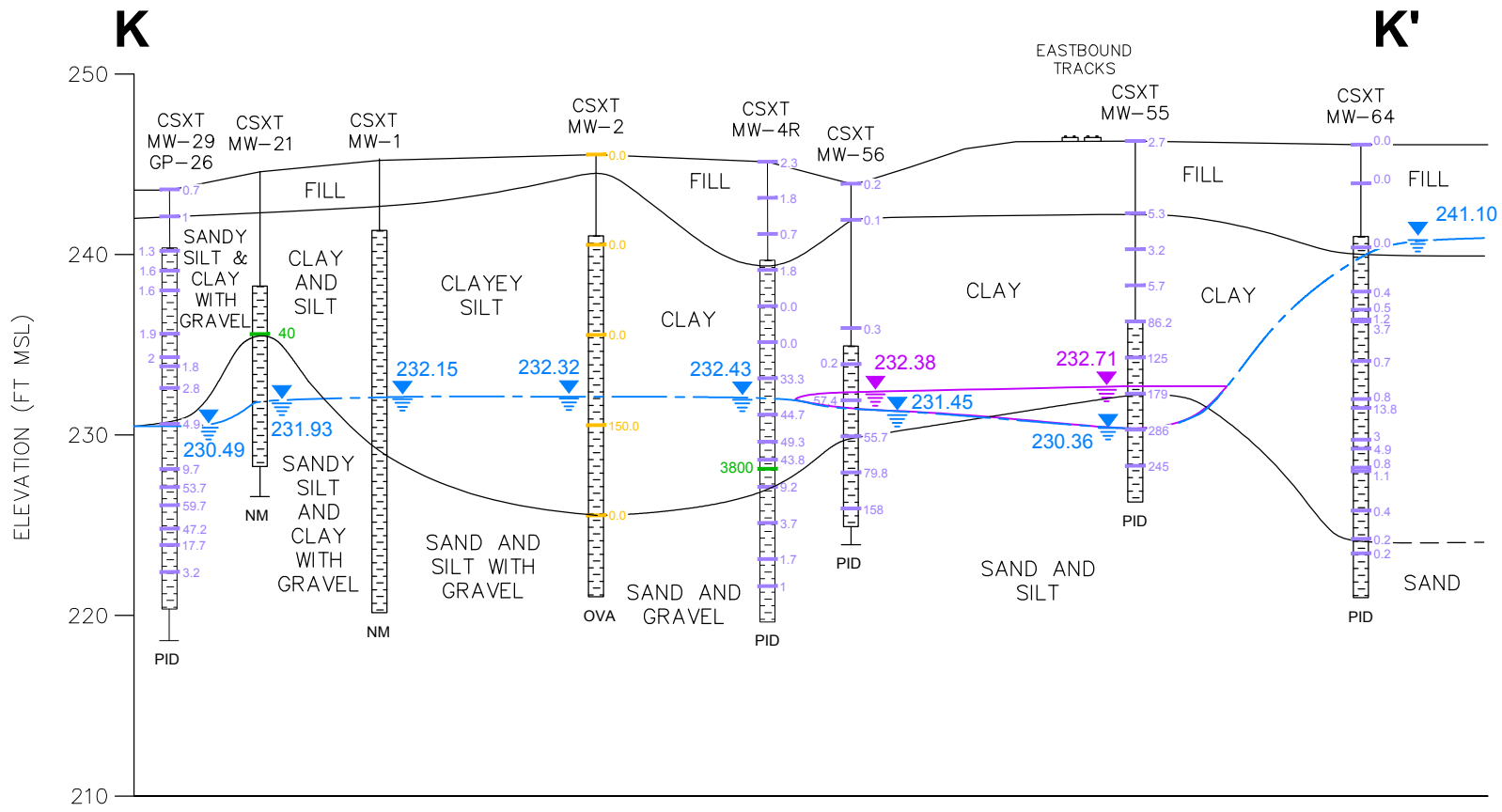
XREFS: IMAGES: PROJECTNAME: ----
Xref_CSX-Brunswick

CITY:SYRACUSE DIV/GROUP:ENV DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\HOUSTON\RETURN-TO\Syracuse-NY\MD000843\0011\00006\MD843_11_6 FC10-C12.dwg LAYOUT: I-4 SAVED: 4/4/2013 2:19 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ACAD.CTB PLOTTED: 4/4/2013 4:18 PM BY: INNISS, HAYDEN
XREFS: IMAGES: PROJECTNAME: ----



0 40 80
HORIZONTAL SCALE: FEET

0 5 10
VERTICAL SCALE: FEET

LEGEND:

GROUNDWATER ELEVATION (FT AMSL, JANUARY 11, 2013)

LIQUID PHASE HYDROCARBON ELEVATION (FT AMSL, JANUARY 11, 2013)

SELECTED SOIL SCREENING CONCENTRATION, PPM:
5.10 PHOTOIONIZATION DETECTOR [PID]
5.10 FLAME IONIZATION DETECTOR [FID]
5.10 ORGANIC VAPOR ANALYZER [OVA]

3.70 TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANICS (TPH-DRO) CONCENTRATION IN SOIL (MG/KG)

NOTES:

1. NM = PID/FID/OVA READINGS AT 0.0 PPM DURING BORING.
2. NM = PID/FID/OVA READING NOT COLLECTED DURING BORING.
3. PPM = PARTS PER MILLION.

CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL INVESTIGATION REPORT AND REVISED SITE CONCEPTUAL MODEL

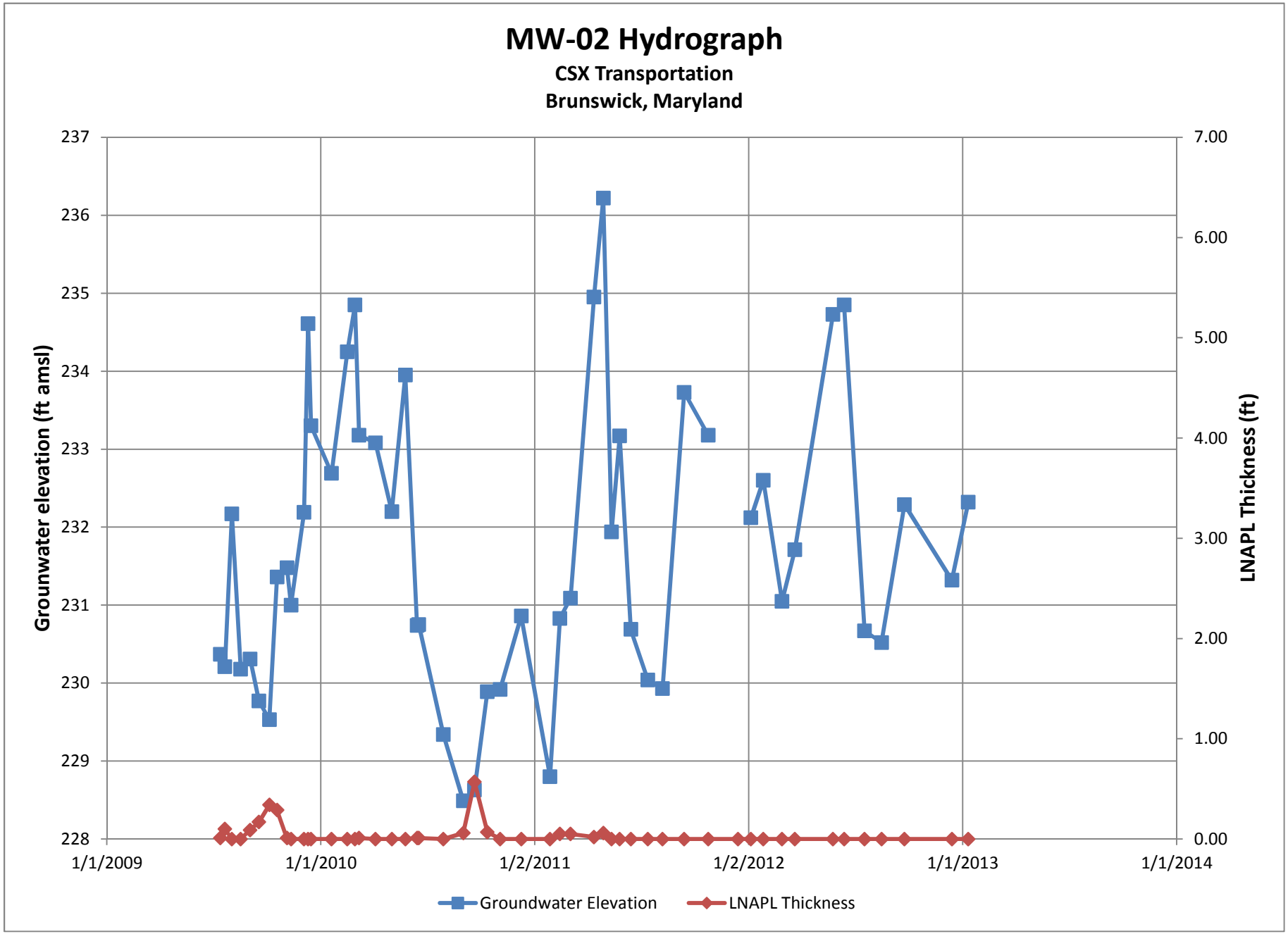
SECTION K-K'

