AQUIFER TESTING AND INTERIM REMEDIAL MEASURES REPORT
Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
PC # 2010-3028

August 1, 2014

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QUALITY ASSURANCE/QUALITY CONTROL

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1.0 INTRODUCTION

Kleinfelder, Inc. (Kleinfelder), on behalf of Fairfax Petroleum Realty, LLC (Fairfax) has prepared this *Aquifer Testing and Interim Remedial Measures Report* (Report) for the inactive service station located at 9901 Georgetown Pike, Great Falls, Virginia (Site). In the Corrective Action Plan (CAP) approval letter dated January 24, 2014, the DEQ requested the completion of 12 items including the proposal of remedial endpoints for methyl tertiary butyl ether (MTBE) protective of area drinking water supply wells in a CAP Addendum by August 1, 2014 (**Appendix A**). As presented in the June 10, 2014 project status meeting with the DEQ and Great Falls Citizens Association, MTBE was detected in off-site monitoring well MW-23D south of the Site that necessitates additional characterization activities. With the exception of the remedial endpoints proposal, the required items of the DEQ CAP approval letter have been completed and are documented in this Report and the *First and Second Quarter 2014 CAP Monitoring Reports*. As per our *CAP Addendum Extension Request and Schedule* letter dated July 28, 2014, this Report is in lieu of the CAP Addendum and is intended to provide the DEQ with results of the aquifer testing and interim remedial measures including the basis of the design for the interim groundwater recovery system (**Appendix A**).

The DEQ assigned pollution complaint (PC) number 2010-3028 in August 2009 following the identification of dissolved phase hydrocarbons and fuel oxygenates during a Phase II Environmental Site Assessment (ESA) by previous site owner Exxon Mobil Corporation (ExxonMobil). Previous potable well sampling and environmental investigations by others have identified the presence of chlorinated ethenes, including tetrachlorethylene (PCE), trichloroethylene (TCE), and cis-1,2 dichloroethylene (DCE), in the groundwater of Great Falls dating back to 1992. Chlorinated ethenes have been identified in shallow and deep monitoring wells on and off-site and in off-site potable wells. The presence of the chlorinated ethenes in groundwater has been attributed to unknown sources and a known dry cleaner release from the Great Falls Shopping Center. This Report was prepared solely to satisfy the requirements of the DEQ Petroleum Storage Tanks Program for petroleum constituents including MTBE.

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2.0 SITE OVERVIEW

The Site is an inactive retail service station located on the southwest corner of the intersection of Georgetown Pike and Walker Road at 9901 Georgetown Pike, Great Falls, Fairfax County, Virginia (**Figure 1**). The Site is located in an area containing commercial businesses. Residential areas are located beyond the commercial businesses in all directions at distances of approximately 700 feet from the Site. The Site is serviced by underground electric, telephone, and municipal water service. A potable well (PW-1), located in the northeastern corner of the Site, was removed from service in August 2009 and is now utilized as a monitoring well. A septic system is located behind the station building in the southern portion of the Site. In August 2012, the gasoline underground storage tank (UST) system was removed. The approximate locations of the Site features are depicted on **Figure 2**.

The DEQ assigned PC number 2010-3028 in August 2009 following the identification of dissolved phase hydrocarbons and fuel oxygenates during a Phase II ESA by previous site owner. Site characterization activities including the installation and sampling of shallow and deep monitoring wells on and off-site and the well locations are depicted on **Figures 2** and **3**. The monitoring well construction details are included in **Table 1** and the boring logs and well construction diagrams are included within **Appendix B**. The site characterization and feasibility testing activities were reported to the DEQ in the *Phase II ESA* (2009), *Site Characterization Report* (2009), *Remediation Feasibility Testing Report* (2010), *CAP* (2013) and *Groundwater Monitoring Reports* (2010 – 2014).

Potential receptors in the vicinity of the Site include surface water and private potable wells. The nearest surface water body to the Site is an ephemeral or intermittent stream with headwaters represented by a storm water retention basin located approximately 600 feet south of the Site (**Figure 1**). Many of the properties surrounding the Site are served by municipal water provided by Fairfax Water Authority; however, a number of properties utilize potable wells. According to the Fairfax County Department of Health, approximately 36 private supply wells are located within approximately one quarter of a mile radius of the Site. Further investigation and Fairfax Water Authority records indicate 22 properties use wells as a sole drinking water source. The approximate locations of the identified private potable wells and municipal water service area are depicted on **Figure 3**. Municipal sanitary sewer services are not available in Great Falls and developed properties utilize septic systems.

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3.0 GEOLOGY AND HYDROGEOLOGY

The Site is located on the United States Geological Survey (USGS) Vienna, Virginia topographic quadrangle map at 39.998 North latitude and 77.288 West longitude (NAD83) at an approximate elevation of 335 feet (NAVD29) in Fairfax County, Virginia (**Figure 1**).

The Site is located in the Piedmont Physiographic Province of Virginia. Reviews of the Geologic Map of the Vienna Quadrangle, Fairfax County, Virginia, and Montgomery County, Maryland (Drake and Lee, 1989) and the Geologic Map of the Seneca Quadrangle, Montgomery County, Maryland, and Fairfax and Loudoun Counties, Virginia (Drake et al, 1999) indicate that the predominant rock type in the vicinity of the Site is polydeformed and highly metamorphosed crystalline bedrock of the Precambrian to Cambrian aged Mathers Gorge Formation. The Mathers Gorge Formation is characterized by quartz-rich schist and locally is deeply weathered to a clay-rich silty saprolite. The transition from schist saprolite to competent rock varies throughout the Site and is likely not represented by a single contact, but instead by a continuum of the weathering profile. The regional strike of fractures and foliations is generally north to south, with localized variations between northwest and northeast to southeast and southwest. The strike of features observed in the saprolite and bedrock encountered during the investigation are consistent with the regional mapping.

The static groundwater depth in the shallow monitoring wells is at depths ranging from 17.21 to 32.56 feet below the top of casing (TOC) (**Table 2**). The June 2014 gauging data indicates that the potentiometric gradient (and apparent groundwater flow direction) is to the southeast under an estimated hydraulic gradient of approximately 0.028 foot per foot (ft/ft) between monitoring wells MW-14 and W-7. This is consistent with previous events and groundwater contour maps from December 2011 through March 2014. The June 2014 gauging data also indicates a second, localized groundwater flow direction, subordinate to the dominant groundwater flow direction, which is to the south under an estimated hydraulic gradient of approximately 0.063 ft/ft. This gradient is greater in magnitude than the dominant hydraulic gradient observed at the site, but is subordinate because it is caused by localized mounding associated with vacuum influence associated with the activation of the soil vapor extraction (SVE) system in June 2014 at the Site. The June 2014 shallow potentiometric surfaces are depicted in **Figure 4**.

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The static groundwater depth in the deep monitoring wells is at depths ranging from 23.37 to 41.11 feet below the TOC (**Table 3**). The potentiometric gradient (and apparent groundwater flow direction) in the bedrock is to the southeast under an estimated hydraulic gradient of approximately 0.029 ft/ft and to the south under an estimated hydraulic gradient of 0.011 ft/ft. The estimate hydraulic gradient to the southeast is consistent with previous hydraulic gradient estimates for the deep portion of the aquifer at the Site (0.027 ft/ft in December 2013 and 0.023 ft/ft in March 2014). The apparent groundwater flow direction to the south has not been observed at the Site previously; therefore, it is unclear as to whether the change in apparent flow direction is due to the addition of monitoring well MW-23D (installed in May 2014) or is a similar but muted response, as is observed in the shallow portion of the aquifer (**Figure 5**).

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4.0 AQUIFER TESTING

As per the CAP, supplemental characterization activities were completed including the installation of a recovery well (RW-1), off-site monitoring wells, and continuous multichannel tubing (CMT) system in monitoring well MW-17D to facilitate groundwater monitoring and the aquifer testing as documented in the *First* and *Second Quarter 2014 CAP Monitoring Reports*. The methodology and results of the aquifer testing completed on recovery well RW-1 are presented in the following sections.

4.1 Monitoring and Recovery Well Network

During the First and Second Quarters of 2014, seven monitoring wells and one recovery well were installed at the Site and surrounding properties to serve as additional assessment points and monitoring points during the aquifer tests. Deep monitoring wells MW-19D and MW-23D, and the open bedrock well MW-20D were installed to the north, south and east of the Site to assess dissolved phase hydrocarbons in the bedrock portion of the aquifer, as well as to serve as additional monitoring points for the aquifer testing. The nested monitoring well pair MW-21S/I was installed to the east of the Site to assess the shallow and transition zones of the aquifer to the east and to address data gaps within the existing monitoring well network to the east. Further to the east, monitoring well MW-22 was installed to assess the shallow aquifer beyond the existing monitoring well network. Monitoring well MW-24 was installed to the south of the Site to assess the transition zone (i.e. interval above bedrock) and to complement the shallow and deep monitoring wells MW-10 and MW-23D, respectively.

The additional monitoring wells and open bedrock well installed at the Site were augmented by the location and monitoring of existing monitoring wells located to the east of the existing monitoring well network and beyond the area of observed MTBE distribution. The expanded monitoring well network allows for additional monitoring points to assess MTBE distribution and to horizontally and vertically evaluate aquifer properties as facilitated by the aquifer testing described below.

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4.2 Step Test

On April 29, 2014, Kleinfelder personnel performed a variable rate pumping test (step-test) at RW-1. Monitoring wells MW-1, MW-11, MW-15, MW-16D, and MW-17D were utilized as observation wells for the Step Test. Boring logs for wells pumped and monitored during the Step Test and subsequent Pumping Test are included as **Appendix B**.

4.2.1 Method

Using a submersible electric pump, groundwater was extracted at approximately one gallon per minute (gpm) for a time of approximately one hour, at a rate of two gpm for approximately one hour, at a rate of five gpm for approximately one hour, and at a rate of 10 gpm for approximately one hour. Following pumping, the water level at RW-1 was allowed to recover under ambient conditions and monitored for approximately 90 minutes.

Water table elevations within the pumping and observation wells were monitored using pressure transducers installed within the wells which recorded pressure at a rate of once per second or once per two seconds. Each screened interval of MW-17D was manually gauged at the end of each pumping interval. An additional pressure transducer was installed at the Site to record atmospheric pressure. These barometric readings were subsequently used to adjust the pressure readings from transducers in the pumping and observation wells to account for changes in atmospheric pressure. Data from the step test was used to determine an optimal pumping rate and duration for the aquifer pumping test.

Groundwater samples were collected at the end of each pumping rate interval for analysis of full list volatile organic compounds (VOCs) by Lancaster Laboratories using Environmental Protection Agency (EPA) Method 8260B. These results were used to determine the most appropriate method of managing and disposal of water generated during the pumping test. The laboratory analytical results for MTBE are summarized in **Table 4** and the Lancaster Analysis Report is included in **Appendix C**. Water generated during the step test was contained within a 21,000 gallon fractionating tank and was subsequently transported off-site for disposal following the pumping test at the Water Depot facility in New Windsor, Maryland. The non-hazardous waste manifests are included within **Appendix D**.

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4.2.2 Well Efficiency

The well efficiency, while a critical component of large capacity (i.e. 1,000 gpm) well design, is in this case only an indicator of the relative drawdown within the well casing as compared to the aquifer. Recovery well RW-1 efficiency ranged from approximately 93% at one gallon per minute to 55% at 10 gallons per minute. The well efficiency calculations are included in **Appendix E.**

The ratio of drawdown to pumping rate observed in RW-1 at the end of each pumping period was plotted against the pumping rate of the previous hour-long pumping period in order to determine well efficiency and to forecast pumping rates required for drawdowns at pumping rates greater than 10 gpm. Increased pumping rates beyond 10 gpm result in decreases in efficiency and progressively greater drawdown in RW-1 compared to the aquifer.

4.2.3 Transmissivity and Storage Coefficients

The step-test was also utilized to provide preliminary estimates of transmissivity (T) and aquifer storage coefficients (in this case Specific Yield, Sy). As the aquifer, which consists of overlying sediments and saprolite, extends via fractures into the competent bedrock, the step-test results were modeled using Theis Method within Aqtesolv™ (3.50) corrected for unconfined aquifers and partially penetrating wells. The aquifer thickness was assumed to be 115 feet, the approximate water column contained within MW-16D at the prior to the start of the test.

RW-1 Step Test Result Summary

Test ID	Method (Unconfined)	T (ft^2/day)	Sy
MW-17D (81 feet)	Theis	3.37E+01	1.89E-02
MW-17D (88 feet)	Theis	2.98E+01	8.88E-02
MW-11	Theis	1.54E+02	3.82E-02
MW-15	Theis	1.45E+02	2.57E-02
MW-1	Theis	2.03E+02	1.46E-02
RW-1	Theis	1.79E+02	3.85E-01
MW-16D	Theis	6.00E+02	3.27E-04

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Transmissivity was found to vary by approximately one order of magnitude, from 83.3 to 600 feet squared per day (ft^2/day). The estimate of specific yield varied three orders of magnitude. The greatest storage coefficient was calculated for RW-1, the least for MW-16D.

It appears that drawdown in RW-1 is affected by the larger amount of water available from storage in the overburden, rather than the competent bedrock. This is further supported by the greater storage coefficients calculated for monitoring wells MW-1, MW-11, and MW-15 (screened above competent bedrock) compared to the other two monitoring wells screened within the competent bedrock.

Of interest was the relatively rapid drawdown observed within well MW-16D, located some 108 feet from the pumping well. The calculated T of 600 ft^2/day and low storage coefficient appears to suggest that wells MW-16D, MW-17D (79-89) and RW-1 each intersect a common fracture or set of fractures. Review of the well logs and borehole geophysical data at MW-17D suggests that this fracture may be identified in MW-17D at a depth of 87.8 feet below grade, and that this feature strikes north by northeast and dips sharply eastward.

Transmissivity, fracture hydraulic conductivity (K) and storage coefficients were evaluated using Theis and Moench's 1984 solution for dual-porosity fractured bedrock. Moench's solution was found to provide better fits to data, as measured by the residual sum of squares, for monitoring wells screened or with open intervals completely within competent rock, and for wells along the north-northeast trend described above.

It was assumed that the fracture spacing for Moench's model was approximately 10 feet, based on the boring logs and previously completed borehole geophysical surveys documented previously. The estimated fracture hydraulic conductivity based on RW-1, MW-16D and MW-17D, ranged from 0.4 to 1.6 feet per day (ft/day). Graphs, error logs, and data reports from Aqtesolv™ are included within **Appendix F.**

4.3 Pump Test

On May 13, 14, and 15, 2014, Kleinfelder personnel conducted a constant-rate aquifer pump test at RW-1. Pumping was conducted at rate of approximately 10 gpm for a period of approximately 48 hours. As with the step-test, pressure transducers were installed in a number of monitoring wells screened with the overburden or the competent bedrock.

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Again, an additional transducer exposed to the atmosphere was installed to record barometric pressure. In order to evaluate water table elevations trends, the transducers were installed and started recording approximately 24 hours prior to the start of pumping. Transducers in select wells remained recording in place for four additional days following the completion of pumping.

Groundwater samples were collected at approximately 12 hour intervals for analysis of full list VOCs using EPA Method 8260B. The groundwater sample collected at the end of the test was also analyzed for pH, total petroleum hydrocarbons – gasoline range organics, lead, and inorganic water quality parameters. The laboratory analytical results for MTBE are summarized in **Table 4** and the Lancaster Analysis Report is included in **Appendix C**. Recovered groundwater was stored within a 21,000 gallon fractionating tank and transported for off-site disposal at the Water Depot facility. The non-hazardous waste manifests are included within **Appendix D**.

The estimates of Transmissivity and Specific Yield described below were made using Aqtesolv™. Aqtesolv™ allows visual or automatic evaluation of aquifer parameters based on a family of published and peer-reviewed analytical solutions. Aqtesolv™ also includes correction factors for partially-penetrating wells, unconfined aquifers and well skin effects. Graphs, error logs, and data reports from Aqtesolv™ are included within **Appendix F.**

4.3.1 Transmissivity

Hydraulic conductivity (K) is the proportionality constant relating hydraulic gradient to specific discharge under non-turbulent flow conditions. Transmissisivity (T) is K multiplied by the thickness of the studied aquifer. T has units of area per time, frequently state as gallons per day per foot or square feet per day (ft^2/day), used in this study.

Transmissivity values estimated for the Site during the pump test ranged from 1337.5 ft^2/day at MW-20D to 141.7 ft^2/day at RW-1. The following table summarizes the T values measured in this study, through both the Step Test and Pump Test. Wells (including MW-1, MW-15, MW-16D, and RW-1) which were monitored during both tests exhibited consistent (within one order of magnitude) T values.

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Test ID	Test Type	Method (Unconfined)	T (ft^2/day)
MW-01	Step Test (RW-1)	Theis	2.03E+02
MW-01	Pump Test (RW-1)	Theis	1.16E+03
MW-06S	Pump Test (RW-1)	Theis	4.04E+02
MW-07	Pump Test (RW-1)	Theis	1.87E+02
MW-10	Pump Test (RW-1)	Theis	3.24E+02
MW-11	Step Test (RW-1)	Theis	1.54E+02
MW-13	Pump Test (RW-1)	Theis	3.88E+02
MW-15	Step Test (RW-1)	Theis	1.45E+02
MW-15	Pump Test (RW-1)	Theis	1.72E+02
MW-16D	Step Test (RW-1)	Theis	6.00E+02
MW-16D	Pump Test (RW-1)	Theis	4.60E+02
MW-17D (81 feet)	Step Test (RW-1)	Theis	3.37E+01
MW-17D (88 feet)	Step Test (RW-1)	Theis	2.98E+01
MW-18D	Pump Test (RW-1)	Theis	1.16E+03
MW-20D	Pump Test (RW-1)	Theis	1.34E+03
MW-21I	Pump Test (RW-1)	Theis	2.59E+03
MW-21S	Pump Test (RW-1)	Theis	1.34E+03
MW-23D	Pump Test (RW-1)	Theis	5.59E+02
MW-24	Pump Test (RW-1)	Theis	2.43E+02
RW-1	Step Test (RW-1)	Theis	1.79E+02
RW-1	Pump Test (RW-1)	Theis	1.42E+02
W-2	Pump Test (RW-1)	Theis	1.34E+03
W-6	Pump Test (RW-1)	Theis	1.34E+03

The wells which exhibited the highest (greater than 10^3 ft^2/day) T were generally located greater than 100 feet east of RW-1. These wells also exhibited (with MW-5) the smallest amount of drawdown by the completion of the pump test.

4.3.2 Storage Coefficients

For unconfined aquifers, the specific yield (Sy) is defined as the volume of water released from storage per unit area of the aquifer per unit decline in the water table Sy ranged from 0.39 as measured at RW-1 to 0.00008 measured at MW-23D and 0.00006 as measured at MW-13. The following table summarizes the Sy values measured in this study, through both the Step Test and Pump Test.

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Test ID	Test Type	Method (Unconfined)	Sy
MW-01	Pump Test (RW-1)	Theis	5.7E-03
MW-01	Step Test (RW-1)	Theis	1.5E-02
MW-06S	Pump Test (RW-1)	Theis	4.3E-02
MW-07	Pump Test (RW-1)	Theis	1.7E-03
MW-10	Pump Test (RW-1)	Theis	3.8E-03
MW-11	Step Test (RW-1)	Theis	3.8E-02
MW-13	Pump Test (RW-1)	Theis	2.2E-02
MW-15	Step Test (RW-1)	Theis	2.6E-02
MW-15	Pump Test (RW-1)	Theis	1.7E-02
MW-16D	Pump Test (RW-1)	Theis	3.6E-03
MW-16D	Step Test (RW-1)	Theis	3.3E-04
MW-17D (81 feet)	Step Test (RW-1)	Theis	1.9E-02
MW-17D (88 feet)	Step Test (RW-1)	Theis	8.8E-02
MW-18D	Pump Test (RW-1)	Theis	6.2E-02
MW-20D	Pump Test (RW-1)	Theis	5.7E-02
MW-21I	Pump Test (RW-1)	Theis	1.1E-01
MW-21S	Pump Test (RW-1)	Theis	2.0E-01
MW-23D	Pump Test (RW-1)	Theis	1.5E-05
MW-24	Pump Test (RW-1)	Theis	3.4E-04
RW-1	Step Test (RW-1)	Theis	3.9E-01
RW-1	Pump Test (RW-1)	Theis	6.2E-03
W-2	Pump Test (RW-1)	Theis	2.0E-1
W-6	Pump Test (RW-1)	Theis	8.5E-02

Similar to T, Sy values calculated for wells (including MW-1, MW-15, MW-16D, and RW-1) which were monitored during both tests exhibited consistent (within 20%) Sy values. Specific yield values for unconfined aquifers commonly ranged from 0.01 to 0.30, reflecting a fraction of the effective pore space of unconsolidated materials. Some of the calculated Sy values in this study are indicative of fracture flow, as opposed to the surficial soils and saprolite, in transmitting water from the areas of the monitoring wells to RW-1. The very low Sy indicate that the water is provided to RW-1 from strata with low effective porosity.

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4.3.3 Diffusivity

The hydraulic diffusivity is proportional to the speed at which a finite pressure pulse will propagate through the system. At this site, the range of estimated values of diffusivity is a function of storage coefficient more than transmissivity. At this Site, the relative value of diffusivity may be considered a proxy for the degree of connectedness to fractures within the open borehole section of RW-1. Interception of a fracture within in the borehole of a monitoring well which also intersects RW-1 results in rapid transmission of the 'signal' of drawdown in RW-1. This phenomena is manifested as a clear and relatively high magnitude drawdown response in the monitoring well. The relevant fracture network also transmits water downward from the overburden into the affected fractures in RW-1, as shown by the relatively (to the other wells at the site) high diffusivity values estimated at MW-10 and MW-24.

4.3.4 Anisotropy and Heterogeneity

The similarity of responses in wells along certain directions indicate that there is a degree of anisotropy of both T and storage coefficients in the vicinity of the Site. The greatest values of T (greater than 1,000 ft2/day) are exhibited by monitoring wells MW-20D, W-6, MW-21I, MW-21S, W-2, and MW-18D. These wells also exhibit the highest storage coefficients (greater than 8%) as determined by the Theis method. Conversely, wells oriented along the north northeast trend, MW-23D, MW-16D, and MW-24 exhibit the greatest hydraulic diffusivity (T/S). The hydraulic diffusivity is proportional to the speed at which a finite pressure pulse will propagate through the system. At this Site, the range of estimated values of diffusivity is a function of storage coefficient more than transmissivity.

4.3.5 Fracture Hydraulic Conductivity

In an attempt to estimate the properties of this fracture network, Moench's method was used to estimate the hydraulic conductivity of the fractures on the Site. The Theis and Moench solutions differ in how the release of water from storage is simulated. Water is supplied from aquifer and water compressibility in the Theis solution, which is defined by a single parameter (S_y). Fractures and blocks of unfractured matrix provide two sources of water in the Moench solution. The first source is from fractures, which contribute water from aquifer and water compressibility in direct proportion to drawdown as defined by a single storage term (S).

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The second source of water is from the blocks of unfractured matrix that can release water at highly variable rates because the blocks are simulated as one-dimensional aquifers. The blocks of unfractured matrix are characterized by; slab thickness (2b'), fracture skin (S_f), matrix hydraulic conductivity (K'), and matrix specific storage (Ss'). The fracture network also can be conceptualized as spheres instead of slabs in the Moench solution where 2b' defines sphere diameter instead of slab thickness. The analyses were found to be relatively insensitive to assumed fracture spacing (10 feet was assumed for each well based on the geophysical evaluation of MW-17D), and the well skin factors S_w and S_f.

Estimated hydraulic conductivity (K) of the fractures ranged from 0.41 to 5.31 ft/day. These estimates are impacted by the fitting of the fracture and matrix storage terms in the Moench model. The fracture storage coefficient for this Site was orders of magnitude lower than that estimated for the aquifer as a whole through Theis. The storage coefficients appear to be influenced by the degree of connectivity to the unconsolidated overburden, which provides much of the groundwater storage on Site. This may result in lower estimated fracture hydraulic conductivities at wells which have been previously established to communicate to the overburden via the fracture network, such as MW-17D (79-89).

4.3.6 Dissolved Phase MTBE Mass Recovery

The mass recovery rates were calculated using the extraction rates at the time of sampling and MTBE concentrations detected from the laboratory analysis. The MTBE analytical data and recovery rates are summarized on **Table 4**. The mass recovery rates during the short term step test increased with pumping rate from 0.04 pounds per hour (lbs./hr.) at 1 gpm to 0.32 lbs./hr. at 10 gpm. The MTBE recovery rates during the pump test were fairly consistent at approximately 0.17 lbs./hr. The MTBE concentrations in the recovered groundwater remained relatively constant during the pump test although the MTBE concentrations decreased 1,000 micrograms per liter (µg/L) every 12 hours after 24 hours. An estimated 8.29 pounds of MTBE was recovered during the step and pump tests.

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5.0 INTERIM REMEDIATION MEASURES

The DEQ in the January 2014 CAP approval letter required the installation and operation of the SVE system by March 21, 2014 subject to the availability of a connection to a permanent local power supply. The SVE system has been operational since June 17, 2014 when the system was connected to the local power supply.

The DEQ has authorized the use of groundwater recovery and treatment with the approval of the CAP. As previously reported, the occurrence of MTBE at a concentration of 8,000 µg/L in the groundwater sample collected from MW-23D, screened from 90 to 100 feet below grade, indicate southward movement of the plume within the bedrock. Additional site characterization activities are underway to delineate the nature and extent of MTBE in the southerly direction. Due to this new understanding of the MTBE distribution in bedrock, and while the additional characterization activities are conducted and the remedial endpoint for MTBE is established in a CAP Addendum, an interim groundwater recovery and treatment system will be installed at the Site as per the letter dated June 27, 2014 (**Appendix A**).

The SVE and interim groundwater recovery and treatment systems are described below.

5.1 Soil Vapor Extraction System

In March 2014, Kleinfelder personnel oversaw the installation of the SVE system, associated piping, and the connections of the piping to the SVE wells and the SVE system. The newly installed SVE wells SVE-1 through SVE-5, as well as monitoring well MW-14 were connected to the SVE system via 2-inch schedule 40 PVC piping installed in below grade trenches. Following the trenching and piping activities, the trenches and former tank field were resurfaced with asphalt. On March 13 and 14, 2014, the temporary SVE system shed was delivered to the Site, installed in position using a crane and connected to the subsurface piping. The location of the SVE system and extraction wells are depicted on **Figure 2**.

The SVE equipment is housed within an 8 feet wide by 18 feet long wood building on a steel frame. The location of the SVE system and extraction wells is depicted on **Figure 2**. The interior of the building is rated for Class 1, Division 2 hazardous locations as defined by the National Electric Code. The building includes a heater, exhaust fan, and lighting; all rated for hazardous locations. The SVE equipment consists of a vacuum blower with an air/water separator, sample ports, and air flow, temperature, and pressure gauges.

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The piping from each well is independently valved to allow for extraction from any or all of the wells at a given time. Each piping leg contains a vacuum gauge to monitor applied vacuum to the individual wellheads. The recovered vapors from the SVE wells are discharged to the atmosphere without treatment under a permit exemption issued by the DEQ Northern Regional Office on January 24, 2014 (Registration No. 91005).

The SVE system has been operational since June 17, 2014. To date, an estimated 8.6 pounds of vapor phase hydrocarbons (which includes MTBE) have been recovered. Specifically, constituents of concern were not detected above the laboratory reporting limits in the SVE effluent samples collected, therefore mass recovery estimates are calculated assuming half of the detection limit when the concentration is non-detect. Complete details regarding the operation and performance of the SVE system have been submitted to DEQ in the *Second Quarter 2014 CAP Monitoring Report*.

The lack of vapor phase recovery at the Site is not unexpected given 1) the UST release has been removed and the tank field area open for approximately two years, 2) petroleum hydrocarbons and MTBE were detected at low to negligible concentrations in soil samples collected from the vadose zone; and 3) petroleum hydrocarbons and MTBE in the soil vapor samples collected during the First Quarter 2014 were below detection laboratory limits. The absence of recovered mass from the SVE system and the lack of quantifiable hydrocarbons in the soil vapor samples suggest limited vapor phase hydrocarbons remain in the vadose zone at the Site. Once the interim groundwater recovery system is brought online and the saprolite is dewatered, it is expected that vapor phase recovery of MTBE will increase as additional soils are exposed to SVE.

5.2 Interim Groundwater Recovery and Treatment System

The interim groundwater recovery and treatment system will utilize readily available equipment that is compatible with the single existing power supply used to operate the SVE system and conforms to Fairfax County Zoning requirements for the installation of an additional accessory structure at the Site. The use of an interim system allows for the timely implementation of this remedy while the MTBE remedial endpoints are developed and before the Site is redeveloped in early 2015. The interim groundwater recovery system will be connected to wells RW-1 and MW-16D and the basis for this design is discussed below.

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In the event that additional areas of impacted groundwater are discovered during the ongoing characterization that are beyond the capture of the interim groundwater recovery system that require remediation, additional recovery wells further from the Site will be connected to the system. If a significantly different groundwater recovery and treatment system is deemed necessary to achieve the MTBE remedial endpoints, the modified system design will be included in the CAP Addendum and subsequently installed.

Determination of the potential zone of groundwater recovery was performed through interpolation of the water table elevation at the conclusion of the pumping test, prior to pump shutdown. Groundwater is interpreted to move down gradient from areas with greater water table elevation to areas with lower groundwater elevation. At the conclusion of the test, all accessible wells, including those which had not been equipped with a pressure transducer, were manually measured to determine the water table elevation. As shown on **Figures 6** and **7**, pumping at a rate of 10 gpm for a period of 48 hours was sufficient to extend the capture zone, the region which contributes the groundwater extracted by wells, north to at least MW-19D, east to at least MW-20D, south towards MW-23D, and west to at least MW-5. To the south, the lack of an additional monitoring location south of MW-23D precludes the interpolation of the water table elevation. The immediate and pronounced drawdown at wells MW-10, MW-23D, and MW-24 is, however, indicative of the fact that water from these locations contributes to that extracted at RW-1, and is by definition evidence that these wells are within the capture zone as measured at the conclusion of the pump test.

In order to provide an initial estimate of the distance to the south which drawdown of at least 0.1 feet could propagate, the drawdown in well RW-1 and MW-23D (171 feet away) at the end of the pump test was evaluated. Drawdown in RW-1 was 14 feet below pre-pumping level and drawdown in MW-23D was 2.5 feet. Drawdown with distance proceeds logarithmically, rather than linearly, meaning that drawdown with distance from the pumping well decreases rapidly with distance from the pumping well, but then persists for relatively long distances. To linearize this effect and allow for simpler estimation of the drawdown with distance, the logarithm of the distance from the pumping well was used. Comparison of drawdown from the pump test to the logarithm of radial distance indicates that 0.1 feet of drawdown could occur as far as 1,300 feet from RW-1. This estimate is preliminary, and will be refined after the additional characterization to the south is completed and the interim groundwater recovery system commences operation.

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As shown during the Step Test conducted at RW-1, well efficiency decreased from 93% to 55% as the pumping rate increased from 1 gpm to 10 gpm. Extrapolation of this trend indicates that well efficiency would be expected to fall to approximately 30% at 20 gpm. As the capture zone at the end of 48 hours of pumping was observed to extend to encompass all MTBE impacted downgradient wells installed to date (**Figures 6** and **7**), a continuous extraction rate of 10 gpm from a single well (i.e. RW-1) is a sufficient pumping rate to capture the known areas of MTBE impact. Based on the extrapolated well efficiency, an increased extraction rate from RW-1 will not significantly increase the capture zone. The groundwater recovery system layout includes the deep well MW-16D and this well will be operated, as conditions warrant, to increase the groundwater extraction rate and capture zone. As previously mentioned, if new data is obtained that demonstrates the existence of MTBE in groundwater in areas that requires remediation outside the capture zone of RW-1, additional recovery wells will be added to the groundwater recovery system.

Water from the extraction wells will be pumped using submersible electric pumps and conveyed through subsurface piping to the treatment system. The interim groundwater treatment system has a 25 gpm capacity and will be contained within an 8 foot wide by 16 foot long cargo trailer. The interim groundwater treatment system is composed of:

- a 500-gallon equalization tank which receives the extracted groundwater;
- a centrifugal transfer pump from the equalization tank;
- an air stripper equipped with a blower which removes VOCs from the extracted groundwater;
- a 1 Hp centrifugal transfer pump from the air stripper;
- two granular activated carbon units which removes remaining VOCs; and
- various control panel, valves, interlocks, and sensors for continuous and safe system operation.

Supplemental carbon units will be installed at the Site and plumbed into series for additional treatment capacity during startup of the system. A Process and Instrumentation Diagram for the interim groundwater treatment system is included within **Appendix G**.

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A VPDES permit (VAG830477) has been obtained and treated groundwater will be discharged to the storm water sewer along the west side of the property. An amendment to the existing access agreement with the adjacent property owner (746 Walker Road) will be required to install the discharge line to this storm sewer. A separate request for an air permit exemption for the air stripper will be submitted to the DEQ Northern Regional Office.

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6.0 SUMMARY AND CONCLUSIONS

Kleinfelder has been retained by Fairfax Petroleum Realty, LLC to prepare this Aquifer Testing and Interim Remedial Measures Report for the Inactive Fairfax Facility #26140 located at 9901 Georgetown Pike, Great Falls, Virginia. Provided below are the summary and conclusions of this Report.

- Step and pump tests were completed on recovery well RW-1 to estimate the hydraulic characteristics of the Site aquifer, including the transmissivity, storage coeffcients, anisotropy, and degree of heterogeneity.

- The results of the aquifer tests indicate that the bedrock structure includes fractures or a fracture zone striking approximately 6-10 degrees east of north on the property. This zone is characterized by relatively high diffusivity (T/S) compared to areas to the west (MW-5, MW-6S) and east (MW-21S, MW-21I, MW-20D). The small storage coefficients evidenced by clear propagation of the 'signal' caused by water extraction at RW-1 may indicate that discrete fractures, as opposed to a broad zone of degraded rock, provides a pathway for migration of MTBE in Site groundwater to the south.

- The aquifer tests also indicate that a groundwater extraction rate of approximately 10 gpm from RW-1 is sufficient to capture water from known areas of MTBE impacted groundwater.

- The SVE system has been operational since mid-June 2014 with limited recovery of vapor phase hydrocarbons including MTBE. This data along with the soil analytical data and First Quarter 2014 soil vapor sampling results suggest there is limited vapor phase hydrocarbons remaining in the vadose zone in the former UST area.

- The proposed interim groundwater extraction and treatment system is sufficient to extract groundwater known to be impacted with MTBE, and will allow relatively quick deployment of the system. Additional recovery wells or equipment may be warranted based on the results of additional ongoing characterization or to achieve the remedial endpoints that will be proposed in the CAP Addendum.

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7.0 REFERENCES

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Neuman, Shlomo P., and Paul A. Witherspoon. "Field determination of the hydraulic properties of leaky multiple aquifer systems." *Water Resources Research* 8.5 (1972): 1284-1298.

Theis C.V. 1935b The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: American Geophysical Union Transactions, 16th Annual Meeting, v. 16, pt. 2, p. 519-524.

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8.0 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

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Figures

0 350 700 1,400 Feet

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N

LEGEND

★ APPROXIMATE SITE LOCATION

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REGIONAL AREA MAP

INACTIVE FAIRFAX FACILITY # 26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE
1

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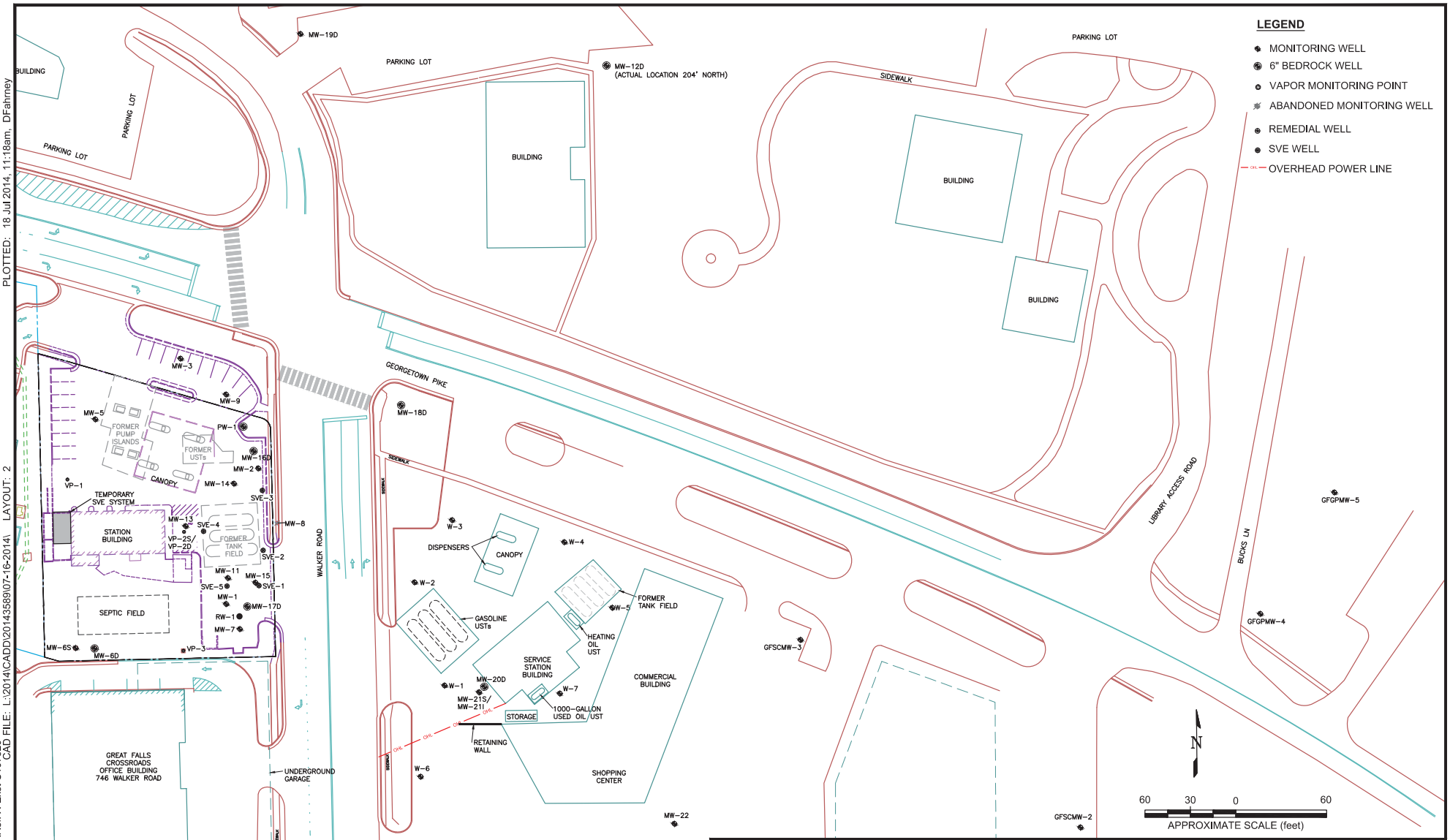

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FILE NAME:	26140_SP_14.dwg

SITE PLAN

INACTIVE FAIRFAX FACILITY #26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE
2

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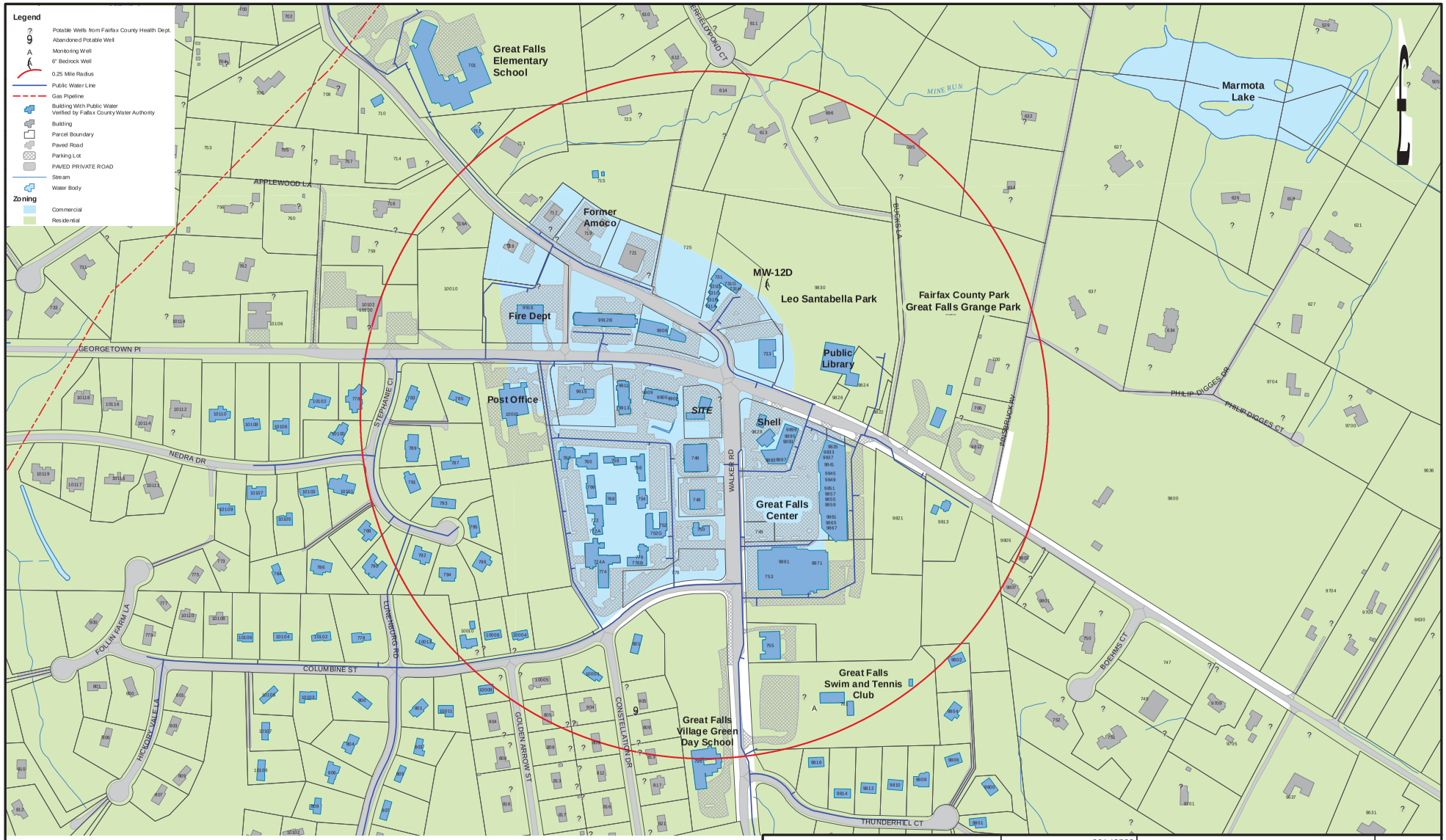
ALBUQUERQUE, NM