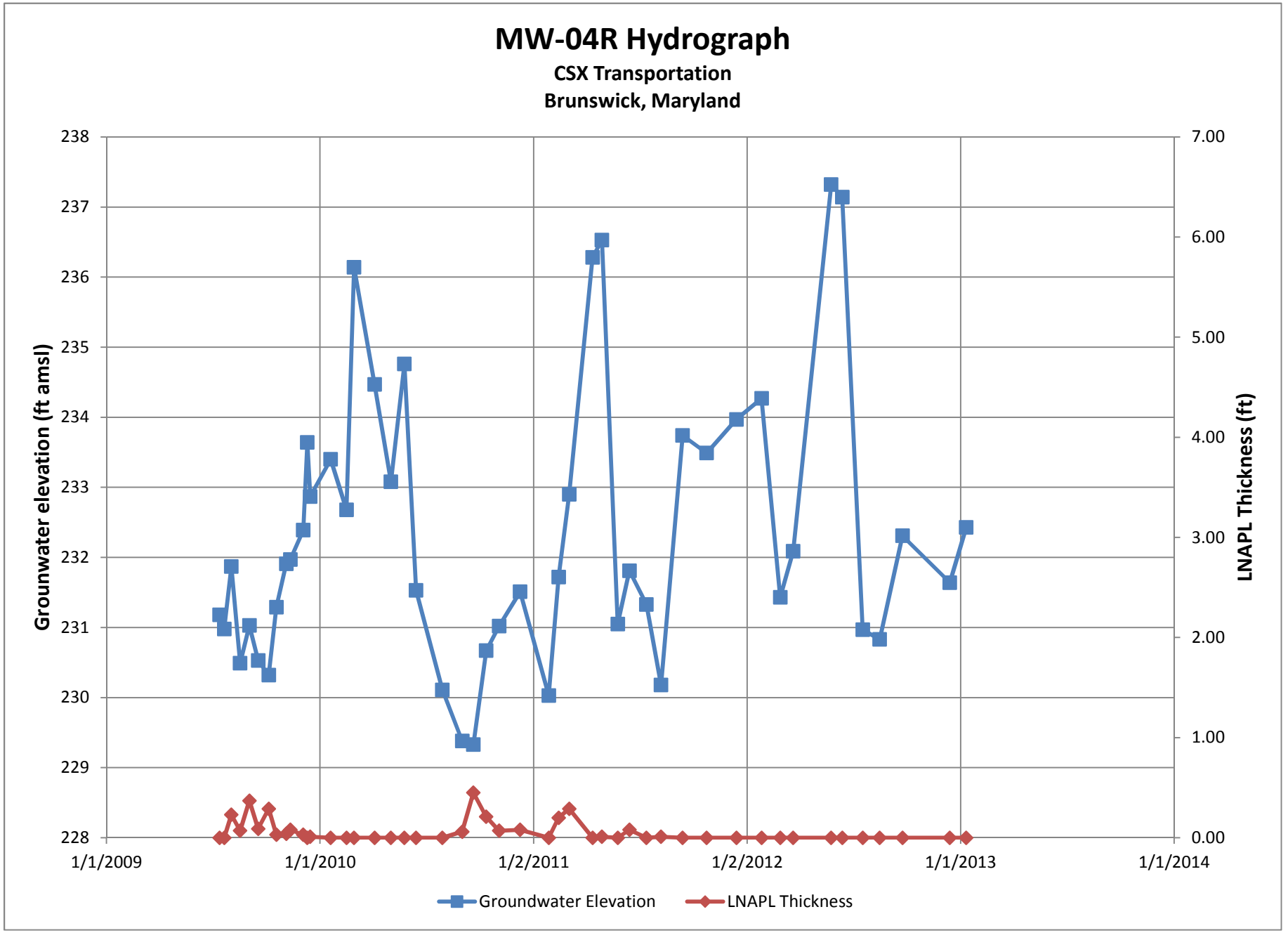
ARCADIS

FIGURE
I-4

Attachment A

Hydrograph


MW-02 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
237
236
235
234
233
232
231
230
229
228
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-04R Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
238
237
236
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228
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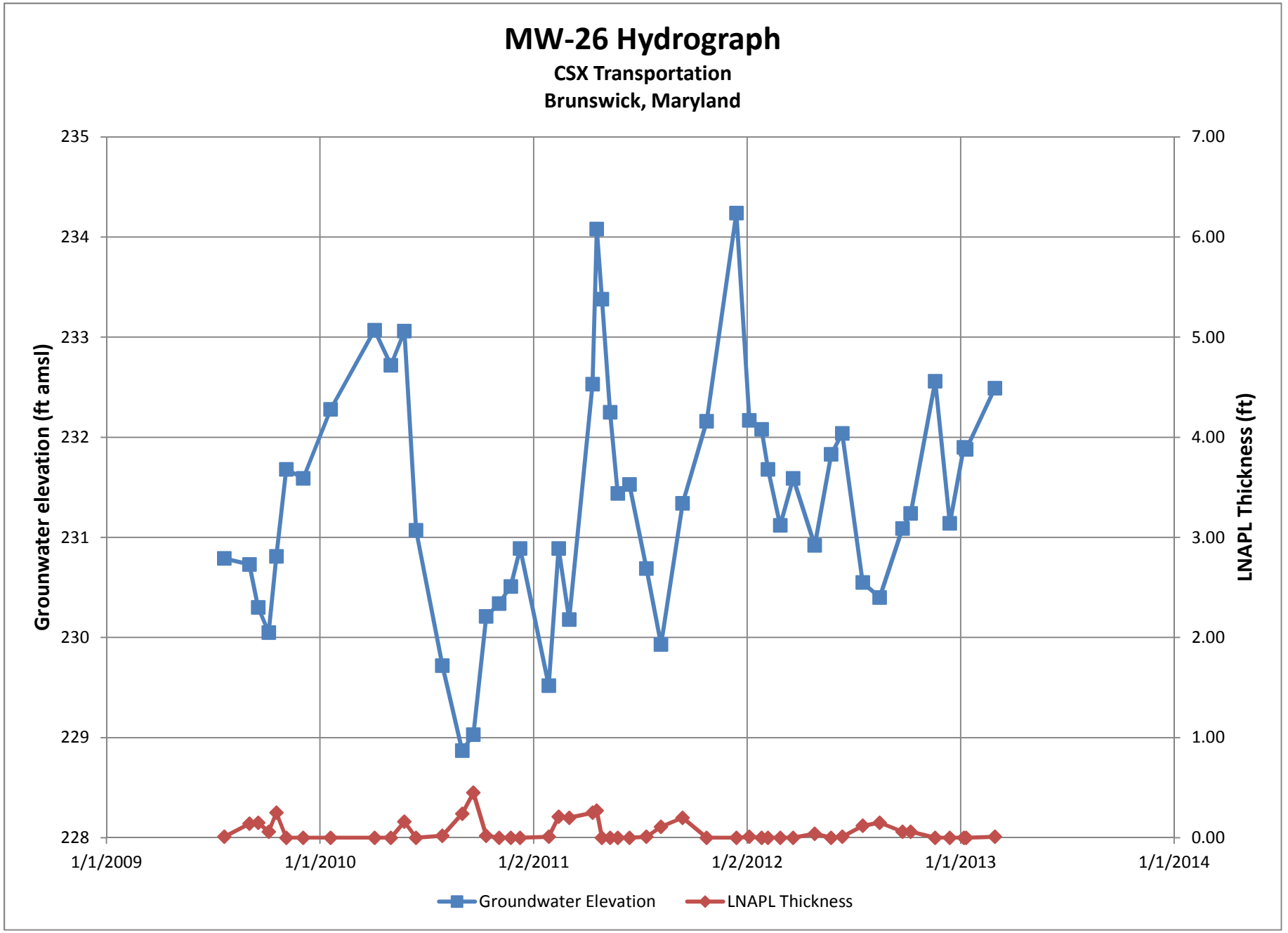
2.00
1.00
0.00
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-26 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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234
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229
228
7.00
6.00
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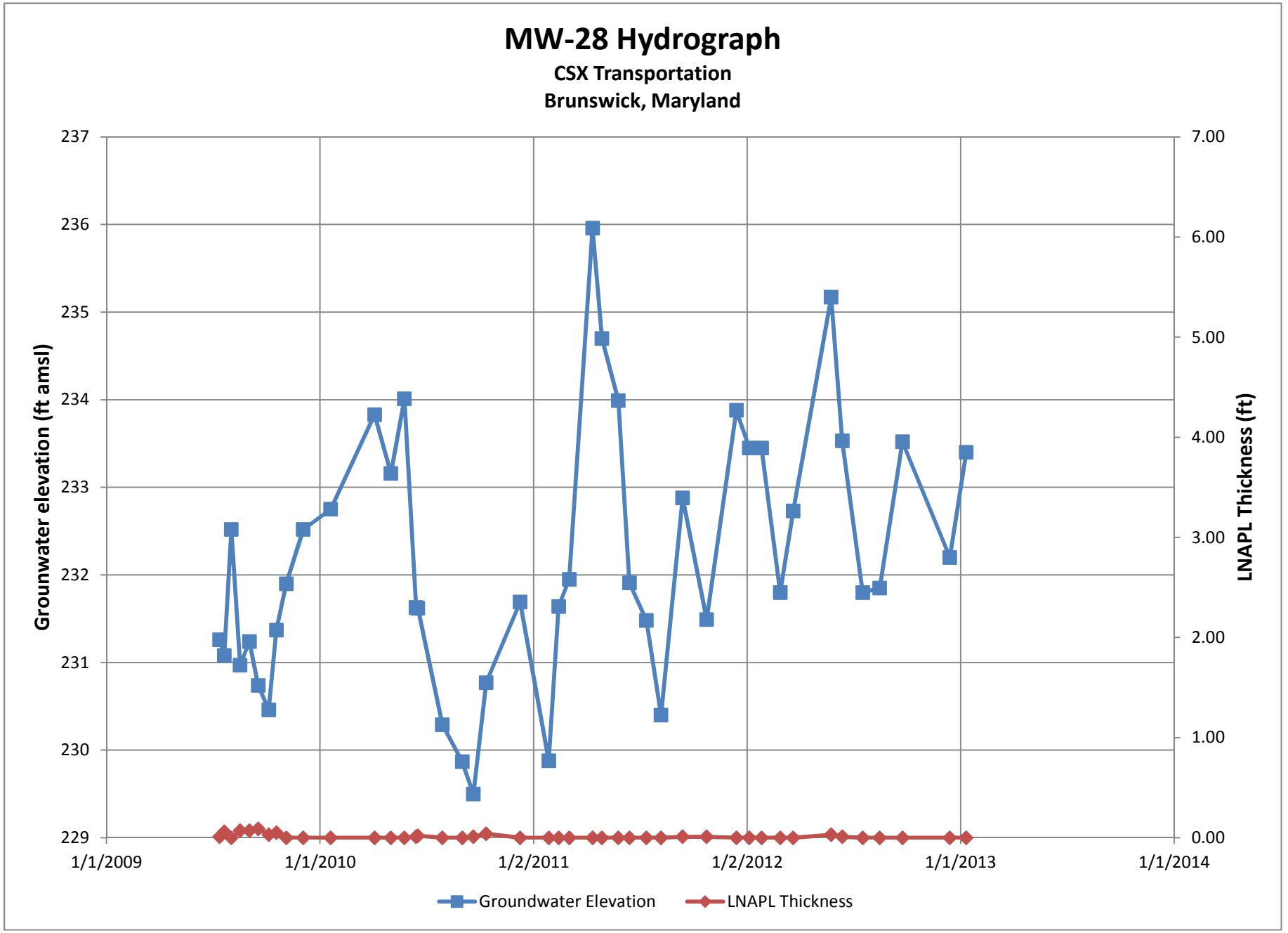
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-28 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
237
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230
229
7.00
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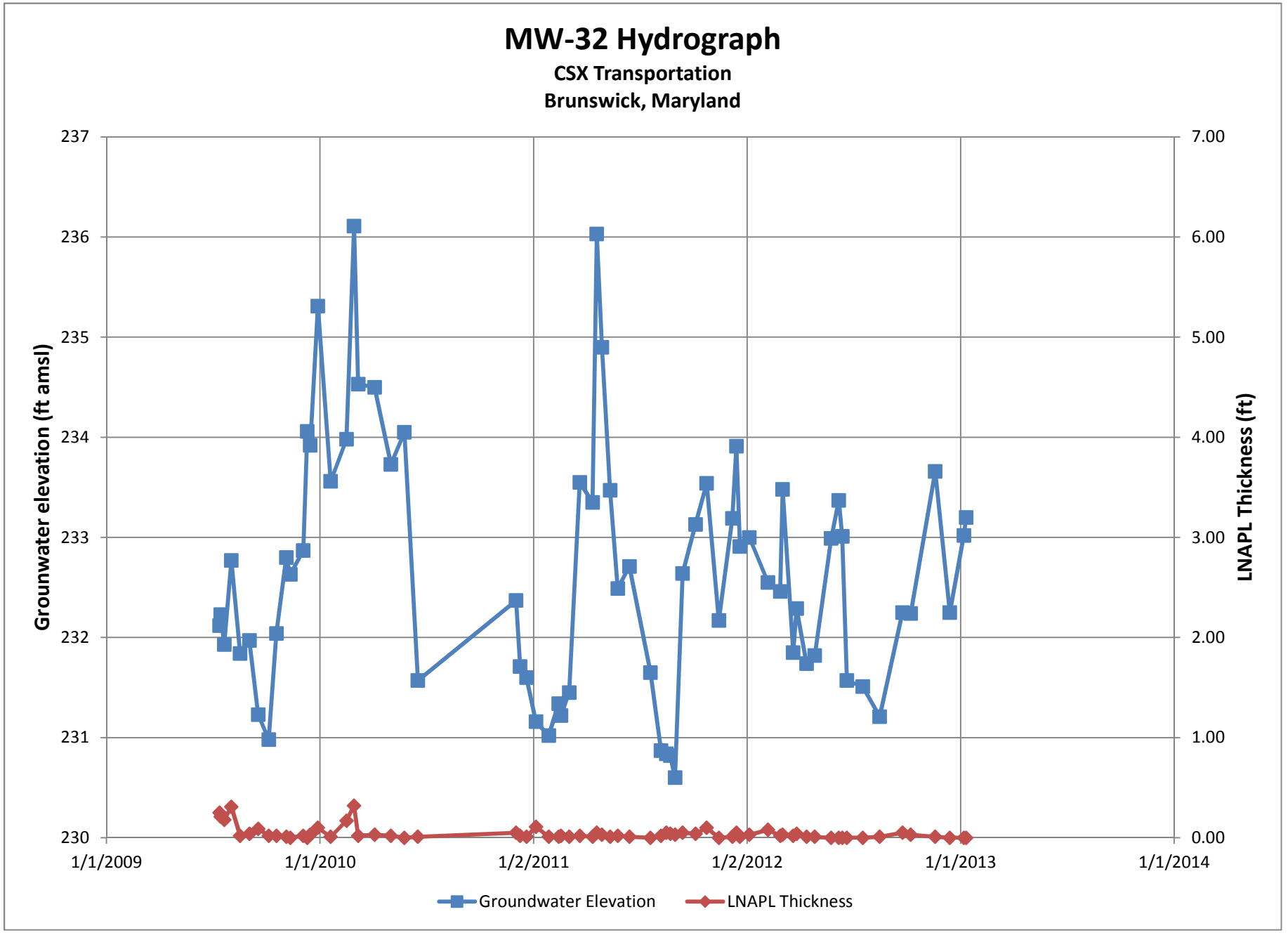
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-32 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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7.00
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4.00
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1/1/2009
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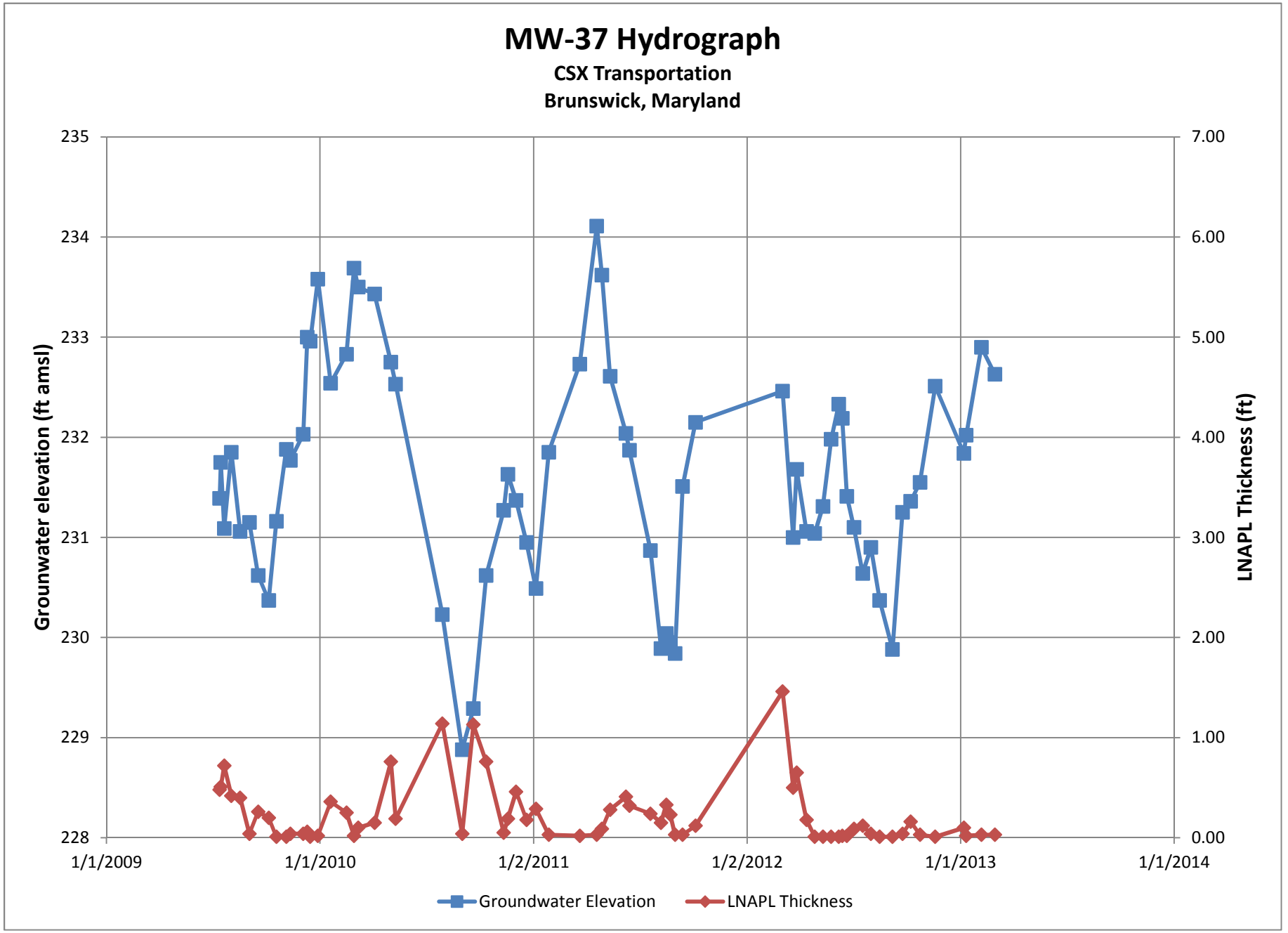
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-37 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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234
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228
7.00
6.00
5.00
4.00
3.00
2.00
1.00
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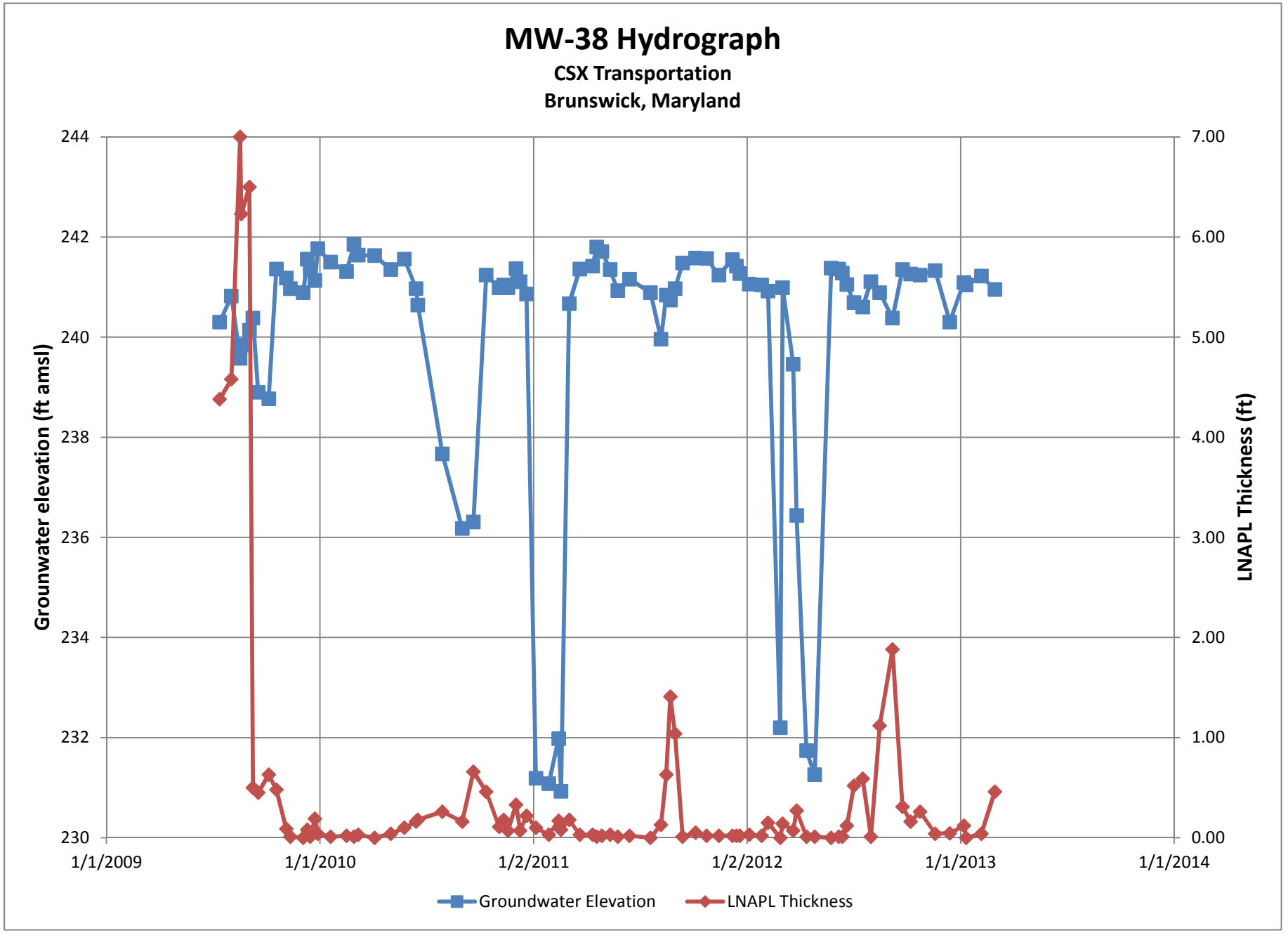
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-38 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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240
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230
7.00
6.00