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0 175 350 700 Feet

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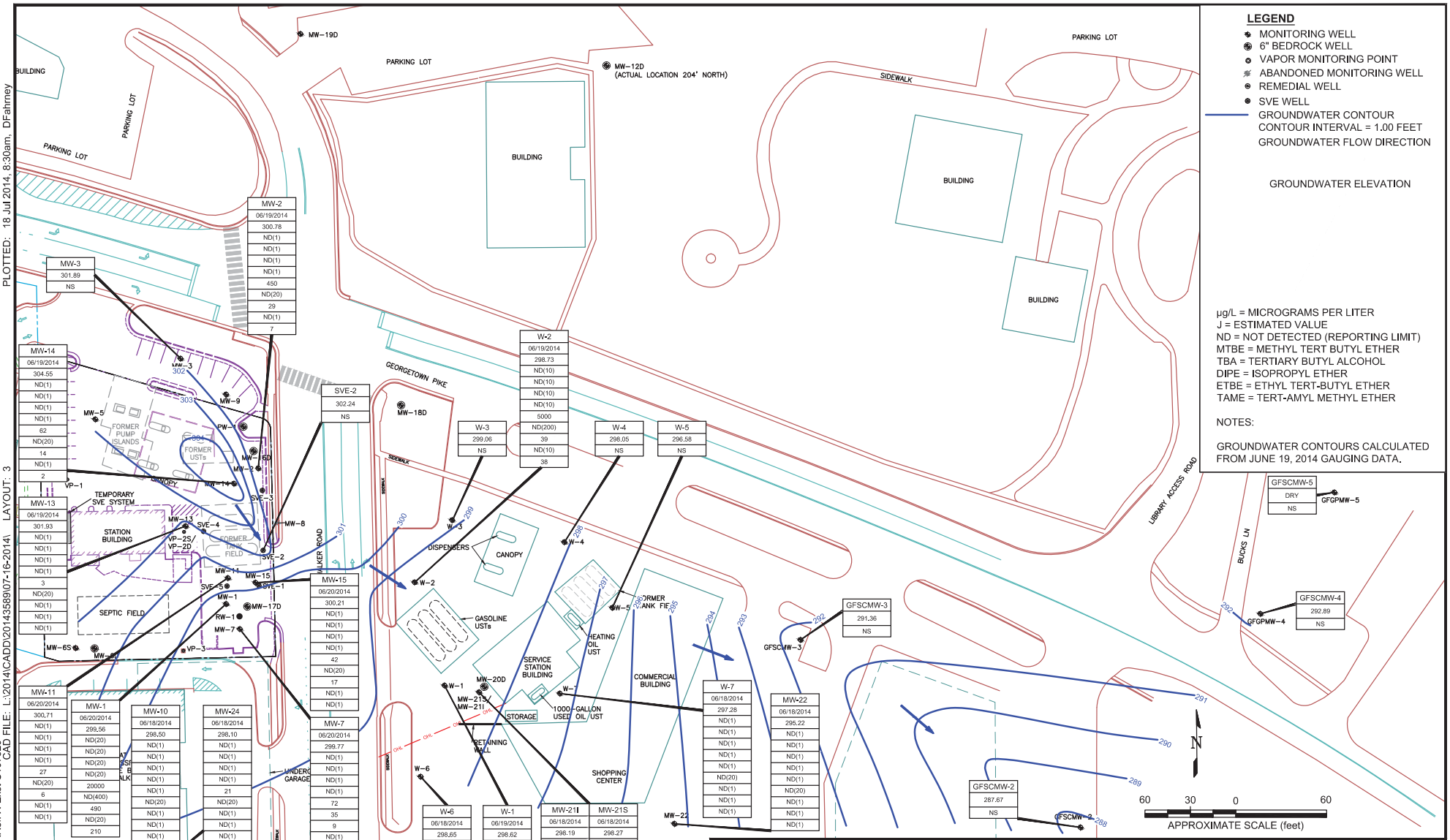
LOCAL AREA MAP

INACTIVE FAIRFAX FACILITY # 26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE
3



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HYDROCARBON DISTRIBUTION / GROUNDWATER CONTOUR MAP JUNE 18 THROUGH JUNE 20, 2014 SHALLOW WELLS

INACTIVE FAIRFAX FACILITY #26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE 4

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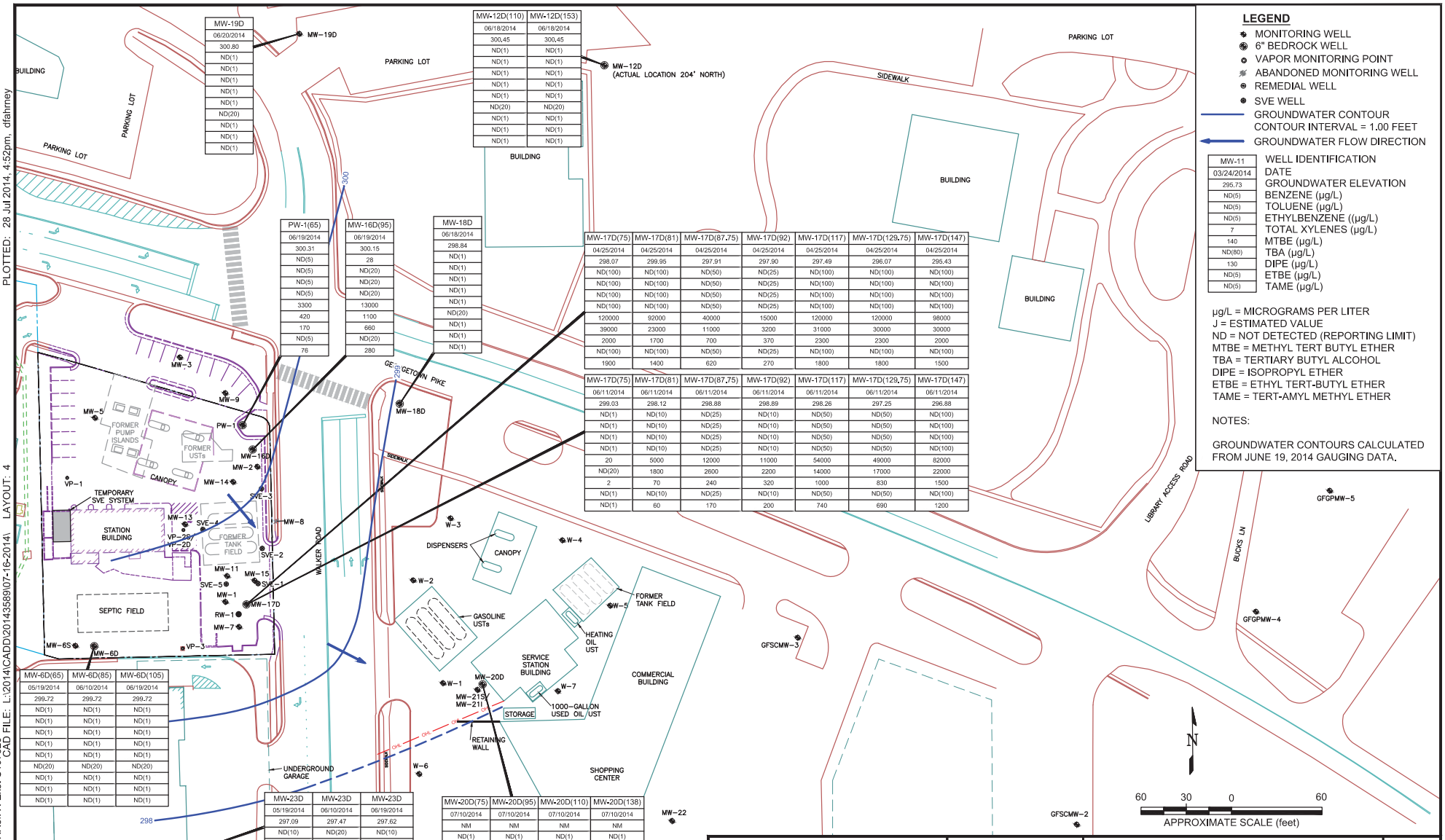

MW-19D
06/20/2014
300.80
ND(1)
ND(1)
ND(1)
ND(1)
ND(1)
ND(20)
ND(1)
ND(1)
ND(1)

MW-12D(110)	MW-12D(153)
06/18/2014	06/18/2014
300.45	300.45
ND(1)	ND(1)
ND(1)	ND(1)
ND(1)	ND(1)
ND(1)	ND(1)
ND(1)	ND(1)
ND(20)	ND(20)
ND(1)	ND(1)
ND(1)	ND(1)
ND(1)	ND(1)

PW-1(65)
06/19/2014
300.31
ND(5)
ND(5)
ND(5)
ND(5)
3300
420
170
ND(5)
76

MW-16D(95)
06/19/2014
300.15
28
ND(20)
ND(20)
ND(20)
13000
1100
660
ND(20)
280

MW-18D
06/18/2014
298.84
ND(1)
ND(1)
ND(1)
ND(1)
ND(1)
ND(20)
ND(1)
ND(1)
ND(1)

MW-17D(75)	MW-17D(81)	MW-17D(87.75)	MW-17D(92)	MW-17D(117)	MW-17D(129.75)	MW-17D(147)
04/25/2014	04/25/2014	04/25/2014	04/25/2014	04/25/2014	04/25/2014	04/25/2014
298.07	299.95	297.91	297.90	297.49	296.07	295.43
ND(100)	ND(100)	ND(50)	ND(25)	ND(100)	ND(100)	ND(100)
ND(100)	ND(100)	ND(50)	ND(25)	ND(100)	ND(100)	ND(100)
ND(100)	ND(100)	ND(50)	ND(25)	ND(100)	ND(100)	ND(100)
ND(100)	ND(100)	ND(50)	ND(25)	ND(100)	ND(100)	ND(100)
120000	92000	40000	15000	120000	120000	98000
39000	23000	11000	3200	31000	30000	30000
2000	1700	700	370	2300	2300	2000
ND(100)	ND(100)	ND(50)	ND(25)	ND(100)	ND(100)	ND(100)
1900	1400	620	270	1800	1800	1500

MW-17D(75)	MW-17D(81)	MW-17D(87.75)	MW-17D(92)	MW-17D(117)	MW-17D(129.75)	MW-17D(147)
06/11/2014	06/11/2014	06/11/2014	06/11/2014	06/11/2014	06/11/2014	06/11/2014
299.03	298.12	298.88	298.89	298.26	297.25	296.88
ND(1)	ND(10)	ND(25)	ND(10)	ND(50)	ND(50)	ND(100)
ND(1)	ND(10)	ND(25)	ND(10)	ND(50)	ND(50)	ND(100)
ND(1)	ND(10)	ND(25)	ND(10)	ND(50)	ND(50)	ND(100)
ND(1)	ND(10)	ND(25)	ND(10)	ND(50)	ND(50)	ND(100)
20	5000	12000	11000	54000	49000	82000
ND(20)	1800	2600	2200	14000	17000	22000
2	70	240	320	1000	830	1500
ND(1)	ND(10)	ND(25)	ND(10)	ND(50)	ND(50)	ND(100)
ND(1)	60	170	200	740	690	1200

MW-6D(65)	MW-6D(85)	MW-6D(105)
05/19/2014	06/10/2014	06/19/2014
299.72	299.72	299.72
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)
ND(20)	ND(20)	ND(20)
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)

MW-23D	MW-23D	MW-23D
05/19/2014	06/10/2014	06/19/2014
297.09	297.47	297.62
ND(10)	ND(20)	ND(10)
ND(10)	ND(20)	ND(10)
ND(10)	ND(20)	ND(10)
ND(10)	ND(20)	ND(10)
8000	11000	5100
1800	2200	ND(200)
260	340	130
ND(10)	ND(20)	ND(10)
120	180	57

MW-20D(75)	MW-20D(95)	MW-20D(110)	MW-20D(138)
07/10/2014	07/10/2014	07/10/2014	07/10/2014
NM	NM	NM	NM
ND(1)	ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)	ND(1)
100	73	43	55
28	21	ND(20)	ND(20)
3	2	1	1
ND(1)	ND(1)	ND(1)	ND(1)
ND(1)	ND(1)	ND(1)	ND(1)

LEGEND

- MONITORING WELL
- 6" BEDROCK WELL
- VAPOR MONITORING POINT
- ABANDONED MONITORING WELL
- REMEDIAL WELL
- SVE WELL
- GROUNDWATER CONTOUR
  CONTOUR INTERVAL = 1.00 FEET
- GROUNDWATER FLOW DIRECTION

MW-11	
03/24/2014	DATE
295.73	GROUNDWATER ELEVATION
ND(5)	BENZENE (µg/L)
ND(5)	TOLUENE (µg/L)
ND(5)	ETHYLBENZENE ((µg/L)
7	TOTAL XYLENES (µg/L)
140	MTBE (µg/L)
ND(80)	TBA (µg/L)
130	DIPE (µg/L)
ND(5)	ETBE (µg/L)
ND(5)	TAME (µg/L)

WELL IDENTIFICATION

µg/L = MICROGRAMS PER LITER
J = ESTIMATED VALUE
ND = NOT DETECTED (REPORTING LIMIT)
MTBE = METHYL TERT BUTYL ETHER
TBA = TERTIARY BUTYL ALCOHOL
DIPE = ISOPROPYL ETHER
ETBE = ETHYL TERT-BUTYL ETHER
TAME = TERT-AMYL METHYL ETHER

NOTES:

GROUNDWATER CONTOURS CALCULATED FROM JUNE 19, 2014 GAUGING DATA.

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FILE NAME:	26140_SP_14.dwg

HYDROCARBON DISTRIBUTION / GROUNDWATER CONTOUR MAP APRIL 25 THROUGH JULY 10, 2014 DEEP WELLS

INACTIVE FAIRFAX FACILITY #26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE
5

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LAYOUT: 4
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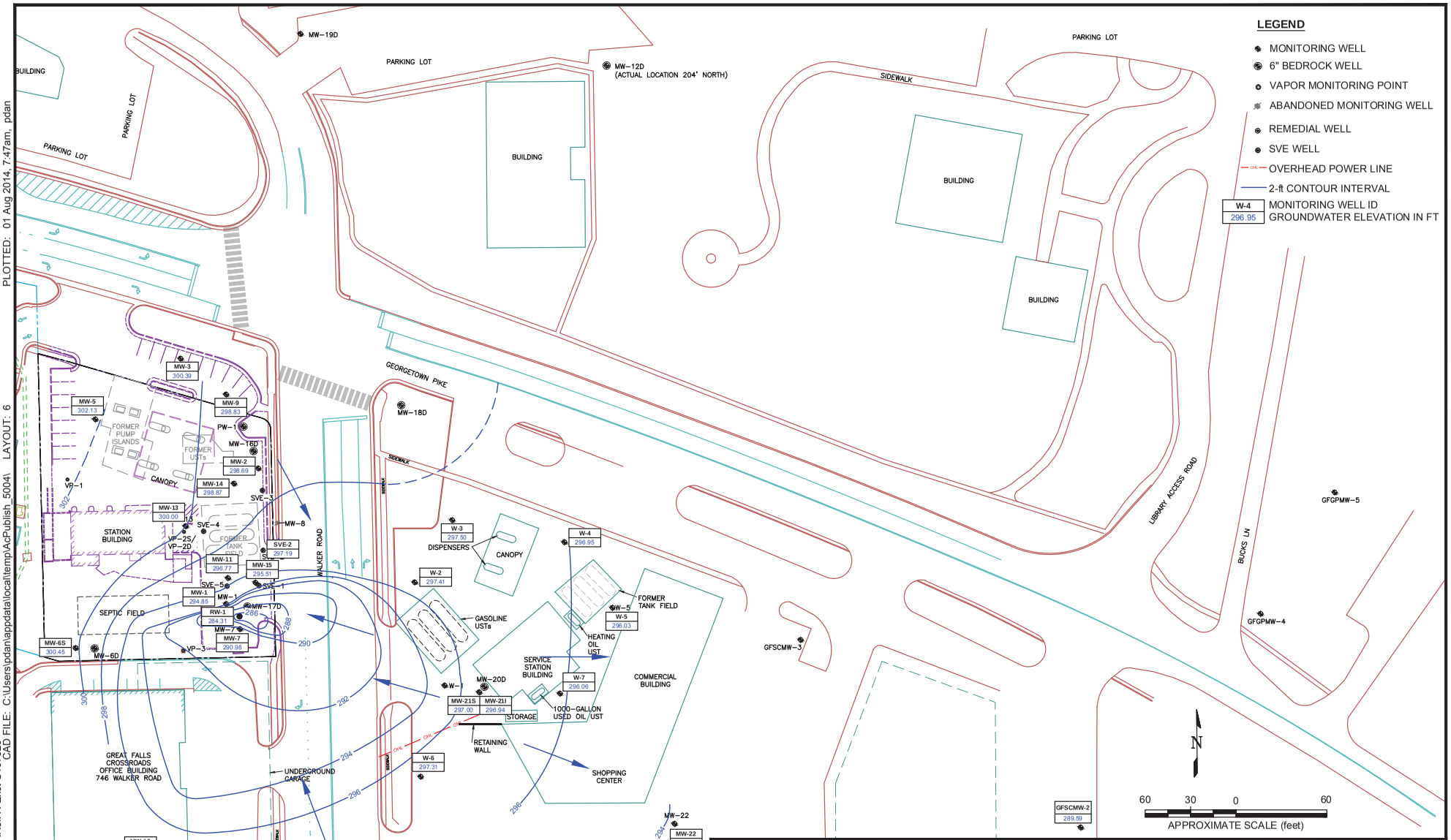
ALBUQUERQUE, NM



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DRAWN BY:	PD
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FILE NAME:	26140_SP_14.dwg

PUMP TEST POTENTIOMETRIC SURFACE MAP
SHALLOW WELLS (5/15/14)

INACTIVE FAIRFAX FACILITY #26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE
6

PLOTTED: 01 Aug 2014, 7:47am, pdan
LAYOUT: 6
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XRef: X-Exst-S107520
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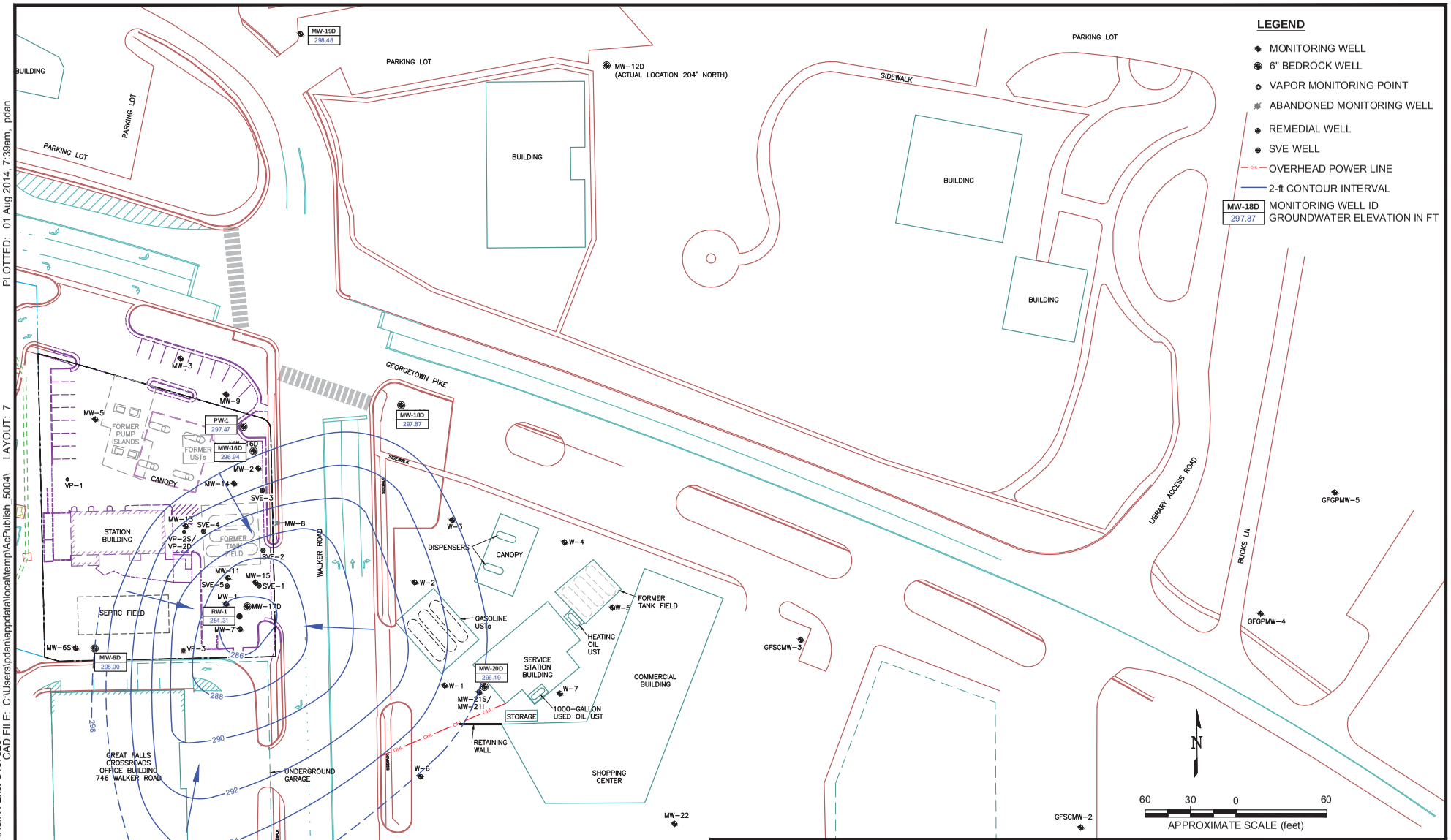

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DRAWN BY:	PD
CHECKED BY:	PW
FILE NAME:	26140_SP_14.dwg

PUMP TEST POTENTIOMETRIC SURFACE MAP
DEEP WELLS (5/15/14)

INACTIVE FAIRFAX FACILITY #26140
9901 GEORGETOWN PIKE
GREAT FALLS, VIRGINIA

FIGURE
7

PLOTTED: 01 Aug 2014, 7:39am, pdan
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ATTACHED IMAGES:
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ALBUQUERQUE, NM

Tables

TABLE 1
Monitoring Well Construction Details
Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, VA

Monitoring Well	Installation Date	Well Type	Well Diameter (inch)	Top of Casing Elevation (feet)	Riser / Casing Length (feet)	Screen Length / Open Interval (feet)	Total Borehole Depth (feet below grade)	Screen / Open Interval (feet below grade)	Comments
MW-1	7/20/2009	Monitoring	2	328.99	20	17	37	20-37	
MW-2	7/21/2009	Monitoring	2	332.05	25	15	42	25-40	
MW-3	7/22/2009	Monitoring	2	333.98	25	10	35	25-35	
MW-5	7/22/2009	Monitoring	2	332.35	30	10	42	30-40	
MW-6S	9/11/2009	Monitoring	4	321.85	20	15	35	20-35	
MW-6D	9/11/2009	Deep Monitoring	6	323.09	70	50	120	70-120	Open borehole after 70 feet
MW-7	10/16/2009	Monitoring	2	327.96	15	25	40	15-40	
MW-8	10/8/2009	Monitoring	2	330.54	25	20	45	25-45	Abandoned 9/19/2013
MW-9	10/9/2009	Monitoring	2	333.46	25	20	45	25-45	
MW-10	10/12/2009	Monitoring	2	324.17	10	30	40	10-40	
MW-11	10/14/2009	Monitoring	2	329.64	10	30	40	10-40	
MW-12D	1/11/2011	Deep Monitoring	6	326.43	100	60	160	100-160	Open borehole after 100 feet
MW-13	8/18/2011	Monitoring	4	332.00	25	20	45	25-45	
MW-14	8/18/2011	Monitoring	4	331.81	25	20	45	25-45	
MW-15	8/18/2011	Monitoring	4	328.95	25	20	45	25-45	
MW-16D	11/22/2011	Monitoring	6	332.90	85	25	110	85-110	Open borehole after 85 feet.
MW-17D	4/9/2013	Deep Monitoring	6	328.99	68	82	150	68-150	Converted to CMT on 4/9/2014.
MW-17D (CMT-1)	4/9/2014	Discrete Interval Monitoring	0.4	328.84	71	6	150	71-77	The Continuous Multichannel Tubing (CMT) screens are approximately six inches in length. The Screen Length / Open Interval and Screen / Open Interval columns refer to the sand pack installed in the borehole annulus surrounding the CMT port.
MW-17D (CMT-2)	4/9/2014	Discrete Interval Monitoring	0.4	328.84	79	4	150	79-83	
MW-17D (CMT-3)	4/9/2014	Discrete Interval Monitoring	0.4	328.84	86	4	150	86-90	
MW-17D (CMT-4)	4/9/2014	Discrete Interval Monitoring	0.4	328.84	91	2	150	91-93	
MW-17D (CMT-5)	4/9/2014	Discrete Interval Monitoring	0.4	328.84	114	6	150	114-120	
MW-17D (CMT-6)	4/9/2014	Discrete Interval Monitoring	0.4	328.84	126	6	150	126-132	
MW-17D (CMT-7)	4/9/2014	Discrete Interval Monitoring	0.38	328.84	146	4	150	146-150	
MW-18D	11/22/2011	Deep Monitoring	6	334.88	97	58	136	92-150	Open borehole after 92 feet. Borehole blocked by rock at 101 feet during testing on 4/30/13.
MW-19D	3/8/2014	Deep Monitoring	2	341.91	80	20	100	80-100	
MW-20D	4/7/2014	Deep Monitoring	6	329.80	70	72	142	70-142	Open borehole after 70 feet.
MW-21I	4/1/2014	Monitoring	2	329.71	56	10	66	56-66	Part of a nested well pair including MW-21S
MW-21S	4/1/2014	Monitoring	2	329.69	26	20	46	26-46	Part of a nested well pair including MW-21I
MW-22	4/3/2014	Monitoring	2	320.97	20	20	40	20-40	
MW-23D	5/1/2014	Deep Monitoring	2	324.81	90	10	100	90-100	
MW-24	4/3/2014	Monitoring	2	324.49	50	10	60	50-60	
PW-1	Unknown	Deep Monitoring	6	334.54	55	20	75	55 - 75	Former potable well. Partially abandoned in November 2011. Original well depth was approximately 116 feet.
RW-1	3/13/2014	Recovery	6	328.31	21	70	91	21-91	Total drilled depth was 100 feet; borehole collapsed to 91 feet during the installation of screen and casing.

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1340 Charwood Road, Suite I, Hanover, MD

Table 2

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-1	07/24/2009	100.00	30.45	ND	ND	69.55	13.3	<1.0	0.53	24	193000	NA	NA	NA	NA	Screened from 20-37'
	08/18/2009	328.99	NM	NM	NM	NM	ND(200)	ND(200)	ND(200)	ND(200)	138000	NA	NA	NA	NA	
	10/15/2009	328.99	31.88	ND	ND	297.11	ND(200)	ND(200)	ND(200)	ND(200)	139000	47000	4070	ND(1000)	2130	
	06/22/2010	328.99	28.65	ND	ND	300.34	ND(5)	ND(7)	ND(8)	ND(8)	13000	NA	NA	NA	NA	
	09/30/2010	328.99	31.11	ND	ND	297.88	ND(50)	ND(70)	ND(80)	110	240000	NA	NA	NA	NA	
	12/16/2010	328.99	30.93	ND	ND	298.06	ND(100)	ND(140)	ND(160)	ND(160)	220000	NA	NA	NA	NA	
	02/17/2011	328.99	31.46	ND	ND	297.53	ND(250)	ND(350)	ND(400)	ND(400)	190000	NA	NA	NA	NA	
	05/24/2011	328.99	30.24	ND	ND	298.75	ND(50)	ND(70)	ND(80)	ND(80)	140000	NA	NA	NA	NA	
	09/02/2011	328.99	32.92	ND	ND	296.07	ND(50)	ND(70)	ND(80)	ND(80)	160000	NA	NA	NA	NA	
	12/29/2011	328.99	30.99	ND	ND	298.00	ND(50)	ND(70)	ND(80)	ND(80)	160000	NA	NA	NA	NA	
	06/01/2012	328.99	31.47	ND	ND	297.52	ND(50)	ND(70)	ND(80)	ND(80)	140000	NA	NA	NA	NA	
	02/25/2013	328.99	32.84	ND	ND	296.15	ND(250)	ND(250)	ND(250)	ND(250)	120000	15000	3700	ND(250)	1700	
	06/06/2013	328.99	32.14	ND	ND	296.85	ND(50)	ND(70)	ND(80)	ND(80)	150000	NA	NA	NA	NA	
	12/19/2013	328.99	33.06	ND	ND	295.93	ND(250)	ND(250)	ND(250)	ND(250)	84000	6900	2200	ND(250)	1100	
	03/25/2014	328.99	31.04	ND	ND	297.95	ND(500)	ND(500)	ND(500)	ND(500)	71000	ND(8000)	1200	ND(500)	850	
	06/20/2014	328.99	29.43	ND	ND	299.56	ND(20)	ND(20)	ND(20)	ND(20)	20000	ND(400)	490	ND(20)	210	

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1340 Charwood Road Suite I, Hanover, MD

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-2	07/24/2009	102.90	33.19	ND	ND	69.71	70.2	8.0	1.0	131	107000	NA	NA	NA	NA	Screened from 25-40'
	08/18/2009	332.05	NM	NM	NM	NM	ND(100)	ND(100)	ND(100)	ND(100)	87100	NA	NA	NA	NA	
	10/15/2009	332.05	34.41	ND	ND	297.64	ND(200)	ND(200)	ND(200)	ND(200)	122000	ND(5000)	6130	ND(1000)	2420	
	07/01/2010	332.05	31.63	ND	ND	300.42	ND(100)	91.3	ND(100)	ND(100)	52400	NA	NA	NA	NA	
	09/30/2010	332.05	32.96	ND	ND	299.09	ND(25)	ND(35)	ND(40)	ND(40)	37000	NA	NA	NA	NA	
	12/16/2010	332.05	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well inaccessible
	02/17/2011	332.05	34.15	ND	ND	297.90	ND(100)	ND(140)	ND(160)	ND(160)	140000	NA	NA	NA	NA	
	05/24/2011	332.05	32.92	ND	ND	299.13	ND(25)	ND(35)	ND(40)	ND(40)	54000	NA	NA	NA	NA	
	09/02/2011	332.05	35.53	ND	ND	296.52	ND(50)	ND(70)	ND(80)	ND(80)	160000	NA	NA	NA	NA	
	12/29/2011	332.05	33.64	ND	ND	298.41	ND(25)	ND(35)	ND(40)	ND(40)	49000	NA	NA	NA	NA	
	06/01/2012	332.05	34.16	ND	ND	297.89	ND(50)	ND(70)	ND(80)	ND(80)	100000	NA	NA	NA	NA	
	02/25/2013	332.05	35.47	ND	ND	296.58	ND(250)	ND(250)	ND(250)	ND(250)	71000	4600	1900	ND(250)	1100	
	06/06/2013	332.05	34.91	ND	ND	297.14	ND(3)	ND(4)	ND(4)	ND(4)	3500	NA	NA	NA	NA	
	12/19/2013	332.05	35.50	ND	ND	296.55	ND(130)	ND(130)	ND(130)	ND(130)	19000	6800	710	ND(130)	280	
	03/25/2014	332.05	33.30	ND	ND	298.75	ND(50)	ND(50)	ND(50)	ND(50)	7500	2500	310	ND(50)	110	
	06/20/2014	332.05	31.27	ND	ND	300.78	ND(1)	ND(1)	ND(1)	ND(1)	450	ND(20)	29	ND(1)	7	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-3	07/24/2009	104.99	33.67	ND	ND	71.32	<0.50	<1.0	<1.0	ND	5.7	NA	NA	NA	NA	Screened from 25-35'
	08/18/2009	333.98	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	10/15/2009	333.98	34.51	ND	ND	299.47	NS	NS	NS	NS	NS	NS	NS	NS	NS	Insufficent volume to sample
	07/01/2010	333.98	32.39	ND	ND	301.59	ND(2)	ND(2)	ND(2)	ND(2)	1.9	NA	NA	NA	NA	
	09/30/2010	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/16/2010	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	02/17/2011	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	05/24/2011	333.98	33.63	ND	ND	300.35	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	2 J	NA	NA	NA	NA	
	09/02/2011	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/29/2011	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/01/2012	333.98	34.56	ND	ND	299.42	NS	NS	NS	NS	NS	NS	NS	NS	NS	Insufficient water for sample
	02/25/2013	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/06/2013	333.98	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/18/2013	333.98	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	03/24/2014	333.98	34.25	ND	ND	299.73	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/19/2014	333.98	32.09	ND	ND	301.89	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-5	07/24/2009	103.43	30.72	ND	ND	72.71	<0.50	<1.0	<1.0	ND	1.3	NA	NA	NA	NA	Screened from 30-40'
	08/18/2009	332.35	NM	NM	NM	NM	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	0.48	NA	NA	NA	NA	
	10/15/2009	332.35	32.51	ND	ND	299.84	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	11.4	ND(25)	0.46	ND(5.0)	ND(5.0)	
	06/22/2010	332.35	29.40	ND	ND	302.95	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	09/30/2010	332.35	32.30	ND	ND	300.05	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	12/16/2010	332.35	32.12	ND	ND	300.23	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	12	NA	NA	NA	NA	
	02/17/2011	332.35	32.31	ND	ND	300.04	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	2 J	NA	NA	NA	NA	
	05/24/2011	332.35	30.84	ND	ND	301.51	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	09/02/2011	332.35	33.39	ND	ND	298.96	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	12/29/2011	332.35	31.36	ND	ND	300.99	ND(0.5)	1 J	ND(0.8)	1 J	7	NA	NA	NA	NA	
	06/01/2012	332.35	31.93	ND	ND	300.42	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.8 J	NA	NA	NA	NA	
	02/25/2013	332.35	33.28	ND	ND	299.07	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	332.35	32.55	ND	ND	299.80	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	12/18/2013	332.35	33.92	ND	ND	298.43	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	332.35	31.32	ND	ND	301.03	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/19/2014	332.35	29.30	ND	ND	303.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-6S	09/24/2009	NM	NM	NM	NM	NM	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	2.8	ND(25)	2.1	ND(5.0)	ND(5.0)	Screened from 20-35'
	10/15/2009	321.85	23.35	ND	ND	298.50	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	2.8	ND(25)	1.3	ND(5.0)	ND(5.0)	
	06/22/2010	321.85	20.22	ND	ND	301.63	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	2	NA	NA	NA	NA	
	09/30/2010	321.85	23.00	ND	ND	298.85	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9	NA	NA	NA	NA	
	12/16/2010	321.85	22.82	ND	ND	299.03	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	02/17/2011	321.85	23.02	ND	ND	298.83	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	05/24/2011	321.85	21.66	ND	ND	300.19	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	09/02/2011	321.85	24.04	ND	ND	297.81	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	12/29/2011	321.85	22.15	ND	ND	299.70	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	2 J	NA	NA	NA	NA	
	06/01/2012	321.85	22.72	ND	ND	299.13	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.8 J	NA	NA	NA	NA	
	02/25/2013	321.85	24.03	ND	ND	297.82	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	321.85	23.49	ND	ND	298.36	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/17/2013	321.85	24.63	ND	ND	297.22	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	321.85	22.19	ND	ND	299.66	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/19/2014	321.85	20.01	ND	ND	301.84	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-7	10/15/2009	327.96	31.21	ND	ND	296.75	2.7	ND(10)	ND(10)	ND(10)	10600	2650	232	ND(50)	217	Screened from 15-40'
	06/22/2010	327.96	28.00	ND	ND	299.96	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	87	NA	NA	NA	NA	
	09/30/2010	327.96	30.24	ND	ND	297.72	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/16/2010	327.96	30.15	ND	ND	297.81	2	ND(1)	ND(2)	ND(2)	2100	NA	NA	NA	NA	
	02/17/2011	327.96	30.75	ND	ND	297.21	ND(10)	ND(14)	ND(16)	ND(16)	9700	NA	NA	NA	NA	
	05/24/2011	327.96	29.56	ND	ND	298.40	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	130	NA	NA	NA	NA	
	09/02/2011	327.96	32.21	ND	ND	295.75	11 J	ND(14)	ND(16)	ND(16)	16000	NA	NA	NA	NA	
	12/29/2011	327.96	30.24	ND	ND	297.72	ND(1)	ND(1)	ND(2)	ND(2)	1600	NA	NA	NA	NA	
	06/01/2012	327.96	30.74	ND	ND	297.22	ND(5)	ND(7)	ND(8)	ND(8)	6700	NA	NA	NA	NA	
	02/25/2013	327.96	32.23	ND	ND	295.73	ND(250)	ND(250)	ND(250)	ND(250)	61000	14000	1700	ND(250)	940	
	06/06/2013	327.96	31.49	ND	ND	296.47	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	950	NA	NA	NA	NA	
	12/18/2013	327.96	32.79	ND	ND	295.17	ND(250)	ND(250)	ND(250)	ND(250)	140000	29000	3000	ND(250)	1600	
	03/28/2014	327.96	30.35	ND	ND	297.61	ND(1)	ND(1)	ND(1)	ND(1)	430	ND(20)	13	ND(1)	6	
	06/20/2014	327.96	28.19	ND	ND	299.77	ND(1)	ND(1)	ND(1)	ND(1)	72	35	9	ND(1)	ND(1)	
MW-8	10/15/2009	330.54	34.01	ND	ND	296.53	ND(500)	ND(500)	ND(500)	ND(500)	226000	30800	6250	ND(2500)	3080	Screened from 25-45'
	06/22/2010	330.54	30.91	ND	ND	299.63	ND(5)	ND(7)	ND(8)	ND(8)	15000	NA	NA	NA	NA	
	09/30/2010	330.54	32.97	ND	ND	297.57	11	ND(14)	ND(16)	ND(16)	44000	NA	NA	NA	NA	
	12/16/2010	330.54	32.85	ND	ND	297.69	ND(25)	ND(35)	ND(40)	ND(40)	49000	NA	NA	NA	NA	
	02/17/2011	330.54	33.62	ND	ND	296.92	ND(25)	ND(35)	ND(40)	ND(40)	41000	NA	NA	NA	NA	
	05/24/2011	330.54	32.44	ND	ND	298.10	ND(5)	ND(7)	ND(8)	ND(8)	8400	NA	NA	NA	NA	
	09/02/2011	330.54	35.18	ND	ND	295.36	ND(10)	ND(14)	ND(16)	ND(16)	15000	NA	NA	NA	NA	
	12/29/2011	330.54	33.23	ND	ND	297.31	ND(3)	ND(4)	ND(4)	ND(4)	1800	NA	NA	NA	NA	
	06/01/2012	330.54	33.73	ND	ND	296.81	3 J	ND(1)	ND(2)	4 J	1200	NA	NA	NA	NA	
	02/25/2013	330.54	35.27	ND	ND	295.27	ND(5)	ND(5)	ND(5)	ND(5)	180	280	220	ND(5)	ND(5)	
	06/06/2013	330.54	34.49	ND	ND	296.05	0.7 J	ND(0.7)	ND(0.8)	ND(0.8)	160	NA	NA	NA	NA	
	09/19/2013	330.54	36.01	ND	ND	294.53	ND(5)	ND(5)	ND(5)	ND(5)	170	NA	NA	NA	NA	Abandoned (9/19/2013)
SVE-2	03/25/2014	329.69	31.32	ND	ND	298.37	ND(1)	ND(1)	ND(1)	ND(1)	600	76	44	ND(1)	11	Screened from 25-45'
	06/19/2014	329.69	27.45	ND	ND	302.24	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-9	10/15/2009	333.46	35.60	ND	ND	297.86	ND(1.0)	0.33	ND(1.0)	0.38	64.7	ND(25)	125	ND(5.0)	2.9	Screened from 25-45'
	06/22/2010	333.46	32.32	ND	ND	301.14	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	22	NA	NA	NA	NA	
	09/30/2010	333.46	34.85	ND	ND	298.61	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	52	NA	NA	NA	NA	
	12/16/2010	333.46	34.73	ND	ND	298.73	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	81	NA	NA	NA	NA	
	02/17/2011	333.46	35.28	ND	ND	298.18	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	48	NA	NA	NA	NA	
	05/24/2011	333.46	34.04	ND	ND	299.42	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	26	NA	NA	NA	NA	
	09/02/2011	333.46	36.86	ND	ND	296.60	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	80	NA	NA	NA	NA	
	12/29/2011	333.46	34.68	ND	ND	298.78	ND(0.5)	2 J	ND(0.8)	1 J	58	NA	NA	NA	NA	
	06/01/2012	333.46	35.17	ND	ND	298.29	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	190	NA	NA	NA	NA	
	02/25/2013	333.46	36.65	ND	ND	296.81	ND(5)	ND(5)	ND(5)	ND(5)	55	ND(80)	17	ND(5)	ND(5)	
	06/06/2013	333.46	35.98	ND	ND	297.48	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	20	NA	NA	NA	NA	
	12/18/2013	333.46	37.33	ND	ND	296.13	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	333.46	34.67	ND	ND	298.79	ND(5)	ND(5)	ND(5)	ND(5)	12	ND(80)	6	ND(5)	ND(5)	
	06/19/2014	333.46	32.56	ND	ND	300.90	NS	NS	NS	NS	NS	NS	NS	NS	NS	
MW-10	10/15/2009	324.17	28.77	ND	ND	295.40	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	10.3	ND(25)	ND(5.0)	ND(5.0)	ND(5.0)	Screened from 10-40'
	06/22/2010	324.17	25.80	ND	ND	298.37	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	4	NA	NA	NA	NA	
	12/16/2010	324.17	27.72	ND	ND	296.45	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	10	NA	NA	NA	NA	
	02/17/2011	324.17	28.05	ND	ND	296.12	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	7	NA	NA	NA	NA	
	05/24/2011	324.17	27.04	ND	ND	297.13	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	3 J	NA	NA	NA	NA	
	09/02/2011	324.17	29.60	ND	ND	294.57	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	8	NA	NA	NA	NA	
	12/29/2011	324.17	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well inaccessible
	06/01/2012	324.17	28.17	ND	ND	296.00	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	4 J	NA	NA	NA	NA	
	02/25/2013	324.17	29.45	ND	ND	294.72	ND(5)	ND(5)	ND(5)	ND(5)	7	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	324.17	28.87	ND	ND	295.30	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/18/2013	324.17	30.04	ND	ND	294.13	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	324.17	27.24	ND	ND	296.93	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/18/2014	324.17	25.67	ND	ND	298.50	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-11	10/16/2009	NM	NM	NM	NM	NM	15.3	ND(10)	ND(10)	10.9	38400	23300	1290	ND(50)	464	Screened from 10-40'
	06/22/2010	329.64	29.00	ND	ND	300.64	ND(50)	ND(70)	ND(80)	ND(80)	170000	NA	NA	NA	NA	
	09/30/2010	329.64	31.42	ND	ND	298.22	ND(50)	ND(70)	ND(80)	ND(80)	130000	NA	NA	NA	NA	
	12/16/2010	329.64	31.22	ND	ND	298.42	ND(25)	ND(35)	ND(40)	ND(40)	41000	NA	NA	NA	NA	
	02/17/2011	329.64	31.81	ND	ND	297.83	ND(10)	ND(14)	ND(16)	ND(16)	23000	NA	NA	NA	NA	
	05/24/2011	329.64	30.56	ND	ND	299.08	ND(13)	ND(18)	ND(20)	ND(20)	16000	NA	NA	NA	NA	
	09/02/2011	329.64	33.22	ND	ND	296.42	4 J	ND(4)	ND(4)	ND(4)	7400	NA	NA	NA	NA	
	12/29/2011	329.64	31.29	ND	ND	298.35	ND(10)	ND(14)	ND(16)	ND(16)	9000	NA	NA	NA	NA	
	06/01/2012	329.64	31.77	ND	ND	297.87	7 J	21 J	ND(8)	34 J	4200	NA	NA	NA	NA	
	02/25/2013	329.64	33.03	ND	ND	296.61	ND(10)	ND(10)	ND(10)	ND(10)	1400	180	530	ND(10)	22	
	06/06/2013	329.64	32.46	ND	ND	297.18	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	770	NA	NA	NA	NA	
	12/18/2013	329.64	33.91	ND	ND	295.73	ND(5)	ND(5)	ND(5)	7	140	ND(80)	130	ND(5)	ND(5)	
	03/24/2014	329.64	31.19	ND	ND	298.45	ND(5)	ND(5)	ND(5)	ND(5)	41	ND(80)	25	ND(5)	ND(5)	
	06/20/2014	329.64	28.93	ND	ND	300.71	ND(1)	ND(1)	ND(1)	ND(1)	27	ND(20)	6	ND(1)	ND(1)	
MW-13	09/02/2011	332.00	34.37	ND	ND	297.63	5	ND(0.7)	ND(0.8)	5	6800	NA	NA	NA	NA	Screened from 25-45'
	12/29/2011	332.00	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well inaccessible
	06/01/2012	332.00	32.88	ND	ND	299.12	ND(5)	ND(7)	ND(8)	ND(8)	5700	NA	NA	NA	NA	
	02/25/2013	332.00	33.80	ND	ND	298.20	ND(25)	ND(25)	ND(25)	ND(25)	5300	ND(400)	150	ND(25)	80	
	06/06/2013	332.00	33.33	ND	ND	298.67	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1300	NA	NA	NA	NA	
	12/19/2013	332.00	34.43	ND	ND	297.57	ND(5)	ND(5)	ND(5)	ND(5)	1100	ND(80)	43	ND(5)	18	
	03/24/2014	332.00	32.29	ND	ND	299.71	ND(5)	ND(5)	ND(5)	ND(5)	21	ND(80)	ND(5)	ND(5)	ND(5)	
	06/19/2014	332.00	30.07	ND	ND	301.93	ND(1)	ND(1)	ND(1)	ND(1)	3	ND(20)	ND(1)	ND(1)	ND(1)	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-14	09/02/2011	331.81	35.02	ND	ND	296.79	54	ND(4)	ND(4)	55	170000	NA	NA	NA	NA	Screened from 25-45'
	12/29/2011	331.81	33.36	ND	ND	298.45	ND(50)	ND(70)	ND(80)	ND(80)	99000	NA	NA	NA	NA	
	06/01/2012	331.81	33.90	ND	ND	297.91	ND(50)	ND(70)	ND(80)	ND(80)	91000	NA	NA	NA	NA	
	02/25/2013	331.81	35.07	ND	ND	296.74	ND(50)	ND(50)	ND(50)	ND(50)	29000	2500	1100	ND(50)	450	
	06/06/2013	331.81	34.35	ND	ND	297.46	ND(1)	ND(1)	ND(2)	ND(2)	3600	NA	NA	NA	NA	
	12/19/2013	331.81	35.15	ND	ND	296.66	ND(5)	ND(5)	ND(5)	ND(5)	33	ND(80)	11	ND(5)	ND(5)	
	03/24/2014	331.82	32.91	ND	ND	298.91	ND(5)	ND(5)	ND(5)	ND(5)	14	ND(80)	ND(5)	ND(5)	ND(5)	
	06/19/2014	331.82	27.27	ND	ND	304.55	ND(1)	ND(1)	ND(1)	ND(1)	62	ND(20)	14	ND(1)	2	
MW-15	09/02/2011	328.95	33.06	ND	ND	295.89	ND(0.5)	ND(0.7)	ND(0.8)	1 J	21000	NA	NA	NA	NA	Screened from 25-45'
	12/29/2011	328.95	31.10	ND	ND	297.85	ND(1)	ND(1)	ND(2)	ND(2)	1100	NA	NA	NA	NA	
	06/01/2012	328.95	31.64	ND	ND	297.31	ND(10)	ND(14)	ND(16)	ND(16)	14000	NA	NA	NA	NA	
	02/25/2013	328.95	33.10	ND	ND	295.85	ND(10)	ND(10)	ND(10)	ND(10)	1800	300	140	ND(10)	28	
	06/06/2013	328.95	32.32	ND	ND	296.63	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	120	NA	NA	NA	NA	
	12/18/2013	328.95	33.86	ND	ND	295.09	ND(10)	ND(10)	ND(10)	14	1700	260	210	ND(10)	27	
	03/25/2014	328.95	30.90	ND	ND	298.05	ND(5)	ND(5)	ND(5)	ND(5)	350	ND(80)	50	ND(5)	5	
	06/20/2014	328.95	28.74	ND	ND	300.21	ND(1)	ND(1)	ND(1)	ND(1)	42	ND(20)	17	ND(1)	ND(1)	
MW-21S	04/11/2014	329.69	33.65	ND	ND	296.04	ND(10)	ND(10)	ND(10)	ND(10)	7500	6200	79	ND(10)	78	Screened from 26-46'
	06/18/2014	329.69	31.42	ND	ND	298.27	ND(1)	ND(1)	ND(1)	ND(1)	53	ND(20)	1	ND(1)	ND(1)	
MW-21I	04/11/2014	329.71	33.71	ND	ND	296.00	ND(2)	ND(2)	ND(2)	ND(2)	2500	1700	31	ND(2)	28	Screened from 56-66'
	06/18/2014	329.71	31.52	ND	ND	298.19	ND(1)	ND(1)	ND(1)	ND(1)	1700	910	26	ND(1)	18	
MW-22	04/11/2014	320.97	28.55	ND	ND	292.42	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	Screened from 20-40'
	06/18/2014	320.97	25.75	ND	ND	295.22	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
MW-24	04/11/2014	324.49	27.66	ND	ND	296.83	ND(1)	1	ND(1)	ND(1)	29	ND(20)	1	ND(1)	ND(1)	Screened from 50-60'
	06/18/2014	324.49	26.39	ND	ND	298.10	ND(1)	ND(1)	ND(1)	ND(1)	21	ND(20)	ND(1)	ND(1)	ND(1)	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
W-1	01/18/2003	328.53	33.83	ND	ND	294.70	ND(5)	ND(5)	ND(5)	ND(10)	13000	9100	81	ND(5)	240	Screened from 10-40'
	08/05/2008	328.53	34.81	ND	ND	293.72	9.6	ND(5.0)	ND(5.0)	ND(5.0)	5200	NA	NA	NA	NA	
	06/07/2013	328.53	34.52	ND	ND	294.01	ND(10)	ND(14)	ND(16)	ND(16)	26000	NA	NA	NA	NA	
	12/19/2013	328.53	36.11	ND	ND	292.42	ND(100)	ND(100)	ND(100)	ND(100)	13000	6900	150	ND(100)	130	
	03/25/2014	328.53	33.50	ND	ND	295.03	ND(25)	ND(25)	ND(25)	ND(25)	16000	15000	170	ND(25)	170	
	06/19/2014	328.53	29.91	ND	ND	298.62	ND(50)	ND(50)	ND(50)	ND(50)	15000	13000	130	ND(50)	140	
W-2	01/18/2003	329.47	34.56	ND	ND	294.91	ND(5)	ND(5)	ND(5)	ND(10)	100	ND(100)	ND(5)	ND(5)	ND(5)	Screened from 10-40'
	08/05/2008	329.47	35.53	ND	ND	293.94	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	320	NA	NA	NA	NA	
	06/07/2013	329.47	35.30	ND	ND	294.17	ND(5)	ND(7)	ND(8)	ND(8)	14000	NA	NA	NA	NA	
	12/19/2013	329.47	36.82	ND	ND	292.65	ND(50)	ND(50)	ND(50)	ND(50)	7700	ND(800)	130	ND(50)	74	
	03/25/2014	329.47	34.26	ND	ND	295.21	ND(100)	ND(100)	ND(100)	ND(100)	7000	ND(1600)	130	ND(100)	ND(100)	
	06/19/2014	329.47	30.74	ND	ND	298.73	ND(10)	ND(10)	ND(10)	ND(10)	5000	ND(200)	39	ND(10)	38	
W-3	01/18/2003	330.14	35.88	ND	ND	294.26	ND(5)	ND(5)	ND(5)	ND(10)	ND(5)	ND(100)	ND(5)	ND(5)	ND(5)	Screened from 10-45'
	08/05/2008	330.14	35.92	ND	ND	294.22	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	22	NA	NA	NA	NA	
	06/07/2013	330.14	35.84	ND	ND	294.30	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	2 J	NA	NA	NA	NA	
	12/18/2013	330.14	37.22	ND	ND	292.92	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	330.14	34.57	ND	ND	295.57	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/19/2014	330.14	31.08	ND	ND	299.06	NS	NS	NS	NS	NS	NS	NS	NS	NS	
W-4	01/18/2003	327.67	34.12	ND	ND	293.55	71	920	850	8700	55	790	ND(5)	ND(5)	ND(5)	Screened from 10-40'
	08/05/2008	327.67	34.25	ND	ND	293.42	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	22	NA	NA	NA	NA	
	06/07/2013	327.67	34.08	ND	ND	293.59	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/18/2013	327.67	35.91	ND	ND	291.76	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	327.67	33.24	ND	ND	294.43	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/19/2014	327.67	29.62	ND	ND	298.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
W-5	08/05/2008	327.81	35.93	ND	ND	291.88	320	3000	3000	16000	ND(5.0)	NA	NA	NA	NA	Interval not available
	06/07/2013	327.81	35.30	ND	ND	292.51	180	96	270	11000	ND(0.5)	NA	NA	NA	NA	
	12/18/2013	327.81	37.46	ND	ND	290.35	290	160	860	6000	ND(13)	ND(200)	ND(13)	ND(13)	ND(13)	
	03/24/2014	327.81	34.75	ND	ND	293.06	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/19/2014	327.81	31.23	ND	ND	296.58	NS	NS	NS	NS	NS	NS	NS	NS	NS	
W-6	08/05/2008	325.21	31.63	ND	ND	293.58	ND(5.0)	ND(5.0)	ND(5.0)	18.6	16	NA	NA	NA	NA	Interval not available
	06/07/2013	325.21	31.12	ND	ND	294.09	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	6	NA	NA	NA	NA	
	12/18/2013	325.21	32.12	ND	ND	293.09	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/25/2014	325.21	29.37	ND	ND	295.84	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/18/2014	325.21	26.56	ND	ND	298.65	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
W-7	08/05/2008	329.77	37.35	ND	ND	292.42	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	16	NA	NA	NA	NA	Interval not available
	06/06/2013	329.77	37.04	ND	ND	292.73	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/18/2013	329.77	38.24	ND	ND	291.53	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	03/24/2014	329.77	35.60	ND	ND	294.17	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/18/2014	329.77	32.49	ND	ND	297.28	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
GFSCMW-2	03/24/2014	316.79	30.18	ND	ND	286.61	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	Interval not available
	06/19/2014	316.79	29.12	ND	ND	287.67	NS	NS	NS	NS	NS	NS	NS	NS	NS	
GFSCMW-3	03/24/2014	319.78	29.14	ND	ND	290.64	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	Interval not available
	06/19/2014	319.78	28.42	ND	ND	291.36	NS	NS	NS	NS	NS	NS	NS	NS	NS	
GFGPMW-4	03/24/2014	310.10	18.87	ND	ND	291.23	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	Screened from 5.5-20.5'
	06/19/2014	310.10	17.21	ND	ND	292.89	NS	NS	NS	NS	NS	NS	NS	NS	NS	
GFGPMW-5	03/24/2014	310.72	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	Screened from 5-25'
	06/19/2014	310.72	DRY	DRY	DRY	DRY	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 2 (Continued)