5.00
4.00
3.00
2.00
1.00
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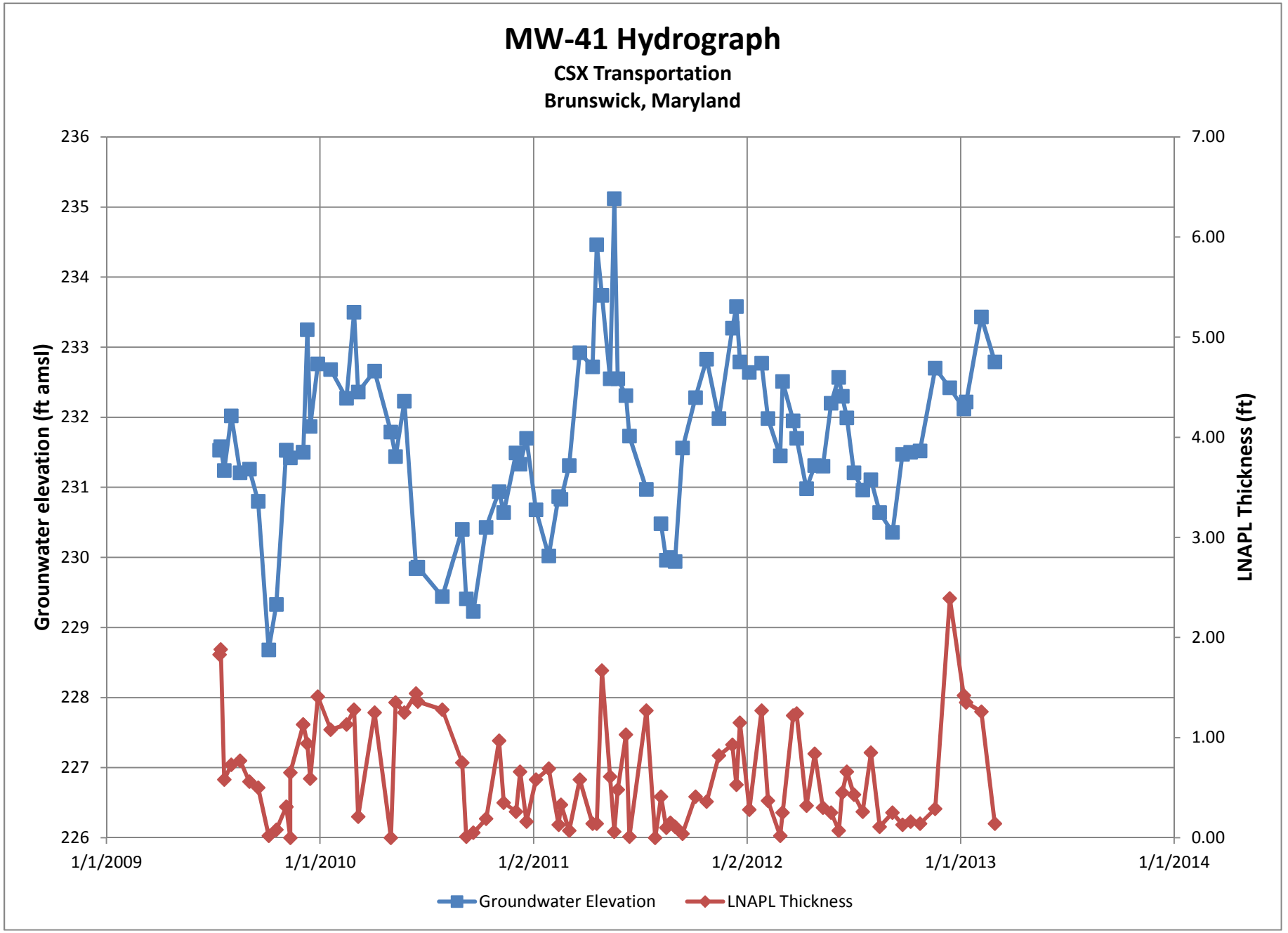
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-41 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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234
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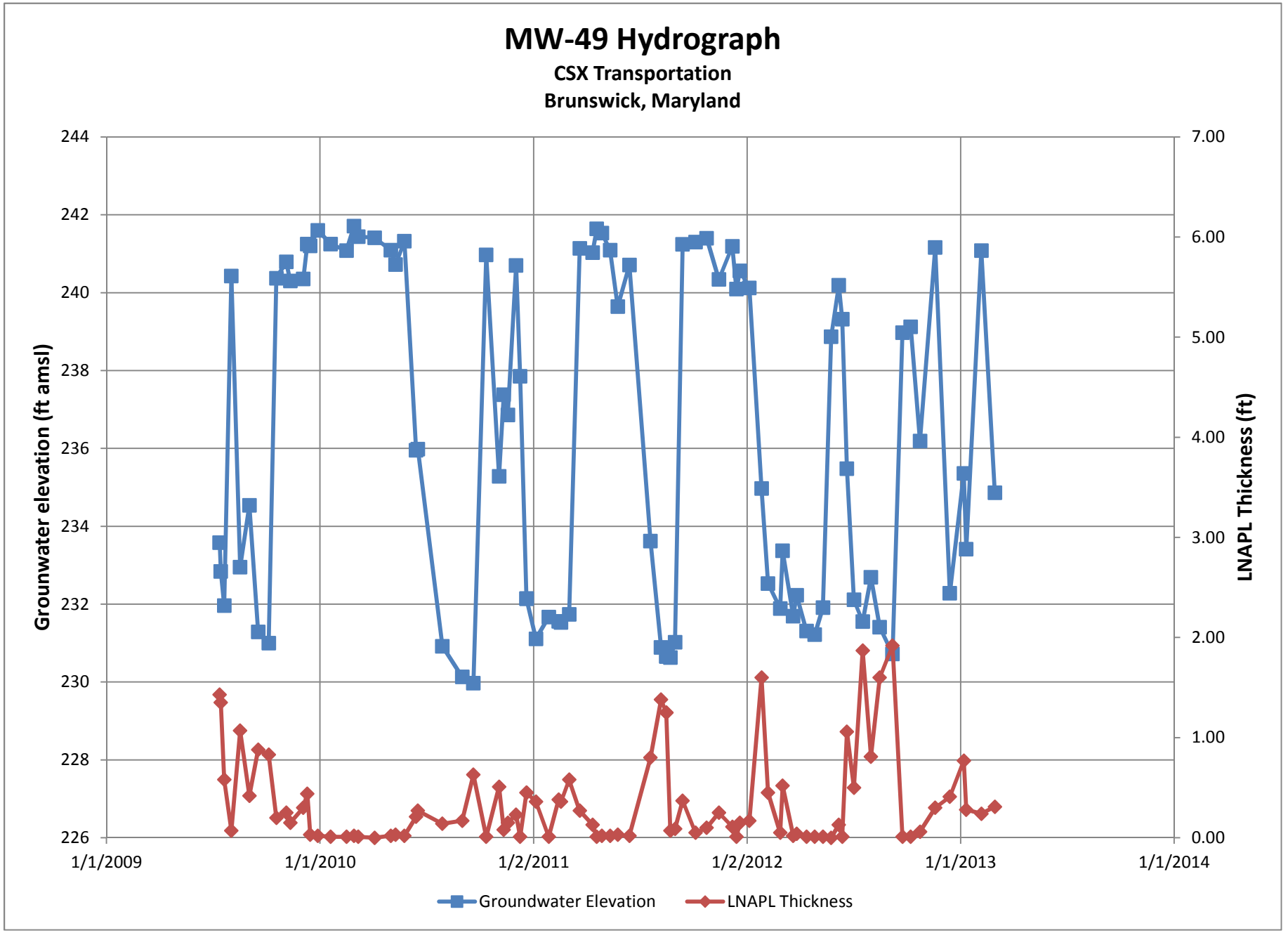
228
227
226
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-49 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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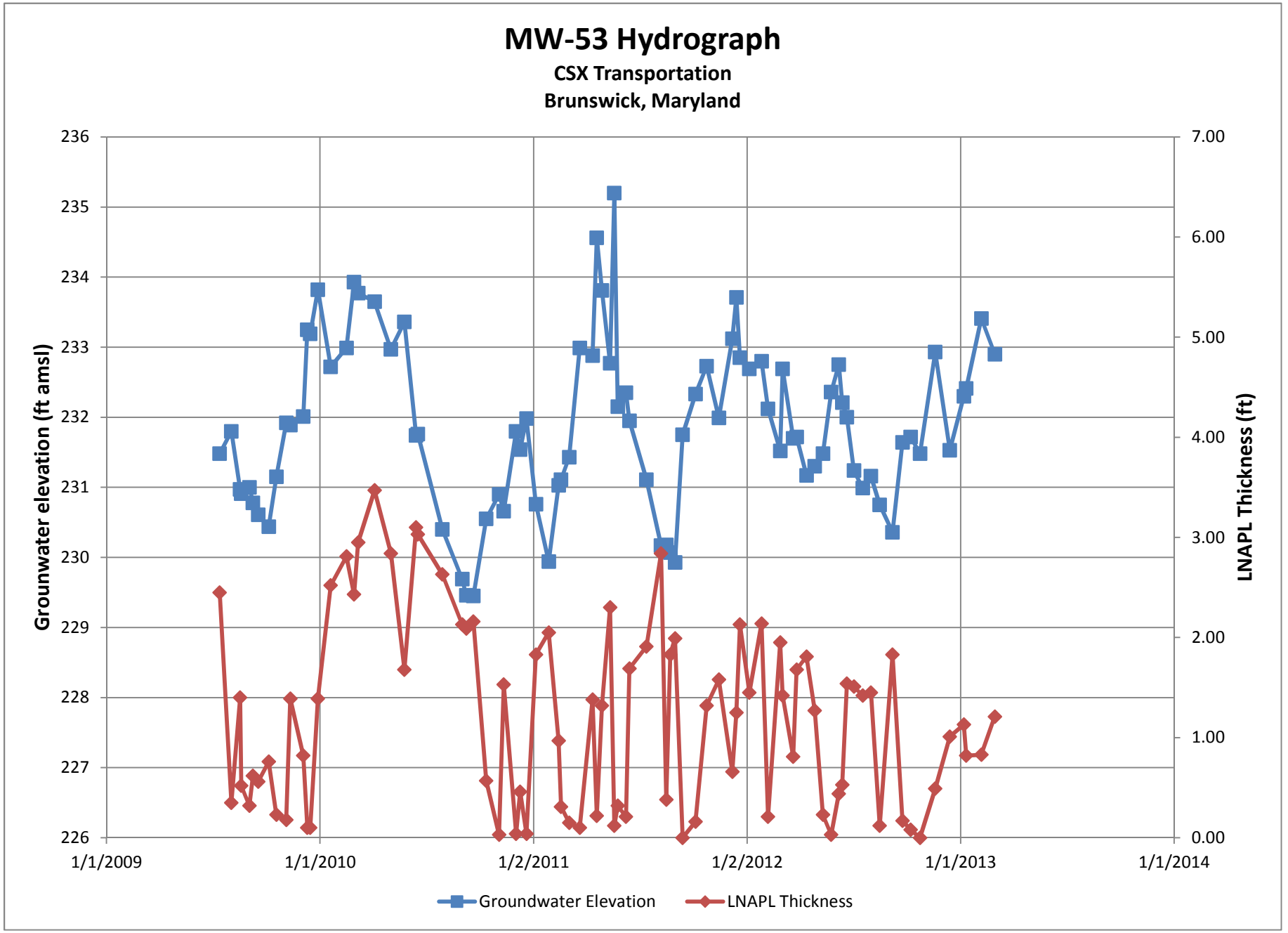
242
240
238
236
234
232
230
228
226
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-53 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
236
235
234
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230
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227
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7.00
6.00
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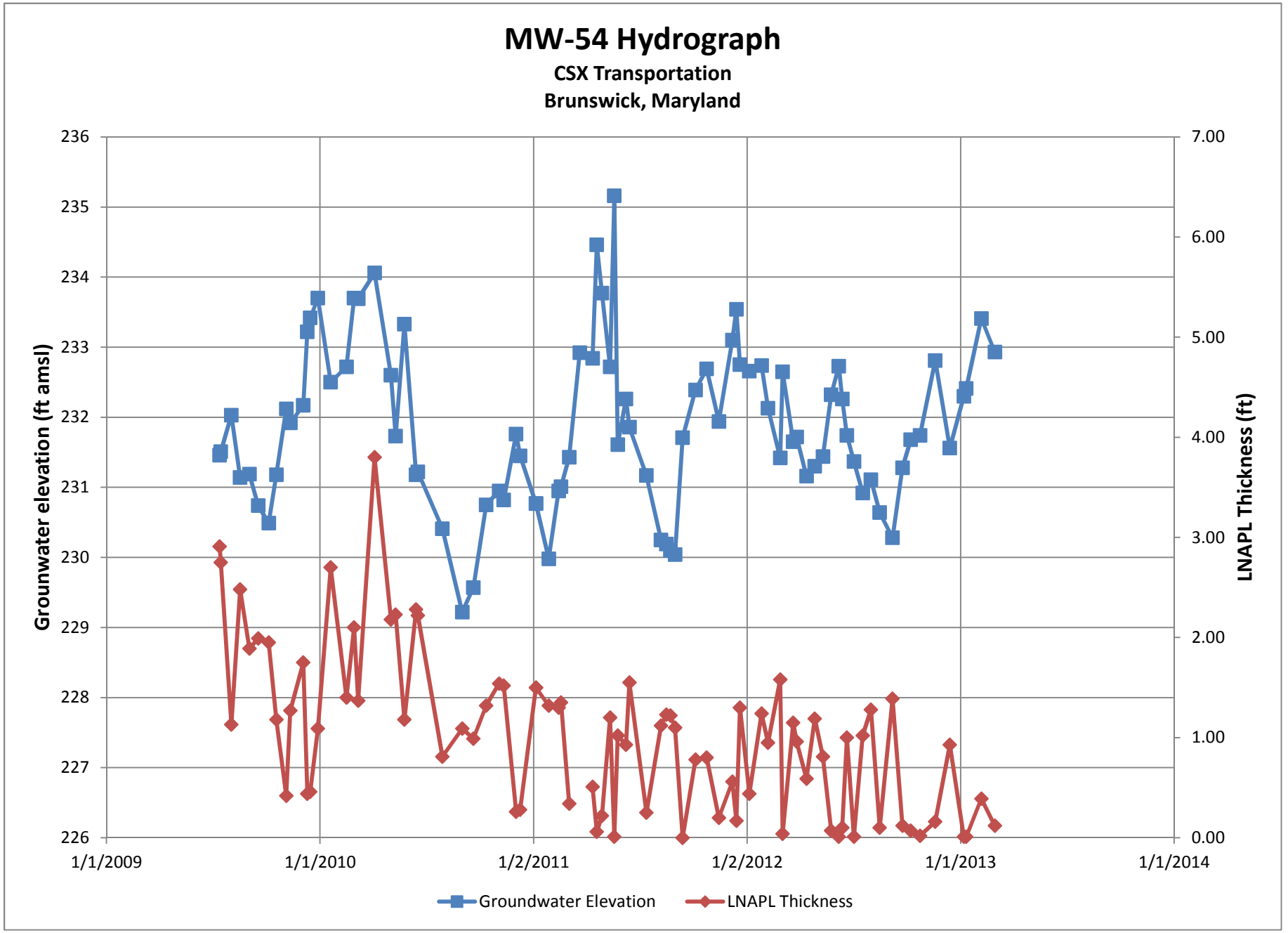
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-54 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
236
235
234
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230
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227
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7.00
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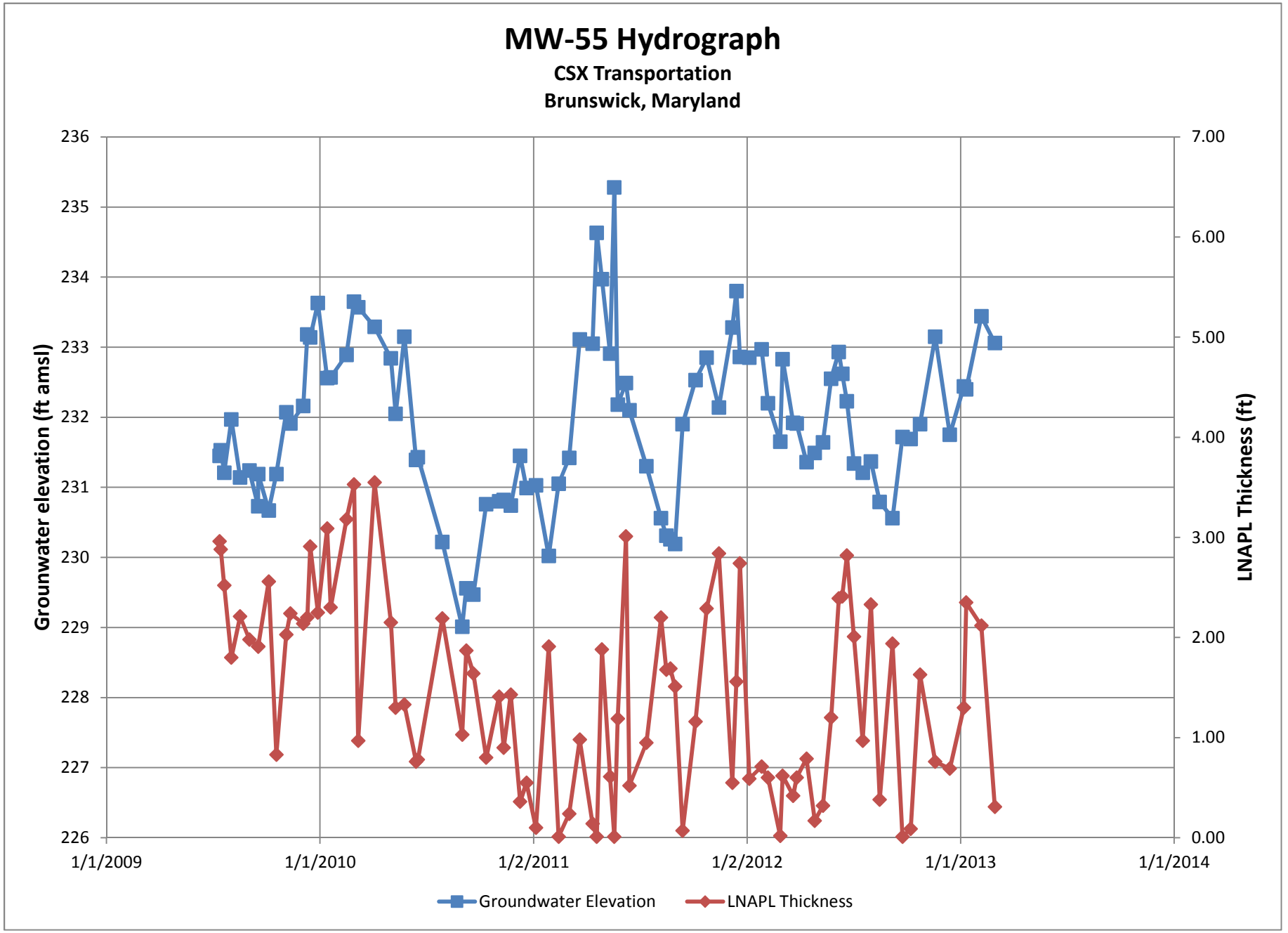
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-55 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
236
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233
232
231
230
229
228
227
226
7.00
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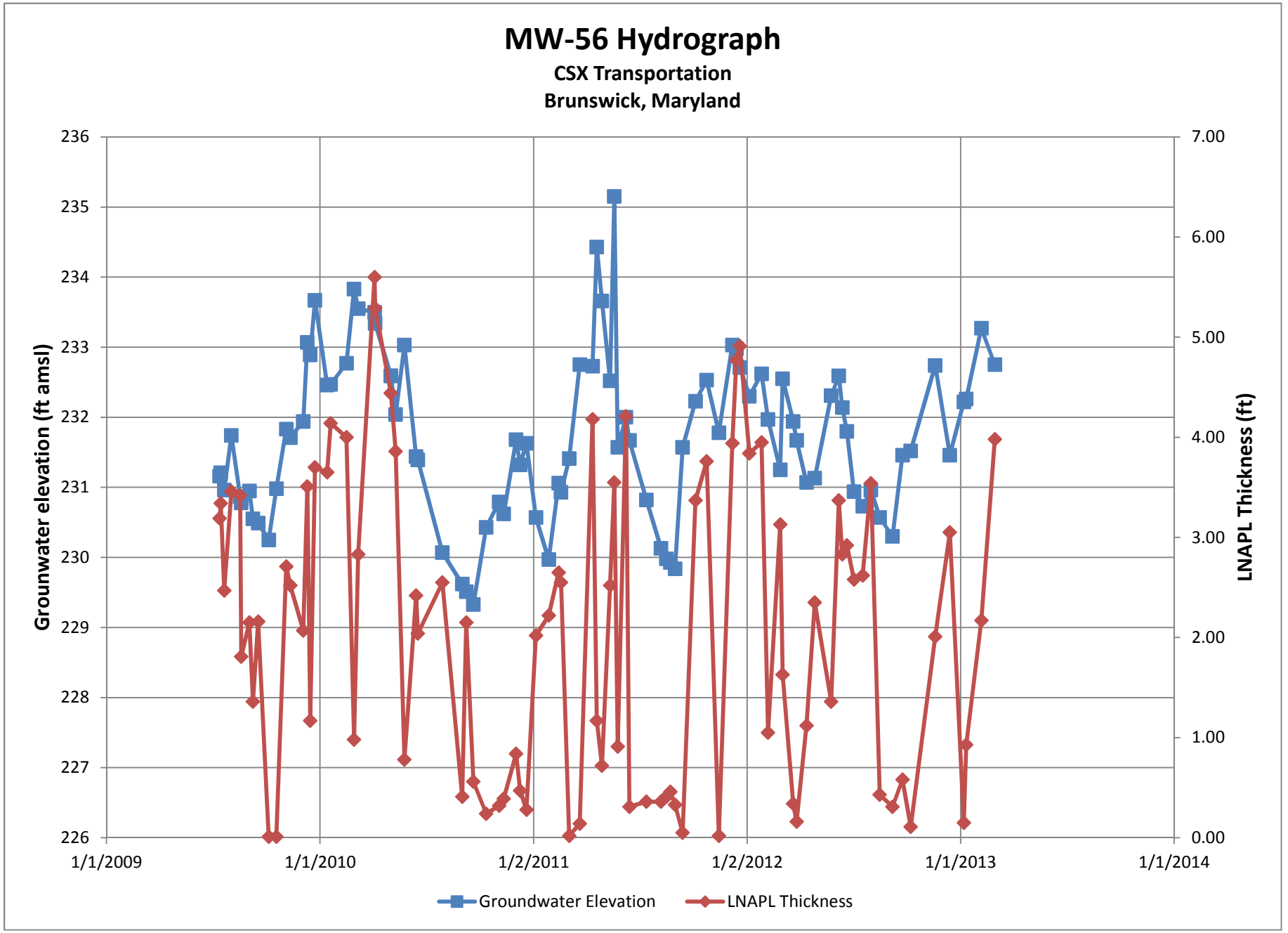
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-56 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
236
235
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227
226
7.00
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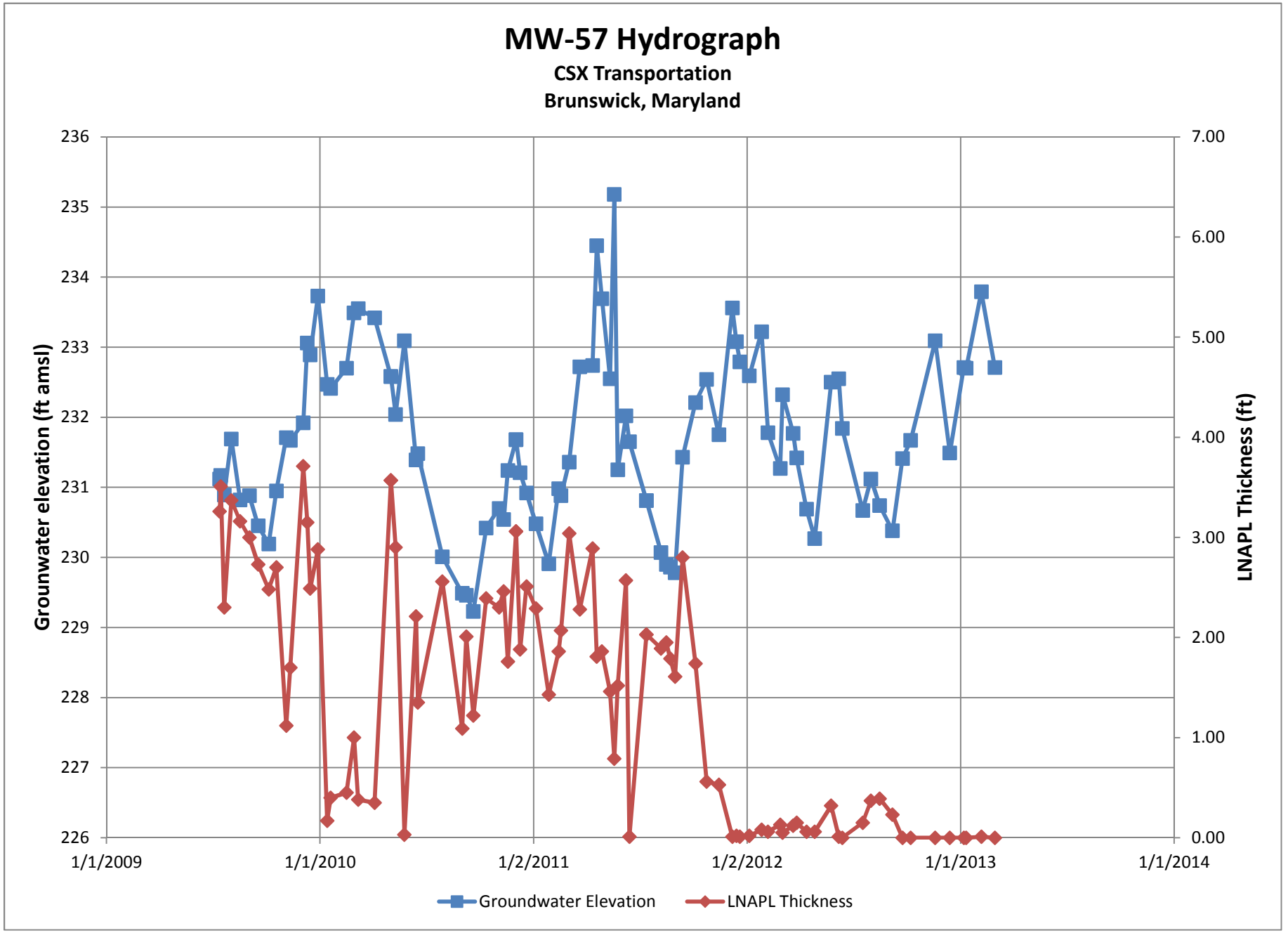
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-57 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