Groundwater Monitoring & Analytical Data – Shallow Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
January 18, 2003 through June 20, 2014

Notes:

µg/L - micrograms per liter (µg/L)
CMT - Continuous Multichannel Tubing
DIPE - Isopropyl ether
ETBE - Ethyl tert-butyl ether
GW - Groundwater
J - Indicates an estimated value
MTBE - Methyl Tertiary Butyl Ether
NA - Not analyzed
ND - Not detected
ND(5.0) - Not detected at or above the laboratory reporting limit, laboratory reporting limit included.
NM - Not monitored
NS - Not sampled
NSVD - Not surveyed to vertical datum
TAME - Tert-Amyl methyl ether
TBA - Tert-Butyl alcohol

Kleinfelder
1340 Charwood Road Suite I, Hanover, MD

Table 3

Groundwater Monitoring & Analytical Data – Deep Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
August 17, 2009 through July 10, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-6D(65)	06/22/2010	323.09	26.69	ND	ND	296.40	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	Open from 70-120'
	09/30/2010	323.09	26.52	ND	ND	296.57	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	12/16/2010	323.09	25.92	ND	ND	297.17	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	02/17/2011	323.09	26.14	ND	ND	296.95	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	05/24/2011	323.09	25.83	ND	ND	297.26	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	09/02/2011	323.09	27.45	ND	ND	295.64	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	12/22/2011	323.09	25.47	ND	ND	297.62	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.8 J	NA	NA	NA	NA	
	06/01/2012	323.09	25.95	ND	ND	297.14	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.8 J	NA	NA	NA	NA	
	02/25/2013	323.09	27.13	ND	ND	295.96	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	323.09	26.66	ND	ND	296.43	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/17/2013	323.09	27.85	ND	ND	295.24	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	03/24/2014	323.09	25.24	ND	ND	297.85	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/18/2014	323.09	23.37	ND	ND	299.72	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
MW-6D(75)	09/24/2009	NM	NM	NM	NM	NM	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	3.0	ND(25)	0.56	ND(5.0)	ND(5.0)	
	10/15/2009	323.09	26.69	ND	ND	296.40	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	2.8	ND(25)	0.49	ND(5.0)	ND(5.0)	
MW-6D(85)	06/22/2010	323.09	26.69	ND	ND	296.40	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	09/30/2010	323.09	26.51	ND	ND	296.58	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	12/16/2010	323.09	25.92	ND	ND	297.17	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	6	NA	NA	NA	NA	
	02/17/2011	323.09	26.14	ND	ND	296.95	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	05/24/2011	323.09	25.83	ND	ND	297.26	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	09/02/2011	323.09	27.45	ND	ND	295.64	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	12/22/2011	323.09	25.47	ND	ND	297.62	ND(0.5)	1 J	ND(0.8)	ND(0.8)	0.8 J	NA	NA	NA	NA	
	06/01/2012	323.09	25.95	ND	ND	297.14	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.8 J	NA	NA	NA	NA	
	02/25/2013	323.09	27.13	ND	ND	295.96	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	323.09	26.66	ND	ND	296.43	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	06/18/2014	323.09	23.37	ND	ND	299.72	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	

Table 3 (Continued)

Groundwater Monitoring & Analytical Data – Deep Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
August 17, 2009 through July 10, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-6D(105)	06/22/2010	323.09	26.69	ND	ND	296.40	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	2 J	NA	NA	NA	NA	
	09/30/2010	323.09	26.52	ND	ND	296.57	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	12/16/2010	323.09	25.92	ND	ND	297.17	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1	NA	NA	NA	NA	
	02/17/2011	323.09	26.14	ND	ND	296.95	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	05/24/2011	323.09	25.83	ND	ND	297.26	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	1 J	NA	NA	NA	NA	
	09/02/2011	323.09	27.45	ND	ND	295.64	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	12/22/2011	323.09	25.47	ND	ND	297.62	ND(0.5)	1 J	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	06/01/2012	323.09	25.95	ND	ND	297.14	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	0.9 J	NA	NA	NA	NA	
	02/25/2013	323.09	27.13	ND	ND	295.96	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	323.09	26.66	ND	ND	296.43	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	06/18/2014	323.09	23.37	ND	ND	299.72	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
MW-6D(110)	09/24/2009	NM	NM	NM	NM	NM	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	3.0	ND(25)	0.57	ND(5.0)	ND(5.0)	
	10/15/2009	323.09	26.69	ND	ND	296.40	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	2.8	ND(25)	0.50	ND(5.0)	ND(5.0)	
MW-12D(110)	05/24/2011	326.43	28.12	ND	ND	298.31	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	Open from 100-160'
	09/02/2011	326.43	32.37	ND	ND	294.06	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/22/2011	326.43	29.63	ND	ND	296.80	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	06/01/2012	326.43	29.75	ND	ND	296.68	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	02/25/2013	326.43	30.86	ND	ND	295.57	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	326.43	30.59	ND	ND	295.84	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/17/2013	326.43	31.51	ND	ND	294.92	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	03/24/2014	326.43	29.33	ND	ND	297.10	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/18/2014	326.43	25.98	ND	ND	300.45	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
MW-12D(153)	05/24/2011	326.43	28.12	ND	ND	298.31	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	Open from 100-160'
	09/02/2011	326.43	32.37	ND	ND	294.06	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	06/01/2012	326.43	29.75	ND	ND	296.68	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	02/25/2013	326.43	30.86	ND	ND	295.57	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
	06/06/2013	326.43	30.59	ND	ND	295.84	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	06/18/2014	326.43	25.98	ND	ND	300.45	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	

Table 3 (Continued)

Groundwater Monitoring & Analytical Data – Deep Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
August 17, 2009 through July 10, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-16D(89)	12/22/2011	332.90	34.88	ND	ND	298.02	ND(3)	ND(4)	ND(4)	ND(4)	2600	NA	NA	NA	NA	
MW-16D(95)	06/01/2012	332.90	35.33	ND	ND	297.57	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	140	NA	NA	NA	NA	Abandoned to 110' (April 2011)
	02/25/2013	332.90	36.83	ND	ND	296.07	ND(100)	ND(100)	ND(100)	ND(100)	9800	ND(1600)	360	ND(100)	200	Open from 85-110'
	06/06/2013	332.90	36.15	ND	ND	296.75	18 J	ND(7)	ND(8)	ND(8)	11000	NA	NA	NA	NA	
	12/19/2013	332.90	37.13	ND	ND	295.77	ND(130)	ND(130)	ND(130)	ND(130)	19000	2800	770	ND(130)	390	
	03/25/2014	332.90	34.64	ND	ND	298.26	25	ND(25)	ND(25)	ND(25)	14000	2000	520	ND(25)	300	
	06/19/2014	332.90	32.75	ND	ND	300.15	28	ND(20)	ND(20)	ND(20)	13000	1100	660	ND(20)	280	
MW-16D(110)	12/22/2011	332.90	34.88	ND	ND	298.02	ND(3)	ND(4)	ND(4)	ND(4)	2600	NA	NA	NA	NA	Abandoned to 110' (April 2011)
MW-16D(125)	12/22/2011	332.90	34.88	ND	ND	298.02	ND(3)	ND(4)	ND(4)	ND(4)	2500	NA	NA	NA	NA	Abandoned to 110' (April 2011)
MW-17D(75)	04/25/2014	328.84	30.77	ND	ND	298.07	ND(100)	ND(100)	ND(100)	ND(100)	120000	39000	2000	ND(100)	1900	CMT
	06/11/2014	328.84	29.81	ND	ND	299.03	ND(1)	ND(1)	ND(1)	ND(1)	20	ND(20)	2	ND(1)	ND(1)	
MW-17D(81)	04/25/2014	328.84	28.89	ND	ND	299.95	ND(100)	ND(100)	ND(100)	ND(100)	92000	23000	1700	ND(100)	1400	CMT
	06/11/2014	328.84	30.72	ND	ND	298.12	ND(10)	ND(10)	ND(10)	ND(10)	5000	1800	70	ND(10)	60	
MW-17D(87.75)	04/25/2014	328.84	30.93	ND	ND	297.91	ND(50)	ND(50)	ND(50)	ND(50)	40000	11000	700	ND(50)	620	CMT
	06/11/2014	328.84	29.96	ND	ND	298.88	ND(25)	ND(25)	ND(25)	ND(25)	12000	2600	240	ND(25)	170	
MW-17D(92)	04/25/2014	328.84	30.94	ND	ND	297.90	ND(25)	ND(25)	ND(25)	ND(25)	15000	3200	370	ND(25)	270	CMT
	06/10/2014	328.84	29.95	ND	ND	298.89	ND(10)	ND(10)	ND(10)	ND(10)	11000	2200	320	ND(10)	200	
MW-17D(117)	04/25/2014	328.84	31.35	ND	ND	297.49	ND(100)	ND(100)	ND(100)	ND(100)	120000	31000	2300	ND(100)	1800	CMT
	06/10/2014	328.84	30.58	ND	ND	298.26	ND(50)	ND(50)	ND(50)	ND(50)	54000	14000	1000	ND(50)	740	
MW-17D(129.75)	04/25/2014	328.84	32.77	ND	ND	296.07	ND(100)	ND(100)	ND(100)	ND(100)	120000	30000	2300	ND(100)	1800	CMT
	06/10/2014	328.84	31.59	ND	ND	297.25	ND(50)	ND(50)	ND(50)	ND(50)	49000	17000	830	ND(50)	690	
MW-17D(147)	04/25/2014	328.84	33.41	ND	ND	295.43	ND(100)	ND(100)	ND(100)	ND(100)	98000	30000	2000	ND(100)	1500	CMT
	06/11/2014	328.84	31.96	ND	ND	296.88	ND(100)	ND(100)	ND(100)	ND(100)	82000	22000	1500	ND(100)	1200	
MW-18D	06/06/2013	334.88	40.69	ND	ND	294.19	ND(0.5)	ND(0.7)	ND(0.8)	ND(0.8)	ND(0.5)	NA	NA	NA	NA	
	12/18/2013	334.88	41.60	ND	ND	293.28	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	03/24/2014	334.88	38.94	ND	ND	295.94	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	06/18/2014	334.88	36.04	ND	ND	298.84	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	

Table 3 (Continued)

Groundwater Monitoring & Analytical Data – Deep Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
August 17, 2009 through July 10, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
MW-18D(1V)	05/10/2013	334.88	40.57	ND	ND	294.31	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
MW-18D(3V)	05/10/2013	334.88	40.57	ND	ND	294.31	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(80)	ND(5)	ND(5)	ND(5)	
MW-19D	03/28/2014	341.91	43.16	ND	ND	298.75	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
	06/20/2014	341.91	41.11	ND	ND	300.80	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(1)	
MW-20D(75)	04/11/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	72	32	2	ND(1)	ND(1)	Hydrasleeve:Open from 70-142'
	07/10/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	100	28	3	ND(1)	ND(1)	
MW-20D(95)	04/11/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	55	24	1	ND(1)	ND(1)	Hydrasleeve
	07/10/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	73	21	2	ND(1)	ND(1)	
MW-20D(110)	04/11/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	37	ND(20)	ND(1)	ND(1)	ND(1)	Hydrasleeve
	07/10/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	43	ND(20)	1	ND(1)	ND(1)	
MW-20D(138)	04/11/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	32	ND(20)	ND(1)	ND(1)	ND(1)	Hydrasleeve
	07/10/2014	329.80	NM	NM	NM	NM	ND(1)	ND(1)	ND(1)	ND(1)	55	ND(20)	1	ND(1)	ND(1)	
MW-23D	05/19/2014	324.81	27.72	ND	ND	297.09	ND(10)	ND(10)	ND(10)	ND(10)	8000	1800	260	ND(10)	120	Screened from 90-100'
	06/10/2014	324.81	27.34	ND	ND	297.47	ND(20)	ND(20)	ND(20)	ND(20)	11000	2200	340	ND(20)	180	
	06/19/2014	324.81	27.19	ND	ND	297.62	ND(10)	ND(10)	ND(10)	ND(10)	5100	ND(200)	130	ND(10)	57	
PW-1	08/17/2009	NM	NM	NM	NM	NM	0.76	ND(0.50)	ND(0.50)	0.46 J	1320	80.9	148	ND(0.50)	36.8	Abandoned to 75' (Nov 2011)

Table 3 (Continued)

Groundwater Monitoring & Analytical Data – Deep Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
August 17, 2009 through July 10, 2014

		Gauging Data					Analytical Data									
Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	Depth to Hydro-carbon (feet)	Hydro-carbon Thickness (feet)	Corrected GW Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Comments
PW-1(65)	10/16/2009	334.54	NM	NM	NM	NM	8	ND	ND	8.4	2520	NA	NA	NA	NA	Open from 55-75'
	06/22/2010	334.54	34.47	ND	ND	300.07	8	ND(0.7)	ND(0.8)	7	1600	NA	NA	NA	NA	
	09/30/2010	334.54	36.84	ND	ND	297.70	9	ND(0.7)	ND(0.8)	5	1600	NA	NA	NA	NA	
	12/16/2010	334.54	36.51	ND	ND	298.03	6	ND(1)	ND(2)	5	1700	NA	NA	NA	NA	
	05/24/2011	334.54	35.87	ND	ND	298.67	8 J	ND(4)	ND(4)	4 J	2100	NA	NA	NA	NA	
	09/02/2011	334.54	38.61	ND	ND	295.93	6	ND(0.7)	ND(0.8)	3 J	1800	NA	NA	NA	NA	Abandoned to 75' (Nov 2011)
	12/22/2011	334.54	36.37	ND	ND	298.17	4 J	ND(4)	ND(4)	ND(4)	1300	NA	NA	NA	NA	
	06/01/2012	334.54	36.82	ND	ND	297.72	3 J	ND(1)	ND(2)	ND(2)	860	NA	NA	NA	NA	
	02/25/2013	334.54	38.28	ND	ND	296.26	ND(5)	ND(5)	ND(5)	ND(5)	800	110	140	ND(5)	51	
	06/06/2013	334.54	37.41	ND	ND	297.13	3 J	ND(0.7)	ND(0.8)	ND(0.8)	1200	NA	NA	NA	NA	
	12/19/2013	334.54	38.60	ND	ND	295.94	ND(25)	ND(25)	ND(25)	ND(25)	4700	630	280	ND(25)	140	
	03/25/2014	334.54	36.19	ND	ND	298.35	ND(10)	ND(10)	ND(10)	ND(10)	6900	1000	290	ND(10)	180	
	06/19/2014	334.54	34.23	ND	ND	300.31	ND(5)	ND(5)	ND(5)	ND(5)	3300	420	170	ND(5)	76	
PW-1(85)	06/22/2010	334.54	34.47	ND	ND	300.07	8	ND(0.7)	ND(0.8)	5	2000	NA	NA	NA	NA	
	09/30/2010	334.54	36.85	ND	ND	297.69	9	ND(0.7)	ND(0.8)	6	1700	NA	NA	NA	NA	
	12/16/2010	334.54	36.51	ND	ND	298.03	8	ND(0.7)	ND(0.8)	6	1900	NA	NA	NA	NA	
	05/24/2011	334.54	35.87	ND	ND	298.67	6 J	ND(1)	ND(2)	3 J	2100	NA	NA	NA	NA	
	09/02/2011	334.54	38.61	ND	ND	295.93	5 J	ND(0.7)	ND(0.8)	2 J	1600	NA	NA	NA	NA	Abandoned to 75' (Nov 2011)
PW-1(105)	10/16/2009	334.54	NM	NM	NM	NM	5.8	ND	ND	4.1	1180	NA	NA	NA	NA	
	06/22/2010	334.54	34.47	ND	ND	300.07	5	ND(1)	ND(2)	3	2300	NA	NA	NA	NA	
	09/30/2010	334.54	36.85	ND	ND	297.69	9	ND(0.7)	ND(0.8)	5	1800	NA	NA	NA	NA	
	12/16/2010	334.54	36.51	ND	ND	298.03	8	ND(1)	ND(2)	5	1700	NA	NA	NA	NA	
	05/24/2011	334.54	35.87	ND	ND	298.67	5 J	ND(1)	ND(2)	2 J	1900	NA	NA	NA	NA	
	09/02/2011	334.54	38.61	ND	ND	295.93	3 J	ND(0.7)	ND(0.8)	1 J	1400	NA	NA	NA	NA	Abandoned to 75' (Nov 2011)
RW-1	03/24/2014	328.31	30.91	ND	ND	297.40	NS	NS	NS	NS	NS	NS	NS	NS	NS	Screened from 21-91'
	06/19/2014	328.31	28.14	ND	ND	300.17	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Table 3 (Continued)

Groundwater Monitoring & Analytical Data – Deep Wells

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Virginia
August 17, 2009 through July 10, 2014

Notes:

µg/L - micrograms per liter (µg/L)
CMT - Continuous Multichannel Tubing
DIPE - Isopropyl ether
ETBE - Ethyl tert-butyl ether
GW - Groundwater
J - Indicates an estimated value
MTBE - Methyl Tertiary Butyl Ether
NA - Not analyzed
ND - Not detected
ND(5.0) - Not detected at or above the laboratory reporting limit, laboratory reporting limit included.
NM - Not monitored
NS - Not sampled
NSVD - Not surveyed to vertical datum
TAME - Tert-Amyl methyl ether
TBA - Tert-Butyl alcohol

Kleinfelder
1340 Charwood Road Suite I, Hanover, MD

TABLE 4

Aquifer Testing - Analytical and Mass Recovery Data

Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Fairfax County, Virginia

Aquifer Test Type	Date	Sample Time	Gallons Pumped	Elapsed Time (min)	Flow Rate (gpm)	MTBE (µg/L)	Recovery Rate (lbs/hour)	Mass Recovered During Period (lbs)	Cumulative Mass Recovered (lbs)
Step Test	4/29/2014	11:18	56	56	1	89,000	0.04	0.04	0.04
	4/29/2014	12:15	170	113	2	71,000	0.07	0.07	0.11
	4/29/2014	13:17	480	175	5	61,000	0.15	0.16	0.27
	4/29/2014	14:16	1,070	234	10	64,000	0.32	0.32	0.58
Pump Test	5/14/2014	2:23	7,200	720	10	25,000	0.13	1.50	2.08
	5/14/2014	14:15	14,320	1432	10	35,000	0.18	2.08	4.16
	5/15/2014	2:23	21,600	2160	10	34,000	0.17	2.07	6.23
	5/15/2014	14:50	29,070	2907	10	33,000	0.17	2.06	8.29

Notes:
gpm - gallons per minute
lbs - pounds
MTBE - Methyl tertiary butyl ether
min - minute

Appendix A
DEQ Correspondence

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

January 24, 2014

Ms. Megan Tingley
Fairfax Petroleum Realty, LLC
6820-B Commercial Drive
Springfield, VA 22151

RE: **PC#2010-3028**; Former Great Falls Exxon
9901 Georgetown Pike, Great Falls, Fairfax County 22066
Corrective Action Plan (CAP) received November 22, 2013
CAP Approval, **CAP #505**

Dear Ms. Tingley:

The Northern Virginia Regional Office (NRO) of the Virginia Department of Environmental Quality (DEQ) has completed review of the referenced Corrective Action Plan (CAP) prepared for Fairfax Petroleum Realty, LLC (Fairfax Petroleum) by Kleinfelder. The proposed remediation strategy complies with the Virginia DEQ Storage Tank Program Technical Manual. CAP Tracking Number 505 is issued for the approved corrective action. Approval to begin the proposed corrective action is hereby granted based on Fairfax Petroleum:

1. Installing and beginning operation of a Soil Vapor Extraction (SVE) system at 9901 Georgetown Pike (on the former Great Falls Exxon property) before **March 21, 2014**, subject to the availability of a connection to a permanent local power supply;

2. Monitoring soil vapor during the implementation of the SVE corrective action;

3. Constructing additional groundwater monitoring wells within the shallow (saprolite), intermediate (transition), and the deep (bedrock) zones to further characterize and evaluate the relationship of the groundwater within and between each zone;

4. Installing one monitoring well to the north, two wells to the south, and four wells to the southeast of the former Great Falls Exxon, subject to obtaining the necessary offsite access;

5. Reconstructing at least one of the existing deep bedrock wells to allow different depths to be sampled in a reliable and consistent manner;

6. Completing pump tests in a recovery well to allow final design of a groundwater pump and treat system and to assess the radial influence of such a well;

7. Sampling the groundwater for petroleum contaminants and indicators of natural attenuation in appropriate monitoring wells. If accessible and useable, pre-existing monitoring wells constructed for other pollution complaint cases should be included;

8. Including dissolved phase MTBE concentration maps in each CAP Monitoring Report;

9. Conducting further evaluation of the vapor intrusion pathway if offsite groundwater monitoring indicates that MTBE concentrations under nearby buildings are above the Virginia Voluntary Remediation Program (VRP) Tier III concentration for vapor intrusion from groundwater;

10. Submitting a CAP Addendum and a schedule for Public Notice of the Addendum by **August 1, 2014**. The Addendum will propose remedial endpoints for MTBE in the groundwater that are protective of the private drinking water supply wells in the area. The Addendum will also include the final design of the pump and treat/soil vapor extraction system, or other technology as appropriate, that will achieve those remedial endpoints;

11. Registering for a General Virginia Permit Discharge Elimination System (VPDES) Permit (VPDES Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation and Hydrostatic Tests) and obtaining an Air Permit (Minor NSR Permit) or an exemption letter for the referenced corrective action;

12. Designing an appropriate vapor barrier for any proposed future construction on the former Great Falls Exxon property.

Fairfax Petroleum shall submit quarterly CAP Monitoring Reports to the NRO no later than 31 days after the end of the quarter, beginning with the quarterly CMR due **January 31, 2014**. Fairfax Petroleum shall submit the CAP Addendum to DEQ no later than **August 1, 2014.**

Please feel free to contact **Alex Wardle**, the case manager for the referenced release, via e-mail at alexander.wardle@deq.virginia.gov or by telephone at (703) 583-3822 if you have any questions.

Respectfully,

Cynthia A. Sale

Cynthia A. Sale
Environmental Manager
Remediation

cc: File
Kleinfelder: MCsteele@kleinfelder.com
GFCA: m.eric.knudsen@gmail.com; gsjoblom@cox.net; what00now@yahoo.com
Fairfax County: John.Foust@fairfaxcounty.gov; benjamin.wiles@fairfaxcounty.gov

enclosures: Responses to Comments on Draft CAP
CAP Approval Memo

DEPARTMENT OF ENVIRONMENTAL QUALITY

Northern Virginia Regional Office
Memorandum

SUBJECT: **PC#2010-3028**; Former Great Falls Exxon, Great Falls, VA 22066
CAP Permit #505
TO: Cynthia A. Sale, Environmental Manager, Remediation Division
FROM: Alex Wardle, Environmental Geologist, Remediation Division
DATE: January 24, 2013
COPIES: File

Responsible Party: Fairfax Petroleum Realty, LLC
6820-B Commercial Drive
Springfield, VA 22151

Facility Location: Former Great Falls Exxon
9901 Georgetown Pike, Great Falls, VA 22066

Public Notification: The release was from a regulated UST. Public notice was made in the *Great Falls Connection* on November 27, 2013 and December 4, 2013. Public comment was received. Comments were received from several parties, generally requesting: a more extensive monitoring network; a commitment to remediation on and offsite; a remediation endpoint consistent with EPA MTBE guidance levels, and requesting further information on potential treatment train discharges to surface water. A list of comments and DEQ responses is attached.

Cleanup Endpoints: Free product phase - < 0.01 feet

Residual phase - Residual phase endpoint will be established and proposed in the Corrective Action Plan (CAP) Addendum (scheduled for August 2014)

Dissolved phase - Dissolved phase endpoint will be established and proposed in the Corrective Action Plan (CAP) Addendum (scheduled for August 2014)

Vapor phase - For onsite, a vapor barrier will be designed and incorporated as part of any future onsite buildings. For offsite, the vapor phase endpoint will be linked to the VADEQ Tier III vapor intrusion based screening criteria for groundwater.

The initial corrective action involves the implementation of a soil vapor extraction (SVE) system. A permit or permit exemption for a discharge to air of Volatile Organic Compounds (VOCs) will be required. Over the following months, the final design of a groundwater remediation system will be completed. This system will be designed to reduce dissolved phase petroleum contaminant concentrations to levels that do not pose any significant risk to offsite private drinking water well users. There will not be a sustained discharge of treated water during the initial phase of this CAP, but groundwater pump and treat testing will likely result in a discharge. All treated water discharges will require a General VPDES Permit for Discharges from Petroleum Contaminated Sites. The system design, as well as the formal cleanup endpoints for the corrective action, will be included in the CAP Addendum (scheduled for August 2014).

VIA ELECTRONIC MAIL

June 27, 2014

Mr. Alexander Wardle
Virginia Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, Virginia, 22193

RE: Groundwater Recovery and Treatment Implementation
Inactive Fairfax Facility # 26140
9901 Georgetown Pike
Great Falls, Fairfax County, Virginia
PC# 2010-3028

Dear Mr. Wardle:

In follow up to our meeting on June 10, 2014 and subsequent conversations, Kleinfelder, on behalf of Fairfax Petroleum Realty, LLC (Fairfax), has prepared this letter to provide an update on the implementation of the groundwater recovery and treatment at the above referenced location. As proposed in the November 2013 *Corrective Action Plan* (CAP), aquifer testing was completed on recovery well RW-1 in May 2014. The results of the aquifer testing indicated that groundwater recovery from one well (RW-1) was able to influence both the overburden and bedrock water bearing zones which contain dissolved phase methyl tertiary butyl ether (MTBE). The Virginia Department of Environmental Quality (DEQ) has authorized the use of groundwater recovery and treatment with the approval of the CAP.

While additional site characterization activities are proposed to the south of the site and until the permanent remediation system is designed, permitted and installed at the site, Kleinfelder, on behalf of Fairfax, proposes to install and operate a temporary groundwater recovery and treatment system (i.e. remediation system). Groundwater recovery will be initiated from recovery well RW-1 and monitoring well MW-16D using electric submersible pumps controlled by a variable frequency drive. It is anticipated that the initial phase of groundwater recovery (30 days) will be from recovery well RW-1 at a rate of 10 gallons per minute (gpm) to establish the baseline of system operating parameters and further obtain data (i.e. drawdown from monitoring wells) for the design of the permanent remediation system. The groundwater treatment equipment will be contained within a cargo trailer and will contain an equalization tank, low profile air stripper, bag filters, transfer pumps, and carbon units capable of treating a maximum of 25 gpm.

Kleinfelder, on behalf of Fairfax, has authorized the construction of remediation system and its delivery to the site is anticipated the week of August 18th. The lead time item for the delivery of the remediation system is the construction of the control panel integrating the submersible pumps with the treatment system controls and critical safety devices. In addition to the construction of the remediation system on-site, the following activities will be completed:

- Submit and obtain the Virginia Pollution Discharge Elimination System (VPDES) Registration System with the DEQ.
- Submit and obtain approval of the temporary remediation system from the Fairfax County Department of Planning and Zoning. Based on conversations with the department staff over the past week, setback and height restrictions will be waived for the installation of this temporary trailer.
- Complete trenching and piping connecting wells RW-1 and MW-16D to the remediation system.
- Upon arrival at the site, connection of the existing electrical service to the remediation system.

We will continue to keep the DEQ updated of the progress of the above mentioned activities. We anticipate the groundwater recovery and treatment system will be tested and operational the week of September 1st.

Fairfax and Kleinfelder appreciate the continued guidance of the VADEQ in the successful completion of this project. Please contact us at (410)-850-0404 if you have questions regarding the information contained in this letter.

Sincerely,
Kleinfelder, Inc.

Paxton Wertz
Geologist

Mark C. Steele
Program Manager

cc: Ms. Megan Tingley – Fairfax Petroleum Realty, LLC

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VIA ELECTRONIC MAIL

July 28, 2014

Mr. Alexander Wardle
Virginia Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, Virginia, 22193

RE: CAP Addendum Extension Request and Schedule
Inactive Fairfax Facility # 26140
9901 Georgetown Pike
Great Falls, Fairfax County, Virginia
PC# 2010-3028

Dear Mr. Wardle:

Kleinfelder, on behalf of Fairfax Petroleum Realty, LLC (Fairfax), has prepared this letter to request an extension and provide an updated schedule for delivery of the Corrective Action Plan (CAP) Addendum (CAPA) for the above referenced location (Site). In the CAP approval letter dated January 24, 2014, the Virginia Department of Environmental Quality (DEQ) requested the completion of 12 items including the proposal of remedial endpoints for methyl tertiary butyl ether (MTBE) protective of area drinking water supply wells in a CAPA by August 1, 2014. As presented in the June 10, 2014 project status meeting, MTBE was detected in off-site monitoring well MW-23D south of the Site that necessitates additional characterization activities. The objectives of the additional characterization activities are to determine the nature and extent of dissolved phase MTBE south of the Site to allow the development of the remedial endpoints for the submission of a complete CAPA.

In lieu of the CAPA, Kleinfelder, on behalf of Fairfax, will submit the Quarterly CAP Monitoring Report and an Aquifer Testing Report to the DEQ on August 1, 2014. The CAP Monitoring Report will detail the data collection and results of the activities completed within the Second Quarter 2014 including monitoring well installation, sampling of monitoring wells and out of service potable wells, and startup and operation of the soil vapor extraction (SVE) system. The Aquifer Testing Report will present the methodology, results and discussion of the step testing and 48-hour pumping test as well as the design basis for the interim groundwater recovery and treatment system described in our letter dated June 27, 2014.

Kleinfelder, on behalf of Fairfax, proposes to submit the CAPA to the DEQ by October 3, 2014. The schedule of activities that will be completed to obtain the data necessary to complete the CAPA is presented below.

- An access agreement has been secured with the Great Falls Village Centre for a surface geophysical survey, the installation of monitoring wells, and subsequent sampling.
- The out of service potable wells at the Great Falls Swim and Tennis Club (100 feet) and 805 Constellation Drive (260 feet) located to the southeast and southwest of the Site, respectively, have been sampled and petroleum related constituents were not detected in the wells.
- The first phase of the surface geophysical survey using seismic refraction to identify bedrock features was completed on the Village Centre Thursday July 24th. The data obtained from this first phase of the geophysical survey will be processed and evaluated to determine if the objectives were satisfied and if a change to electrical resistivity as the preferred geophysical survey method is warranted. The second phase of the survey is tentatively scheduled for later this week on July 31st and August 1st and is contingent upon the owner of the Great Falls Shopping Center executing an addendum to the Site Access License.
- The installation of a deep monitoring well on the Village Centre is tentatively scheduled for the week of August 11th. The location and construction of this well is dependent on the analysis of the geophysical survey results and the geology encountered during borehole advancement.
    - The boring will be located with the goal of intercepting the water bearing fracture observed in monitoring wells MW-17D (at approximately 88 feet below grade) and MW-23D (at approximately 93 feet below grade) at a depth of approximately 80 feet below grade.
    - In the event a water bearing fracture is encountered at approximately 80 feet (±15 feet) below grade, a monitoring well consisting of 10 feet of 0.020 slot screen will be constructed to discretely monitor the fracture.
    - In the event the fracture is not encountered, the boring will remain an open borehole so that geophysical borehole logging and packer testing may be conducted pending groundwater sampling analytical results.
- Sampling of the proposed deep monitoring well on the Village Centre is proposed for the week of August 18th.
- Depending on the construction and sampling results of this deep well, a borehole geophysical survey and subsequent packer testing may be conducted.
- The following action will be proposed depending on sampling results:
    - If MTBE is not delineated on the Village Centre, an additional well to the south or in the direction of bedrock features may be proposed further south on the Village Green Day School property. In the event a well may be necessary on the school property, an access request has been submitted to the property owner.
    - If MTBE is delineated with the new well, an additional well may be proposed between the newly installed well and MW-23D.

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This schedule is contingent upon the continued assistance of the local property owners with the timing and placement of future monitoring wells and the timely execution of access agreements or modifications.

In addition to the above schedule for the completion of the CAPA, Kleinfelder, on behalf of Fairfax, continues to proceed with the installation of the interim groundwater recovery and treatment system. The procurement / construction of the remediation system equipment is in progress with ESD Waste2Water, a Virginia Pollution Discharge Elimination System permit has been obtained, and the trenching for the piping to the recovery wells is scheduled for the week of August 11, 2014. It is anticipated the groundwater recovery and treatment system will be tested and operational the week of September 1, 2014.

Fairfax and Kleinfelder appreciate the continued guidance of the DEQ in the successful completion of this project. Please contact us at (410)-850-0404 if you have questions regarding the information contained in this letter.

Sincerely,
Kleinfelder, Inc.

Paxton Wertz
Geologist

Mark C. Steele
Senior Program Manager

cc: Ms. Megan Tingley – Fairfax Petroleum Realty, LLC

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Appendix B

Boring and Well Construction - Logs

BORING LOG MW1

(Page 1 of 1)

Date Drilled:	: 07/20/09
Drilling Co.:	: Geosearch, Inc.
Drilling Method:	: Hollow-Stem Auger
Sampling Method:	: Split Spoon
Borehole Diameter:	: 8"
Casing Diameter:	: 2"
Location N-S	: 63'5" S of SE crnr of station
Location E-W	: 38'10" E of SE crnr of station
Total Depth:	: 37' bgs
First GW Depth:	: 30' bgs

Project No.:	: 091058
Site:	: ExxonMobil Station #2-6140, Great Falls, VA
Logged By:	: Eric Koosha / Scott Peret
Reviewed By:	: Steve M. Zigan, P.G. 1812
Signature:	:

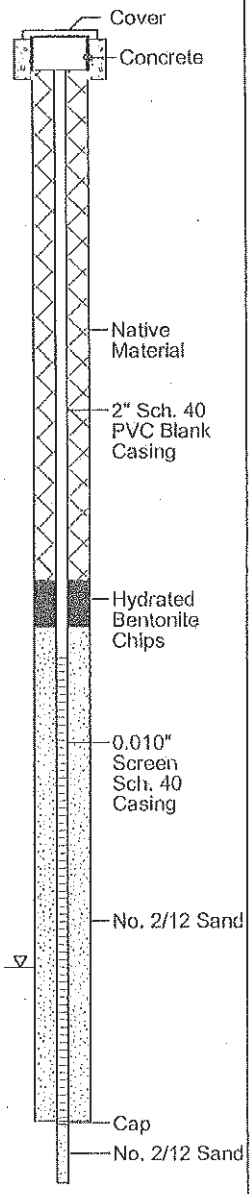
Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Well: MW1
Elevation: 100.00'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (% clay/silt/sand/gravel)
0				CONCRETE: 6"
5	1 2 3 3	1.4	MH	SILT: red-yellow, damp, uniform, non-plastic, micaceous, unconsolidated, good recovery (5/95/0/0)
10	1 5 4 8	0.0	MH	SILT with Clay: red-yellow to rust-red, damp, uniform, non-plastic, unconsolidated to 10.8' bgs, buff yellow to white gray with gray mottles and lamina in splintery, brittle texture, micaceous, good recovery, few black (organic) lamina occasionally in base of core (15/85/0/0)
15	5 15 17 24	0.0	MH	SILT: red-brown, damp, matrix uniform, brittle, friable, non-plastic, micaceous, few small, fine gravel sized nodules, unconsolidated, smooth texture
20	8 19 30 30	0.0	MH	SILT with Gravel: light yellow-brown, gravel is green-black, dry, uniform; @ 21.2' bgs, few fine, rounded, smooth, soapstone gravel, fractured white rock; angular, well graded, coarse-grained sand, micaceous, good recovery (10/65/5/20)
25	14 24 36 34	2.4	MH	SILT: gray-brown, with semi-lithified clasts of siltstone, few white-gray thin lamina densely spaced with black (organic) particles throughout bottom 4 inches, micaceous (10/90/0/0)
30	13 25 18 21	0.0	GM	Silty GRAVEL with Sand: white, saturated, angular, fractured rock, well graded with silty fines (more clay noticable) poor recovery (5/25/20/50)
35	14 14 20 21	225	GM	Silty GRAVEL with sand: white, saturated, angular, well graded, few silty fines, fractured rock, moderate recovery (0/25/25/50)
40				

Borehole cleared to 6'4" bgs on 07/20/09 with air knife excavation tools.



BORING LOG MW2

(Page 1 of 1)

Project No.:	: 091058
Site:	: ExxonMobil Station #2-6140, Great Falls, VA
Logged By:	: Eric Koosha / Scott Peret
Reviewed By:	: Steve M. Zigan, P.G. 1812
Signature:	:

Date Drilled:	: 07/21/09
Drilling Co.:	: Geosearch, Inc.
Drilling Method:	: Hollow-Stem Auger
Sampling Method:	: Split Spoon
Borehole Diameter:	: 8"
Casing Diameter:	: 2"
Location N-S	: 24.1' N of NE crnr of station
Location E-W	: 63.5' E of NE crnr of station
Total Depth:	: 42' bgs
First GW Depth:	: 30' bgs

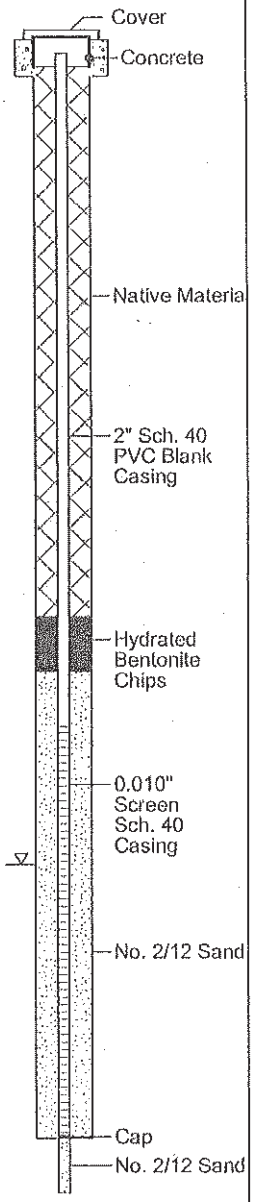
Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater During Drilling

Well: MW2
Elevation: 102.90'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	USCS	DESCRIPTION (% Clay/Silt/Sand/Gravel)
0				CONCRETE: 6"
5	Hand Auger	0.0	ML	SILT: red, non-plastic (10/80/10/0)
10	3 4 7 6	0.0	MH	SILT: red-yellow to rust-red, dry, non-plastic, unconsolidated, uniform smooth texture, micaceous; trace black (organic) lamina (5/95/0/0) @11.5' bgs yellow mottles
15	3 6 8 10	0.0	MH	SILT: red-yellow to rust-red, color grading to yellow-brown, dry, non-plastic, unconsolidated, uniform smooth texture, micaceous; frequent black (organic) lamina (thin) throughout (5/95/0/0) @16.5' bgs grades to rust-red at bottom of core, damp
20	2 8 10 9	0.0	MH	SILT: red-yellow to rust-red with yellow mottles, damp, non-plastic, micaceous; trace black (organic) thin lamina (5/95/0/0) @20.5' bgs splintery textures for upper 3" and lower 4" of core
25	7 15 19 16	3.5	MH	SILT: greenish-yellow, damp, non-plastic, micaceous, uniform smooth texture, unconsolidated, few black lamina or thin beds; trace very fine-grained sand (4/95/1/0)
30	6 12 17 24	33.8	MH	SILT: light olive, moist, non-plastic, micaceous, uniform smooth texture, unconsolidated, few black lamina (5/95/0/0)
35	7 17 15 18	163.1	MH	SILT: olive-gray, moist, micaceous, uniform, unconsolidated (5/95/0/0) @35'-36' bgs: common black thin lamina and single red-yellow thin bed with higher clay content @36'-37' bgs: no splintery texture
40	15 33 32 50	1.8	MH	SILT: olive-gray, moist, micaceous, smooth uniform texture, unconsolidated; top of sample occasional black thin lamina (5/95/0/0)
45				

Borehole cleared to 8' bgs with hand tools and air knife on 07/20/09.



BORING LOG MW3

(Page 1 of 1)

Date Drilled:	: 07/22/09
Drilling Co.:	: Geosearch, Inc
Drilling Method:	: Hollow-Stem Auger
Sampling Method:	: Split Spoon
Borehole Diameter:	: 8"
Casing Diameter:	: 2"
Location N-S	: 99'10" N of SE cnr of station
Location E-W	: 4'7" E of SE cnr of station
Total Depth:	: 37'
First GW Depth:	: N/A

Project No.:	: 091058
Site:	: ExxonMobil Station #2-6140, Great Falls, VA
Logged By:	: Eric Koosha / Scott Peret
Reviewed By:	: Steve M. Zigan, P.G. 1812
Signature:	: Steve M. Zigan

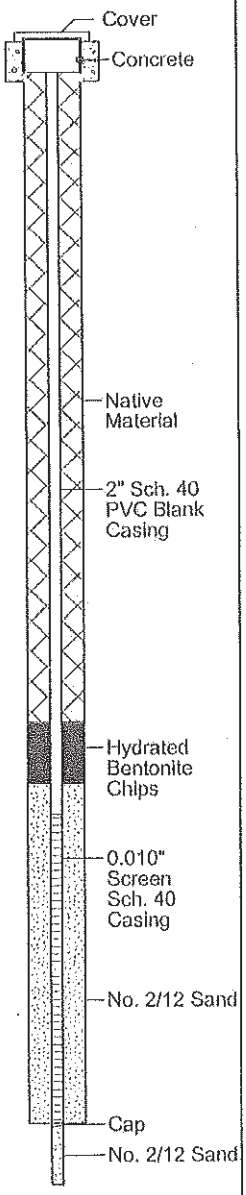
Sample Condition
- No Recovery
- Sampled Interval
- Described Sample
- Preserved Sample

Water Levels
- Groundwater After Completion
- Groundwater During Drilling

Well: MW3
Elevation: 104.99'

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (% clay/silt/sand/gravel)
0						ASPHALT: 4"
5					ML	SILT: rust-red, dry, non-plastic, micaceous
10	1 2 5 6	0.0			MH	SILT: rust-red with gray mottles, dry to damp, few thin black lamina, non-plastic, smooth, uniform texture, unconsolidated, micaceous, good recovery (5/95/0/0)
15	2 4 5 6	0.0			MH	SILT: rust-red, damp, red-yellow thin lamina, non-plastic, splintery texture, brittle, non-consolidated, micaceous, good recovery (5/95/0/0)
20	2 6 9 9	0.0			MH	SILT: rust-red, damp, red-yellow thin lamina, good recovery, splintery texture, black mottles but none in lower half of core, micaceous (5/95/0/0)
25	2 7 12 14	0.0			MH	SILT: red-yellow, light gray mottling scattered, moist, with frequent rust-red lamina, few thin black lamina, non-plastic, smooth, uniform texture, unconsolidated, micaceous (5/95/0/0)
30	2 8 11 13	1.4			MH	SILT: yellow-brown and red-yellow, black and light gray mottles, saturated, unconsolidated, micaceous (5/95/0/0)
35	3 3 9 17	0.6			MH	SILT: yellow-brown and red-yellow, black and light gray mottles, saturated, unconsolidated, micaceous (5/95/0/0)
40						

Borehole cleared to 8' bgs on 07/21/09 with air knife excavation tools.



BORING LOG SB4

(Page 1 of 1)

Project No.:	: 091058
Site:	: ExxonMobil Station #2-6140, Great Falls, VA
Logged By:	: Eric Koosha
Reviewed By:	: Steve M. Zigan, P.G. 1812
Signature:	:

Date Drilled:	: 07/20/09
Drilling Co.:	: Geosearch, Inc.
Drilling Method:	: Air Knife
Sampling Method:	: Hand Auger
Borehole Diameter:	: 10"
Casing Diameter:	: N/A
Location N-S	: 50' S of SE crnr of station
Location E-W	: 43' W of SE crnr of station
Total Depth:	: 10.3' bgs
First GW Depth:	: N/A

Sample Condition
- No Recovery
- Sampled Interval
- Described Sample
- Preserved Sample

Water Levels
- Groundwater After Completion
- Groundwater During Drilling

Boring: SB4

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (% clay/silt/sand/gravel)
0						
5		0.0			ML	SILT: sandy brown, non-plastic; few very fine- to fine-grained sand (10/80/10/0)
10		0.0			ML	SILT: sandy brown with specks of black, non-plastic; few very fine- to fine-grained sand (10/80/10/0) @ 10.3' bgs: Refusal
15						
20						
25						
30						
35						
40						

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BORING LOG MW5

(Page 1 of 1)

Project No.:	: 091058
Site:	: ExxonMobil Station #2-6140, Great Falls, VA
Logged By:	: Eric Koosha / Scott Peret
Reviewed By:	: Steve M. Zigan, P.G. 1812
Signature:	:

Date Drilled:	: 07/22/09
Drilling Co.:	: Geosearch, Inc.
Drilling Method:	: Hollow-Stem Auger
Sampling Method:	: Split Spoon
Borehole Diameter:	: 8"
Casing Diameter:	: 2"
Location N-S	: 61'5" N of SE cnr of station
Location E-W	: 45'4" W of SE cnr of station
Total Depth:	: 42' bgs
First GW Depth:	: 36' bgs

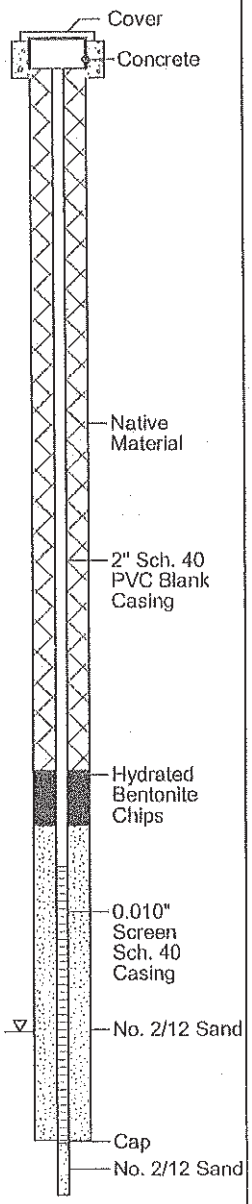
Sample Condition: No Recovery; Sampled Interval; Described Sample; Preserved Sample

Water Levels: Groundwater After Completion; Groundwater While Drilling

Depth (ft)	Blow Count / 6"	OVM/PID (ppmv)	Sample	Column	USCS	DESCRIPTION (% clay/silt/sand/gravel)
0						CONCRETE: 5"
5	3 3 3 3	0.0			MH	SILT: yellow-brown, dry, non-plastic, smooth texture, unconsolidated, uniform, micaceous, moderate recovery (5/95/0/0)
10	2 4 4 7	0.0			MH	SILT: yellow-gray, dry, non-plastic, smooth texture, unconsolidated, uniform, micaceous, good recovery (5/95/0/0)
15	5 8 10 10	0.0			MH	SILT: gray-brown, damp, non-plastic, smooth texture, unconsolidated, uniform, micaceous, good recovery (5/95/0/0)
20	7 11 17 5	0.0			MH	SILT: gray-brown, damp, smooth texture, unconsolidated; few closely spaced, dense thin lamina of black (organic) @ 2'1 bgs for 3" to 5"; @ 21.6' bgs splintery books weathered mica in silt, brown dirty mottles, micaceous, good recovery (5/95/0/0)
25	6 12 22 18	0.0			MH	SILT: gray-brown, damp, smooth texture, unconsolidated, few frequent yellow laminas (thin); @ 26.5' bgs rust-red to red-orange lamina, smooth, uniform texture, micaceous, good recovery (5/95/0/0)
30	9 11 10 14	0.0			MH	SILT: grey-brown, damp, with splintery texture to 30.7' bgs and bottom 4"; other parts smooth, uniform texture, unconsolidated, micaceous, good recovery (5/95/0/0)
35	6 12 10 14	0.0			MH	SILT: grey-brown to yellow, wet; @ 36' bgs few black, thin bed lamina and red-yellow thin lamina to depth, non-plastic, smooth, micaceous, good recovery (5/95/0/0)
40	9 17 24 21	0.0			MH	SILT: grey-brown, saturated; @ 41.5' bgs few black and rust-red thin-bed, black to grey-brown, few black lamina to base, non-plastic, micaceous, good recovery (5/95/0/0)
45						

Borehole cleared to 4'bgs on 07/22/09 with air knife excavation tools.

Well: MW5
Elevation: 103.43'



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WELL LOG

ID NO. **MW-6**

Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	TOTAL DEPTH: 35'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA		CASING EL.: 321.85
JOB NO.	0402403	BOREHOLE DIA.: 6.25"	WELL DIA.: 4"

Logged By:	Tim Davis	Drilling Method:	Hollow Stem Auger/Air Rotary
Dates Drilled:	9/11/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm) 0 – 10	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
0					Fill materials from Air-Knifing operations	Fill	Air-knifed 0-5 fbg for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'
5					SILT trace sand, non-plastic, med-sorted, high mica content,stiff, layered structured, red-tan	Silt		Grout 0.5'-16'
10	10-12	0.0	4-4-5-19	12"				
	12-14	0.0	45-55-0-0	24"				
	14-16	0.0	15-21-56-0	18"				
15	16-18	0.0	3-3-3-4	12"	Silt trace sand, non-plastic, med-sorded, high mica content, loose, none structured, red-tan			Bentonite Plug 16'-18'
	18-20	0.0	22-60-0-0	12"				
20	20-22	0.0	27-65-0-0	6"	Structured Saprolite with trace rock fragments, stiff, mica foliations 0.25" thick	Saprolite	sample collected from 22-24 fbg	#2 Sandpack 18'-35'
	22-24	1.5	23-70-0-0	4"			Static water level at 22.5 fbg	
25					Structured Saprolite with layered 0.2.5-0.5" angular rock fragments, mica foliations 0.25" think		Spoon and Auger refusal at 24 fbg	
30								
35								5" PVC Cap35'

LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

fbg = feet below grade
NA = not available
ppm = parts per million
in. = inches

Groundwater & Environmental Services, Inc.
2142 Priest Bridge Court, Crofton, Maryland 800.220.3606 Fax 410.721.3733

WELL LOG

ID NO. **MW-6D**

Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	TOTAL DEPTH: 35'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA		CASING EL.: 323.09
JOB NO.	0402403	BOREHOLE DIA.: 6.25"	WELL DIA.: 6"

Logged By:	Tim Davis	Drilling Method:	Air Rotary
Dates Drilled:	9/11/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm) 0 – 10	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
10-12	10-12	0.0	4-4-5-19	12"	Fill materials from Air-Knifing operations	Fill	Air-knifed 0-5 fbg for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'
12-14	12-14	0.0	45-55-0-0	24"	Silt trace sand, non-plastic, med-sorded, high mica content, loose, none structured, red-tan	Silt		
14-16	14-16	0.0	15-21-56-0	18"			Soil lithology taken from MW-6 Samples	
16-18	16-18	0.0	3-3-3-4	12"				
18-20	18-20	0.0	22-60-0-0	12"	Structured Saprolite with layered 0.2.5-0.5" angular rock fragments, mica foliations 0.25" think	Saprolite		
20-22	20-22	0.0	27-65-0-0	6"			Static water level at 27 fbg	Grout 0.5'-65'
22-24	22-24	1.5	23-70-0-0	4"				
					Weathered Schist, rapid pentration rate (>1ft/min), tan-grey.	Schist		6" steel casing 0.5'-65'
					Schist, pentration rate (<1ft/min)	Schist		Open Borehole 70'-120'

LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

fbg = feet below grade
NA = not available
ppm = parts per million
in. = inches

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WELL LOG

ID NO. **MW-7**

Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	TOTAL DEPTH: 40'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA		CASING EL.: 327.96
JOB NO.	0402403	BOREHOLE DIA.: 4.25"	WELL DIA.: 2"

Logged By:	Tim Davis	Drilling Method:	Hollow Stem Auger
Dates Drilled:	10/16/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm) 0 – 10	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
0					SILT, trace sand, none plastic, tan-red. dry. vertical clay inclutions. black.	Silt	Air-knifed 0-8 fbg for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'
5								Grout 0.5'-11'
	8-10	0.0	5-8-9-12	12"				
10	10-12	0.0	5-9-11-12	24"				Bentonite Plug 11'-13'
	12-14	0.0	8-9-13-7	6"				
	14-16	0.0	4-6-15-17	12"	SILT, little sand, some layers have foliation planes, dry			
15	16-18	0.0		6"				#2 Sandpack 13'-40'
	18-20	0.0	5-9-17-18	12"				
20	20-22	0.0	4-11-16-21	20"	SILT. trace sand. vertical inclutions. no foliations, mica, tan-red			
	22-24	0.0	10-13-12-27	6"				
	24-26	0.0	13-15-35-43	20"				
25	26-28	0.0	18-21-22-17	12"				
	28-30	0.0	8-9-9-17	12"	SILT, some sand, coarse quartz pebbles, sub angular, 0.1"-0.25", in layers, silt mica, no foliation,		sample collected from 28-30 fbg	
		0.0						
30	30-32	0.0	10-15-26-37	24"			Static water level at 31.5 fbg	
	32-34	0.0	28-23-25-34	20"				
	34-36	0.0	14-23-32-39	20"	Saprolite, mica silt, folition planes present, some sand, in layers, tan-grey	Saprolite		
35								
40								3" PVC Cap35'

LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

fbg = feet below grade

NA = not available

ppm = parts per million

in. = inches

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2142 Priest Bridge Court, Crofton, Maryland 800.220.3606 Fax 410.721.3733

WELL LOG

ID NO. **MW-8**

Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	36.84'	TOTAL DEPTH:	45'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA			CASING EL.:	330.54
JOB NO.	0402403	BOREHOLE DIA.:	4.25"	WELL DIA.:	2"

Logged By:	Jeremy Joiner	Drilling Method:	Hollow Stem Auger
Dates Drilled:	10/08/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm) 0 – 10	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
0–5					Fill materials from Air-Knifing operations	Fill	Air-knifed 0-8' for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'
8'-10'	8'-10'	0.0	6-16-21-25	19"	Brown clayey silt with mica plating, stiff, few gravels	Clay and Silt		Grout 0.5'-20'
10'-12'	10'-12'	0.0	6-20-21-20	13"				
12'-14'	12'-14'	0.0	15-11-20-18	11"	Reddish-brown sandy silt, little clay, trace gravel	Sandy Silt		
14'-16'	14'-16'	0.0	13-14-25-32	19"	Light brown clayey silt	Clay and Silt		
16'-18'	16'-18'	0.0	32-21-32-31	14"				
18-'20'	18-'20'	0.0	6-8-10-13	14"	Brown silty sand, trace clay and gravels	Silty Sand		
20'-22'	20'-22'	0.0	8-11-12-6	16"				Bentonite Plug 20'-23'
22'-24'	22'-24'	0.0	8-12-14-16	14"	Brown sandy silt, little clay, trace gravels and mica	Sandy Silt		
24'-26'	24'-26'	0.0	11-14-20-21	19"				
26'-28'	26'-28'	0.0	17-15-21-20	23"	Grayish-brown sandy silt, more structured, mica plating	Sandy Silt		
28'-30'	28'-30'	0.0	6-12-17-26	22"				
30'-32'	30'-32'	0.0	11-11-9-10	17"				#2 Sandpack 23'-45'
32'-34'	32'-34'	0.0	14-16-26-31	20"	Gray clayey sand, trace mica, structured	Clayey Sand		
34'-36'	34'-36'	0.0	11-17-20-16	19"				
36'-38'	36'-38'	90.0	30-17-20-24	21"	Gray silty sand, little clay, less structured, very moist sample, wet spoon	Silty Sand	Static water depth 36.84'; Sampled collected 36-38'	
38'-40'	38'-40'	70	17-12-19-50/3"	17"	Gray saprolite with mica plating	Saprolite		
40–45								3" PVC Cap 45'

LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

fbg = feet below grade

NA = not available

ppm = parts per million

in. = inches

Groundwater & Environmental Services, Inc.
2142 Priest Bridge Court, Crofton, Maryland 800.220.3606 Fax 410.721.3733

WELL LOG

ID NO. **MW-9**

Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	35.62'	TOTAL DEPTH:	45'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA			CASING EL.:	333.46
JOB NO.	0402403	BOREHOLE DIA.:	4.25"	WELL DIA.:	2"

Logged By:	Jeremy Joiner	Drilling Method:	Hollow Stem Auger
Dates Drilled:	10/09/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm) 0–10	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
					Fill materials from Air-Knifing operations.	Fill	Air-knifed 0-8' for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'
	8'-10'	36	3-10-14-22	13"	Reddish-brown clayey silt, very dry.	Clay and Silt		
	10'-12'	24	11-14-17-16	17"				Sand 0.5'-20'
	12'-14'	68	11-14-14-18	13"			Sampled collected 12'-14'	
	14'-16'	19	6-10-10-12	17"				
	16'-18'	6	9-10-13-15	10"	Reddish-brown sandy silt, trace gravel and mica.	Sandy Silt		
	18-'20'	21	8-12-14-14	19"	Brown clayey silt, little sand, trace gravels.	Clay and Silt		
	20'-22'	19	4-5-10-13	15"				
	22'-24'	18	8-7-12-15	14"				Bentonite Plug 20'-23'
	24'-26'	35	9-11-23-18	16"				
	26'-28'	40	14-16-12-17	17"				
	28'-30'	38	6-13-18-16	17'				
	30'-32'	31	7-9-12-10	20"	Brownish-gray clayey silt, mica plating, trace sand, moist	Clay and Silt		#2 Sandpack 23'-45'
	32'-34'	46	16-15-13-16	21"				
	34'-36'	33	6-12-14-13	21"			Static water depth 35.62'	
	36'-38'	30	13-10-15-11	23"				
								3" PVC Cap 45'

LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

fbg = feet below grade

NA = not available

ppm = parts per million

in. = inches

Groundwater & Environmental Services, Inc.
2142 Priest Bridge Court, Crofton, Maryland 800.220.3606 Fax 410.721.3733

WELL LOG

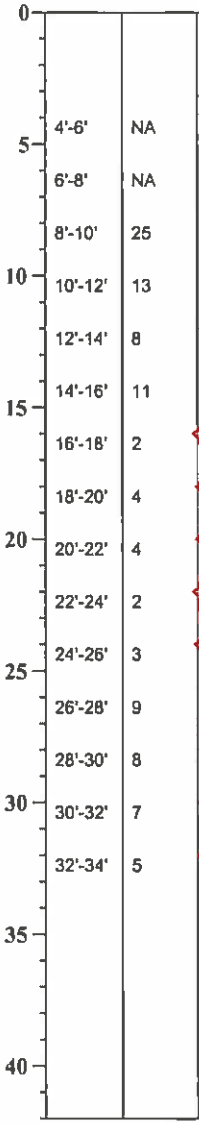
ID NO. **MW-10**

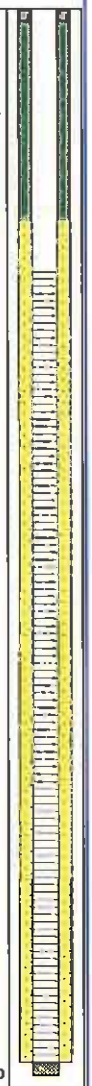
Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	28.96'	TOTAL DEPTH:	40'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA			CASING EL.:	324.17
JOB NO.	0402403	BOREHOLE DIA.:	4.25"	WELL DIA.:	2"

Logged By:	Jeremy Joiner	Drilling Method:	Hollow Stem Auger
Dates Drilled:	10/12/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm)	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
					Fill materials from Air-Knifing operations.	Fill	Air-knifed 0-5' for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'
	4'-6'	NA	6-5-5-6	0"				
	6'-8'	NA	7-6-7-6	0"	Reddish-brown clayey silt.	Clay and Silt		Bentonite Plug 0.5'-8'
	8'-10'	25	2-3-4-4	4"	Brown clayey silt, few gravels.	Clay and Silt	Sampled collected 8'-10'	
	10'-12'	13	1-2-4-4	0"				
	12'-14'	8	6-6-8-12	20"				
	14'-16'	11	6-6-8-10	7"				
	16'-18'	2	17-26-23-15	13"	Reddish-brown sandy silt, little clay, few gravels.	Sandy Silt		
	18'-20'	4	4-5-7-11	23"	Reddish-brown clayey silt, little mica.	Clay and Silt		
	20'-22'	4	2-4-7-10	23"				
	22'-24'	2	11-11-12-15	21"				
	24'-26'	3	4-6-9-14	23"				
	26'-28'	9	5-6-11-16	16"	Little sand and moist.			#2 Sandpack 8'-40'
	28'-30'	8	6-6-9-12	20"				
	30'-32'	7	8-7-8-9	23"	Brown sandy silt, little clay, few gravels	Sandy Silt	Static water depth 28.96'	
	32'-34'	5	7-11-11-14	23"	Brown saprolite, moist. Wet spoon.	Saprolite		
								3" PVC Cap 40'





LEGEND

Proportion Descriptions:

Trace = <10% Some = <50%

Little = <25% And = 50%

Symbol Key:

Water Level

Sample Location

fbg = feet below grade

NA = not available

ppm = parts per million

in. = inches

Groundwater & Environmental Services, Inc.
2142 Priest Bridge Court, Crofton, Maryland 800.220.3606 Fax 410.721.3733

WELL LOG

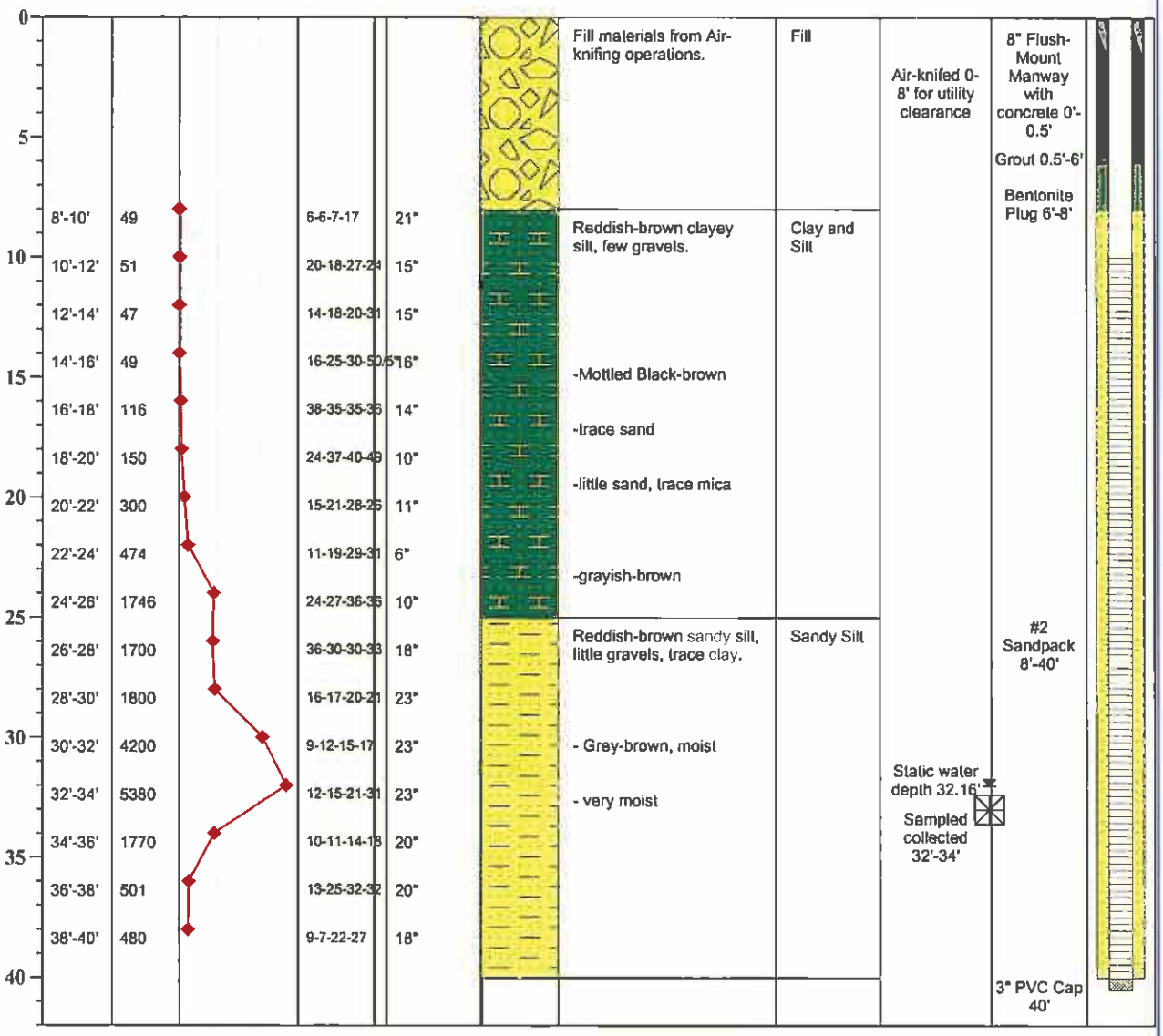
ID NO. **MW-11**

Groundwater and Environmental Services, Inc.

PROJECT:	ExxonMobil Station # 2-6140	WATER DEPTH:	32.16'	TOTAL DEPTH:	40'
ADDRESS:	9901 Georgetown Pike, Great Falls, VA			CASING EL.:	329.64
JOB NO.	0402403	BOREHOLE DIA.:	4.25"	WELL DIA.:	2"

Logged By:	Jeremy Joiner	Drilling Method:	Hollow Stem Auger
Dates Drilled:	10/14/2009	Sampling Method:	Split Spoon
Drilling Company:	B.L. Meyers	Soil Class. System:	NA
Well Permit #:		Field Screening:	MiniRae 2000, Model PGM 7600

Depth (feet)	Sample Interval (feet)	Field Screen: Total Organic Volatiles (ppm) 0–10	Blow Counts	Recovery (inches)	Sample Lithology	Stratigraphy	Comments	Completion Details
					Fill materials from Air-knifing operations.	Fill	Air-knifed 0-8' for utility clearance	8" Flush-Mount Manway with concrete 0'-0.5'; Grout 0.5'-6'; Bentonite Plug 6'-8'
	8'-10'	49	6-6-7-17	21"	Reddish-brown clayey silt, few gravels.	Clay and Silt		
	10'-12'	51	20-18-27-24	15"				
	12'-14'	47	14-18-20-31	15"				
	14'-16'	49	16-25-30-50/5	16"	-Mottled Black-brown			
	16'-18'	116	38-35-35-36	14"	-trace sand			
	18'-20'	150	24-37-40-49	10"	-little sand, trace mica			
	20'-22'	300	15-21-28-26	11"				
	22'-24'	474	11-19-29-31	6"	-grayish-brown			
	24'-26'	1746	24-27-36-36	10"				
	26'-28'	1700	36-30-30-33	18"	Reddish-brown sandy silt, little gravels, trace clay.	Sandy Silt		#2 Sandpack 8'-40'
	28'-30'	1800	16-17-20-21	23"				
	30'-32'	4200	9-12-15-17	23"	- Grey-brown, moist			
	32'-34'	5380	12-15-21-31	23"	- very moist		Static water depth 32.16'; Sampled collected 32'-34'	
	34'-36'	1770	10-11-14-18	20"				
	36'-38'	501	13-25-32-32	20"				
	38'-40'	480	9-7-22-27	18"				3" PVC Cap 40'



LEGEND

Proportion Descriptions:
Trace = <10% Some = <50%
Little = <25% And = 50%

Symbol Key:
Water Level
Sample Location

fbg = feet below grade
NA = not available
ppm = parts per million
in. = inches

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BORING LOG

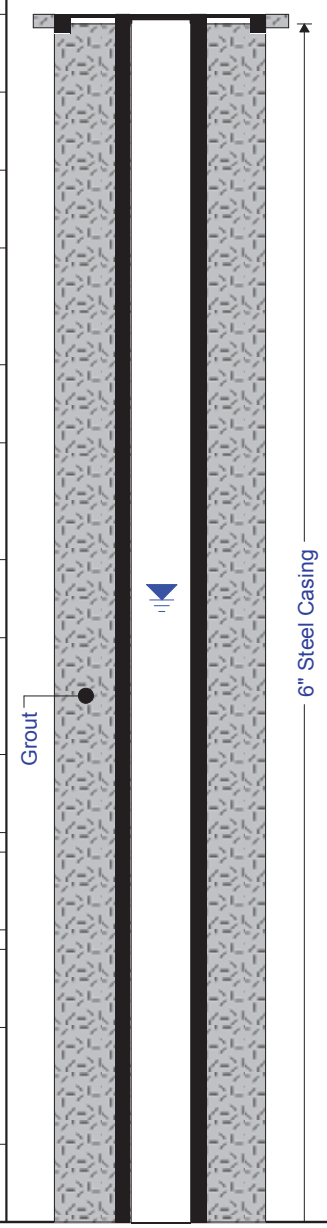
Boring No. MW-12

Project Name: Fairfax Facility #26140 Great Falls
Site Location: 9830 Georgetown Pike, Great Falls, VA
Kleinfelder Project No: 114992
Client: Fairfax Petroleum Realty LLC
Drilling Company: Connelly and Assoc.
Driller: C. Shaff
Drill Rig Type: Schramm T450
Drilling Method: Air Rotary
Sampling Method: Cuttings

Start Date: 1-11-11
End Date: 1-13-11
Total Hole Depth: 160 feet
Hole Diameter: 10"(0-100), 6"(100-160)
Depth to Bedrock: 95 feet
Surface Elevation: 326.43 feet
Water Level (Initial): 85 feet
Water Level (Static): 30.07 feet
Logged By (Geol.): C. Low

Permit No.: NA
License No.: NA
Checked By: R. Perkins
Notes:

SUBSURFACE PROFILE			SAMPLE			
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	PID (ppm)	Well Construction	Depth (feet)
		Ground Surface				
0–9		***SP*** Very fine SAND, brown, dry		0.0		
10–19		***SM*** Fine SAND with trace silt, light brown, dry		0.0		
20–29		***SM*** Fine SAND with trace silt, light brown, slightly micaceous, dry		0.0		
30		Weathered Rock at 30 feet		0.0		
31–39		***SM*** Silty fine SAND, light brown, micaceous, dry				
40–61		***ML*** SILT with fine sand, gray, micaceous, dry Cuttings moist at 45 feet	MW-12 (45)	0.0 0.0 0.0		



PID - Photoionization Detector
NA - Not Applicable
NS - Not Sampled
NM - Not Measured
MU - Meter Units
PP - Pocket Penetrometer Reading (tons/sq. foot)

KLEINFELDER Bright People. Right Solutions.	1340 Charwood Road, Suite I Hanover, MD 21076 (410) 850-0404	BORING LOG **Boring No. MW-12**

Project Name: Fairfax Facility #26140 Great Falls
Site Location: 9830 Georgetown Pike, Great Falls, VA
Kleinfelder Project No: 114992
Client: Fairfax Petroleum Realty LLC
Drilling Company: Connelly and Assoc.
Driller: C. Shaff
Drill Rig Type: Schramm T450
Drilling Method: Air Rotary
Sampling Method: Cuttings

Start Date: 1-11-11
End Date: 1-13-11
Total Hole Depth: 160 feet
Hole Diameter: 10"(0-100), 6"(100-160)
Depth to Bedrock: 95 feet
Surface Elevation: 326.43 feet
Water Level (Initial): 85 feet
Water Level (Static): 30.07 feet
Logged By (Geol.): C. Low

Permit No.: NA
License No.: NA
Checked By: R. Perkins
Notes:

SUBSURFACE PROFILE | **SAMPLE**

Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	PID (ppm)	Well Construction	Depth (feet)
62–65						62–65
65–90		***ML*** SILT with fine sand, rock fragments, gray, moist, micaceous Water returning at surface at 85 feet		0.0 0.0 0.0		65–90
90–95		***ML*** SILT with gravel, gray, micaceous, wet, rock fragments		0.0 0.0		90–95
95–122		***Bk*** Schist, black, some quartz grains Water bearing fracture at 109 - 110 feet			Bedrock	95–122

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BORING LOG

Boring No. MW-12

Project Name: Fairfax Facility #26140 Great Falls
Site Location: 9830 Georgetown Pike, Great Falls, VA
Kleinfelder Project No: 114992
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Drilling Company: Connelly and Assoc.
Driller: C. Shaff
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Start Date: 1-11-11
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Depth to Bedrock: 95 feet
Surface Elevation: 326.43 feet
Water Level (Initial): 85 feet
Water Level (Static): 30.07 feet
Logged By (Geol.): C. Low

Permit No.: NA
License No.: NA
Checked By: R. Perkins
Notes:

SUBSURFACE PROFILE			SAMPLE			
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	PID (ppm)	Well Construction	Depth (feet)
123–152					6" Open Borehole	123–152
153–160		Fracture at 153 feet				153–160
161–183		End of Borehole				161–183

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BORING LOG

Boring No. MW-13

Project Name: Fairfax Facility #26140
Site Location: 9901 Georgetown Pike, Great Falls, VA
Kleinfelder Project No: 121473
Client: Fairfax Petroleum Realty LLC
Drilling Company: B.L. Myers Bros.
Driller: J. Long
Drill Rig Type: Mobile B-61
Drilling Method: 6.25 inch Hollow Stem Augers
Sampling Method: Split Spoon

Start Date: 8-18-11
End Date: 8-23-11
Total Hole Depth: 45 feet
Hole Diameter: 10 inches
Depth to Bedrock: Not encountered
Surface Elevation: 332.00 feet
Water Level (Initial): 31 feet
Water Level (Static): 33.98 feet
Logged By (Geol.): R. Reeves

Permit No.: NA
License No.: NA
Checked By: BB
Notes: Airknife to 7.5 feet

SUBSURFACE PROFILE | **SAMPLE**

Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	Blows/6 in	PID (ppm)	Well Construction	Depth (feet)
0		Ground Surface					0
		Concrete					
1		***SM*** Fine SAND with silt and some clay, dark orange-brown, damp					1
2					0.0		2
3							3
4		***SM*** Fine SAND with silt and some clay, dark brown, dry			0.0		4
5							5
6							6
7					0.0		7
8							8
9							9
10		***ML*** SILT with fine sand, dark orange-brown, damp, micaceous		3, 4, 6, 9	3.3	Portland Cement / Bentonite Grout; 4" PVC Riser	10
11							11
12							12
13							13
14							14
15				7, 9, 17, 22	29.9		15
16							16
17				8, 15, 21, 24	16.0		17
18							18
19		***ML*** SILT with fine sand and some clay, dark orange-brown, damp to moist, micaceous		2, 4, 6, 13	23.3		19
20							20
21				15, 18, 20, 24	96.8	Bentonite	21
22							22
23				23, 21, 25, 28	158		23
24							24
25				3			25

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BORING LOG
Boring No. MW-13

Project Name: Fairfax Facility #26140
Site Location: 9901 Georgetown Pike, Great Falls, VA
Kleinfelder Project No: 121473
Client: Fairfax Petroleum Realty LLC
Drilling Company: B.L. Myers Bros.
Driller: J. Long
Drill Rig Type: Mobile B-61
Drilling Method: 6.25 inch Hollow Stem Augers
Sampling Method: Split Spoon

Start Date: 8-18-11
End Date: 8-23-11
Total Hole Depth: 45 feet
Hole Diameter: 10 inches
Depth to Bedrock: Not encountered
Surface Elevation: 332.00 feet
Water Level (Initial): 31 feet
Water Level (Static): 33.98 feet
Logged By (Geol.): R. Reeves

Permit No.: NA
License No.: NA
Checked By: BB
Notes: Airknife to 7.5 feet

SUBSURFACE PROFILE			SAMPLE				
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	Blows/6 in	PID (ppm)	Well Construction	Depth (feet)
26		**ML** SILT with fine sand and some clay, dark orange-brown, moist, micaceous		3, 12, 19, 24	151		26
27							27
28			MW-13 (27-29)	18, 26, 20, 19	364		28
29							29
30		**ML** SILT with fine sand and some clay, dark orange-brown and dark brown, wet, micaceous		9, 18, 30, 34	111		30
31							31
32							32
33							33
34							34
35				42, 46, 48, 49	77.4	#2 Silica Sand	35
36							36
37							37
38							38
39		**ML** SILT with fine sand and some clay, brown and olive brown, wet, micaceous					39
40				21, 29, 32, 32	7.6		40
41							41
42							42
43							43
44				9, 12, 19, 22	60.1		44
45		End of Borehole				4" 0.020-inch Slotted Screen	45
46							46
47							47
48							48
49							49
50							50

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BORING LOG

Boring No. MW-14

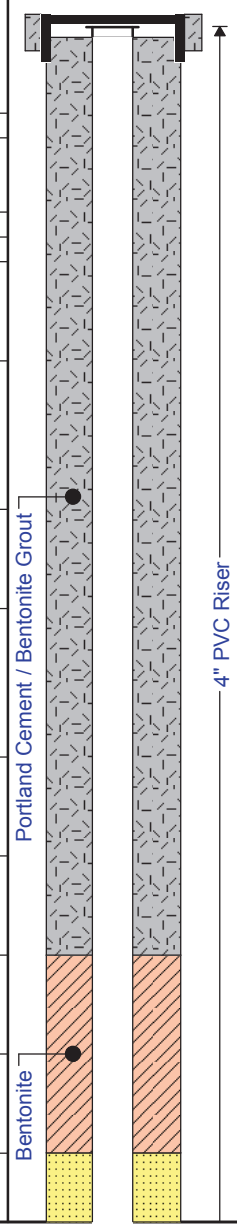
Project Name: Fairfax Facility #26140
Site Location: 9901 Georgetown Pike, Great Falls, VA
Kleinfelder Project No: 121473
Client: Fairfax Petroleum Realty LLC
Drilling Company: B.L. Myers Bros.
Driller: J. Long
Drill Rig Type: Mobile B-61
Drilling Method: 6.25 inch Hollow Stem Augers
Sampling Method: Split Spoon

Start Date: 8-18-11
End Date: 8-23-11
Total Hole Depth: 47 feet
Hole Diameter: 10 inches
Depth to Bedrock: Not encountered
Surface Elevation: 331.81 feet
Water Level (Initial): 31 feet
Water Level (Static): 35.02 feet
Logged By (Geol.): R. Reeves

Permit No.: NA
License No.: NA
Checked By: BB
Notes: Airknife to 5 feet

SUBSURFACE PROFILE | **SAMPLE**

Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	Blows/6 in	PID (ppm)	Well Construction	Depth (feet)
0		Ground Surface					0
		Concrete					
1		***SM*** Fine SAND with silt and some clay, dark orange-brown, damp					1
2					0.0		2
3							3
4		***SM*** Fine SAND with silt and some clay, light orange-brown, damp			0.0		4
5				3			5
6		***SM*** Fine SAND with silt and some clay, light brown and light orange-brown, damp		5	0.0		6
7				7			7
				9			
8							8
9							9
10		***ML*** SILT with fine sand and some clay, light brown and light orange-brown, dry to damp, micaceous					10
11				6			11
				9	0.0		
				7			
12				11			12
13							13
14							14
15							15
				6			
16				10	2.2		16
				11			
17				15			17
				17			
18				22	2.0		18
				32			
19				36			19
				7			
20				20	5.8		20
				26			
21				24			21
				27			
22				29	1.9		22
				34			
23				37			23
				22			
24				27	1.2		24
				32			



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BORING LOG

Borin□ □o□MW-14

□□□□□□□□ □□ □□Fairfax Facility #26140
***S*□□□*L*□□□□□□□9901 Georgetown Pike, Great Falls, VA**
□□□□□□□□□□□□□□□□□□□□121473
□□□□□□Fairfax Petroleum Realty LLC
□□□□□□□□□□ □□□□□B.L. Myers Bros.
□□□□□□□J. Long
□□□□□□□□□□□□□Mobile B-61
□□□□□□□□*M*□□□□□□6.25 inch Hollow Stem Augers
***S*□□ □□□□□*M*□□□□□Split Spoon

***S*□□□□□□□□□8-18-11**
□□□□□□□□□8-23-11
□□□□□□□□□□□□□□□□47 feet
□□□□□□□□□ □□□□□10 inches
□□□□□□□□□□□□□□Not encountered
***S*□□□□□□□□□□□□□□□331.81 feet
□ □□□□□*L*□□□□□□□□□□□31 feet
□ □□□□□*L*□□□□□*S*□□□□□□35.02 feet
***L*□□□□□□□□□ □□□□□R. Reeves