236
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230
229
228
227
226
7.00
6.00
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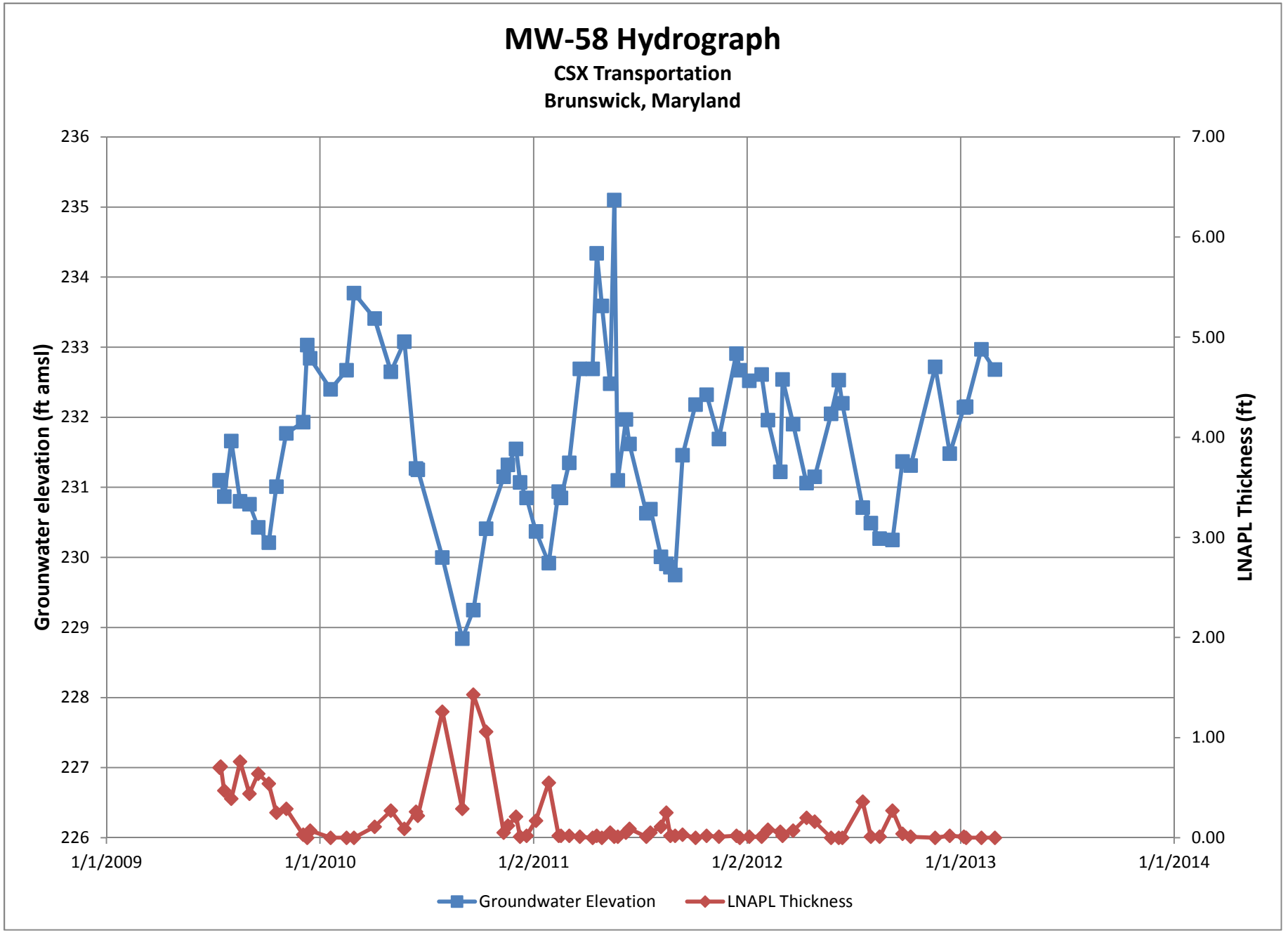
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-58 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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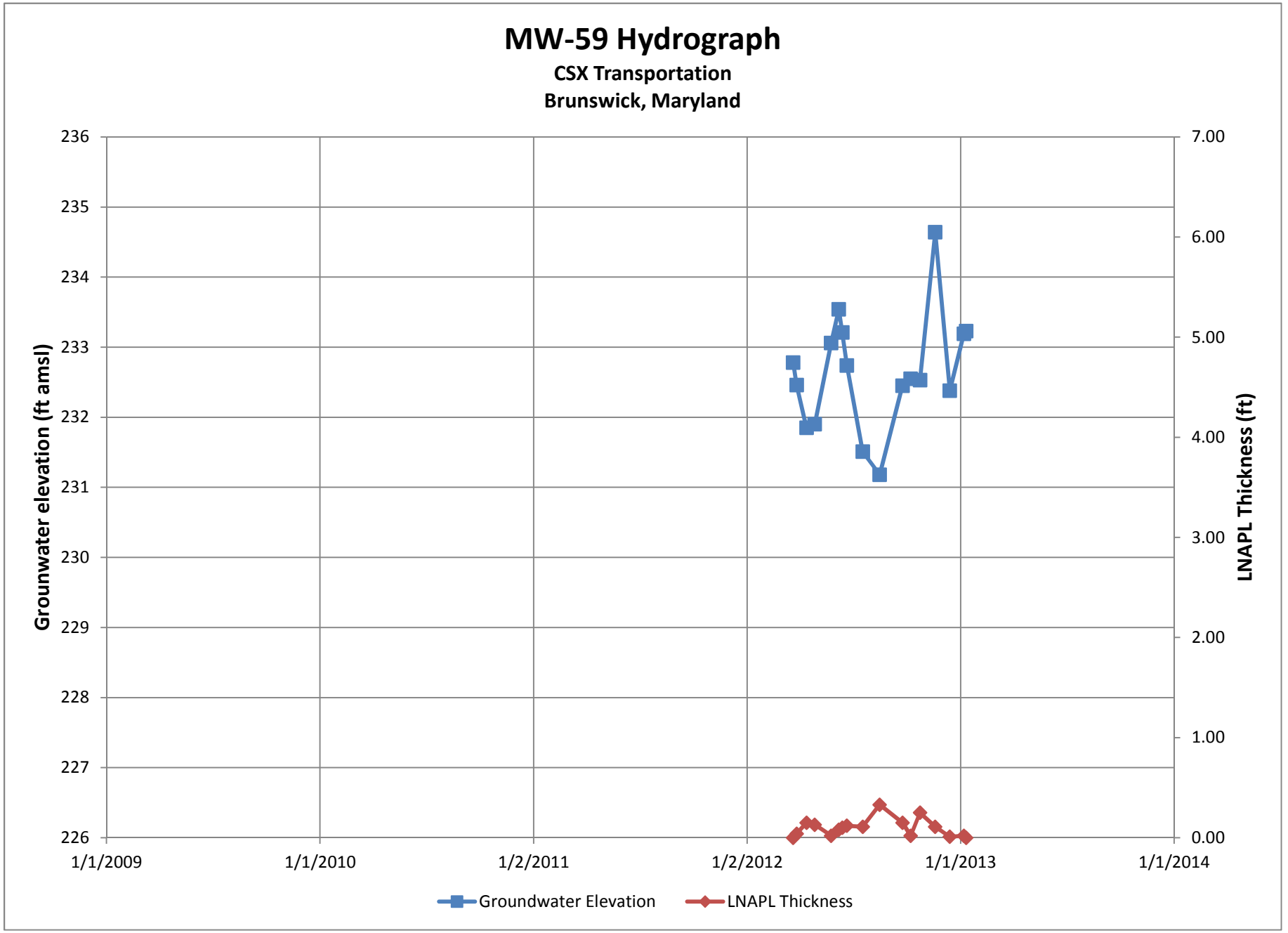
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-59 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
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229
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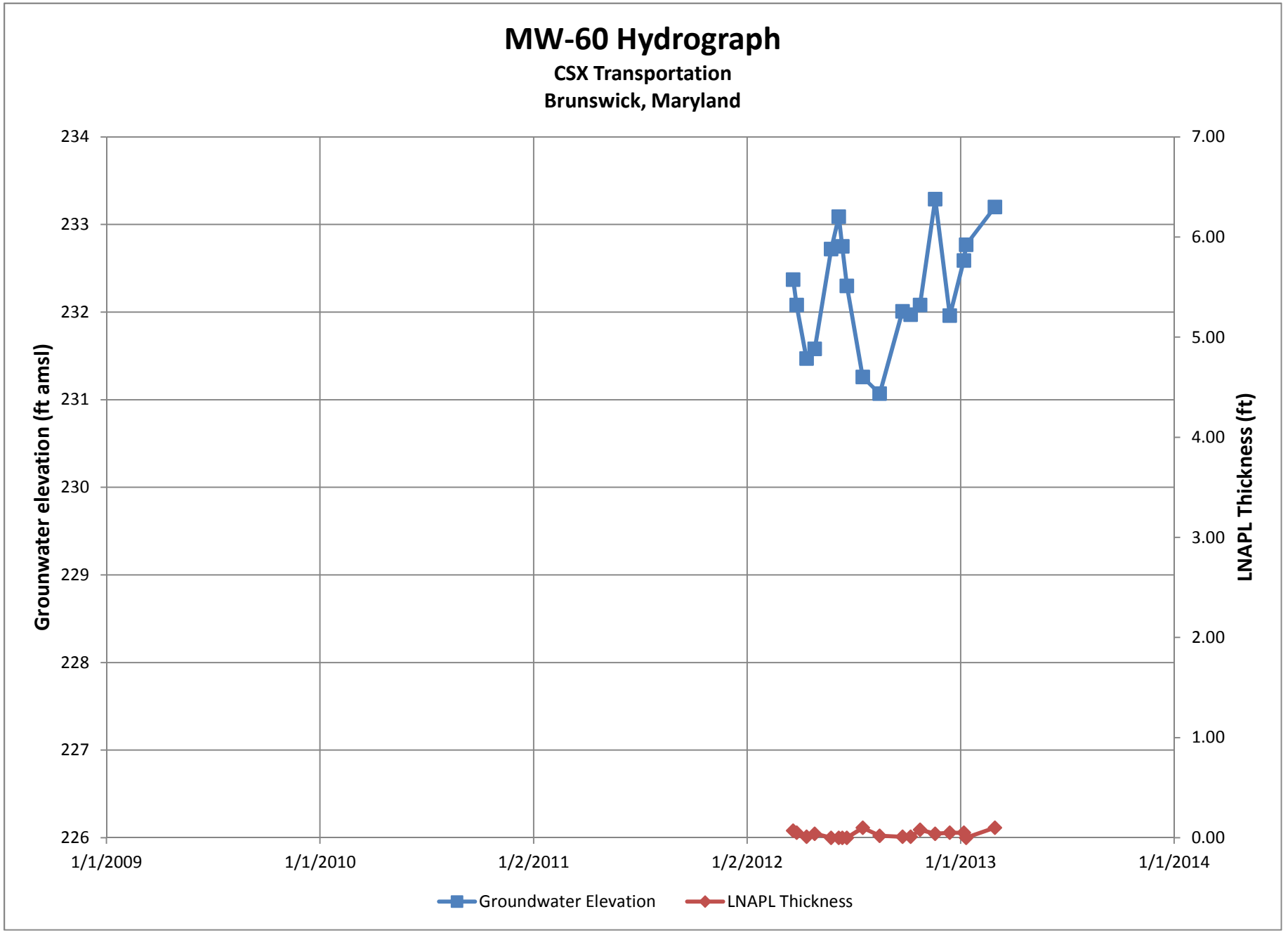
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-60 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
234
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227
226
7.00
6.00
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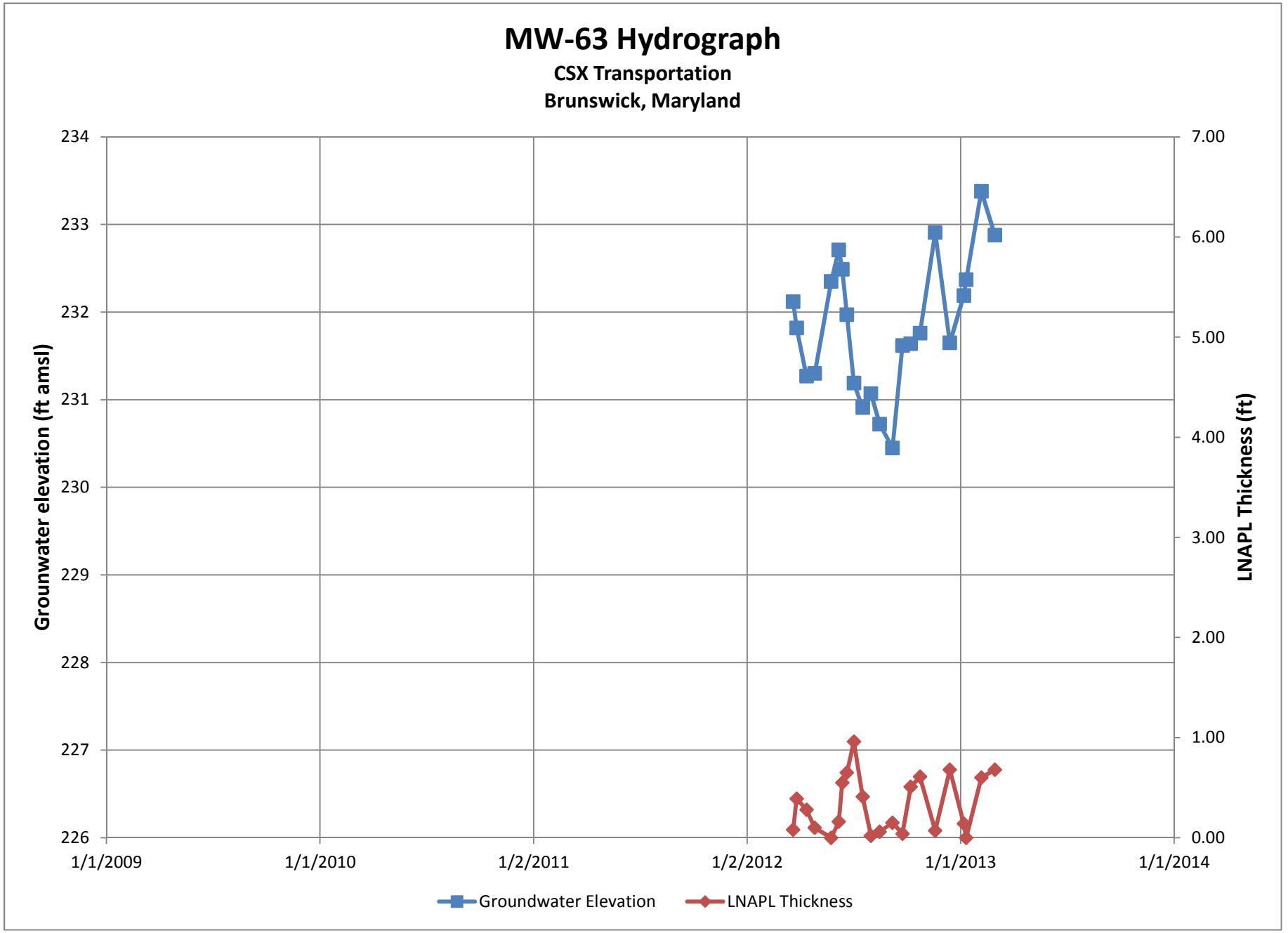
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