□□□ □□□□□□NA
***L*□□□□□□□□□NA**
□□□□□□□□□□BB
□□□□□Airknife to 5 feet

SUBSURFACE PROFILE			SAMPLE				
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	Blows/6 in	PID (ppm)	Well Construction	Depth (feet)
25				32, 38			25
26		***ML*** SILT with fine sand and some clay, light brown to olive brown, moist, micaceous		11, 15, 22, 32	20.9		26
27							27
28				6, 8, 13, 19	10.2		28
29		***ML*** SILT with fine sand and some clay, light brown to olive brown, wet, micaceous		8, 20, 22, 24	117		29
30			MW-14 (29-31)				30
31							31
32							32
33							33
34							34
35				8, 9, 18, 21	89.1	#2 Silica Sand	35
36							36
37							37
38							38
39							39
40				6, 8, 11, 14	148		40
41							41
42							42
43							43
44							44
45						4" 0.020-inch Slotted Screen	45
46					28.1		46
47		□nd of Borehole					47
48							48

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BORING LOG

Borin□ □o□MW-15

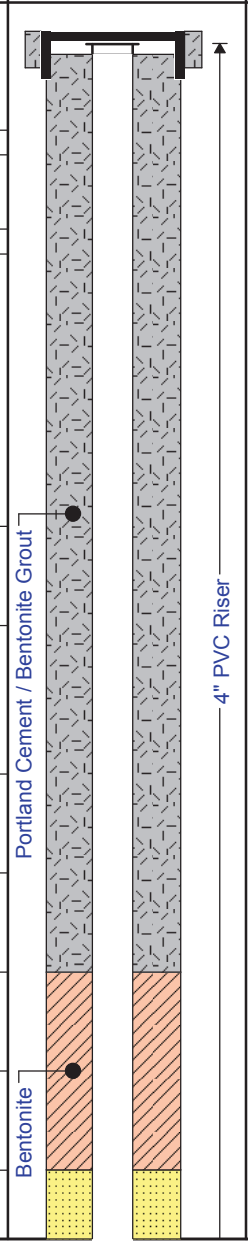
□□□□□□□□ □□ □□Fairfax Facility #26140
S□□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
□□□□□□□□□□□□□□□□□□□□□□121473
□□□□□□Fairfax Petroleum Realty LLC
□□□□□□□□□□ □□□□□B.L. Myers Bros.
□□□□□□□J. Long
□□□□□□□□□□□□□Mobile B-61
□□□□□□□□***M***□□□□□□6.25 inch Hollow Stem Augers
S□□ □□□□□***M***□□□□□Split Spoon

S□□□□□□□□□□8-18-11
□□□□□□□□□□8-22-11
□□□□□□□□□□□□□□□□□□45 feet
□□□□□□□□□ □□□□□10 inches
□□□□□□□□□□□□□□□□Not encountered
S□□□□□□□□□□□□□□□□328.95 feet
□ □□□□□***L***□□□□□□□□□□□35 feet
□ □□□□□***L***□□□□□***S***□□□□□□33.06 feet
L□□□□□□□□□□□□□□R. Reeves

□□□□ □□□□□□NA
L□□□□□□□□□□NA
□□□□□□□□□□BB
□□□□□□Airknife to 5 feet

SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	Blows/6 in	PID (ppm)
0		Ground Surface			
		Concrete			
1–4		□***L*** Clay with silt, dark brown, damp			0.0
4–6		***SM*** Fine SAND with silt and some clay, dark orange-brown, dry to damp		50□2"	0.0
		No Recovery			
10–15		***SM*** Fine SAND with silt and some clay, brown, dry to damp		50□3"	0.0
15–17		***ML*** SILT with fine sand and some clay, light brown and light orange-brown, damp, micaceous		21, 13, 16, 20	0.0
17–19		***ML*** SILT with fine sand and some clay, light brown, damp, micaceous		20, 18, 26, 32	0.0
19–21		***ML*** SILT with fine sand and some clay, light brown and light orange-brown, damp, micaceous		10, 14, 14, 22	0.0
21–23				10, 10, 12, 16	0.0
23–24				12, 19, 21	0.0



PID - Photoionization Detector
NA - Not Applicable
NS - Not Sampled
NM - Not Measured
MU - Meter Units
PP - Pocket Penetrometer Reading (tons/sq. foot)

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(410) 850-0404

BORING LOG

Borin□ □o□MW-15

□□□□□□□□ □□ □□Fairfax Facility #26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
□□□□□□□□□□□□□□□□□□□□121473
□□□□□□Fairfax Petroleum Realty LLC
□□□□□□□□□□ □□□□□B.L. Myers Bros.
□□□□□□□J. Long
□□□□□□□□□□□□□Mobile B-61
□□□□□□□□***M***□□□□□□6.25 inch Hollow Stem Augers
S□□ □□□□□***M***□□□□□Split Spoon

S□□□□□□□□□□8-18-11
□□□□□□□□□□8-22-11
□□□□□□□□□□□□□□□□45 feet
□□□□□□□□□ □□□□□10 inches
□□□□□□□□□□□□□□□Not encountered
S□□□□□□□□□□□□□□□328.95 feet
□ □□□□□***L***□□□□□□□□□□□35 feet
□ □□□□□***L***□□□□□***S***□□□□□□33.06 feet
L□□□□□□□□□ □□□□□R. Reeves

□□□ □□□□□□NA
L□□□□□□□□□NA
□□□□□□□□□□BB
□□□□□Airknife to 5 feet

SUBSURFACE PROFILE			SAMPLE				
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	Blows/6 in	PID (ppm)	Well Construction	Depth (feet)
25				21, 23			25
26				7, 8, 10, 16	2.6		26
27				14, 19, 21, 23	2.2		27
28							28
29		***ML*** SILT with fine sand and some clay, brown, moist, micaceous			0.0		29
30							30
31				1, 3, 14, 26	0.0		31
32							32
33				8, 20, 42, 46	7.8		33
34			MW-15 (33-35)				34
35						#2 Silica Sand	35
36		***ML*** SILT with fine sand and some clay, brown, wet, micaceous					36
37							37
38		***ML*** SILT with fine sand and some clay, gray and orange-brown, wet, micaceous					38
39					10.2		39
40							40
41							41
42							42
43							43
44					48.3		44
45		□nd of Borehole				4" 0.020-inch Slotted Screen	45
46							46
47							47
48							48

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BORING LOG

Borin□ □o□MW-16D

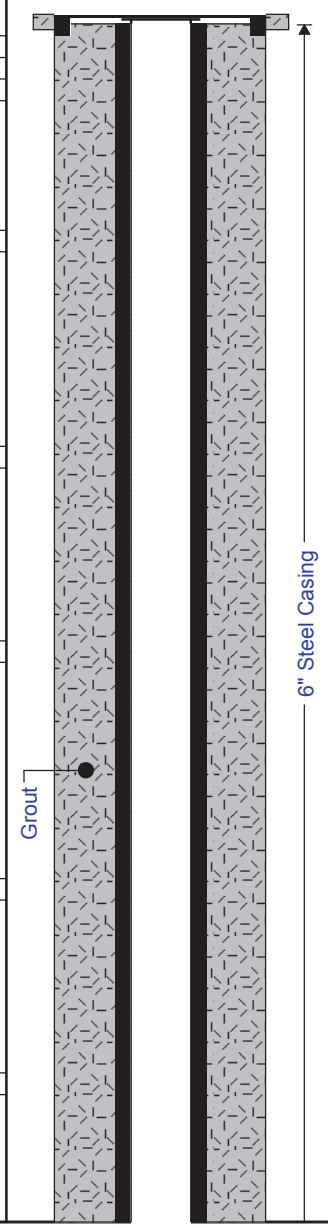
□□□□□□□□ □□ □□Fairfax Facility #26140 Great Falls
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
□□□□□□□□□□□□□□□□□□□□□□119667
□□□□□□Fairfax Petroleum Realty LLC
□□□□□□□□□□ □□□□□B.L. Myers Bros.
□□□□□□□D. Ferrel
□□□□□□□□□□□□□□Schramm T450W
□□□□□□□□***M***□□□□□□Air Rotary
S□□ □□□□□***M***□□□□□Grab / Cuttings

S□□□□□□□□□□11-21-11
□□□□□□□□□□11-22-11
□□□□□□□□□□□□□□□□150 feet
□□□□□□□□□ □□□□□10"(0-85), 6"(85-150)
□□□□□□□□□□□□□□□46 feet
S□□□□□□□□□□□□□□□332.90 feet
□ □□□□□***L***□□□□□□□□□□NA
□ □□□□□***L***□□□□□***S***□□□□□□34.47 feet
L□□□□□□□□□□ □□□□C. Low

□□□ □□□□□□NA
L□□□□□□□□□NA
□□□□□□□□□□B. Barone
□□□□□Airknife to 5 feet

SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	PID (ppm)	Well Construction	Depth (feet)
0		Ground Surface				0
1		Concrete with rebar				1
2–9		***SM*** Silty fine SAND, red-brown, moist		0.3; 0.1		2–9
10–19		***ML*** Sandy SILT, light brown, dry, slightly micaceous		0.4		10–19
20–39		***ML*** Sandy SILT, light brown, moist, slightly micaceous; Saprolitic at 27 feet		17.6; 32.1		20–39
40–46		***ML*** Sandy SILT, olive-brown, moist, slightly micaceous, with rock fragments		19.8		40–46
46–55		□□ Schist, gray		12.5		46–55



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□□□□□□□D. Ferrel
□□□□□□□□□□□□□Schramm T450W
□□□□□□□□***M***□□□□□□Air Rotary
S□□ □□□□□***M***□□□□□Grab / Cuttings

S□□□□□□□□□□11-21-11
□□□□□□□□□□11-22-11
□□□□□□□□□□□□□□□□150 feet
□□□□□□□□□ □□□□□10"(0-85), 6"(85-150)
□□□□□□□□□□□□□□□46 feet
S□□□□□□□□□□□□□□□332.90 feet
□ □□□□□***L***□□□□□□□□□□□NA
□ □□□□□***L***□□□□□***S***□□□□□□34.47 feet
L□□□□□□□□□□□□□C. Low

□□□□ □□□□□□NA
L□□□□□□□□□□NA
□□□□□□□□□□□B. Barone
□□□□□□Airknife to 5 feet

SUBSURFACE PROFILE			SAMPLE			
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	PID (ppm)	Well Construction	Depth (feet)
56						56
57						57
58						58
59						59
60						60
61				6.1		61
62						62
63						63
64						64
65						65
66						66
67						67
68						68
69						69
70						70
71				8.4		71
72						72
73						73
74						74
75						75
76						76
77						77
78						78
79						79
80						80
81						81
82						82
83						83
84						84
85				3.2		85
86		Water bearing fracture at 85-86 feet				86
87						87
88						88
89						89
90						90
91				0.8		91
92						92
93						93
94						94
95						95
96		Water bearing fracture at □95 feet			Bedrock	96
97						97
98						98
99						99
100						100
101				4.3		101
102						102
103						103
104						104
105						105
106						106
107						107
108						108
109						109
110						110

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BORING LOG

Borin□ □o□MW-16D

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S□□ □□□□□***M***□□□□□Grab / Cuttings

S□□□□□□□□□11-21-11
□□□□□□□□□11-22-11
□□□□□□□□□□□□□□□□150 feet
□□□□□□□□□ □□□□□10"(0-85), 6"(85-150)
□□□□□□□□□□□□□□□46 feet
S□□□□□□□□□□□□□□□332.90 feet
□ □□□□□***L***□□□□□□□□□□□NA
□ □□□□□***L***□□□□□***S***□□□□□□34.47 feet
L□□□□□□□□□ □□□□□C. Low

□□□ □□□□□□NA
L□□□□□□□□□NA
□□□□□□□□□□□B. Barone
□□□□□□Airknife to 5 feet

SUBSURFACE PROFILE			SAMPLE			
Depth (feet)	Graphic Log	Soil/Geologic Description (Unified Soil Classification System)	Sample ID	PID (ppm)	Well Construction	Depth (feet)
111		Water bearing fracture at 110 feet		2.2		111
112						112
113						113
114						114
115						115
116						116
117						117
118						118
119						119
120						120
121				1.9		121
122						122
123						123
124						124
125						125
126						126
127						127
128						128
129						129
130						130
131		□□ Schist, black, some quartz grains		2.2		131
132						132
133						133
134						134
135						135
136						136
137						137
138						138
139						139
140						140
141		□□ Schist, olive-brown, some quartz grains		1.6		141
142						142
143						143
144						144
145						145
146						146
147						147
148						148
149						149
150				1.1		150
151		□nd of Borehole				151
152						152
153						153
154						154
155						155
156						156
157						157
158						158
159						159
160						160
161						161
162						162
163						163
164						164
165						165

6" Open Borehole

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NM - Not Measured
MU - Meter Units
PP - Pocket Penetrometer Reading (tons/sq. foot)

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DRILLING LOG
We□□o□MW-17D

□□□□□□□□□□ □□Fairfax 26140
S□□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□□□□□□□□Schramm T450WS
□□□□□□□□***M***□□□□□□Air knife/Air Rotary
S□□ □□□□□***M***□□□□□Hand auger/Cuttings

S□□□□□□□□□□04/08/2013
□□□□□□□□□□04/09/2013
□□□□□□□□□□□□□□□□150□
□□□□□□□□□□ □□□□□10"/6"
□□□□□□□□□□□□□□□□□63□
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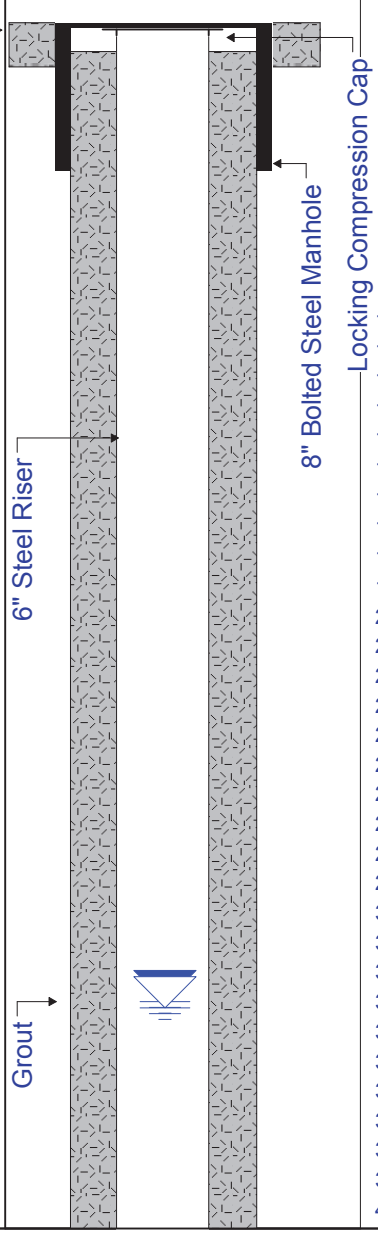
L□□□□□□□□□□ □□□□C. Low

□□□□ □□□□ □□NA
L□□□□□□□□□□NA
□□□□□□□□□□□PW
□□□□□□Air knife to 5□bgs

SUBSURFACE PROFILE			SAMPLE					Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000			Depth (feet)
0		Ground Surface							0
1		□8" Concrete with rebar				0.1	2□x2□Concrete Pad		1
2		***S***□				0.0			2
3		Dark brown, dry, clayey fine SAND				0.5			3
4		***SM***				0.3			4
5		Red-brown, dry, silty fine SAND							5
6									6
7									7
8									8
9									9
10						0.1			10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20		***SM***				0.3			20
21		Red-brown, dry, silty fine SAND with some gravel							21
22									22
23									23
24									24
25									25
26									26
27									27
28									28
29									29
30						0.1			30
31									31
32									32
33		***SM***							33
34		Red-brown, moist, silty fine SAND with some gravel							34
35									35
36									36
37									37
38									38
39									39
40						26.5			40



VOC - Volatile Organic Compound
NA - Not Applicable
NS - Not Sampled
NR - Not Recorded
NM - Not Measured
N□ - Not □ncountered
bgs - below ground surface

USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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DRILLING LOG
We□□o□MW-17D

□□□□□□□□□□ □□Fairfax 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□□□***M***□□□□□□Air knife/Air Rotary
S□□ □□□□□***M***□□□□□Hand auger/Cuttings

S□□□□□□□□□□04/08/2013
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□□□□□□□□□□□□□□□□□□□63□
□□□□□□□□□□□□□□□□□□□□□□□□□□328.99□
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L□□□□□□□□□□ □□□□□C. Low

□□□□ □□□□ □□□NA
L□□□□□□□□□ □□□NA
□□□□□□□□□□□□PW
□□□□□□Air knife to 5□bgs

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000		Depth (feet)
41–49		***SM*** Red-brown, moist, silty fine SAND with some gravel	MW-17D (40-42)			26.5	Grout	41–49
50–62		***SM*** Gray, moist, silty fine SAND with some gravel				32.8; 31.4	6" Steel Riser	50–62
63–80		□□ Gray, SCHIST, competant rock encountered at 63□bgs; Water-bearing fracture □ 75-76□bgs				11.3; 5.1	Bedrock; 6" Open Borehole	63–80

VOC - Volatile Organic Compound
NA - Not Applicable
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bgs - below ground surface

USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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DRILLING LOG

We□□o□MW-17D

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□□□□□□□CB
□□□□□□□□□□□□□□Schramm T450WS
□□□□□□□□***M***□□□□□□Air knife/Air Rotary
S□□ □□□□□***M***□□□□□Hand auger/Cuttings

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□ □□□□□***L***□□□□□□□□□□□□□33□
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L□□□□□□□□□□□□□□□C. Low

□□□□ □□□□ □□NA
L□□□□□□□□□□NA
□□□□□□□□□□□PW
□□□□□Air knife to 5□bgs

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000		Depth (feet)
81		□□ Gray, wet, SCHIST, competant rock				5.1		81
82								82
83								83
84								84
85								85
86								86
87								87
88								88
89		Water bearing zone 89-90□bgs				1.4		89
90								90
91								91
92		Potential fracture □ □92□bgs						92
93								93
94								94
95								95
96								96
97								97
98								98
99						4.6		99
100							Bedrock	100
101								101
102								102
103								103
104								104
105								105
106								106
107								107
108								108
109						1.8	6" Open Borehole	109
110		Potential fracture □ □111□bgs						110
111								111
112								112
113								113
114								114
115								115
116								116
117								117
118								118
119						5.1		119
120								120

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NR - Not Recorded
NM - Not Measured
N□ - Not □ncountered
bgs - below ground surface

USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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1340 Charwood Road
Suite I
Hanover, MD 21076

DRILLING LOG

We□□□o□MW-17D

□□□□□□□□□□ □□Fairfax 26140
S□□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
□□□□□□□□□□□□□□□□□□□□□□121473
□□□□□□Fairfax Petroleum, LLC
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□□□□□□□□□□□□□Schramm T450WS
□□□□□□□□***M***□□□□□□Air knife/Air Rotary
S□□ □□□□□***M***□□□□□Hand auger/Cuttings

S□□□□□□□□□□04/08/2013
□□□□□□□□□□□□04/09/2013
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□□□□□□□□□ □□□□□10"/6"
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L□□□□□□□□□□□□□□C. Low

□□□□ □□□□ □□NA
L□□□□□□□□□□NA
□□□□□□□□□□□PW
□□□□□Air knife to 5□bgs

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 2000		Depth (feet)
121–129						5.1		121–129
130						3.2		130
131–137		□□ Black, wet, SCHIST, competant rock					Bedrock	131–137
138–139		Potential Fracture □ 138-139□bgs				4.6	6" Open Borehole	138–139
140–149		□□ Black, wet, SCHIST, compentant rock, olive brown, some quartz fragments						140–149
150						2.2		150
151–160		End of Boring						151–160

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DRILLING LOG
We□□□o□MW-18D

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S□□ □□□□□□***M***□□□□□□Hand auger/Cuttings

S□□□□□□□□□□□□04/08/2013
□□□□□□□□□□□□04/11/2013
□□□□□□□□□□□□□□□□□□136'
□□□□□□□□□□□□□□□□10"/6"
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□□□□□□□□***L***□□□□□□□□□□□□□□~37'
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L□□□□□□□□□□□□□□□□□C. Low

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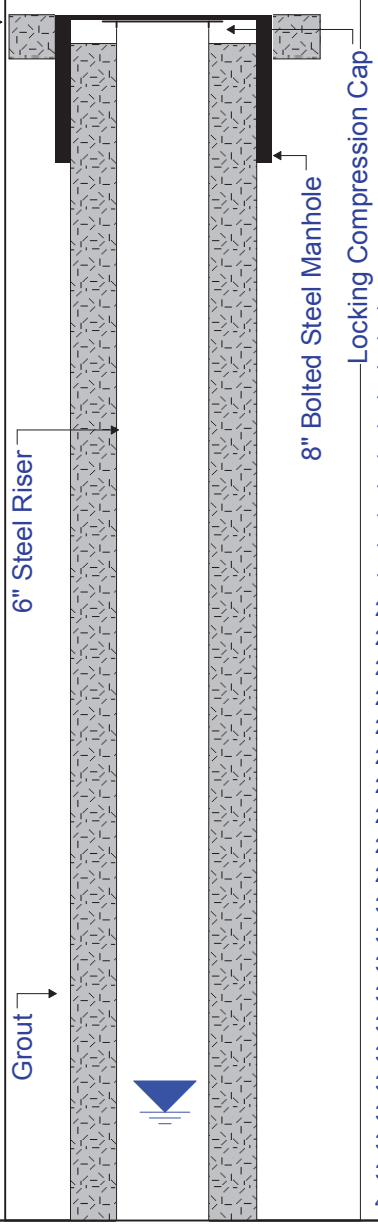
□□□□□□□□□□□□□□PW
□□□□□□□Air knife to 5' bgs

Depth (feet)	Graphic Log	USCS Code / Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000	Well Completion Details	Depth (feet)
0		Ground Surface						0
0–1		Grass and Topsoil				0.0		1
1–5		***SM*** Red-brown, dry, silty fine SAND				0.0, 0.0, 0.0		2–4
5–30		***SM*** Red-brown, dry, silty fine SAND				0.0		5–29
30–37		***SM*** Gray, dry silty fine SAND				0.0		30–36
37–40		***SM*** Gray, moist, silty fine SAND				0.0		37–40



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Hanover, MD 21076

DRILLING LOG
We□□o□MW-18D

□□□□□□□□□□ □□Fairfax 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum, LLC
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□□□□□□□□***M***□□□□□□Air knife/Air Rotary
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□□□□□□Air knife to 5' bgs

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 2000		Depth (feet)
41			MW-18D (40-40.5)			0.0		41
42								42
43								43
44								44
45								45
46								46
47								47
48							Grout	48
49						0.0		49
50								50
51		***SM*** Light brown, moist, silty fine SAND						51
52								52
53								53
54								54
55								55
56								56
57								57
58								58
59						0.0	6" Steel Riser	59
60								60
61								61
62								62
63								63
64								64
65								65
66								66
67								67
68								68
69						0.0		69
70								70
71								71
72								72
73								73
74								74
75								75
76								76
77								77
78								78
79						0.0		79
80								80

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DRILLING LOG

We□□o□MW-18D

□□□□□□□□□□ □□Fairfax 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum, LLC
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□□□□□□□□NA
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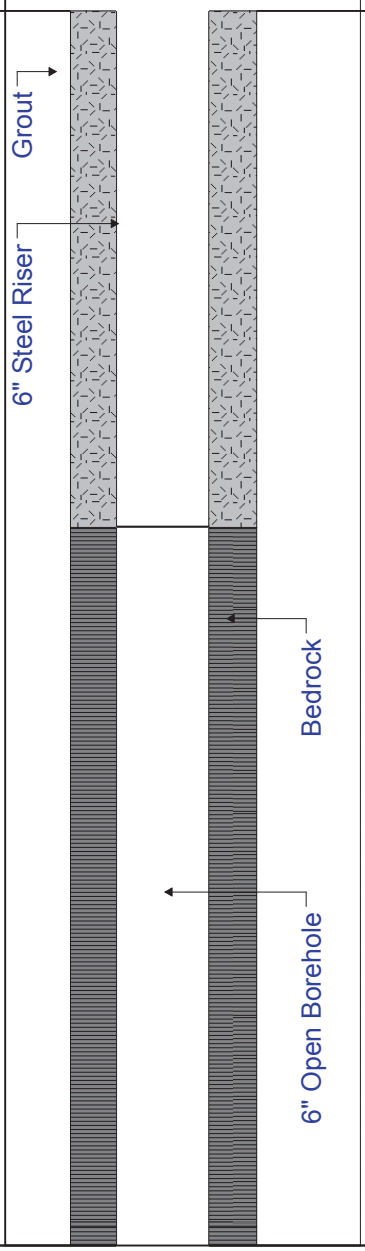
□□□□□□□□□□□□PW
□□□□□□Air knife to 5' bgs

SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000
81–92						0.0; 0.0
92–110		□□ Gray, SCHIST, competant rock encountered at 92" bgs Water bearing zone @ 98-100' bgs Water bearing zone @ 108-110' bgs				0.0; 0.0; 0.0
110–120		□□ Gray, wet, SCHIST with fine quartz fragments Potential fractures @ 112-114' bgs and at 115' Potential fracture @ 118-120' bgs				0.0; 0.0



Well Completion Details

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We□□o□MW-18D

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□□□□□Air knife to 5' bgs

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 2000		Depth (feet)
121		□□				0.0		121
122								122
123								123
124								124
125								125
126								126
127								127
128								128
129						0.0		129
130								130
131								131
132								132
133		Potential fracture @ 134.5-135' bgs						133
134						0.0		134
135								135
136		End of boring						136
137								137
138								138
139								139
140								140
141								141
142								142
143								143
144								144
145								145
146								146
147								147
148								148
149								149
150								150
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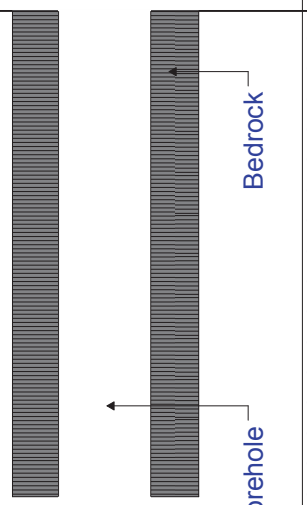
160								160



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DRILLING LOG

We□□o□MW-1□D

□□□□□□□□□□□□Inactive Fairfax Facility 26140
S□□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
□□□□□□□□□□□□□□Allied Well Drilling
□□□□□□□Tim Moyer
□□□□□□□□□□□□□Drilltech D25□W
□□□□□□□□***M***□□□□□□Air Rotary
S□□□□□□□***M***□□□□□□Cuttings

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□□□□□□□□□□NA
L□□□□□□□□□□NA
□□□□□□□□□□□□MCS
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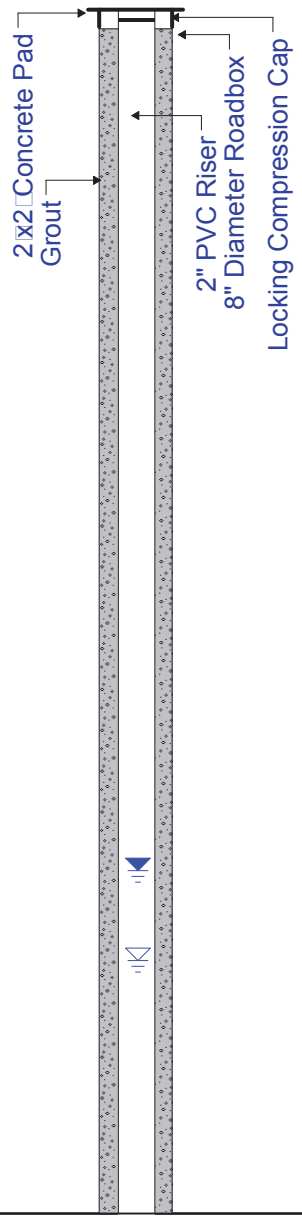
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
1		Asphalt				0.0
2–9		□***L*** Red, moist, CLA□ with silt, medium plasticity, firm, schist clasts present				
10		□ellowish olive, moist, SCHIST saprolite				0.0
20		Reddish yellow, moist, SCHIST saprolite				0.0
30		□ellowish brown, moist, SCHIST saprolite				0.0
49						1.5

Well Completion Details



VOC - Volatile Organic Compound
NA - Not Applicable
NS - Not Sampled
NR - Not Recorded
NM - Not Measured
N□ - Not □ncountered
bgs - below ground surface

USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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1340 Charwood Road
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DRILLING LOG

We□□o□MW-1□D

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
□□□□□□□□□□ □□□□□Allied Well Drilling
□□□□□□□Tim Moyer
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□□□□□□□□***M***□□□□□□Air Rotary
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□ □□□□□***L***□□□□□***S***□□□□□□□44.17□
L□□□□□□□□□□□□□□□P. Wertz

□□□□ □□□□ □□NA
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□□□□□□□□□□□□MCS
□□□□□

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000	Well Completion Details	Depth (feet)
60		□ellow, moist, SCHIST saprolite				0.8	Grout	
67		Competent B□DROC□, yellow schist				0.9	Bentonite; 2" PVC Riser	
77		Water producing fracture □ 78□bgs						
78		Greenish gray, GN□ISS						
85		□nd of Borehole					#2 Sand Pack; 2" PVC 0.020" Slot Screen	

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DRILLING LOG

We□□o□MW-20D

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC.
□□□□□□□□□□ □□□□□Allied Well Drilling
□□□□□□□Tim Moyer
□□□□□□□□□□□□□Drilltech D25□W
□□□□□□□□***M***□□□□□□Air Rotary
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S□□□□□□□□□04/01/2014
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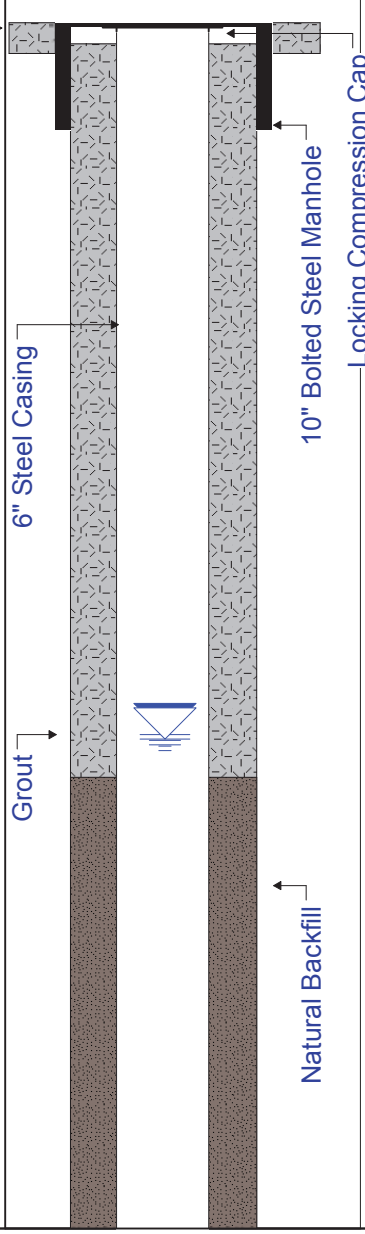
□□□□□□□□□□□□MCS
□□□□□□Cleared to 8□bgs

SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
		Ground Surface				
0–4		Asphalt				0.0, 0.0, 0.0
4–14		Red brown, moist, clayey SILT, loose, homogeous, micaceous, fill				0.1, 0.0
		Red orange, moist, fine SAND with silt				
14–30		Olive yellow, SCHIST, saprolite				0.0, 0.0
30–50		□ellowish brown, SCHIST, saprolite				0.0, 0.1
		Fracture □ 35□bgs				
50–55		Olive, SCHIST, saprolite				1.8



Well Completion Details

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DRILLING LOG

We□□o□MW-20D

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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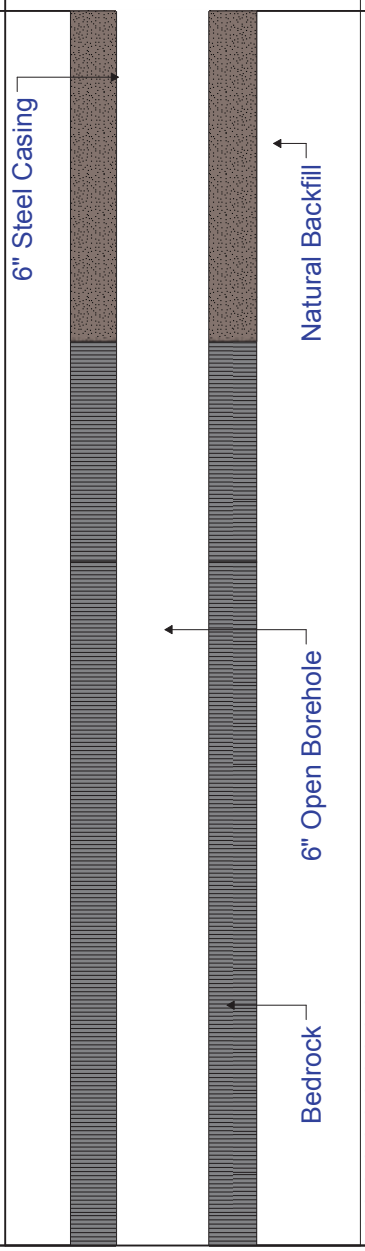
□□□□□Cleared to 8□bgs

SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000
60		Light brownish gray, SCHIST, saprolite				0.4
63		Gray, SCHIST				
80		□ellowish brown, SCHIST				



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WOH - weight of hammer
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DRILLING LOG

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L□□□□□□□□□□NA
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SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 2000		Depth (feet)
111		Dark gray, SCHIST						111
112								112
113								113
114								114
115								115
116								116
117								117
118								118
119								119
120								120
121								121
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127								127
128								128
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130								130
131								131
132								132
133								133
134								134
135								135
136								136
137								137
138		Water bearing zone □ 138□bgs						138
139								139
140								140
141								141
142								142
143		□nd of Borehole						143
144								144
145								145
146								146
147								147
148								148
149								149
150								150
151								151
152								152
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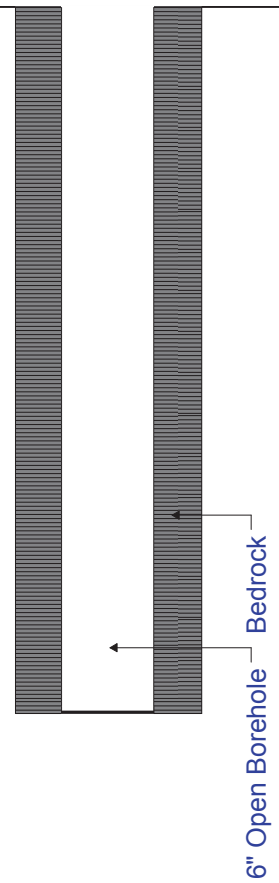
164								164
165								165



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bgs - below ground surface

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WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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DRILLING LOG

We□□o□MW-21S□MW-21I

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S□□□□□□□□□□□□

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DRILLING LOG

We□□□o□MW-21S□MW-21I

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S□□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
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SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000	Well Completion Details	Depth (feet)
46–53						1.0	Bentonite; 2" PVC Riser	46–53
54–66		Weathered SCHIST				0.2	#2 Sand Pack; 2" PVC 0.020" Slot Screen	54–66
67–90		□nd of Borehole						67–90

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DRILLING LOG
We□□o□MW-22

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S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
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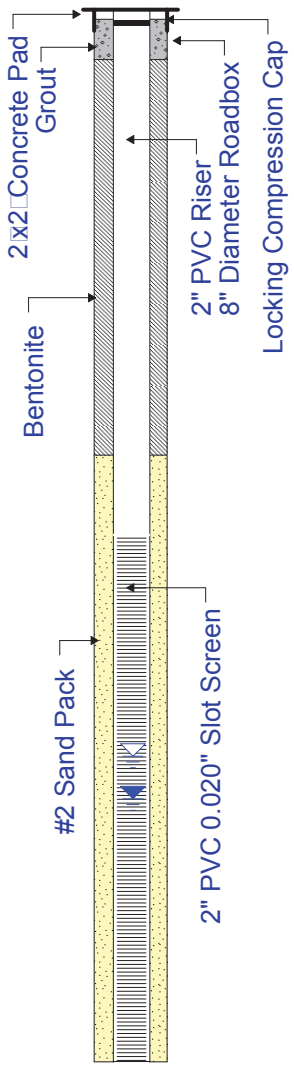
□□□□□□□□□□□□□□MCS
□□□□□□□Cleared to 8□bgs

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000		Depth (feet)
0		Ground Surface						0
		Asphalt						
		□ellow, dry to moist, sandy SILT, loose, non-plastic				0.0		
						0.0		
						0.0		
						0.0		
10		□ellowish brown, moist, SCHIST saprolite						10
						0.0		
						0.0		
30		Olive, moist to wet, SCHIST, saprolite						30
						0.0		
40		□nd of Borehole						40



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DRILLING LOG
We□□o□MW-23D

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□□□□□□□□***M***□□□□□□Hollow-stem auger/Air Rotary
S□□ □□□□□***M***□□□□□Hand auger/Cuttings

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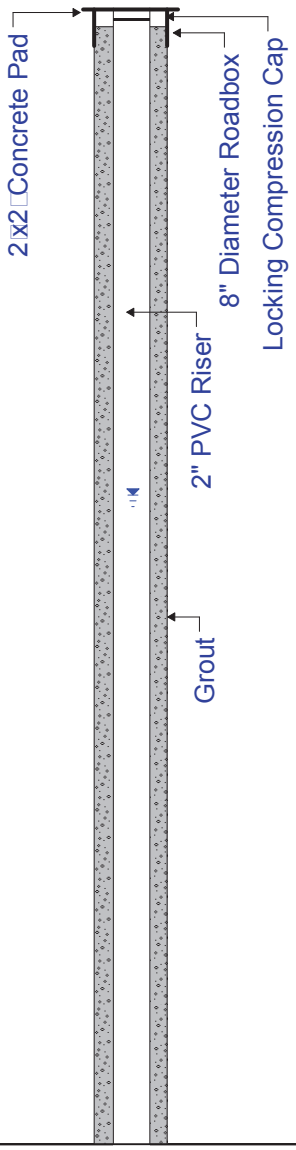
□□□□□Cleared to 8□bgs

SUBSURFACE PROFILE			SAMPLE					Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 6000			Depth (feet)
0		Ground Surface							0
1		Asphalt				0.0			1
2–14		Red brown, moist, silty CLA□, low plasticity, (fill)				0.0, 0.0, 0.0, 0.0			2–14
9–10				1-2-2-4	24/24				9–10
11–12				3-4-5-7	24/24				11–12
15		Red brown, moist, CLA□, medium plasticity				0.0			15
19						0.0			19
22–55		Brown, moist, SCHIST saprolite wet at 24□				0.0, 0.0, 0.2, 0.0, 0.1, 0.0, 0.0			22–55



VOC - Volatile Organic Compound
NA - Not Applicable
NS - Not Sampled
NR - Not Recorded
NM - Not Measured
N□ - Not □ncountered
bgs - below ground surface
ppm - parts per million
USCS - Unified Soil Classification System

1340 Charwood Road,
Suite I
Hanover, MD 21076

DRILLING LOG

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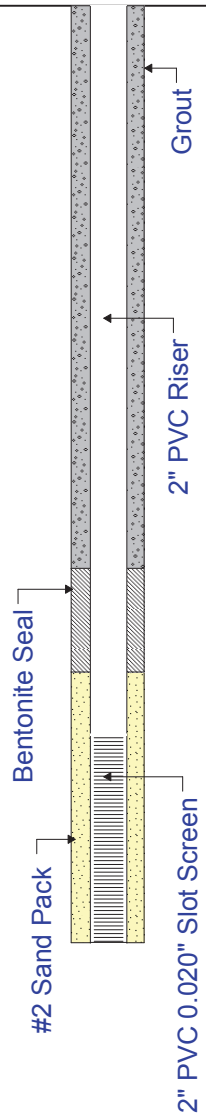
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 6000
56–66						0.0, 0.0, 0.0
67–90		Gray/brown, wet, SCHIST Fracture at 76□bgs				0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
90–100		Gray, SCHIST Fracture at 93□bgs				0.0
100–110		□nd of Borehole				



Well Completion Details

VOC - Volatile Organic Compound
NA - Not Applicable
NS - Not Sampled
NR - Not Recorded
NM - Not Measured
N□ - Not □ncountered
bgs - below ground surface
ppm - parts per million
USCS - Unified Soil Classification System

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DRILLING LOG
We□□o□MW-24

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S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□□□***M***□□□□□□Hollow-stem auger
S□□ □□□□□***M***□□□□□Split Spoon

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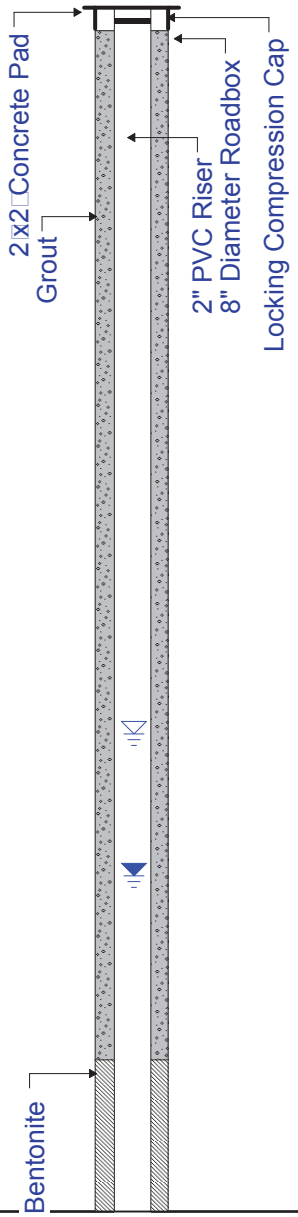
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
		Asphalt				
		Red brown, moist, silty CLA□, low plasticity, (fill)				0.3
						0.1
						0.1
						0.1
						0.0
				6-7-6-7	24/18	0.0
				3-3-3-2	24/10	0.0
		Orange red, moist, saprolite quartz grains, micaceous		3-6-6-7	24/6	0.0
				5-4-4-6	24/20	0.0
				6-7-11-8	24/16	0.0
		Red brown, moist, SCHIST saprolite		5-2-3-4	24/6	0.0
		Fracture with black mineralization		3-3-4-5	24/20	0.0
				4-4-5-5	24/24	0.0
				3-3-5-7	24/24	0.0
		Light brown, moist, SCHIST, saprolite with black and orange mineralization throughout fractures		6-4-4-6	24/24	0.0
		quartz vein and quartzite lense □ 26□ bgs		7-4-4-5	24/24	
						0.0
				2-3-4-6	24/24	
		quartz vein and quartzite lense □ 38□ bgs				0.0
				3-4-6-8	24/24	
						0.0
				6-9-9-9	24/24	

Well Completion Details



VOC - Volatile Organic Compound
NA - Not Applicable
NS - Not Sampled
NR - Not Recorded
NM - Not Measured
N□ - Not □ncountered
bgs - below ground surface

USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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DRILLING LOG
We□□□o□MW-24

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
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SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000		Depth (feet)
46–48						0.0	Bentonite; 2" PVC Riser	46–48
49				5-4-7-9	24/24			49
50–52						0.0		50–52
53								53
54				12-50/4	24/10			54
55–57						0.0	#2 Sand Pack; 2" PVC 0.020" Slot Screen	55–57
58								58
59				13-50/5	24/10			59
60		□nd of Borehole						60
61–90								61–90

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USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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DRILLING LOG

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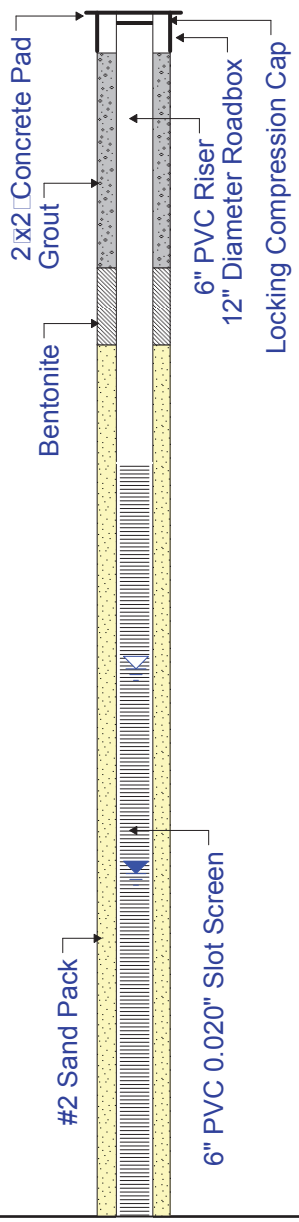
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000	Well Completion Details	Depth (feet)
0		Ground Surface						0
1		Concrete/Crushed stone fill				0.0		1
2–17		□***L*** Red, moist, CLA□, medium plasticity, soft						2–17
17						0.0		17
18		Reddish brown, SCHIST saprolite				0.0		18
19–38		Reddish yellow, SCHIST saprolite						19–38
38–55		□ellowish brown, SCHIST saprolite				4.4 10.5		38–55



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DRILLING LOG

We□□o□RW-1

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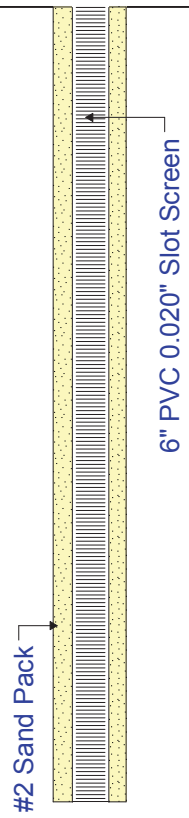
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000
56–59						
60						3.3
61–62		Olive yellow, SCHIST saprolite				
63						
64–68		Competent B□DROC□, Olive yellow, SCHISTwith quartzite lenses				
69						18.2
70–78						
79						9.3
80		Water producing fracture at 80□bgs				
81–99						
100						
101		□nd of Borehole				
102–110						

Well Completion Details



Depth (feet): 56–110

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DRILLING LOG

We□□o□S□E-1

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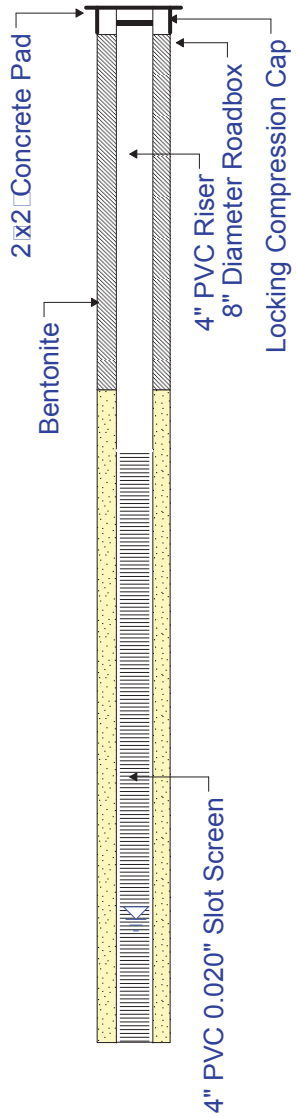
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
0–1		Concrete				
1–8		***M***□ Brown, moist, SILT with clay, medium plasticity, soft, micaceous; ***M***□ Red, moist, clayey SILT, medium plasticity, soft, micaceous, decomposed schist		3-3-5-5	NR	0.0
8–35		□ellowish brown, moist, SCHIST saprolite, fine grained, highly weathere, moderately fractured, non-plastic		5-6-7-19	NR	0.0
				5-14-12-23	NR	0.0
				12-16-22-23	NR	0.0
				15-24-34-45	NR	0.0
				12-16-16-28	NR	0.0
				10-18-28-25	NR	0.0
35		□nd of Borehole				

Well Completion Details



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NA - Not Applicable
NS - Not Sampled
NR - Not Recorded
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bgs - below ground surface

USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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1340 Charwood Road
Suite I
Hanover, MD 21076

DRILLING LOG
We□□o□S□E-2

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
□□□□□□□□□□ □□□□□Allied Well Drilling
□□□□□□□□□ach Gilbach
□□□□□□□□□□□□□□Diedrich D-120
□□□□□□□□***M***□□□□□□Hollow-stem auger
S□□ □□□□□***M***□□□□□Split-spoon/Cuttings

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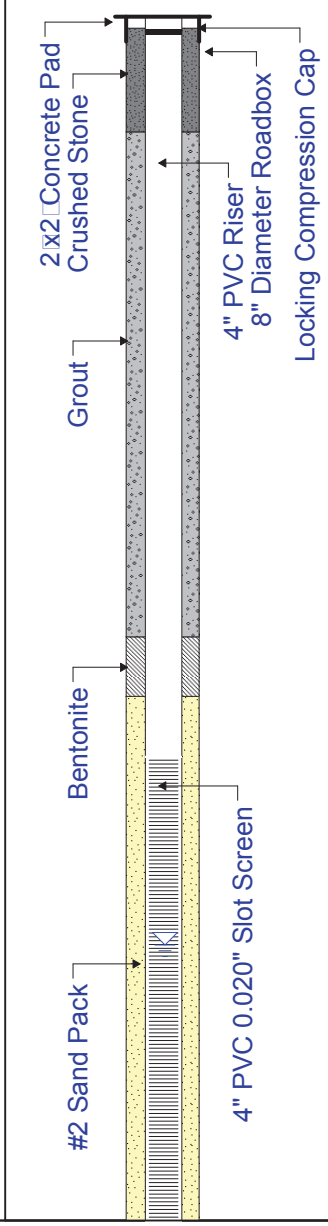
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
		Crushed Stone #57/peagravel to 13□bgs				
13		□ellowish brown, moist, SCHIST saprolite		8-18-29-24	NR	0.1
				9-15-17-15	NR	0.0
				7-11-11-18	NR	0.1
		1" quartz vein at 28□bgs		14-20-22-20	NR	0.1
				13-14-23-28	NR	0.2
				17-16-17-20	NR	74.1
40						



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WOH - weight of hammer
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KLEINFELDER
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DRILLING LOG
We□□o□S□E-2

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
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□□□□□□□□□□□□□Diedrich D-120
□□□□□□□□***M***□□□□□□Hollow-stem auger
S□□ □□□□□***M***□□□□□Split-spoon/Cuttings

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SUBSURFACE PROFILE			SAMPLE					
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0 – 2000	Well Completion Details	Depth (feet)
41								41
42								42
43								43
44			SV□-2 (43-45)	10-11 24-50/4"	NR	714.9		44
45								45
46		□nd of Borehole						46
47								47
48								48
49								49
50								50
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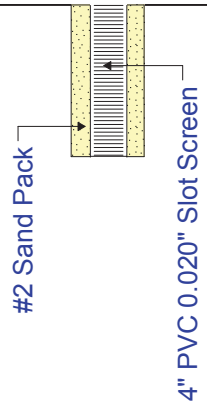
80								80



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USCS - Unified Soil Classification System
WOR - weight of rod
WOH - weight of hammer
ppm - parts per million

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DRILLING LOG
We□□o□S□E-3

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
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□□□□□□□□□□□□□Diedrich D-120
□□□□□□□□***M***□□□□□□Hollow-stem auger
S□□ □□□□□***M***□□□□□Split-spoon/Cuttings

S□□□□□□□□□02/19/2014
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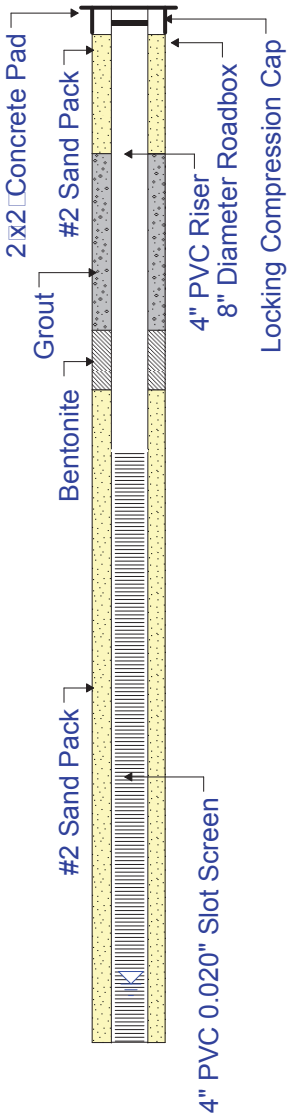
Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
0–1		Concrete				
1–8		***M***□ Red, moist, SILT with clay, non-plastic, weakly cemented, firm		6-9-8-9	NR	0.0
8–13		***M***□ Red, moist, SILT with clay, non-plastic, weakly cemented, decomposed schist saprolite		7-8-8-11	NR	0.0
13–18		Reddish yellow, moist, SCHIST saprolite		11-14-15-18	NR	0.0
18–35		□ellowish brown, moist, SCHIST, saprolite		9-10-13-15	NR	0.0
				13-13-15-16	NR	0.0
				10-7-8-16	NR	0.0
				9-12-13-16	NR	0.0
35		□nd of Borehole				

Well Completion Details



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ppm - parts per million

1340 Charwood Road
Suite I
Hanover, MD 21076

DRILLING LOG

We□□o□S□E-4

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□□□***M***□□□□□□Hollow-stem auger
S□□ □□□□□***M***□□□□□Split-spoon/Cuttings

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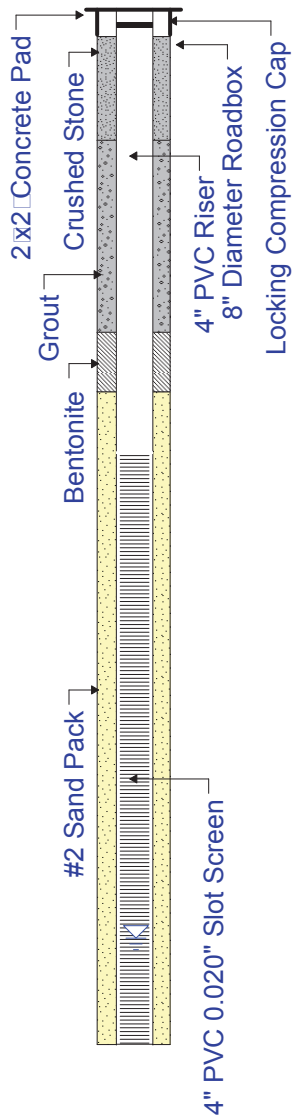
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
0–13		Crushed stone #57/peagravel to 13□bgs				
13–35		Red, moist, SCHIST saprolite				
14				6-5-6-7	NR	0.0
19				7-7-10-16	NR	0.0
24				11-15-16-16	NR	0.0
29				8-8-7-36	NR	0.0
34				11-16-25-26	NR	0.0
35		□nd of Borehole				

Well Completion Details



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DRILLING LOG
We□□o□S□E-5

□□□□□□□□□□ □□Inactive Fairfax Facility 26140
S□□□***L***□□□□□□□□9901 Georgetown Pike, Great Falls, VA
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□□□□□□Fairfax Petroleum Realty, LLC
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S□□ □□□□□***M***□□□□□Split-spoon/Cuttings

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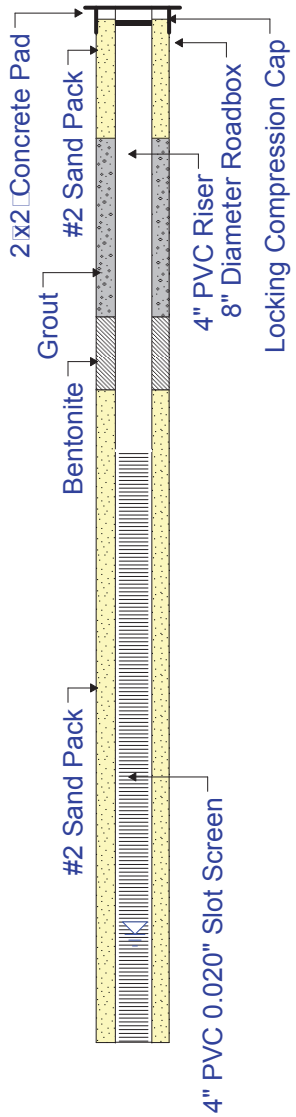
SUBSURFACE PROFILE / SAMPLE

Depth (feet)	Graphic Log	USCS Code Soil/Geologic Description	Sample ID	Blows/6"	Penetration / Recovery	VOC (ppm) 0–2000
0		Ground Surface				
0–1		Concrete				
1–8		Reddish yellow, moist, SILT with clay, low plasticity, firm		21-3-4-4	NR	0.0
8–13		Reddish yellow, moist, SILT with clay, non-plastic, decomposed schist saprolite, firm		6-8-11-17	NR	0.0
13–35		□ellowish brown, moist, SCHIST saprolite		10-18-20-19	NR	0.0
				10-10-16-13	NR	0.6
				24-16-27-28	NR	7.1
				8-15-16-20	NR	62.7
				9-11-15-22	NR	7.2
35		□nd of Borehole				

Well Completion Details



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ppm - parts per million

Appendix C

Laboratories Analysis Reports - Water

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Kleinfelder
1 Speen Street
Framingham MA 01701

May 02, 2014

Project: Fairfax 26140

Submittal Date: 04/30/2014
Group Number: 1470872
PO Number: 51141-293031
State of Sample Origin: VA

Client Sample Description	Lancaster Labs (LL) #
RW-1 (1 GPM) Grab Water	7447794
RW-1 (2 GPM) Grab Water	7447795
RW-1 (5 GPM) Grab Water	7447796
RW-1 (10 GPM) Grab Water	7447797

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO	Kleinfelder	Attn: Mark Steele
ELECTRONIC COPY TO	Kleinfelder	Attn: Angela Vogt
ELECTRONIC COPY TO	Kleinfelder	Attn: Venelda Williams
ELECTRONIC COPY TO	Kleinfelder	Attn: Paxton Wertz
ELECTRONIC COPY TO	Kleinfelder	Attn: Charlie Low

Respectfully Submitted,

Amek Carter
Specialist

(717) 556-7252

eurofins
Lancaster Laboratories Environmental
2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

Sample Description: RW-1 (1 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447794
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 11:18 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW101

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 2,000	2,000	100
10335	Acrolein	107-02-8	< 10,000	10,000	100
10335	Acrylonitrile	107-13-1	< 2,000	2,000	100
10335	**t-Amyl methyl ether**	994-05-8	**1,400**	100	100
10335	Benzene	71-43-2	< 100	100	100
10335	Bromodichloromethane	75-27-4	< 100	100	100
10335	Bromoform	75-25-2	< 400	400	100
10335	Bromomethane	74-83-9	< 100	100	100
10335	2-Butanone	78-93-3	< 1,000	1,000	100
10335	**t-Butyl alcohol**	75-65-0	**20,000**	2,000	100
10335	n-Butylbenzene	104-51-8	< 500	500	100
10335	sec-Butylbenzene	135-98-8	< 500	500	100
10335	Carbon Tetrachloride	56-23-5	< 100	100	100
10335	Chlorobenzene	108-90-7	< 100	100	100
10335	Chloroethane	75-00-3	< 100	100	100
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 1,000	1,000	100
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 100	100	100
10335	Chloromethane	74-87-3	< 100	100	100
10335	Dibromochloromethane	124-48-1	< 100	100	100
10335	1,2-Dichlorobenzene	95-50-1	< 500	500	100
10335	1,3-Dichlorobenzene	541-73-1	< 500	500	100
10335	1,4-Dichlorobenzene	106-46-7	< 500	500	100
10335	1,1-Dichloroethane	75-34-3	< 100	100	100
10335	1,2-Dichloroethane	107-06-2	< 100	100	100
10335	1,1-Dichloroethene	75-35-4	< 100	100	100
10335	cis-1,2-Dichloroethene	156-59-2	< 100	100	100
10335	trans-1,2-Dichloroethene	156-60-5	< 100	100	100
10335	1,2-Dichloropropane	78-87-5	< 100	100	100
10335	cis-1,3-Dichloropropene	10061-01-5	< 100	100	100
10335	trans-1,3-Dichloropropene	10061-02-6	< 100	100	100
10335	Ethyl t-butyl ether	637-92-3	< 100	100	100
10335	Ethylbenzene	100-41-4	< 100	100	100
10335	**di-Isopropyl ether**	108-20-3	**2,200**	100	100
10335	Isopropylbenzene	98-82-8	< 500	500	100
10335	p-Isopropyltoluene	99-87-6	< 500	500	100
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**89,000**	1,000	1000
10335	Methylene Chloride	75-09-2	< 300	300	100
10335	Naphthalene	91-20-3	< 500	500	100
10335	n-Propylbenzene	103-65-1	< 500	500	100
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 100	100	100
10335	Tetrachloroethene	127-18-4	< 100	100	100
10335	Toluene	108-88-3	< 100	100	100
10335	1,1,1-Trichloroethane	71-55-6	< 100	100	100
10335	1,1,2-Trichloroethane	79-00-5	< 100	100	100
10335	Trichloroethene	79-01-6	< 100	100	100
10335	Trichlorofluoromethane	75-69-4	< 100	100	100
10335	1,2,4-Trimethylbenzene	95-63-6	< 500	500	100

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Analysis Report

Sample Description: RW-1 (1 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447794
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 11:18 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW101

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	1,3,5-Trimethylbenzene	108-67-8	< 500	500	100
10335	Vinyl Chloride	75-01-4	< 100	100	100
10335	Xylene (Total)	1330-20-7	< 100	100	100

General Sample Comments

Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 16:52	Linda C Pape	100
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 17:16	Linda C Pape	1000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	T141211AA	05/01/2014 16:52	Linda C Pape	100
01163	GC/MS VOA Water Prep	SW-846 5030B	2	T141211AA	05/01/2014 17:16	Linda C Pape	1000

Sample Description: RW-1 (2 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447795
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 12:15 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW102

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 2,000	2,000	100
10335	Acrolein	107-02-8	< 10,000	10,000	100
10335	Acrylonitrile	107-13-1	< 2,000	2,000	100
10335	**t-Amyl methyl ether**	994-05-8	**1,100**	100	100
10335	Benzene	71-43-2	< 100	100	100
10335	Bromodichloromethane	75-27-4	< 100	100	100
10335	Bromoform	75-25-2	< 400	400	100
10335	Bromomethane	74-83-9	< 100	100	100
10335	2-Butanone	78-93-3	< 1,000	1,000	100
10335	**t-Butyl alcohol**	75-65-0	**16,000**	2,000	100
10335	n-Butylbenzene	104-51-8	< 500	500	100
10335	sec-Butylbenzene	135-98-8	< 500	500	100
10335	Carbon Tetrachloride	56-23-5	< 100	100	100
10335	Chlorobenzene	108-90-7	< 100	100	100
10335	Chloroethane	75-00-3	< 100	100	100
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 1,000	1,000	100
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 100	100	100
10335	Chloromethane	74-87-3	< 100	100	100
10335	Dibromochloromethane	124-48-1	< 100	100	100
10335	1,2-Dichlorobenzene	95-50-1	< 500	500	100
10335	1,3-Dichlorobenzene	541-73-1	< 500	500	100
10335	1,4-Dichlorobenzene	106-46-7	< 500	500	100
10335	1,1-Dichloroethane	75-34-3	< 100	100	100
10335	1,2-Dichloroethane	107-06-2	< 100	100	100
10335	1,1-Dichloroethene	75-35-4	< 100	100	100
10335	**cis-1,2-Dichloroethene**	156-59-2	**120**	100	100
10335	trans-1,2-Dichloroethene	156-60-5	< 100	100	100
10335	1,2-Dichloropropane	78-87-5	< 100	100	100
10335	cis-1,3-Dichloropropene	10061-01-5	< 100	100	100
10335	trans-1,3-Dichloropropene	10061-02-6	< 100	100	100
10335	Ethyl t-butyl ether	637-92-3	< 100	100	100
10335	Ethylbenzene	100-41-4	< 100	100	100
10335	**di-Isopropyl ether**	108-20-3	**1,800**	100	100
10335	Isopropylbenzene	98-82-8	< 500	500	100
10335	p-Isopropyltoluene	99-87-6	< 500	500	100
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**71,000**	1,000	1000
10335	Methylene Chloride	75-09-2	< 300	300	100
10335	Naphthalene	91-20-3	< 500	500	100
10335	n-Propylbenzene	103-65-1	< 500	500	100
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 100	100	100
10335	Tetrachloroethene	127-18-4	< 100	100	100
10335	Toluene	108-88-3	< 100	100	100
10335	1,1,1-Trichloroethane	71-55-6	< 100	100	100
10335	1,1,2-Trichloroethane	79-00-5	< 100	100	100
10335	Trichloroethene	79-01-6	< 100	100	100
10335	Trichlorofluoromethane	75-69-4	< 100	100	100
10335	1,2,4-Trimethylbenzene	95-63-6	< 500	500	100

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Analysis Report

Sample Description: RW-1 (2 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447795
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 12:15 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW102

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	1,3,5-Trimethylbenzene	108-67-8	< 500	500	100
10335	Vinyl Chloride	75-01-4	< 100	100	100
10335	Xylene (Total)	1330-20-7	< 100	100	100

General Sample Comments

Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 17:40	Linda C Pape	100
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 18:03	Linda C Pape	1000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	T141211AA	05/01/2014 17:40	Linda C Pape	100
01163	GC/MS VOA Water Prep	SW-846 5030B	2	T141211AA	05/01/2014 18:03	Linda C Pape	1000

Sample Description: RW-1 (5 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447796
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 13:17 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW105

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 2,000	2,000	100
10335	Acrolein	107-02-8	< 10,000	10,000	100
10335	Acrylonitrile	107-13-1	< 2,000	2,000	100
10335	**t-Amyl methyl ether**	994-05-8	**940**	100	100
10335	Benzene	71-43-2	< 100	100	100
10335	Bromodichloromethane	75-27-4	< 100	100	100
10335	Bromoform	75-25-2	< 400	400	100
10335	Bromomethane	74-83-9	< 100	100	100
10335	2-Butanone	78-93-3	< 1,000	1,000	100
10335	**t-Butyl alcohol**	75-65-0	**14,000**	2,000	100
10335	n-Butylbenzene	104-51-8	< 500	500	100
10335	sec-Butylbenzene	135-98-8	< 500	500	100
10335	Carbon Tetrachloride	56-23-5	< 100	100	100
10335	Chlorobenzene	108-90-7	< 100	100	100
10335	Chloroethane	75-00-3	< 100	100	100
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 1,000	1,000	100
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 100	100	100
10335	Chloromethane	74-87-3	< 100	100	100
10335	Dibromochloromethane	124-48-1	< 100	100	100
10335	1,2-Dichlorobenzene	95-50-1	< 500	500	100
10335	1,3-Dichlorobenzene	541-73-1	< 500	500	100
10335	1,4-Dichlorobenzene	106-46-7	< 500	500	100
10335	1,1-Dichloroethane	75-34-3	< 100	100	100
10335	1,2-Dichloroethane	107-06-2	< 100	100	100
10335	1,1-Dichloroethene	75-35-4	< 100	100	100
10335	**cis-1,2-Dichloroethene**	156-59-2	**150**	100	100
10335	trans-1,2-Dichloroethene	156-60-5	< 100	100	100
10335	1,2-Dichloropropane	78-87-5	< 100	100	100
10335	cis-1,3-Dichloropropene	10061-01-5	< 100	100	100
10335	trans-1,3-Dichloropropene	10061-02-6	< 100	100	100
10335	Ethyl t-butyl ether	637-92-3	< 100	100	100
10335	Ethylbenzene	100-41-4	< 100	100	100
10335	**di-Isopropyl ether**	108-20-3	**1,500**	100	100
10335	Isopropylbenzene	98-82-8	< 500	500	100
10335	p-Isopropyltoluene	99-87-6	< 500	500	100
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**61,000**	1,000	1000
10335	Methylene Chloride	75-09-2	< 300	300	100
10335	Naphthalene	91-20-3	< 500	500	100
10335	n-Propylbenzene	103-65-1	< 500	500	100
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 100	100	100
10335	Tetrachloroethene	127-18-4	< 100	100	100
10335	Toluene	108-88-3	< 100	100	100
10335	1,1,1-Trichloroethane	71-55-6	< 100	100	100
10335	1,1,2-Trichloroethane	79-00-5	< 100	100	100
10335	Trichloroethene	79-01-6	< 100	100	100
10335	Trichlorofluoromethane	75-69-4	< 100	100	100
10335	1,2,4-Trimethylbenzene	95-63-6	< 500	500	100

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Analysis Report

Sample Description: RW-1 (5 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447796
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 13:17 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW105

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	1,3,5-Trimethylbenzene	108-67-8	< 500	500	100
10335	Vinyl Chloride	75-01-4	< 100	100	100
10335	Xylene (Total)	1330-20-7	< 100	100	100

General Sample Comments

Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 18:27	Linda C Pape	100
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 18:51	Linda C Pape	1000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	T141211AA	05/01/2014 18:27	Linda C Pape	100
01163	GC/MS VOA Water Prep	SW-846 5030B	2	T141211AA	05/01/2014 18:51	Linda C Pape	1000

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Analysis Report

Sample Description: RW-1 (10 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447797
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 14:16 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW110

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 2,000	2,000	100
10335	Acrolein	107-02-8	< 10,000	10,000	100
10335	Acrylonitrile	107-13-1	< 2,000	2,000	100
10335	**t-Amyl methyl ether**	994-05-8	**1,000**	100	100
10335	Benzene	71-43-2	< 100	100	100
10335	Bromodichloromethane	75-27-4	< 100	100	100
10335	Bromoform	75-25-2	< 400	400	100
10335	Bromomethane	74-83-9	< 100	100	100
10335	2-Butanone	78-93-3	< 1,000	1,000	100
10335	**t-Butyl alcohol**	75-65-0	**15,000**	2,000	100
10335	n-Butylbenzene	104-51-8	< 500	500	100
10335	sec-Butylbenzene	135-98-8	< 500	500	100
10335	Carbon Tetrachloride	56-23-5	< 100	100	100
10335	Chlorobenzene	108-90-7	< 100	100	100
10335	Chloroethane	75-00-3	< 100	100	100
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 1,000	1,000	100
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 100	100	100
10335	Chloromethane	74-87-3	< 100	100	100
10335	Dibromochloromethane	124-48-1	< 100	100	100
10335	1,2-Dichlorobenzene	95-50-1	< 500	500	100
10335	1,3-Dichlorobenzene	541-73-1	< 500	500	100
10335	1,4-Dichlorobenzene	106-46-7	< 500	500	100
10335	1,1-Dichloroethane	75-34-3	< 100	100	100
10335	1,2-Dichloroethane	107-06-2	< 100	100	100
10335	1,1-Dichloroethene	75-35-4	< 100	100	100
10335	**cis-1,2-Dichloroethene**	156-59-2	**140**	100	100
10335	trans-1,2-Dichloroethene	156-60-5	< 100	100	100
10335	1,2-Dichloropropane	78-87-5	< 100	100	100
10335	cis-1,3-Dichloropropene	10061-01-5	< 100	100	100
10335	trans-1,3-Dichloropropene	10061-02-6	< 100	100	100
10335	Ethyl t-butyl ether	637-92-3	< 100	100	100
10335	Ethylbenzene	100-41-4	< 100	100	100
10335	**di-Isopropyl ether**	108-20-3	**1,600**	100	100
10335	Isopropylbenzene	98-82-8	< 500	500	100
10335	p-Isopropyltoluene	99-87-6	< 500	500	100
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**64,000**	1,000	1000
10335	Methylene Chloride	75-09-2	< 300	300	100
10335	Naphthalene	91-20-3	< 500	500	100
10335	n-Propylbenzene	103-65-1	< 500	500	100
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 100	100	100
10335	Tetrachloroethene	127-18-4	< 100	100	100
10335	Toluene	108-88-3	< 100	100	100
10335	1,1,1-Trichloroethane	71-55-6	< 100	100	100
10335	1,1,2-Trichloroethane	79-00-5	< 100	100	100
10335	Trichloroethene	79-01-6	< 100	100	100
10335	Trichlorofluoromethane	75-69-4	< 100	100	100
10335	1,2,4-Trimethylbenzene	95-63-6	< 500	500	100

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Analysis Report

Sample Description: RW-1 (10 GPM) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7447797
LL Group # 1470872
Account # 12152

Project Name: Fairfax 26140

Collected: 04/29/2014 14:16 by CC

Submitted: 04/30/2014 16:30
Reported: 05/02/2014 15:42

Kleinfelder
1 Speen Street
Framingham MA 01701

RW110

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	1,3,5-Trimethylbenzene	108-67-8	< 500	500	100
10335	Vinyl Chloride	75-01-4	< 100	100	100
10335	Xylene (Total)	1330-20-7	< 100	100	100

General Sample Comments

Trip blank vials were not received by the laboratory for this sample group.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 19:15	Linda C Pape	100
10335	VOCs 8260 Kleinfelder Full	SW-846 8260B	1	T141211AA	05/01/2014 19:38	Linda C Pape	1000
01163	GC/MS VOA Water Prep	SW-846 5030B	1	T141211AA	05/01/2014 19:15	Linda C Pape	100
01163	GC/MS VOA Water Prep	SW-846 5030B	2	T141211AA	05/01/2014 19:38	Linda C Pape	1000

Quality Control Summary

Client Name: Kleinfelder Group Number: 1470872
Reported: 05/02/14 at 03:42 PM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: T141211AA	Sample number(s): 7447794-7447797							
Acetone	< 20	20.	ug/l	117		43-149		
Acrolein	< 100	100.	ug/l	79		52-129		
Acrylonitrile	< 20	20.	ug/l	106		62-120		
t-Amyl methyl ether	< 1	1.	ug/l	108		75-120		
Benzene	< 1	1.	ug/l	103		78-120		
Bromodichloromethane	< 1	1.	ug/l	99		73-120		
Bromoform	< 4	4.	ug/l	90		61-120		
Bromomethane	< 1	1.	ug/l	93		58-120		
2-Butanone	< 10	10.	ug/l	115		54-133		
t-Butyl alcohol	< 20	20.	ug/l	106		75-120		
n-Butylbenzene	< 5	5.	ug/l	104		68-120		
sec-Butylbenzene	< 5	5.	ug/l	105		80-120		
Carbon Tetrachloride	< 1	1.	ug/l	118		74-130		
Chlorobenzene	< 1	1.	ug/l	106		80-120		
Chloroethane	< 1	1.	ug/l	85		56-120		
2-Chloroethyl Vinyl Ether	< 10	10.	ug/l	107		54-126		
Chloroform	< 1	1.	ug/l	106		80-122		
Chloromethane	< 1	1.	ug/l	98		63-120		
Dibromochloromethane	< 1	1.	ug/l	98		72-120		
1,2-Dichlorobenzene	< 5	5.	ug/l	105		80-120		
1,3-Dichlorobenzene	< 5	5.	ug/l	103		80-120		
1,4-Dichlorobenzene	< 5	5.	ug/l	106		80-120		
1,1-Dichloroethane	< 1	1.	ug/l	106		80-120		
1,2-Dichloroethane	< 1	1.	ug/l	116		65-135		
1,1-Dichloroethene	< 1	1.	ug/l	103		76-124		
cis-1,2-Dichloroethene	< 1	1.	ug/l	103		80-120		
trans-1,2-Dichloroethene	< 1	1.	ug/l	103		80-120		
1,2-Dichloropropane	< 1	1.	ug/l	104		80-120		
cis-1,3-Dichloropropene	< 1	1.	ug/l	106		80-120		
trans-1,3-Dichloropropene	< 1	1.	ug/l	113		76-120		
Ethyl t-butyl ether	< 1	1.	ug/l	109		74-120		
Ethylbenzene	< 1	1.	ug/l	107		79-120		
di-Isopropyl ether	< 1	1.	ug/l	111		65-120		
Isopropylbenzene	< 5	5.	ug/l	109		77-120		
p-Isopropyltoluene	< 5	5.	ug/l	105		80-120		
Methyl Tertiary Butyl Ether	< 1	1.	ug/l	113		75-120		
Methylene Chloride	< 3	3.	ug/l	101		80-120		
Naphthalene	< 5	5.	ug/l	100		47-126		
n-Propylbenzene	< 5	5.	ug/l	106		80-120		
1,1,2,2-Tetrachloroethane	< 1	1.	ug/l	100		70-120		
Tetrachloroethene	< 1	1.	ug/l	104		80-120		
Toluene	< 1	1.	ug/l	104		80-120		
1,1,1-Trichloroethane	< 1	1.	ug/l	123		66-126		

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1470872
Reported: 05/02/14 at 03:42 PM

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1,2-Trichloroethane	< 1	1.	ug/l	99		80-120		
Trichloroethene	< 1	1.	ug/l	107		80-120		
Trichlorofluoromethane	< 1	1.	ug/l	99		65-130		
1,2,4-Trimethylbenzene	< 5	5.	ug/l	110		74-120		
1,3,5-Trimethylbenzene	< 5	5.	ug/l	110		74-120		
Vinyl Chloride	< 1	1.	ug/l	102		63-120		
Xylene (Total)	< 1	1.	ug/l	105		80-120		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: T141211AA	Sample number(s): 7447794-7447797 UNSPK: P447446								
Acetone	107	105	35-144	2	30				
Acrolein	74	74	39-136	1	30				
Acrylonitrile	106	106	51-125	1	30				
t-Amyl methyl ether	111	113	65-117	2	30				
Benzene	110	111	72-134	1	30				
Bromodichloromethane	104	107	73-125	3	30				
Bromoform	91	91	48-118	0	30				
Bromomethane	102	106	47-129	4	30				
2-Butanone	119	118	44-135	1	30				
t-Butyl alcohol	104	99	67-119	5	30				
n-Butylbenzene	109	107	74-134	2	30				
sec-Butylbenzene	115	113	74-137	1	30				
Carbon Tetrachloride	136	136	75-148	0	30				
Chlorobenzene	109	108	87-124	1	30				
Chloroethane	94	93	55-130	1	30				
2-Chloroethyl Vinyl Ether	0*	0*	10-151	0	30				
Chloroform	113	113	81-134	1	30				
Chloromethane	107	110	61-125	3	30				
Dibromochloromethane	97	97	74-116	0	30				
1,2-Dichlorobenzene	104	105	84-119	1	30				
1,3-Dichlorobenzene	104	104	86-121	0	30				
1,4-Dichlorobenzene	106	104	85-121	2	30				
1,1-Dichloroethane	117	116	84-129	1	30				
1,2-Dichloroethane	127	127	63-142	0	30				
1,1-Dichloroethene	114	117	79-137	3	30				
cis-1,2-Dichloroethene	108	109	80-141	1	30				
trans-1,2-Dichloroethene	110	113	86-131	3	30				
1,2-Dichloropropane	110	110	83-124	1	30				
cis-1,3-Dichloropropene	113	113	70-116	0	30				
trans-1,3-Dichloropropene	115	116	74-119	1	30				
Ethyl t-butyl ether	115	114	74-122	1	30				
Ethylbenzene	112	112	71-134	0	30				
di-Isopropyl ether	119	119	70-129	0	30				
Isopropylbenzene	114	113	75-128	0	30				
p-Isopropyltoluene	109	108	76-123	1	30				
Methyl Tertiary Butyl Ether	117	118	72-126	1	30				
Methylene Chloride	105	105	78-133	0	30				

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1470872
Reported: 05/02/14 at 03:42 PM

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Naphthalene	96	97	52-125	0	30				
n-Propylbenzene	113	112	74-134	1	30				
1,1,2,2-Tetrachloroethane	99	99	72-128	0	30				
Tetrachloroethene	109	107	80-128	2	30				
Toluene	107	107	80-125	0	30				
1,1,1-Trichloroethane	126	126	69-140	0	30				
1,1,2-Trichloroethane	102	102	71-141	1	30				
Trichloroethene	114	114	88-133	0	30				
Trichlorofluoromethane	123	125	63-163	2	30				
1,2,4-Trimethylbenzene	114	113	72-130	1	30				
1,3,5-Trimethylbenzene	114	113	65-132	1	30				
Vinyl Chloride	113	115	66-133	1	30				
Xylene (Total)	112	111	79-125	1	30				

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 8260 VOCs
Batch number: T141211AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7447794	112	102	98	101
7447795	109	102	101	104
7447796	111	98	100	106
7447797	112	104	100	103
Blank	104	102	103	103
LCS	104	102	101	103
MS	107	99	99	103
MSD	107	102	99	101
Limits:	80-116	77-113	80-113	78-113

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Lancaster Laboratories

Analysis Request/Environmental Services Chain of Custody

For Lancaster Laboratories use only Acct. #: 12152
Group #: 1470872 Sample #: 7447794-97

Client:	Fairfax Petroleum	Acct. #:	
Project Name/#:	26140 Great Falls, VA	PWSID #:	
Project Manager:	Mark C. Steele	P.O. #:	51141-293031
Sampler:	Chris Cresci	Quote #:	
Name of State where samples were collected:	Virginia		

For Lab Use Only
FSC:
SCR#:

Preservation Codes
H=HCl T=Thiosulfate
N=HNO3 B=NaOH
S=H2SO4 O=Other

Sample Identification	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Matrix: Water (Potable / NPDES)	Matrix: Other	Total # of Containers	Analyses Requested / Preservation Codes: Full List VOCs, Including Oxygenates (8260B) (H)	Remarks	Temperature of samples upon receipt (if requested)
RW-1 (1 GPM)	4/29/14	1118	X			X		3	X		
RW-1 (2 GPM)	↓	1215	X			X		3	X		
RW-1 (5 GPM)	↓	1317	X			X		3	X		
RW-1 (10 GPM)	↓	1416	X			X		3	X		

Turnaround Time Requested (TAT) (please circle): Normal (Rush)
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: 5/4/2014
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	4/29/14	1800	Storage		
Storage	4/30/14	12:55	[signature]	4/30/14	12:55
[signature]	4/30/14	16:30			
			[signature]	4/30/14	16:30

Data Package Options (please circle if required)
Type I (validation/NJ reg) TX-TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

SDG Complete? Yes No

State-specific QC (MS/MSD/Dup)? Yes No
(If yes, indicated QC sample and submit triplicate volume) -
Internal COC required? Yes No

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	[illegible]	**BMQL**	[illegible]
N.D.	[illegible]	**MPN**	[illegible]
TNTC	[illegible]	**CP Units**	[illegible]
IU	[illegible]	**NTU**	[illegible]
umhos/cm	[illegible]	**ng**	[illegible]
C	[illegible]	**F**	[illegible]
meq	[illegible]	**lb.**	[illegible]
g	[illegible]	**kg**	[illegible]
µg	[illegible]	**mg**	[illegible]
mL	[illegible]	**L**	[illegible]
m3	[illegible]	**µL**	[illegible]
		pg/L	[illegible]

< [illegible] of [illegible]

> [illegible]

ppm [illegible]

ppb [illegible]

Dry weight basis [illegible]

Data Qualifiers:

C – [illegible]

J - [illegible]

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers		Inorganic Qualifiers	
A	[illegible]	**B**	[illegible]
B	[illegible]	**E**	[illegible]
C	[illegible]	**M**	[illegible]
D	[illegible]	**N**	[illegible]
E	[illegible]	**S**	[illegible]
N	[illegible]	**U**	[illegible]
P	[illegible]	**W**	[illegible]
U	[illegible]	*****	[illegible]
X,Y,Z	[illegible]	**+**	[illegible]

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

[illegible]

[illegible]

[illegible]

WARRANTY AND LIMITS OF LIABILITY [illegible]

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Kleinfelder
1 Speen Street
Framingham MA 01701

May 27, 2014

Project: Fairfax 26140

Submittal Date: 05/16/2014
Group Number: 1475056
PO Number: 51141-295589
State of Sample Origin: VA

Client Sample Description	Lancaster Labs (LL) #
RW-1 (12 hrs) Grab Water	7467178
RW-1 (24 hrs) Grab Water	7467179
RW-1 (36 hrs) Grab Water	7467180
RW-1 (48 hrs) Grab Water	7467181
RW-1 (48 hrs) Filtered Grab Water	7467182

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO	Kleinfelder	Attn: Mark Steele
ELECTRONIC COPY TO	Kleinfelder	Attn: Angela Vogt
ELECTRONIC COPY TO	Kleinfelder	Attn: Venelda Williams
ELECTRONIC COPY TO	Kleinfelder	Attn: Charlie Low
ELECTRONIC COPY TO	Kleinfelder	Attn: Paxton Wertz

Respectfully Submitted,

Amek Carter
Specialist

(717) 556-7252

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Lancaster Laboratories Environmental
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Analysis Report

Sample Description: RW-1 (12 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467178
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/14/2014 02:23 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW1

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 1,000	1,000	50
10335	Acrolein	107-02-8	< 5,000	5,000	50
10335	Acrylonitrile	107-13-1	< 1,000	1,000	50
10335	**t-Amyl methyl ether**	994-05-8	**410**	50	50
10335	Benzene	71-43-2	< 50	50	50
10335	Bromodichloromethane	75-27-4	< 50	50	50
10335	Bromoform	75-25-2	< 200	200	50
10335	Bromomethane	74-83-9	< 50	50	50
10335	2-Butanone	78-93-3	< 500	500	50
10335	**t-Butyl alcohol**	75-65-0	**6,400**	1,000	50
10335	n-Butylbenzene	104-51-8	< 250	250	50
10335	sec-Butylbenzene	135-98-8	< 250	250	50
10335	Carbon Tetrachloride	56-23-5	< 50	50	50
10335	Chlorobenzene	108-90-7	< 50	50	50
10335	Chloroethane	75-00-3	< 50	50	50
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 500	500	50
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 50	50	50
10335	Chloromethane	74-87-3	< 50	50	50
10335	Dibromochloromethane	124-48-1	< 50	50	50
10335	1,2-Dichlorobenzene	95-50-1	< 250	250	50
10335	1,3-Dichlorobenzene	541-73-1	< 250	250	50
10335	1,4-Dichlorobenzene	106-46-7	< 250	250	50
10335	1,1-Dichloroethane	75-34-3	< 50	50	50
10335	1,2-Dichloroethane	107-06-2	< 50	50	50
10335	1,1-Dichloroethene	75-35-4	< 50	50	50
10335	**cis-1,2-Dichloroethene**	156-59-2	**170**	50	50
10335	trans-1,2-Dichloroethene	156-60-5	< 50	50	50
10335	1,2-Dichloropropane	78-87-5	< 50	50	50
10335	cis-1,3-Dichloropropene	10061-01-5	< 50	50	50
10335	trans-1,3-Dichloropropene	10061-02-6	< 50	50	50
10335	Ethanol	64-17-5	< 13,000	13,000	50
10335	Ethyl t-butyl ether	637-92-3	< 50	50	50
10335	Ethylbenzene	100-41-4	< 50	50	50
10335	**di-Isopropyl ether**	108-20-3	**640**	50	50
10335	Isopropylbenzene	98-82-8	< 250	250	50
10335	p-Isopropyltoluene	99-87-6	< 250	250	50
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**25,000**	500	500
10335	Methylene Chloride	75-09-2	< 150	150	50
10335	Naphthalene	91-20-3	< 250	250	50
10335	n-Propylbenzene	103-65-1	< 250	250	50
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 50	50	50
10335	Tetrachloroethene	127-18-4	< 50	50	50
10335	Toluene	108-88-3	< 50	50	50
10335	1,1,1-Trichloroethane	71-55-6	< 50	50	50
10335	1,1,2-Trichloroethane	79-00-5	< 50	50	50
10335	Trichloroethene	79-01-6	< 50	50	50
10335	Trichlorofluoromethane	75-69-4	< 50	50	50

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Analysis Report

Sample Description: RW-1 (12 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467178
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/14/2014 02:23 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW1

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	
10335	1,2,4-Trimethylbenzene	95-63-6	< 250	250	50
10335	1,3,5-Trimethylbenzene	108-67-8	< 250	250	50
10335	Vinyl Chloride	75-01-4	< 50	50	50
10335	Xylene (Total)	1330-20-7	< 50	50	50

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141413AA	05/22/2014 10:22	Stephanie A Selis	50
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141413AA	05/22/2014 10:45	Stephanie A Selis	500
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W141413AA	05/22/2014 10:22	Stephanie A Selis	50
01163	GC/MS VOA Water Prep	SW-846 5030B	2	W141413AA	05/22/2014 10:45	Stephanie A Selis	500