MW-63 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
234
233
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228
227
226
7.00
6.00
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4.00
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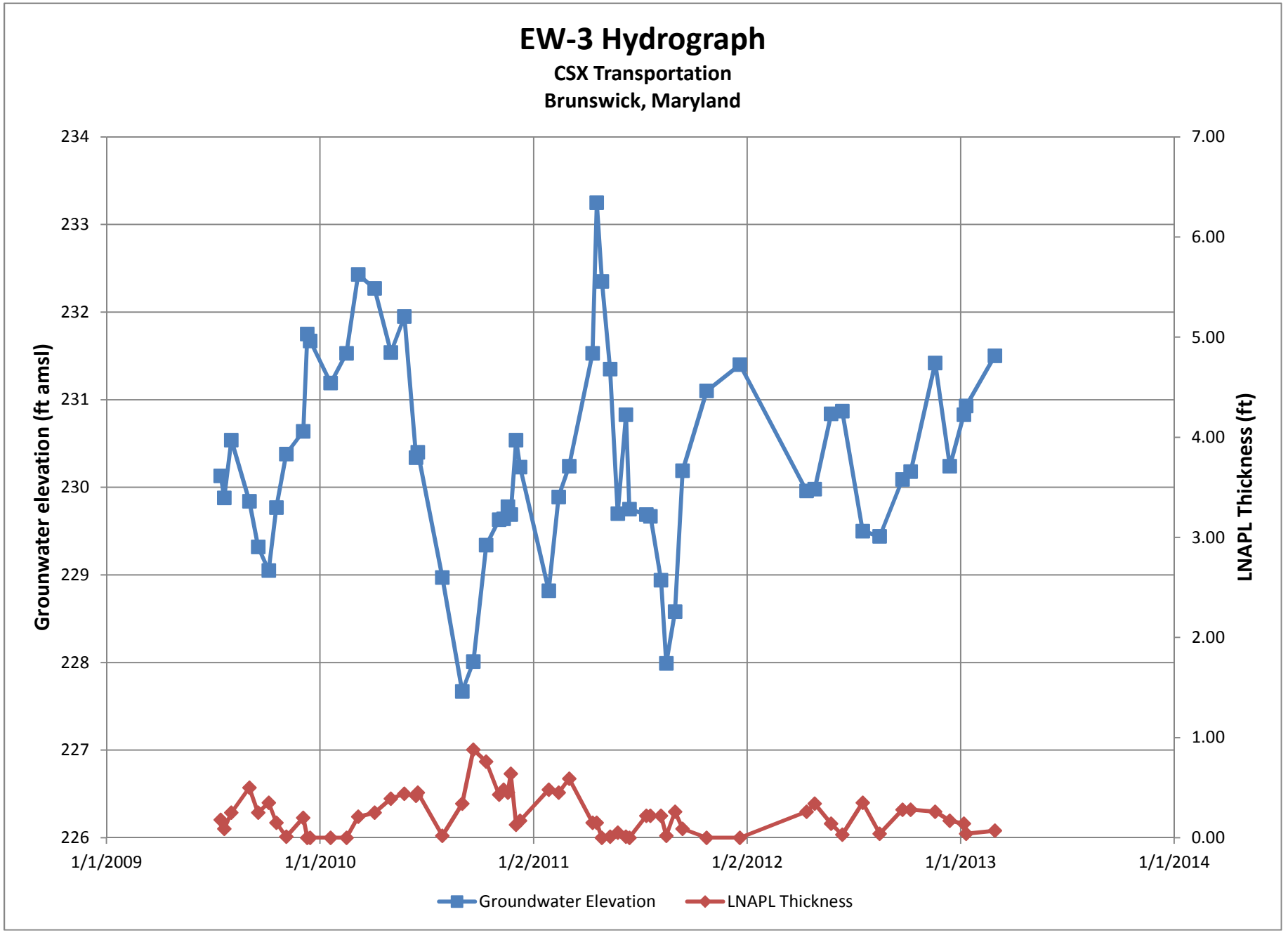
1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness