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Analysis Report

Sample Description: RW-1 (24 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467179
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/14/2014 14:15 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 1,000	1,000	50
10335	Acrolein	107-02-8	< 5,000	5,000	50
10335	Acrylonitrile	107-13-1	< 1,000	1,000	50
10335	**t-Amyl methyl ether**	994-05-8	**580**	50	50
10335	Benzene	71-43-2	< 50	50	50
10335	Bromodichloromethane	75-27-4	< 50	50	50
10335	Bromoform	75-25-2	< 200	200	50
10335	Bromomethane	74-83-9	< 50	50	50
10335	2-Butanone	78-93-3	< 500	500	50
10335	**t-Butyl alcohol**	75-65-0	**8,700**	1,000	50
10335	n-Butylbenzene	104-51-8	< 250	250	50
10335	sec-Butylbenzene	135-98-8	< 250	250	50
10335	Carbon Tetrachloride	56-23-5	< 50	50	50
10335	Chlorobenzene	108-90-7	< 50	50	50
10335	Chloroethane	75-00-3	< 50	50	50
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 500	500	50
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 50	50	50
10335	Chloromethane	74-87-3	< 50	50	50
10335	Dibromochloromethane	124-48-1	< 50	50	50
10335	1,2-Dichlorobenzene	95-50-1	< 250	250	50
10335	1,3-Dichlorobenzene	541-73-1	< 250	250	50
10335	1,4-Dichlorobenzene	106-46-7	< 250	250	50
10335	1,1-Dichloroethane	75-34-3	< 50	50	50
10335	1,2-Dichloroethane	107-06-2	< 50	50	50
10335	1,1-Dichloroethene	75-35-4	< 50	50	50
10335	**cis-1,2-Dichloroethene**	156-59-2	**150**	50	50
10335	trans-1,2-Dichloroethene	156-60-5	< 50	50	50
10335	1,2-Dichloropropane	78-87-5	< 50	50	50
10335	cis-1,3-Dichloropropene	10061-01-5	< 50	50	50
10335	trans-1,3-Dichloropropene	10061-02-6	< 50	50	50
10335	Ethanol	64-17-5	< 13,000	13,000	50
10335	Ethyl t-butyl ether	637-92-3	< 50	50	50
10335	Ethylbenzene	100-41-4	< 50	50	50
10335	**di-Isopropyl ether**	108-20-3	**910**	50	50
10335	Isopropylbenzene	98-82-8	< 250	250	50
10335	p-Isopropyltoluene	99-87-6	< 250	250	50
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**35,000**	500	500
10335	Methylene Chloride	75-09-2	< 150	150	50
10335	Naphthalene	91-20-3	< 250	250	50
10335	n-Propylbenzene	103-65-1	< 250	250	50
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 50	50	50
10335	Tetrachloroethene	127-18-4	< 50	50	50
10335	Toluene	108-88-3	< 50	50	50
10335	1,1,1-Trichloroethane	71-55-6	< 50	50	50
10335	1,1,2-Trichloroethane	79-00-5	< 50	50	50
10335	Trichloroethene	79-01-6	< 50	50	50
10335	Trichlorofluoromethane	75-69-4	< 50	50	50

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Analysis Report

Sample Description: RW-1 (24 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467179
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/14/2014 14:15 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW2

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		ug/l	ug/l	
10335	1,2,4-Trimethylbenzene	95-63-6	< 250	250	50
10335	1,3,5-Trimethylbenzene	108-67-8	< 250	250	50
10335	Vinyl Chloride	75-01-4	< 50	50	50
10335	Xylene (Total)	1330-20-7	< 50	50	50

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141413AA	05/22/2014 11:08	Stephanie A Selis	50
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141413AA	05/22/2014 11:31	Stephanie A Selis	500
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W141413AA	05/22/2014 11:08	Stephanie A Selis	50
01163	GC/MS VOA Water Prep	SW-846 5030B	2	W141413AA	05/22/2014 11:31	Stephanie A Selis	500

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Analysis Report

Sample Description: RW-1 (36 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467180
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/15/2014 02:23 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW3

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 1,000	1,000	50
10335	Acrolein	107-02-8	< 5,000	5,000	50
10335	Acrylonitrile	107-13-1	< 1,000	1,000	50
10335	**t-Amyl methyl ether**	994-05-8	**560**	50	50
10335	Benzene	71-43-2	< 50	50	50
10335	Bromodichloromethane	75-27-4	< 50	50	50
10335	Bromoform	75-25-2	< 200	200	50
10335	Bromomethane	74-83-9	< 50	50	50
10335	2-Butanone	78-93-3	< 500	500	50
10335	**t-Butyl alcohol**	75-65-0	**8,600**	1,000	50
10335	n-Butylbenzene	104-51-8	< 250	250	50
10335	sec-Butylbenzene	135-98-8	< 250	250	50
10335	Carbon Tetrachloride	56-23-5	< 50	50	50
10335	Chlorobenzene	108-90-7	< 50	50	50
10335	Chloroethane	75-00-3	< 50	50	50
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 500	500	50
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 50	50	50
10335	Chloromethane	74-87-3	< 50	50	50
10335	Dibromochloromethane	124-48-1	< 50	50	50
10335	1,2-Dichlorobenzene	95-50-1	< 250	250	50
10335	1,3-Dichlorobenzene	541-73-1	< 250	250	50
10335	1,4-Dichlorobenzene	106-46-7	< 250	250	50
10335	1,1-Dichloroethane	75-34-3	< 50	50	50
10335	1,2-Dichloroethane	107-06-2	< 50	50	50
10335	1,1-Dichloroethene	75-35-4	< 50	50	50
10335	**cis-1,2-Dichloroethene**	156-59-2	**140**	50	50
10335	trans-1,2-Dichloroethene	156-60-5	< 50	50	50
10335	1,2-Dichloropropane	78-87-5	< 50	50	50
10335	cis-1,3-Dichloropropene	10061-01-5	< 50	50	50
10335	trans-1,3-Dichloropropene	10061-02-6	< 50	50	50
10335	Ethanol	64-17-5	< 13,000	13,000	50
10335	Ethyl t-butyl ether	637-92-3	< 50	50	50
10335	Ethylbenzene	100-41-4	< 50	50	50
10335	**di-Isopropyl ether**	108-20-3	**930**	50	50
10335	Isopropylbenzene	98-82-8	< 250	250	50
10335	p-Isopropyltoluene	99-87-6	< 250	250	50
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**34,000**	500	500
10335	Methylene Chloride	75-09-2	< 150	150	50
10335	Naphthalene	91-20-3	< 250	250	50
10335	n-Propylbenzene	103-65-1	< 250	250	50
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 50	50	50
10335	Tetrachloroethene	127-18-4	< 50	50	50
10335	Toluene	108-88-3	< 50	50	50
10335	1,1,1-Trichloroethane	71-55-6	< 50	50	50
10335	1,1,2-Trichloroethane	79-00-5	< 50	50	50
10335	Trichloroethene	79-01-6	< 50	50	50
10335	Trichlorofluoromethane	75-69-4	< 50	50	50

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Analysis Report

Sample Description: RW-1 (36 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467180
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/15/2014 02:23 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW3

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	1,2,4-Trimethylbenzene	95-63-6	< 250	250	50
10335	1,3,5-Trimethylbenzene	108-67-8	< 250	250	50
10335	Vinyl Chloride	75-01-4	< 50	50	50
10335	Xylene (Total)	1330-20-7	< 50	50	50

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141431AA	05/23/2014 04:35	Stephanie A Selis	50
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141431AA	05/23/2014 04:59	Stephanie A Selis	500
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W141431AA	05/23/2014 04:35	Stephanie A Selis	50
01163	GC/MS VOA Water Prep	SW-846 5030B	2	W141431AA	05/23/2014 04:59	Stephanie A Selis	500

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Analysis Report

Sample Description: RW-1 (48 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467181
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/15/2014 14:50 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW4

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	Acetone	67-64-1	< 1,000	1,000	50
10335	Acrolein	107-02-8	< 5,000	5,000	50
10335	Acrylonitrile	107-13-1	< 1,000	1,000	50
10335	**t-Amyl methyl ether**	994-05-8	**530**	50	50
10335	Benzene	71-43-2	< 50	50	50
10335	Bromodichloromethane	75-27-4	< 50	50	50
10335	Bromoform	75-25-2	< 200	200	50
10335	Bromomethane	74-83-9	< 50	50	50
10335	2-Butanone	78-93-3	< 500	500	50
10335	**t-Butyl alcohol**	75-65-0	**7,800**	1,000	50
10335	n-Butylbenzene	104-51-8	< 250	250	50
10335	sec-Butylbenzene	135-98-8	< 250	250	50
10335	Carbon Tetrachloride	56-23-5	< 50	50	50
10335	Chlorobenzene	108-90-7	< 50	50	50
10335	Chloroethane	75-00-3	< 50	50	50
10335	2-Chloroethyl Vinyl Ether	110-75-8	< 500	500	50
	2-Chloroethyl vinyl ether may not be recovered if acid was used to preserve this sample.				
10335	Chloroform	67-66-3	< 50	50	50
10335	Chloromethane	74-87-3	< 50	50	50
10335	Dibromochloromethane	124-48-1	< 50	50	50
10335	1,2-Dichlorobenzene	95-50-1	< 250	250	50
10335	1,3-Dichlorobenzene	541-73-1	< 250	250	50
10335	1,4-Dichlorobenzene	106-46-7	< 250	250	50
10335	1,1-Dichloroethane	75-34-3	< 50	50	50
10335	1,2-Dichloroethane	107-06-2	< 50	50	50
10335	1,1-Dichloroethene	75-35-4	< 50	50	50
10335	**cis-1,2-Dichloroethene**	156-59-2	**140**	50	50
10335	trans-1,2-Dichloroethene	156-60-5	< 50	50	50
10335	1,2-Dichloropropane	78-87-5	< 50	50	50
10335	cis-1,3-Dichloropropene	10061-01-5	< 50	50	50
10335	trans-1,3-Dichloropropene	10061-02-6	< 50	50	50
10335	Ethanol	64-17-5	< 13,000	13,000	50
10335	Ethyl t-butyl ether	637-92-3	< 50	50	50
10335	Ethylbenzene	100-41-4	< 50	50	50
10335	**di-Isopropyl ether**	108-20-3	**870**	50	50
10335	Isopropylbenzene	98-82-8	< 250	250	50
10335	p-Isopropyltoluene	99-87-6	< 250	250	50
10335	**Methyl Tertiary Butyl Ether**	1634-04-4	**33,000**	500	500
10335	Methylene Chloride	75-09-2	< 150	150	50
10335	Naphthalene	91-20-3	< 250	250	50
10335	n-Propylbenzene	103-65-1	< 250	250	50
10335	1,1,2,2-Tetrachloroethane	79-34-5	< 50	50	50
10335	Tetrachloroethene	127-18-4	< 50	50	50
10335	Toluene	108-88-3	< 50	50	50
10335	1,1,1-Trichloroethane	71-55-6	< 50	50	50
10335	1,1,2-Trichloroethane	79-00-5	< 50	50	50
10335	Trichloroethene	79-01-6	< 50	50	50
10335	Trichlorofluoromethane	75-69-4	< 50	50	50

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Analysis Report

Sample Description: RW-1 (48 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467181
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/15/2014 14:50 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW4

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**ug/l**	**ug/l**	
10335	1,2,4-Trimethylbenzene	95-63-6	< 250	250	50
10335	1,3,5-Trimethylbenzene	108-67-8	< 250	250	50
10335	Vinyl Chloride	75-01-4	< 50	50	50
10335	Xylene (Total)	1330-20-7	< 50	50	50
GC Volatiles	**SW-846 8015B modified**		**mg/l**	**mg/l**	
01635	**TPH-GRO water C6-C10**	n.a.	**21**	0.25	5
GC Petroleum Hydrocarbons	**SW-846 8015B**		**mg/l**	**mg/l**	
12858	DRO C10-C28	n.a.	< 0.10	0.10	1
Metals	**SW-846 6010B**		**mg/l**	**mg/l**	
01750	**Calcium**	7440-70-2	**66.4**	0.200	1
01754	Iron	7439-89-6	< 0.200	0.200	1
01757	**Magnesium**	7439-95-4	**28.3**	0.100	1
	SW-846 6020		**mg/l**	**mg/l**	
06035	Lead	7439-92-1	< 0.0010	0.0010	1
06037	**Manganese**	7439-96-5	**0.165**	0.0020	1
Wet Chemistry	**SM 2340 C-1997**		**mg/l as CaCO3**	**mg/l as CaCO3**	
12147	**Total Hardness**	471-34-1	**293**	10.0	2
	SM 2540 C-1997		**mg/l**	**mg/l**	
00212	**Total Dissolved Solids**	n.a.	**519**	60.0	1
	SM 2540 D-1997		**mg/l**	**mg/l**	
10457	Total Suspended Solids	n.a.	< 3.00	3.00	1
	SM 4500-H+ B-2000		**Std. Units**	**Std. Units**	
12152	**pH in water**	n.a.	**6.4**	0.010	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141431AA	05/23/2014 05:22	Stephanie A Selis	50

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Analysis Report

Sample Description: RW-1 (48 hrs) Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467181
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/15/2014 14:50 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

FPRW4

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time		Analyst	Dilution Factor
10335	VOC 8260 Kleinfelder Full+EtOH	SW-846 8260B	1	W141431AA	05/23/2014	05:45	Stephanie A Selis	500
01163	GC/MS VOA Water Prep	SW-846 5030B	1	W141431AA	05/23/2014	05:22	Stephanie A Selis	50
01163	GC/MS VOA Water Prep	SW-846 5030B	2	W141431AA	05/23/2014	05:45	Stephanie A Selis	500
01635	TPH-GRO water C6-C10	SW-846 8015B modified	1	14142A20A	05/23/2014	01:12	Miranda P Tillinghast	5
01146	GC VOA Water Prep	SW-846 5030B	1	14142A20A	05/23/2014	01:12	Miranda P Tillinghast	5
12858	TPH-DRO water C10-C28	SW-846 8015B	1	141420002A	05/23/2014	18:17	Christine E Dolman	1
12059	Microextraction - DRO (waters)	SW-846 3511	1	141420002A	05/22/2014	14:45	Wanda F Oswald	1
01750	Calcium	SW-846 6010B	1	141401848001	05/21/2014	19:04	Eric L Eby	1
01754	Iron	SW-846 6010B	1	141401848001	05/21/2014	19:04	Eric L Eby	1
01757	Magnesium	SW-846 6010B	1	141401848001	05/21/2014	19:04	Eric L Eby	1
06035	Lead	SW-846 6020	1	141396050004A	05/20/2014	20:01	John P Hook	1
06037	Manganese	SW-846 6020	1	141396050004A	05/20/2014	20:01	John P Hook	1
01848	WW SW846 ICP Digest (tot rec)	SW-846 3005A	1	141401848001	05/21/2014	10:17	Micaela L Dishong	1
06050	ICP/MS SW-846 Water Digest	SW-846 3020A	1	141396050004	05/20/2014	09:34	Micaela L Dishong	1
12147	Total Hardness	SM 2340 C-1997	2	14139004201B	05/20/2014	08:30	Susan A Engle	2
00212	Total Dissolved Solids	SM 2540 C-1997	1	14141021201B	05/21/2014	06:36	Noah M Rainbow	1
10457	Total Suspended Solids	SM 2540 D-1997	1	14140145702B	05/20/2014	20:54	Hannah M Royer	1
12152	pH in water	SM 4500-H+ B-2000	1	14140004102A	05/20/2014	16:45	Michele L Graham	1

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Analysis Report

Sample Description: RW-1 (48 hrs) Filtered Grab Water
Fairfax Petroleum 26140

LL Sample # WW 7467182
LL Group # 1475056
Account # 12152

Project Name: Fairfax 26140

Collected: 05/15/2014 14:50 by PW

Submitted: 05/16/2014 16:15
Reported: 05/27/2014 17:47

Kleinfelder
1 Speen Street
Framingham MA 01701

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
Metals Dissolved	**SW-846 6010B**		mg/l	mg/l	
01750	**Calcium**	7440-70-2	**64.3**	0.200	1
01754	Iron	7439-89-6	< 0.200	0.200	1
01757	**Magnesium**	7439-95-4	**27.4**	0.100	1
	SW-846 6020		mg/l	mg/l	
06035	Lead	7439-92-1	< 0.0010	0.0010	1
06037	**Manganese**	7439-96-5	**0.174**	0.0020	1

The manganese result for the filtered sample is slightly higher than the result for the total sample. This difference between the two results is not able to be distinguished on this instrumentation or may be related to actual concentration differences in the samples used for the analysis.

General Sample Comments

This sample was filtered in the lab for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01750	Calcium	SW-846 6010B	1	141401848001	05/21/2014 17:38	Eric L Eby	1
01754	Iron	SW-846 6010B	1	141401848001	05/21/2014 17:38	Eric L Eby	1
01757	Magnesium	SW-846 6010B	1	141401848001	05/21/2014 17:38	Eric L Eby	1
06035	Lead	SW-846 6020	1	141396050004A	05/20/2014 20:03	John P Hook	1
06037	Manganese	SW-846 6020	1	141396050004A	05/20/2014 20:03	John P Hook	1
01848	WW SW846 ICP Digest (tot rec)	SW-846 3005A	1	141401848001	05/21/2014 10:17	Micaela L Dishong	1
06050	ICP/MS SW-846 Water Digest	SW-846 3020A	1	141396050004	05/20/2014 09:34	Micaela L Dishong	1

Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: W141413AA	Sample number(s): 7467178-7467179							
Acetone	< 20	20.	ug/l	80		43-149		
Acrolein	< 100	100.	ug/l	84		52-129		
Acrylonitrile	< 20	20.	ug/l	80		62-120		
t-Amyl methyl ether	< 1	1.	ug/l	95		75-120		
Benzene	< 1	1.	ug/l	101		78-120		
Bromodichloromethane	< 1	1.	ug/l	90		73-120		
Bromoform	< 4	4.	ug/l	81		61-120		
Bromomethane	< 1	1.	ug/l	93		58-120		
2-Butanone	< 10	10.	ug/l	82		54-133		
t-Butyl alcohol	< 20	20.	ug/l	103		75-120		
n-Butylbenzene	< 5	5.	ug/l	102		68-120		
sec-Butylbenzene	< 5	5.	ug/l	103		80-120		
Carbon Tetrachloride	< 1	1.	ug/l	99		74-130		
Chlorobenzene	< 1	1.	ug/l	103		80-120		
Chloroethane	< 1	1.	ug/l	87		56-120		
2-Chloroethyl Vinyl Ether	< 10	10.	ug/l	119		54-126		
Chloroform	< 1	1.	ug/l	100		80-122		
Chloromethane	< 1	1.	ug/l	85		63-120		
Dibromochloromethane	< 1	1.	ug/l	94		72-120		
1,2-Dichlorobenzene	< 5	5.	ug/l	99		80-120		
1,3-Dichlorobenzene	< 5	5.	ug/l	98		80-120		
1,4-Dichlorobenzene	< 5	5.	ug/l	97		80-120		
1,1-Dichloroethane	< 1	1.	ug/l	98		80-120		
1,2-Dichloroethane	< 1	1.	ug/l	104		65-135		
1,1-Dichloroethene	< 1	1.	ug/l	103		76-124		
cis-1,2-Dichloroethene	< 1	1.	ug/l	101		80-120		
trans-1,2-Dichloroethene	< 1	1.	ug/l	106		80-120		
1,2-Dichloropropane	< 1	1.	ug/l	95		80-120		
cis-1,3-Dichloropropene	< 1	1.	ug/l	92		80-120		
trans-1,3-Dichloropropene	< 1	1.	ug/l	91		76-120		
Ethanol	< 250	250.	ug/l	92		54-149		
Ethyl t-butyl ether	< 1	1.	ug/l	90		74-120		
Ethylbenzene	< 1	1.	ug/l	97		79-120		
di-Isopropyl ether	< 1	1.	ug/l	92		65-120		
Isopropylbenzene	< 5	5.	ug/l	98		77-120		
p-Isopropyltoluene	< 5	5.	ug/l	100		80-120		
Methyl Tertiary Butyl Ether	< 1	1.	ug/l	96		75-120		
Methylene Chloride	< 3	3.	ug/l	102		80-120		
Naphthalene	< 5	5.	ug/l	94		47-126		
n-Propylbenzene	< 5	5.	ug/l	93		80-120		
1,1,2,2-Tetrachloroethane	< 1	1.	ug/l	88		70-120		
Tetrachloroethene	< 1	1.	ug/l	104		80-120		
Toluene	< 1	1.	ug/l	101		80-120		

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1,1-Trichloroethane	< 1	1.	ug/l	97		66-126		
1,1,2-Trichloroethane	< 1	1.	ug/l	98		80-120		
Trichloroethene	< 1	1.	ug/l	104		80-120		
Trichlorofluoromethane	< 1	1.	ug/l	89		65-130		
1,2,4-Trimethylbenzene	< 5	5.	ug/l	96		74-120		
1,3,5-Trimethylbenzene	< 5	5.	ug/l	95		74-120		
Vinyl Chloride	< 1	1.	ug/l	85		63-120		
Xylene (Total)	< 1	1.	ug/l	98		80-120		
Batch number: W141431AA	Sample number(s): 7467180-7467181							
Acetone	< 20	20.	ug/l	90		43-149		
Acrolein	< 100	100.	ug/l	92		52-129		
Acrylonitrile	< 20	20.	ug/l	89		62-120		
t-Amyl methyl ether	< 1	1.	ug/l	98		75-120		
Benzene	< 1	1.	ug/l	103		78-120		
Bromodichloromethane	< 1	1.	ug/l	94		73-120		
Bromoform	< 4	4.	ug/l	85		61-120		
Bromomethane	< 1	1.	ug/l	92		58-120		
2-Butanone	< 10	10.	ug/l	92		54-133		
t-Butyl alcohol	< 20	20.	ug/l	111		75-120		
n-Butylbenzene	< 5	5.	ug/l	114		68-120		
sec-Butylbenzene	< 5	5.	ug/l	111		80-120		
Carbon Tetrachloride	< 1	1.	ug/l	91		74-130		
Chlorobenzene	< 1	1.	ug/l	109		80-120		
Chloroethane	< 1	1.	ug/l	92		56-120		
2-Chloroethyl Vinyl Ether	< 10	10.	ug/l	123		54-126		
Chloroform	< 1	1.	ug/l	100		80-122		
Chloromethane	< 1	1.	ug/l	93		63-120		
Dibromochloromethane	< 1	1.	ug/l	96		72-120		
1,2-Dichlorobenzene	< 5	5.	ug/l	105		80-120		
1,3-Dichlorobenzene	< 5	5.	ug/l	105		80-120		
1,4-Dichlorobenzene	< 5	5.	ug/l	106		80-120		
1,1-Dichloroethane	< 1	1.	ug/l	97		80-120		
1,2-Dichloroethane	< 1	1.	ug/l	101		65-135		
1,1-Dichloroethene	< 1	1.	ug/l	93		76-124		
cis-1,2-Dichloroethene	< 1	1.	ug/l	103		80-120		
trans-1,2-Dichloroethene	< 1	1.	ug/l	101		80-120		
1,2-Dichloropropane	< 1	1.	ug/l	103		80-120		
cis-1,3-Dichloropropene	< 1	1.	ug/l	98		80-120		
trans-1,3-Dichloropropene	< 1	1.	ug/l	98		76-120		
Ethanol	< 250	250.	ug/l	101		54-149		
Ethyl t-butyl ether	< 1	1.	ug/l	94		74-120		
Ethylbenzene	< 1	1.	ug/l	103		79-120		
di-Isopropyl ether	< 1	1.	ug/l	99		65-120		
Isopropylbenzene	< 5	5.	ug/l	103		77-120		
p-Isopropyltoluene	< 5	5.	ug/l	108		80-120		
Methyl Tertiary Butyl Ether	< 1	1.	ug/l	95		75-120		
Methylene Chloride	< 3	3.	ug/l	101		80-120		
Naphthalene	< 5	5.	ug/l	102		47-126		
n-Propylbenzene	< 5	5.	ug/l	104		80-120		
1,1,2,2-Tetrachloroethane	< 1	1.	ug/l	106		70-120		
Tetrachloroethene	< 1	1.	ug/l	102		80-120		
Toluene	< 1	1.	ug/l	107		80-120		
1,1,1-Trichloroethane	< 1	1.	ug/l	88		66-126		
1,1,2-Trichloroethane	< 1	1.	ug/l	108		80-120		
Trichloroethene	< 1	1.	ug/l	105		80-120		

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Analysis Name	Blank Result	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Trichlorofluoromethane	< 1	1.	ug/l	89		65-130		
1,2,4-Trimethylbenzene	< 5	5.	ug/l	103		74-120		
1,3,5-Trimethylbenzene	< 5	5.	ug/l	101		74-120		
Vinyl Chloride	< 1	1.	ug/l	91		63-120		
Xylene (Total)	< 1	1.	ug/l	104		80-120		
Batch number: 14142A20A	Sample number(s): 7467181							
TPH-GRO water C6-C10	< 0.050	0.050	mg/l	99	98	80-129	1	30
Batch number: 141420002A	Sample number(s): 7467181							
DRO C10-C28	< 0.10	0.10	mg/l	87	90	56-122	4	20
Batch number: 141396050004A	Sample number(s): 7467181-7467182							
Lead	< 0.0010	0.0010	mg/l	103		90-110		
Manganese	< 0.0020	0.0020	mg/l	106		90-110		
Batch number: 141401848001	Sample number(s): 7467181-7467182							
Calcium	< 0.200	0.200	mg/l	104		90-112		
Iron	< 0.200	0.200	mg/l	105		90-112		
Magnesium	< 0.100	0.100	mg/l	102		89-110		
Batch number: 14139004201B	Sample number(s): 7467181							
Total Hardness	< 5.0	5.0	mg/l as CaCO3	99		96-110		
Batch number: 14140004102A	Sample number(s): 7467181							
pH in water				100		90-110		
Batch number: 14140145702B	Sample number(s): 7467181							
Total Suspended Solids	< 3.00	3.00	mg/l	96		91-105		
Batch number: 14141021201B	Sample number(s): 7467181							
Total Dissolved Solids	< 30.0	30.0	mg/l	105		80-120		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: W141413AA	Sample number(s): 7467178-7467179 UNSPK: P464253								
Acetone	80	80	35-144	0	30				
Acrolein	84	86	39-136	3	30				
Acrylonitrile	80	80	51-125	0	30				
t-Amyl methyl ether	97	100	65-117	3	30				
Benzene	116	114	72-134	1	30				
Bromodichloromethane	96	98	73-125	2	30				
Bromoform	85	87	48-118	2	30				
Bromomethane	99	101	47-129	2	30				
2-Butanone	84	84	44-135	0	30				
t-Butyl alcohol	99	101	67-119	2	30				
n-Butylbenzene	108	111	74-134	2	30				

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
sec-Butylbenzene	118	118	74-137	0	30				
Carbon Tetrachloride	116	119	75-148	3	30				
Chlorobenzene	108	110	87-124	2	30				
Chloroethane	95	99	55-130	4	30				
2-Chloroethyl Vinyl Ether	0*	0*	10-151	0	30				
Chloroform	106	108	81-134	2	30				
Chloromethane	93	97	61-125	4	30				
Dibromochloromethane	95	97	74-116	2	30				
1,2-Dichlorobenzene	104	104	84-119	0	30				
1,3-Dichlorobenzene	101	103	86-121	2	30				
1,4-Dichlorobenzene	104	105	85-121	1	30				
1,1-Dichloroethane	107	107	84-129	0	30				
1,2-Dichloroethane	110	109	63-142	1	30				
1,1-Dichloroethene	119	120	79-137	1	30				
cis-1,2-Dichloroethene	108	110	80-141	1	30				
trans-1,2-Dichloroethene	115	116	86-131	1	30				
1,2-Dichloropropane	101	101	83-124	0	30				
cis-1,3-Dichloropropene	99	99	70-116	1	30				
trans-1,3-Dichloropropene	96	97	74-119	1	30				
Ethanol	85	87	53-146	1	30				
Ethyl t-butyl ether	95	99	74-122	3	30				
Ethylbenzene	118	114	71-134	2	30				
di-Isopropyl ether	97	98	70-129	1	30				
Isopropylbenzene	112	112	75-128	0	30				
p-Isopropyltoluene	114	114	76-123	0	30				
Methyl Tertiary Butyl Ether	101	102	72-126	1	30				
Methylene Chloride	108	107	78-133	1	30				
Naphthalene	129 (2)	120 (2)	52-125	1	30				
n-Propylbenzene	104	104	74-134	0	30				
1,1,2,2-Tetrachloroethane	93	94	72-128	2	30				
Tetrachloroethene	117	117	80-128	0	30				
Toluene	110	111	80-125	1	30				
1,1,1-Trichloroethane	110	111	69-140	1	30				
1,1,2-Trichloroethane	100	100	71-141	0	30				
Trichloroethene	114	114	88-133	0	30				
Trichlorofluoromethane	120	121	63-163	1	30				
1,2,4-Trimethylbenzene	145*	129	72-130	4	30				
1,3,5-Trimethylbenzene	116	110	65-132	3	30				
Vinyl Chloride	102	103	66-133	1	30				
Xylene (Total)	144*	122	79-125	5	30				

Batch number: W141431AA Sample number(s): 7467180-7467181 UNSPK: P467916

Acetone	90	88	35-144	2	30
Acrolein	89	82	39-136	8	30
Acrylonitrile	88	89	51-125	2	30
t-Amyl methyl ether	100	95	65-117	5	30
Benzene	111	107	72-134	4	30
Bromodichloromethane	95	91	73-125	4	30
Bromoform	84	78	48-118	7	30
Bromomethane	98	96	47-129	2	30
2-Butanone	88	89	44-135	1	30
t-Butyl alcohol	104	98	67-119	7	30

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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
n-Butylbenzene	118	112	74-134	5	30				
sec-Butylbenzene	127	121	74-137	5	30				
Carbon Tetrachloride	105	106	75-148	0	30				
Chlorobenzene	115	105	87-124	9	30				
Chloroethane	99	99	55-130	0	30				
2-Chloroethyl Vinyl Ether	10	0*	10-151	200*	30				
Chloroform	106	103	81-134	3	30				
Chloromethane	103	99	61-125	4	30				
Dibromochloromethane	98	90	74-116	8	30				
1,2-Dichlorobenzene	108	99	84-119	9	30				
1,3-Dichlorobenzene	107	100	86-121	7	30				
1,4-Dichlorobenzene	108	100	85-121	7	30				
1,1-Dichloroethane	105	101	84-129	3	30				
1,2-Dichloroethane	104	98	63-142	6	30				
1,1-Dichloroethene	108	104	79-137	4	30				
cis-1,2-Dichloroethene	110	105	80-141	4	30				
trans-1,2-Dichloroethene	112	109	86-131	2	30				
1,2-Dichloropropane	107	103	83-124	3	30				
cis-1,3-Dichloropropene	100	94	70-116	6	30				
trans-1,3-Dichloropropene	100	93	74-119	7	30				
Ethanol	109	92	53-146	16	30				
Ethyl t-butyl ether	96	93	74-122	3	30				
Ethylbenzene	111	110	71-134	0	30				
di-Isopropyl ether	103	99	70-129	4	30				
Isopropylbenzene	113	108	75-128	4	30				
p-Isopropyltoluene	120	112	76-123	7	30				
Methyl Tertiary Butyl Ether	98	94	72-126	4	30				
Methylene Chloride	111	104	78-133	6	30				
Naphthalene	103	99	52-125	5	30				
n-Propylbenzene	113	115	74-134	1	30				
1,1,2,2-Tetrachloroethane	102	99	72-128	3	30				
Tetrachloroethene	115	111	80-128	3	30				
Toluene	117	111	80-125	5	30				
1,1,1-Trichloroethane	99	98	69-140	1	30				
1,1,2-Trichloroethane	110	105	71-141	5	30				
Trichloroethene	114	111	88-133	2	30				
Trichlorofluoromethane	113	119	63-163	4	30				
1,2,4-Trimethylbenzene	111	104	72-130	6	30				
1,3,5-Trimethylbenzene	107	115	65-132	6	30				
Vinyl Chloride	106	105	66-133	1	30				
Xylene (Total)	113	107	79-125	5	30				
Batch number: 141396050004A	Sample number(s): 7467181-7467182 UNSPK: P466926 BKG: P466926								
Lead	104	105	89-120	1	20	< 0.0010	< 0.0010	16 (1)	20
Manganese	57 (2)	73 (2)	77-124	2	20	0.377	0.358	5	20
Batch number: 141401848001	Sample number(s): 7467181-7467182 UNSPK: 7467182 BKG: 7467182								
Calcium	70 (2)	140 (2)	75-125	4	20	64.3	63.4	1	20
Iron	103	108	75-125	5	20	< 0.200	< 0.200	0 (1)	20
Magnesium	76 (2)	139 (2)	81-118	4	20	27.4	27.2	1	20
Batch number: 14139004201B	Sample number(s): 7467181 UNSPK: P465335 BKG: 7467181								

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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Total Hardness	101		67-120			293	295	1	5
Batch number: 14140004102A Sample number(s): 7467181 BKG: P469549									
pH in water						7.6	7.7	1	3
Batch number: 14140145702B Sample number(s): 7467181 BKG: P470620									
Total Suspended Solids						18.0	18.4	2 (1)	5
Batch number: 14141021201B Sample number(s): 7467181 UNSPK: P466063 BKG: P465411									
Total Dissolved Solids	106		66-131			2,820	2,760	2	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 8260 VOCs
Batch number: W141413AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7467178	97	97	98	96
7467179	97	99	98	97
Blank	100	99	98	98
LCS	100	98	98	97
MS	101	101	98	96
MSD	101	101	98	98
Limits:	80-116	77-113	80-113	78-113

Analysis Name: 8260 VOCs
Batch number: W141431AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7467180	92	99	99	98
7467181	94	98	99	97
Blank	95	100	99	98
LCS	96	99	101	99
MS	95	98	103	100
MSD	98	101	100	99
Limits:	80-116	77-113	80-113	78-113

Analysis Name: TPH-GRO water C6-C10
Batch number: 14142A20A

	Trifluorotoluene-F
7467181	77
Blank	84
LCS	80

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Quality Control Summary

Client Name: Kleinfelder Group Number: 1475056
Reported: 05/27/14 at 05:47 PM

Surrogate Quality Control

LCSD	80
Limits:	63-135

Analysis Name: DRO/DX Microextraction Master
Batch number: 141420002A

	Orthoterphenyl
7467181	113
Blank	112
LCS	102
LCSD	111
Limits:	50-150

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Lancaster Laboratories

Analysis Request/Environmental Services Chain of Custody

For Lancaster Laboratories use only Acct. #: 12152
Group #: 1475056 Sample #: 7467178-82

Client:	Fairfax Petroleum	Acct. #:	
Project Name/#:	26140	PWSID #:	
Project Manager:	Mark C. Steele	P.O. #:	51141-295589
Sampler:	Preston Wertz	Quote #:	
Name of State where samples were collected:	Virginia		

For Lab Use Only
FSC:
SCR#:

Preservation Codes: H=HCl T=Thiosulfate N=HNO3 B=NaOH S=H2SO4 O=Other

Sample Identification	Date Collected	Time Collected	Grab	Composite	Matrix: Soil	Matrix: Potable	Matrix: NPDES	Matrix: Water	Matrix: Other	Total # of Containers	TPH-GRO (8015)	TPH-DRO (8015)	pH (150.1)	TSS (160.2)	TDS (160.1)	Total Hardness (130.2)	Dissolved calcium, iron, lead, magnesium, manganese (lab filtered) (6020)	Total calcium, iron, lead, magnesium, manganese (6020)	Full list VOCs+oxy+Ethanol (8260)	Remarks	Temperature of samples upon receipt (if requested)
											H	H				N		N	H		
RW-1 (12 hrs)	5/14/14	0223	X					X		3									X		
RW-1 (24 hrs)	5/14/14	1415	X					X		3									X		
RW-1 (36 hrs)	5/15/14	0223	X					X		3									X		
RW-1(48 hrs)	5/15/14	1450	X					X		14	X	X	X	X	X	X	X	X	X		

Turnaround Time Requested (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed:
Rush results requested by (please circle): Phone Fax E-mail
Phone #: Fax #:
E-mail address:

Data Package Options (please circle if required)
Type I (validation/NJ reg) TX-TRRP-13
Type II (Tier II) MA MCP CT RCP
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)

SDG Complete? Yes No

State-specific QC (MS/MSD/Dup)? Yes No
(If yes, indicated QC sample and submit triplecate volume)
Internal COC required? Yes No

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	5/15/14	2115	Bottle Storage	5/15/14	2115
[signature]	5/16/14	12:10	[signature]	5-16-14	12:10
			[signature]	5/16/14	1615

Lancaster Laboratories, Inc. 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 717-656-2300
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client

eurofins | Lancaster Laboratories Environmental

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	[illegible]	**BMQL**	[illegible]
N.D.	[illegible]	**MPN**	[illegible]
TNTC	[illegible]	**CP Units**	[illegible]
IU	[illegible]	**NTU**	[illegible]
umhos/cm	[illegible]	**ng**	[illegible]
C	[illegible]	**F**	[illegible]
meq	[illegible]	**lb.**	[illegible]
g	[illegible]	**kg**	[illegible]
µg	[illegible]	**mg**	[illegible]
mL	[illegible]	**L**	[illegible]
m3	[illegible]	**µL**	[illegible]
		pg/L	[illegible]

< [illegible] of [illegible]

> [illegible]

ppm [illegible]

ppb [illegible]

Dry weight basis [illegible]

Data Qualifiers:

C – [illegible]

J - [illegible]

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers		Inorganic Qualifiers	
A	[illegible]	**B**	[illegible]
B	[illegible]	**E**	[illegible]
C	[illegible]	**M**	[illegible]
D	[illegible]	**N**	[illegible]
E	[illegible]	**S**	[illegible]
N	[illegible]	**U**	[illegible]
P	[illegible]	**W**	[illegible]
U	[illegible]	*****	[illegible]
X,Y,Z	[illegible]	**+**	[illegible]

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

[illegible]

[illegible]

[illegible]

WARRANTY AND LIMITS OF LIABILITY [illegible]

Appendix D
Waste Manifests

Water Depot, Inc.

1301 Avondale Rd., New Windsor, MD 21776 • (P) 410-857-967 • (F) 410-857-2814 • www.oilwaterdisposal.com

NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: SB051414B

Generator Name: FAIRFAX PETROLEUM REALTY			Site Name (if different):		
Address: 9901 GEORGETOWN PIKE			Address:		
City: GREAT FALLS	State: VA	Zip:	City:	State:	Zip:
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 51141-295654

Transporter 1 Company Name: ☑ Water Depot, Inc. ☐ Subsurface Technologies, Inc.

Transporter 2 Company Name:			
Designated Facility Name: **Water Depot, Inc.**			Other:
Address: **1301 Avondale Rd.**			
City: **New Windsor**	State: **MD**	Zip: **21776**	
Phone: **410-857-9670**			

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	5725	Combustible Liquids, N.O.S., (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil for Recycling			
Oil & Water for Recycling		Glycol & Water for Recycling	

	Containers		Quantity	Volume/Units
	No	Type		
Other:				
Other:				

Special handling instructions or additional information

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Parton Wertz FOR: Fairfax Petroleum Realty LLC	X Signature:	Date: 05/14/14
X Transporter 1 Printed Name: SCOTT BALINS	X Signature: Scott Balins	Date: 05/14/14
X Transporter 2 Printed Name:	X Signature:	Date: / /

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Eric Hoar	Acceptance Signature:	Date: 5/14/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

Water Depot, Inc.

1301 Avondale Rd., New Windsor, MD 21776 • (P) 410-857-967 • (F) 410-857-2814 • www.oilwaterdisposal.com

NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: NR 51414 A

Generator Name: Fairfax Petroleum Realty			Site Name (if different):		
Address: 9901 George Town Pike			Address:		
City: Great Falls	State: VA	Zip: 22066	City:	State:	Zip:
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 5141-295654

Transporter 1 Company Name: ☑ **Water Depot, Inc.** ☐ **Subsurface Technologies, Inc.**

Transporter 2 Company Name:

Designated Facility Name: **Water Depot, Inc.**			Other: Frac Tank
Address: **1301 Avondale Rd.**			
City: **New Windsor**	State: **MD**	Zip: **21776**	
Phone: **410-857-9670**			

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	5866	Combustible Liquids, N.O.S., (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil for Recycling			
Oil & Water for Recycling		Glycol & Water for Recycling	

Other:	Containers		Quantity	Volume/Units
	No	Type		

Other:	Containers		Quantity	Volume/Units
	No	Type		

Special handling instructions or additional information

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Paxton Hyde for: Fairfax Petroleum Realty LLC	X Signature	Date 5/14/14
X Transporter 1 Printed Name: Nick Riggle	X Signature	Date 5/14/14
X Transporter 2 Printed Name	X Signature	Date / /

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Ethan Harris	Acceptance Signature	Date 5/14/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

Water Depot, Inc.

1301 Avondale Rd., New Windsor, MD 21776 • (P) 410-857-967 • (F) 410-857-2814 • www.oilwaterdisposal.com

NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: NR 51414B

Generator Name: Fairfax Petroleum Realty			Site Name (if different):		
Address: 9901 Georgetown Pike			Address:		
City: Great Falls	State: VA	Zip: 22066	City:	State:	Zip:
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 51141-295654

Transporter 1 Company Name: ☑ **Water Depot, Inc.** ☐ **Subsurface Technologies, Inc.**

Transporter 2 Company Name:

Designated Facility Name: **Water Depot, Inc.**		Other:
Address: **1301 Avondale Rd.**		
City: **New Windsor**	State: **MD**	Zip: **21776**
Phone: **410-857-9670**		

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	4,799	Combustible Liquids, N.O.S., (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil for Recycling		Glycol & Water for Recycling	
Oil & Water for Recycling			

	Containers		Quantity	Volume/Units
Other:	No	Type		
Other:	No	Type		

Special handling instructions or additional information

FRAC TANK

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Paxton Wertz for: Fairfax Petroleum Realty, LLC	X Signature	Date 5/14/14
X Transporter 1 Printed Name: Nick Riggle	X Signature	Date 5/14/14
X Transporter 2 Printed Name	X Signature	Date / /

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Erin Hoop	Acceptance Signature	Date 5/14/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

Water Depot, Inc.

1301 Avondale Rd., New Windsor, MD 21776 • (P) 410-857-967 • (F) 410-857-2814 • www.oilwaterdisposal.com

NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: 5D05 1514 A

Generator Name: FAIRFAX PETROLEUM REALITY LLC			Site Name (if different):		
Address: 9901 GEORGETOWN PIKE			Address:		
City: GREAT FALLS	State: VA	Zip:	City:	State:	Zip:
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 51141-295654

Transporter 1 Company Name: ☑ Water Depot, Inc. ☐ Subsurface Technologies, Inc.

Transporter 2 Company Name:

Designated Facility Name: **Water Depot, Inc.**			Other:
Address: **1301 Avondale Rd.**			
City: **New Windsor**	State: **MD**	Zip: **21776**	
Phone: **410-857-9670**			

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	6113	Combustible Liquids, N.O.S. (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil for Recycling			
Oil & Water for Recycling		Glycol & Water for Recycling	

Other:	Containers		Quantity	Volume/Units
	No	Type		
Other:	Containers		Quantity	Volume/Units
	No	Type		

Special handling instructions or additional information

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Parton Wertz FOR: Fairfax Petroleum Realty LLC	X Signature	Date: 5/15/14
X Transporter 1 Printed Name: SCOTT BALINS	X Signature	Date: 05/15/14
X Transporter 2 Printed Name	X Signature	Date: / /

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Erin Hasen	Acceptance Signature	Date: 5/15/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

Water Depot, Inc.

1301 Avondale Rd., New Windsor, MD 21776 • (P) 410-857-967 • (F) 410-857-2814 • www.oilwaterdisposal.com

NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: NR 51514 A

Generator Name: Fairfax Petroleum Realty			Site Name (if different):		
Address: 9901 Georgetown Pike			Address:		
City: Great Falls	State: VA	Zip: 22066	City:	State:	Zip:
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 51141-295654

Transporter 1 Company Name: ☑ Water Depot, Inc. ☐ Subsurface Technologies, Inc.

Transporter 2 Company Name:

Designated Facility Name: **Water Depot, Inc.**			Other:
Address: **1301 Avondale Rd.**			
City: **New Windsor**	State: **MD**	Zip: **21776**	
Phone: **410-857-9670**			

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	6147	Combustible Liquids, N.O.S., (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil for Recycling			
Oil & Water for Recycling		Glycol & Water for Recycling	

Other:	Containers		Quantity	Volume/Units
	No	Type		
Other:	Containers		Quantity	Volume/Units
	No	Type		

Special handling instructions or additional information

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Paston Hughes for: Fairfax Petroleum Realty	X Signature	Date 5/15/14
X Transporter 1 Printed Name: Nate Kupke	X Signature	Date 5/15/14
X Transporter 2 Printed Name	X Signature	Date

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Ethan Harris	Acceptance Signature	Date 5/15/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

Water Depot, Inc.

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NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: NR 51914B

Generator Name: Fairfax Petroleum Realty			Site Name (if different):		
Address: 9901 Georgetown Pike			Address:		
City: Great Falls	State: VA	Zip:	City:	State:	Zip:
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 51141-295654

Transporter 1 Company Name: ☑ **Water Depot, Inc.** ☐ **Subsurface Technologies, Inc.**

Transporter 2 Company Name:

Designated Facility Name: **Water Depot, Inc.**			Other:
Address: **1301 Avondale Rd.**			
City: **New Windsor**	State: **MD**	Zip: **21776**	
Phone: **410-857-9670**			

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	2644	Combustible Liquids, N.O.S., (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil for Recycling			
Oil & Water for Recycling		Glycol & Water for Recycling	

	Containers		Quantity	Volume/Units
Other	No	Type		
Other	No	Type		

Special handling instructions or additional information

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Paxton Warke FOR: Fairfax Petroleum Realty	X Signature	Date 5/19/14
X Transporter 1 Printed Name: Nick Kugle	X Signature	Date 5/19/14
X Transporter 2 Printed Name	X Signature	Date / /

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Erin Hoch	Acceptance Signature	Date 5/19/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

Water Depot, Inc.