EW-3 Hydrograph
CSX Transportation
Brunswick, Maryland
Grounwater elevation (ft amsl)
LNAPL Thickness (ft)
234
233
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231
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228
227
226
7.00
6.00
5.00
4.00
3.00
2.00
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1/1/2009
1/1/2010
1/2/2011
1/2/2012
1/1/2013
1/1/2014
Groundwater Elevation
LNAPL Thickness

Attachment B

Mann-Kendall Statistical Analysis

MAROS Mann-Kendall Statistics Summary

Project: CSX
User Name: KLL
Location: Brunswick
State: Maryland

Time Period: 7/5/1994 **to** 2/6/2013
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Maximum
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
PHC as DIESEL FUEL								
MW-1	S	18	17	0.97	-54	97.8%	No	D
MW-20	S	5	1	0.45	0	40.8%	No	S (NA)
MW-21	S	6	6	0.82	-7	86.4%	No	S
MW-22	S	15	15	0.42	-60	99.9%	No	D
MW-24	S	12	11	0.92	31	98.1%	No	I
MW-25	S	15	15	0.59	12	70.4%	No	NT
MW-27	S	5	5	1.26	-6	88.3%	No	NT
MW-29	S	12	12	0.91	-11	74.9%	No	S
MW-3	S	29	12	1.15	-53	83.4%	No	NT (NA)
MW-31	S	4	4	0.61	-4	83.3%	No	S
MW-35	S	5	5	0.32	0	40.8%	No	S
MW-43	S	13	13	0.69	15	79.9%	No	NT
MW-5	S	17	17	1.30	-11	65.7%	No	NT
MW-50	S	4	3	1.74	-2	62.5%	No	NT
MW-51	S	13	12	0.54	-6	61.7%	No	S
MW-52	S	4	4	0.43	-2	62.5%	No	S
MW-65	S	4	4	0.46	-6	95.8%	No	D
MW-6R	S	20	20	0.97	12	63.8%	No	NT
MW-8	S	20	7	1.00	-50	94.4%	No	PD (NA)
MW-9	S	20	10	1.38	-17	69.6%	No	NT
NPS-MW-1	S	17	14	0.97	22	80.4%	No	NT
NPS-MW-10	S	9	7	0.63	-16	94.0%	No	PD
NPS-MW-11	S	8	4	1.06	-20	99.3%	No	D
NPS-MW-12	S	9	8	0.57	-18	96.2%	No	D
NPS-MW-13	T	17	15	0.52	14	70.1%	No	NT
NPS-MW-14	T	17	16	0.59	-2	51.6%	No	S
NPS-MW-15	T	9	9	0.44	-26	99.7%	No	D
NPS-MW-16	T	17	16	0.59	-15	71.5%	No	S
NPS-MW-17	T	9	6	0.62	-15	92.5%	No	PD
NPS-MW-2	T	17	16	0.52	6	58.0%	No	NT
NPS-MW-3	T	9	5	0.95	-16	94.0%	No	PD
NPS-MW-4	T	18	18	0.90	-49	96.6%	No	D
NPS-MW-5	T	17	14	0.61	-23	81.5%	No	S

Project: CSX

User Name: KLL

Location: Brunswick

State: Maryland

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
PHC as DIESEL FUEL								

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

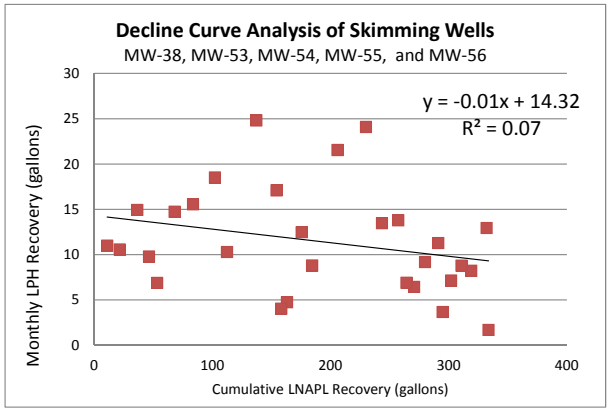
ARCADIS

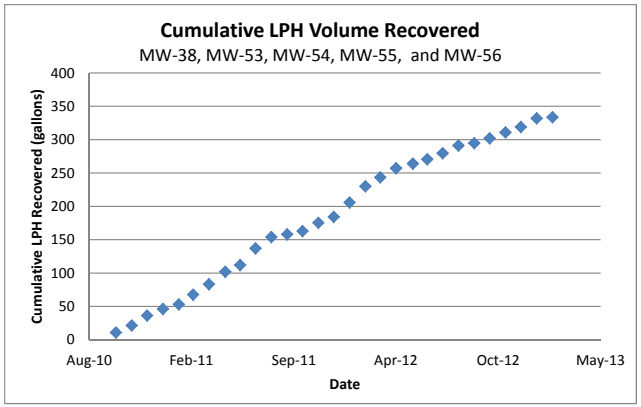
Attachment C

LPH Decline Curve Analysis

Decline curve analysis at wells with active skimming
MW-38, MW-41, MW-53, MW-54, MW-55, and MW-56

Month	Monthly LNAPL Volume Recovered	Cumulative LNAPL Volume Recovered
Feb-13	1.7	334
Jan-13	12.9	332
Dec-12	8.2	319
Nov-12	8.8	311
Oct-12	7.2	302
Sep-12	3.7	295
Aug-12	11.3	291
Jul-12	9.2	280
Jun-12	6.4	271
May-12	6.9	264
Apr-12	13.8	257
Mar-12	13.5	244
Feb-12	24.1	230
Jan-12	21.6	206
Dec-11	8.8	184
Nov-11	12.5	176
Oct-11	4.8	163
Sep-11	4.0	158
Aug-11	17.1	154
Jul-11	24.8	137
Jun-11	10.3	112
May-11	18.5	102
Apr-11	15.6	84
Mar-11	14.7	68
Feb-11	6.9	53
Jan-11	9.8	46
Dec-10	14.9	37
Nov-10	10.6	22
Oct-10	11.0	11





Estimated Recovery Volume at 6 skimming wells

-1.50E-02 1.43E+01 Trend formula variables

620 Remaining recoverable volume

553 Remaining recoverable volume with 1 gallon/month endpoint

486 Remaining recoverable volume with 5 gallon/month endpoint

Assuming skimmers capture 78% of the LPH recovery (historically)

Total remaining recoverable volume at the site

710 Recovered to date

800 Remaining recoverable volume

1510 Total Recoverable LNAPL

Notes:
Analysis started in October 2010 because all wells had a skimmer pump by then.