1301 Avondale Rd., New Windsor, MD 21776 • (P) 410-857-967 • (F) 410-857-2814 • www.oilwaterdisposal.com

NON-HAZARDOUS WASTE MANIFEST/BILL OF LADING TRACKING NUMBER: 5C051914A

Generator Name: Fairfax Petroleum Reality			Site Name (if different):		
Address:			Address: 9901 Georgetown Pike		
City:	State:	Zip:	City: Great Falls	State: Va	Zip: 22066
Phone:	Contact:		Phone	Contact:	

Purchase Order No: 5141-295654

Transporter 1 Company Name: [X] **Water Depot, Inc.** [ ] **Subsurface Technologies, Inc.**

Transporter 2 Company Name:

Designated Facility Name: **Water Depot, Inc.**			Other:
Address: **1301 Avondale Rd.**			
City: **New Windsor**	State: **MD**	Zip: **21776**	
Phone: **410-857-9670**			

Shipping Name & Description

Non-hazardous/Non-regulated Material:	Gallons:	Non-hazardous/Non-regulated Material:	Gallons:
Petroleum-Contaminated Water	2025	Combustible Liquids, N.O.S., (fuel oil & water for recycling), 3, NA 1993, PGIII	
Petroleum-Contaminated Sludge	200		
Oil for Recycling		Combustible Liquids, N.O.S., (fuel oil & water for recycling), 2, NA 1993, PGIII	
Oil & Water for Recycling		Glycol & Water for Recycling	

	Containers		Quantity	Volume/Units
	No	Type		
Other:				
Other:				

Special handling instructions or additional information

Generator/Shipper Certification Statement

As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCBs). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Water Depot, Inc. or Subsurface Technologies, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator Authorized Agent Printed Name: Preston Wentz FOR: Fairfax Petroleum Realty	X Signature: [signature]	Date: 5/19/14
X Transporter 1 Printed Name: Stephen Crotty	X Signature: [signature]	Date: 5/19/14
X Transporter 2 Printed Name:	X Signature:	Date: / /

Discrepancy Indication Space

Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in discrepancy indication space.

Printed Name: Erin [illegible]	Acceptance Signature: [signature]	Date: 5/19/14

White-Original Yellow-Transporter 1 Blue-Transporter 2 Pink-Facility Gold-Customer

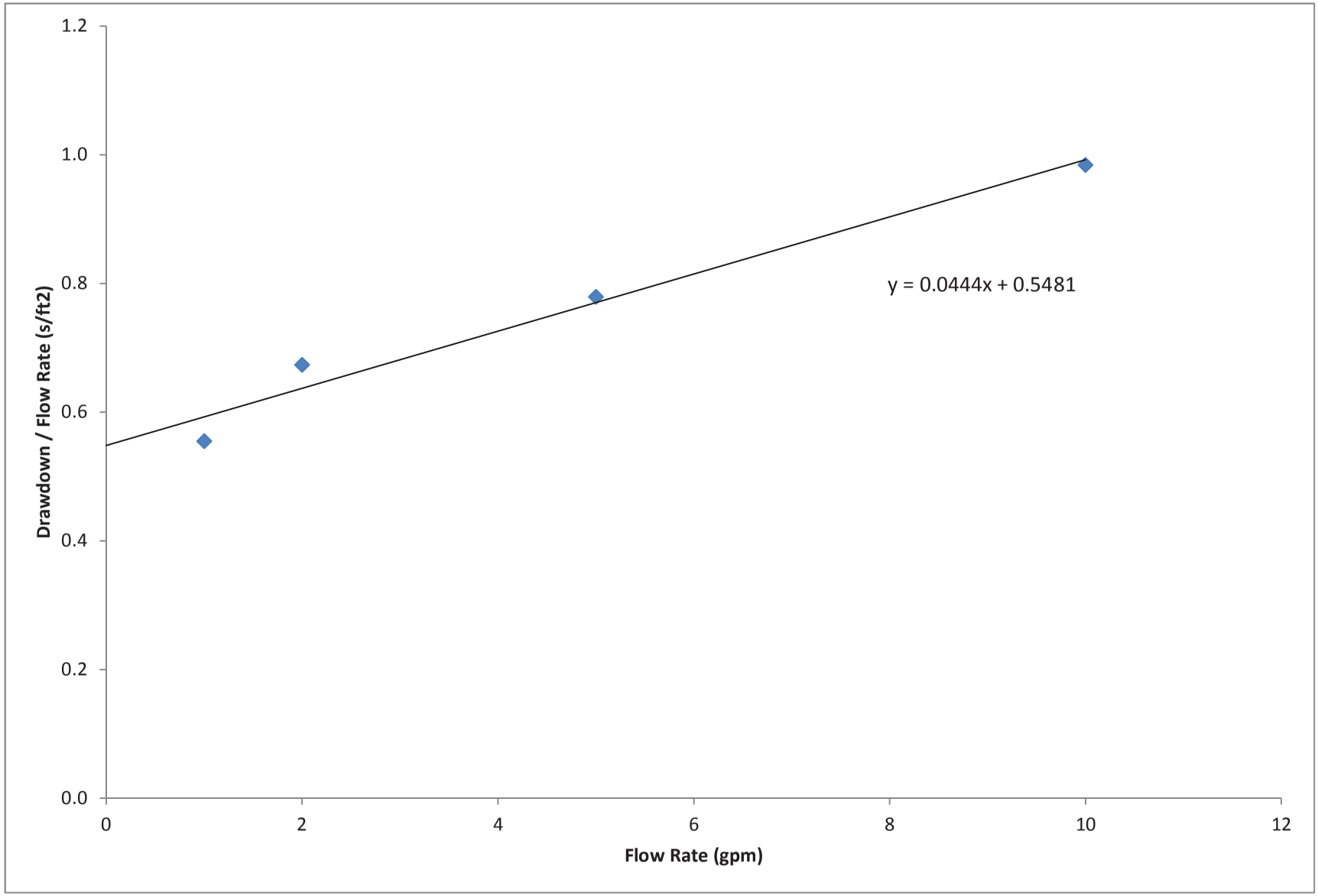
Appendix E
Well Efficiency Calculations

Step Drawdown Test RW-1
Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Fairfax County, Virginia

Test Date	29-Apr-14	P Wertz		
Evaluation Date	1-May-14	N Stevens		
Reference:	Groundwater & Wells, 2nd Ed. 1986			
Enter Q (gpm)	**Enter** sw (ft)	**Calculated** Specific Capacity Q/sw (gpm/ft)	**Calculated** Specific Drawdown sw/Q (ft/gpm)	
1	0.56	1.8	0.6	
2	1.35	1.5	0.7	
5	3.90	1.3	0.8	
10	9.84	1.0	1.0	
Calculated Aquifer Loss Coefficient (y-B ft/gpm	**Calculated** Aquifer Loss (BQ)	**Calculated** Well Loss Coefficient C	**Calculated** Well Loss (CQ^2)	**Calculated** Well Efficiency (100 x (BQ/(BQ+CQ^2))
0.55	0.55	0.04	0.04	93%
0.55	1.10	0.04	0.18	86%
0.55	2.74	0.04	1.11	71%
0.55	5.48	0.04	4.44	55%

Kleinfelder
1340 Charwood Road, Suite I, Hanover, MD

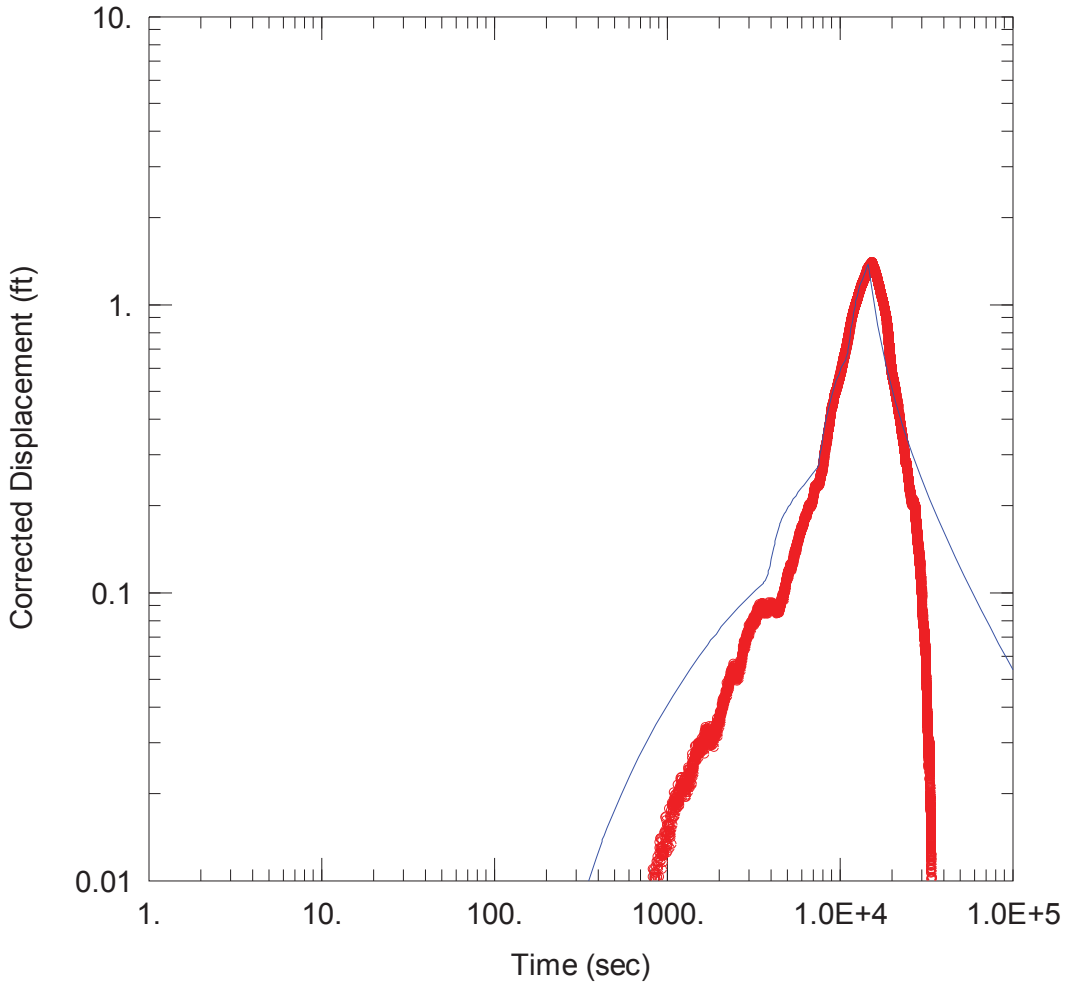
Step Drawdown Test RW-1
Inactive Fairfax Facility #26140
9901 Georgetown Pike
Great Falls, Fairfax County Virginia



7/23/2014

Kleinfelder
1340 Charwood Road, Suite I, Hanover, MD

Appendix F
Aqtesolv™ Data Reports



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Step Tests\MW-1.aqt
Date: 08/01/14 Time: 09:02:46

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

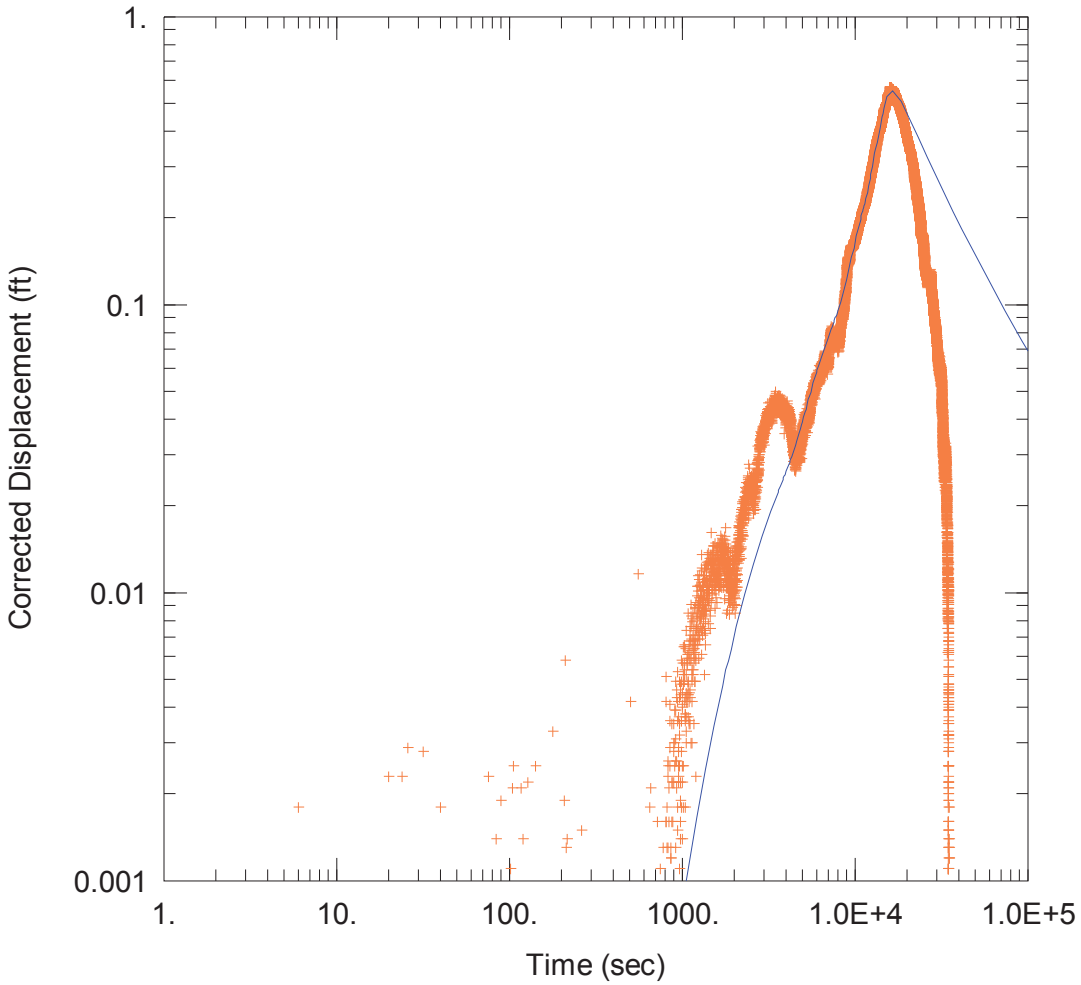
Observation Wells

Well Name	X (ft)	Y (ft)
○ MW-1	-7.5	18

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 202.9 ft^2/day
S = 0.01453
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: C:\...\MW-11_MW-15.aqt
Date: 08/01/14 Time: 09:06:41

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

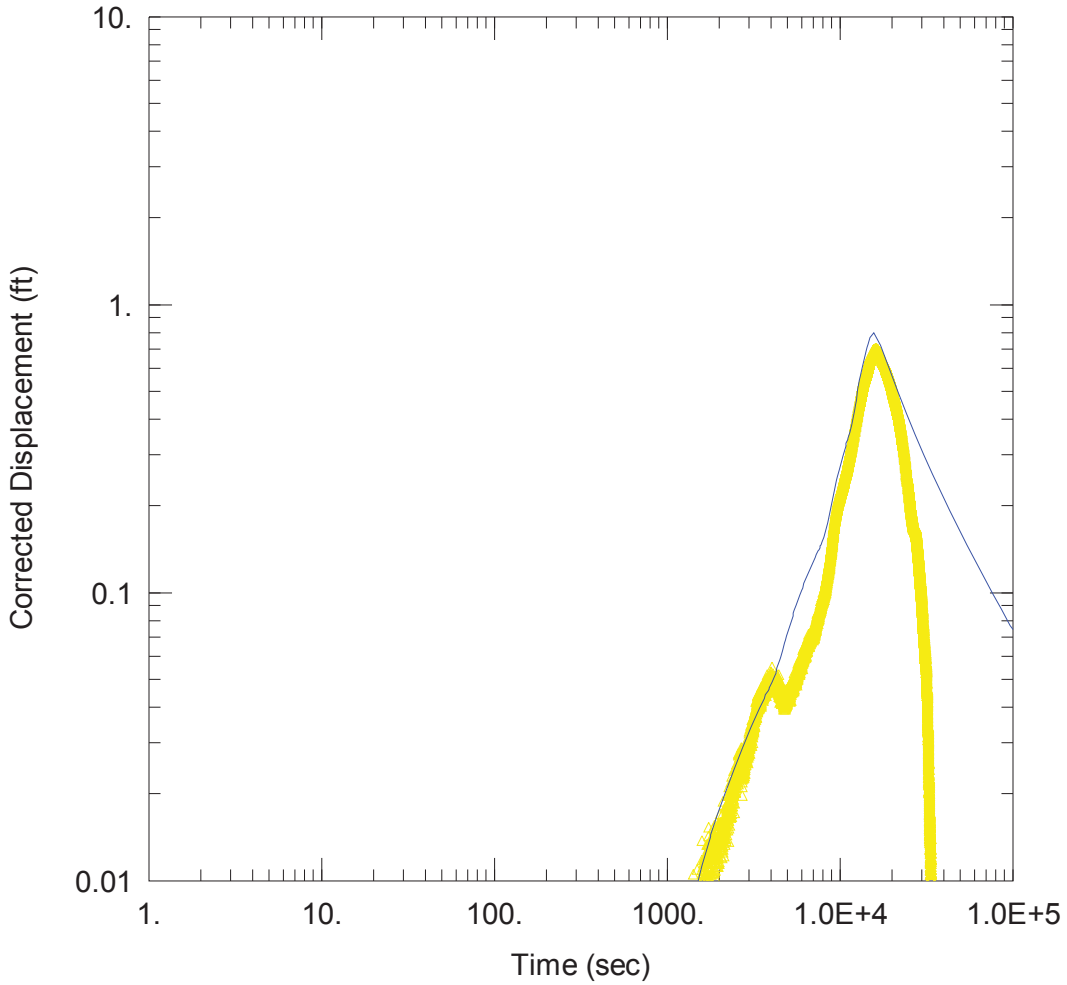
Well Name	X (ft)	Y (ft)
+ MW-11	-8	25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 154. ft^2/day
Kz/Kr = 1.

S = 0.03822
b = 115. ft



WELL TEST ANALYSIS

Data Set: \...\MW-15.aqt
Date: 07/31/14 Time: 22:02:32

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

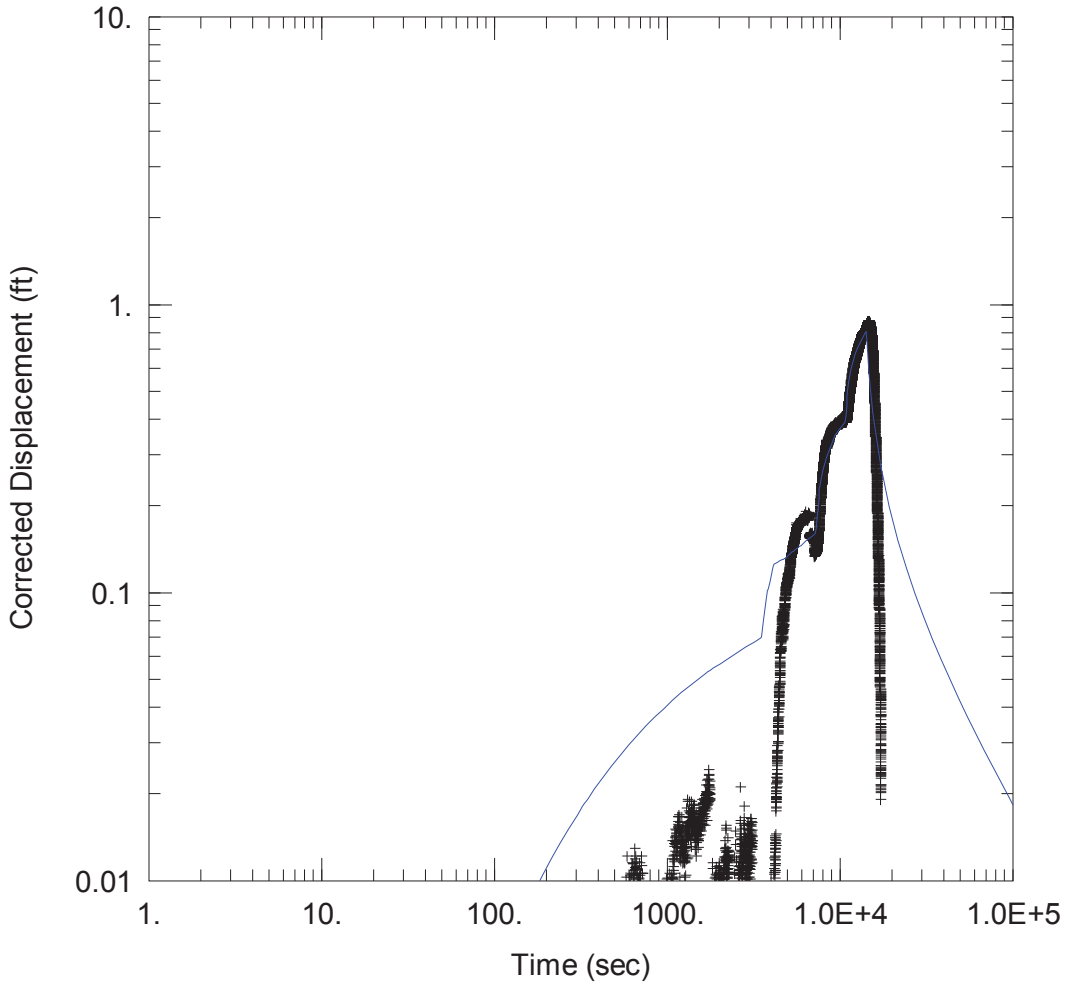
Well Name	X (ft)	Y (ft)
△ MW-15	12	22.5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 144.6 ft^2/day
Kz/Kr = 1.

S = 0.02573
b = 115. ft



WELL TEST ANALYSIS

Data Set: \...\MW-16D Theis.aqt
Date: 07/31/14 Time: 21:44:19

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

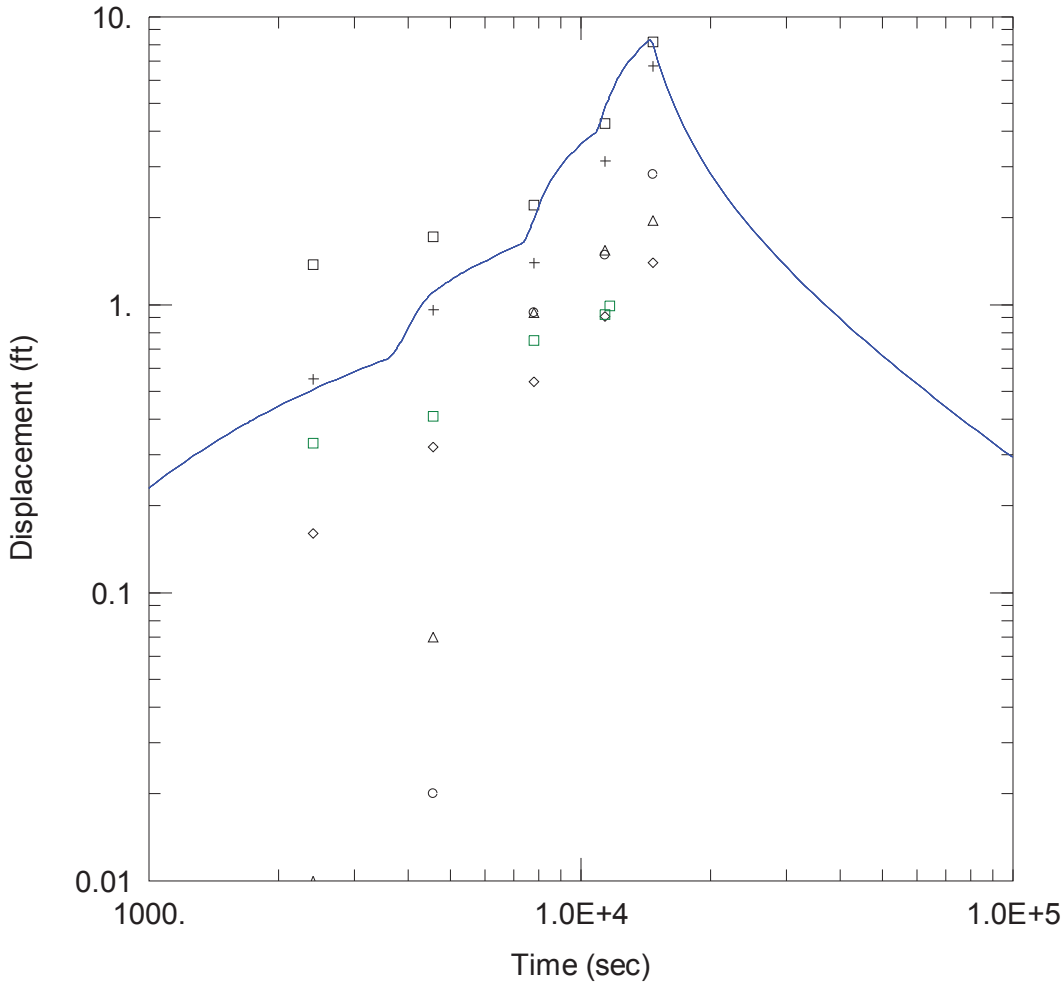
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-16	9.4	107.8

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 600.3 ft^2/day
S = 0.0003266
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Step Tests\MW-17D.aqt
Date: 08/01/14 Time: 11:05:01

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 147. ft Slab Block Thickness: 10. ft

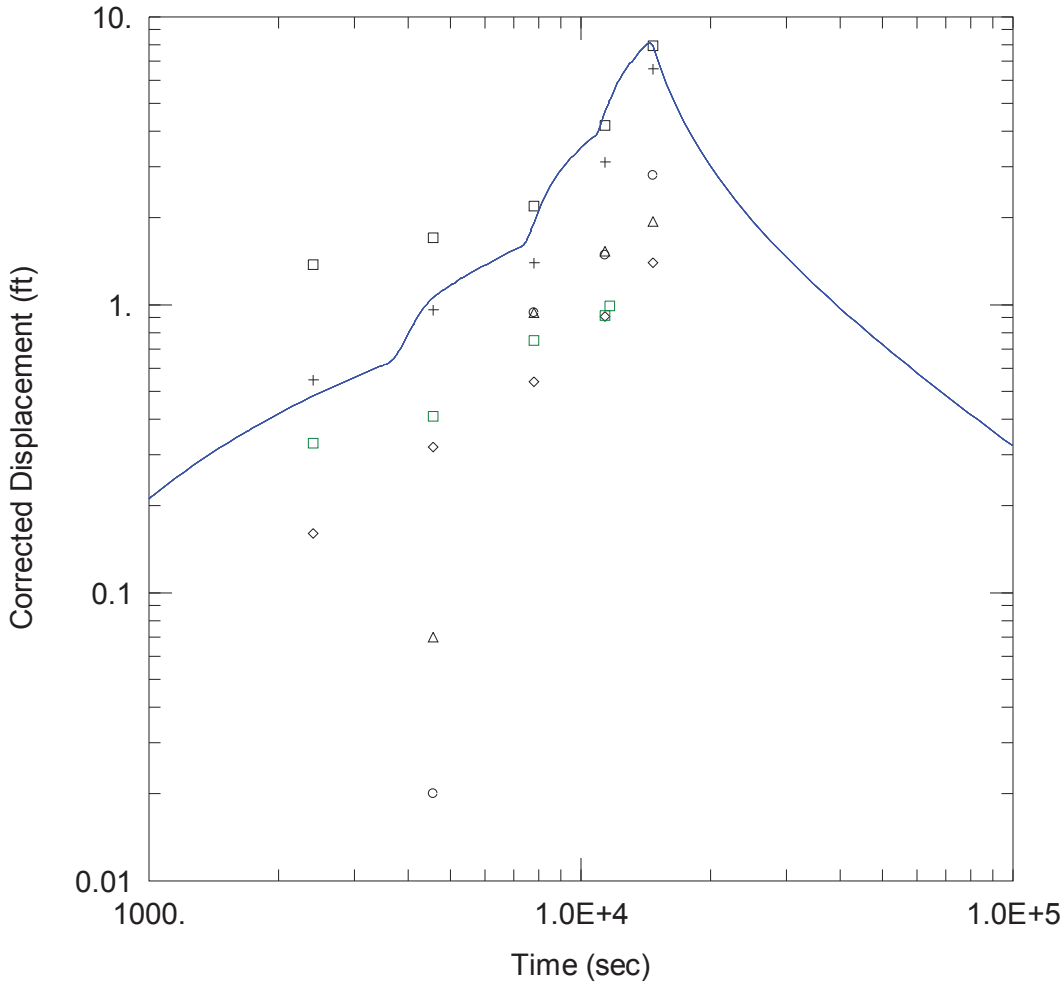
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-17D (75)	5	5
□ MW-17D (81)	5	5
○ MW-17D (88)	5	5
△ MW-17D (92)	5	5
◇ MW-17D (117)	5	5
□ MW-17D (130)	5	5
+ MW-17D (147)	5	5



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Step Tests\MW-17D.aqt
Date: 08/01/14 Time: 11:03:11

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

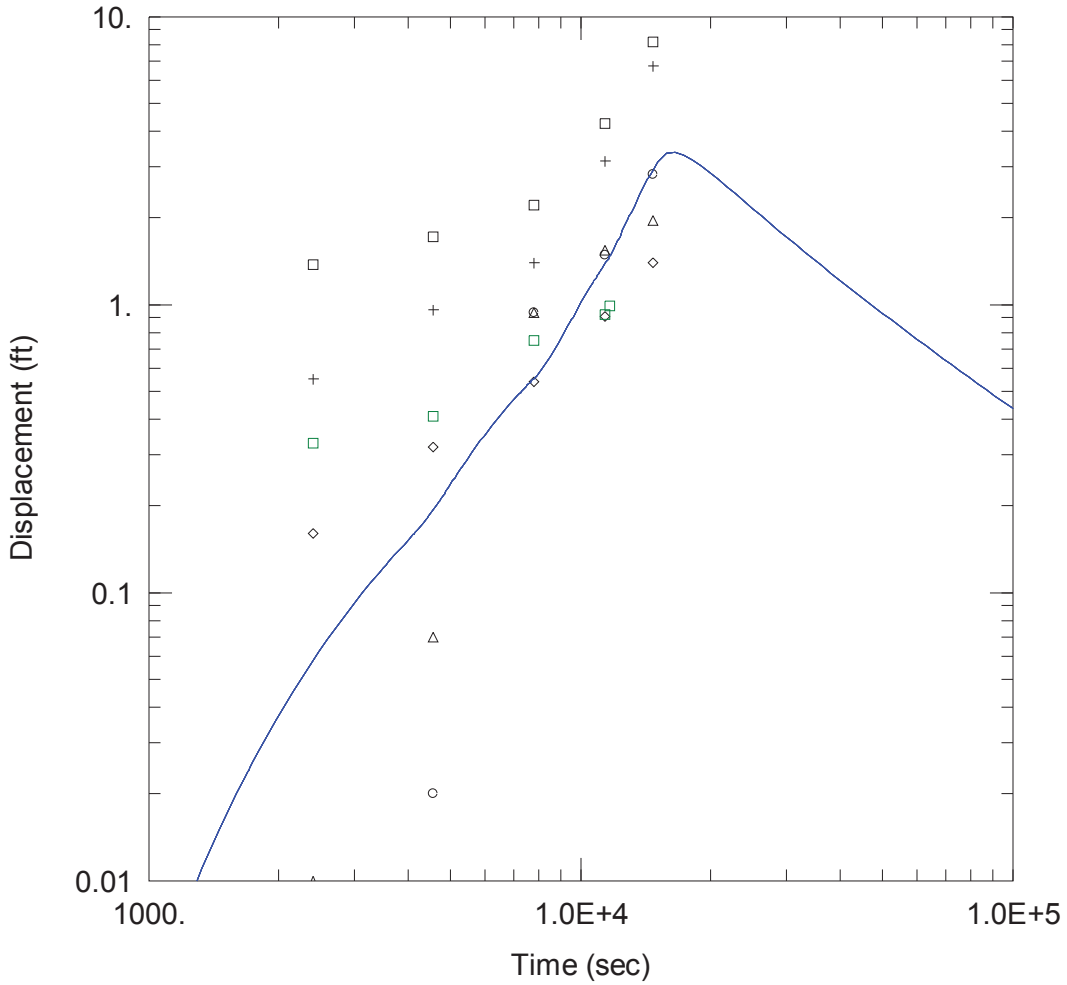
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-17D (75)	5	5
□ MW-17D (81)	5	5
○ MW-17D (88)	5	5
△ MW-17D (92)	5	5
◇ MW-17D (117)	5	5
□ MW-17D (130)	5	5
+ MW-17D (147)	5	5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 33.74 ft^2/day
S = 0.01894



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Step Tests\MW-17D.aqt
Date: 08/01/14 Time: 11:07:12

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 147. ft Slab Block Thickness: 10. ft

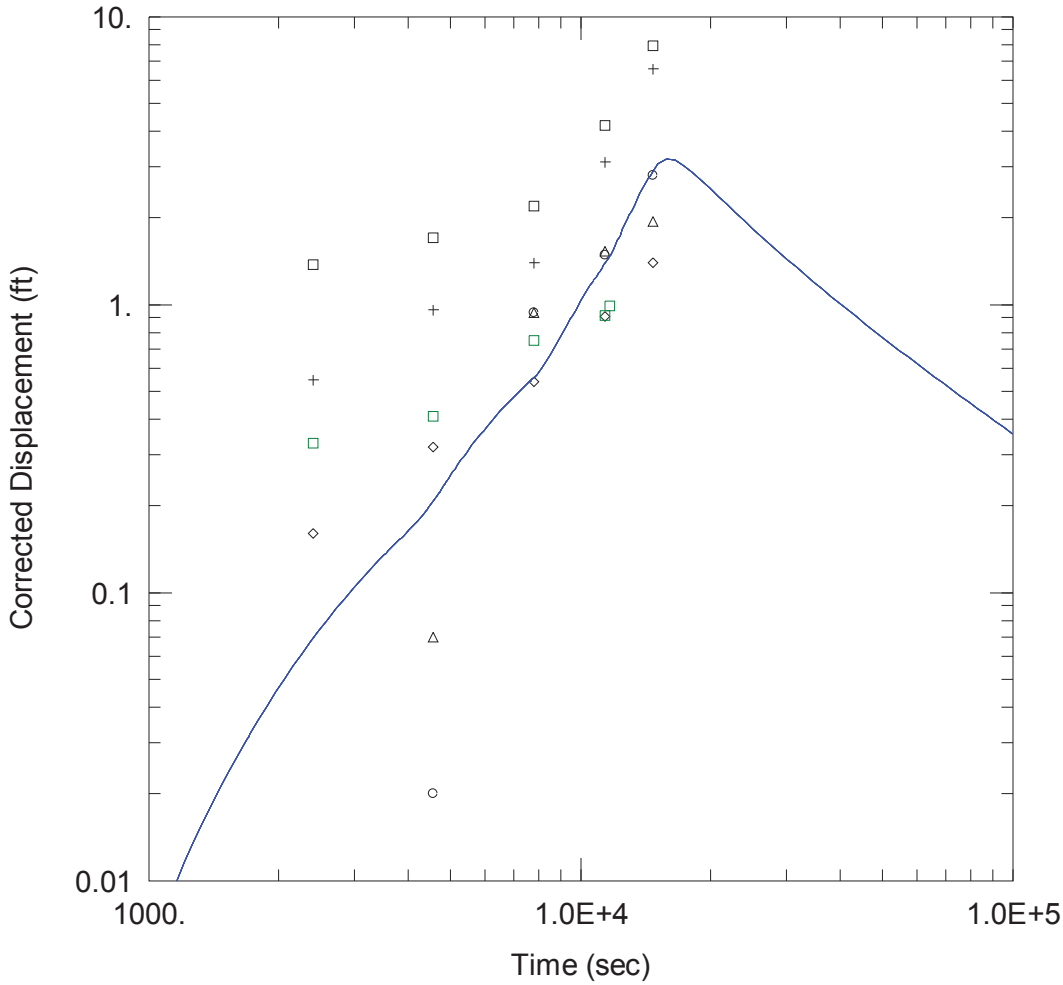
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-17D (75)	5	5
□ MW-17D (81)	5	5
○ MW-17D (88)	5	5
△ MW-17D (92)	5	5
◇ MW-17D (117)	5	5
□ MW-17D (130)	5	5
+ MW-17D (147)	5	5



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Step Tests\MW-17D.aqt
Date: 08/01/14 Time: 11:08:35

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

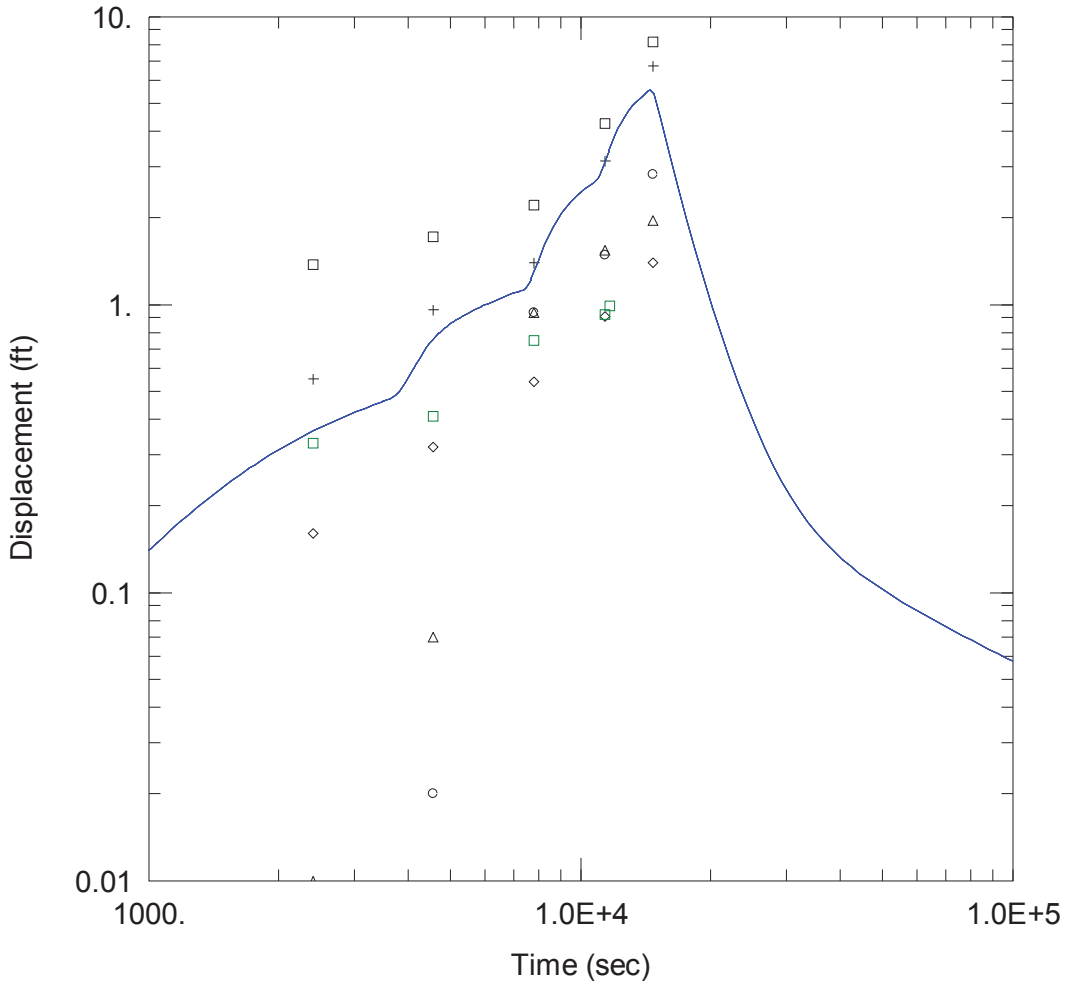
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-17D (75)	5	5
□ MW-17D (81)	5	5
○ MW-17D (88)	5	5
△ MW-17D (92)	5	5
◇ MW-17D (117)	5	5
□ MW-17D (130)	5	5
+ MW-17D (147)	5	5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 29.8 ft^2/day
S = 0.08784



WELL TEST ANALYSIS

Data Set: \...\MW-17D.aqt
Date: 07/31/14 Time: 21:30:26

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 147. ft Slab Block Thickness: 10. ft

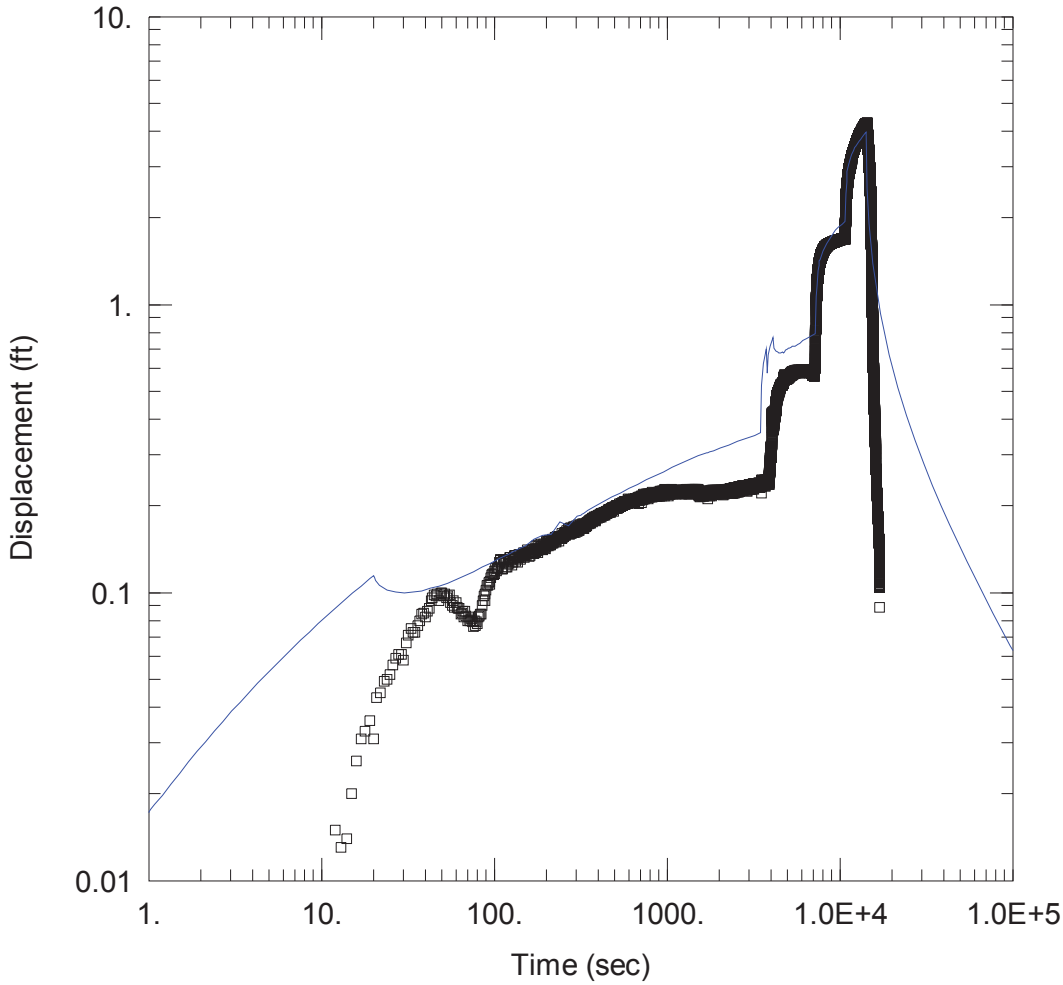
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-17D (75)	5	5
□ MW-17D (81)	5	5
○ MW-17D (88)	5	5
△ MW-17D (92)	5	5
◇ MW-17D (117)	5	5
□ MW-17D (130)	5	5
+ MW-17D (147)	5	5



WELL TEST ANALYSIS

Data Set: \...\RW-1 Moench.aqt
Date: 07/31/14 Time: 21:06:55

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 115. ft Slab Block Thickness: 10. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

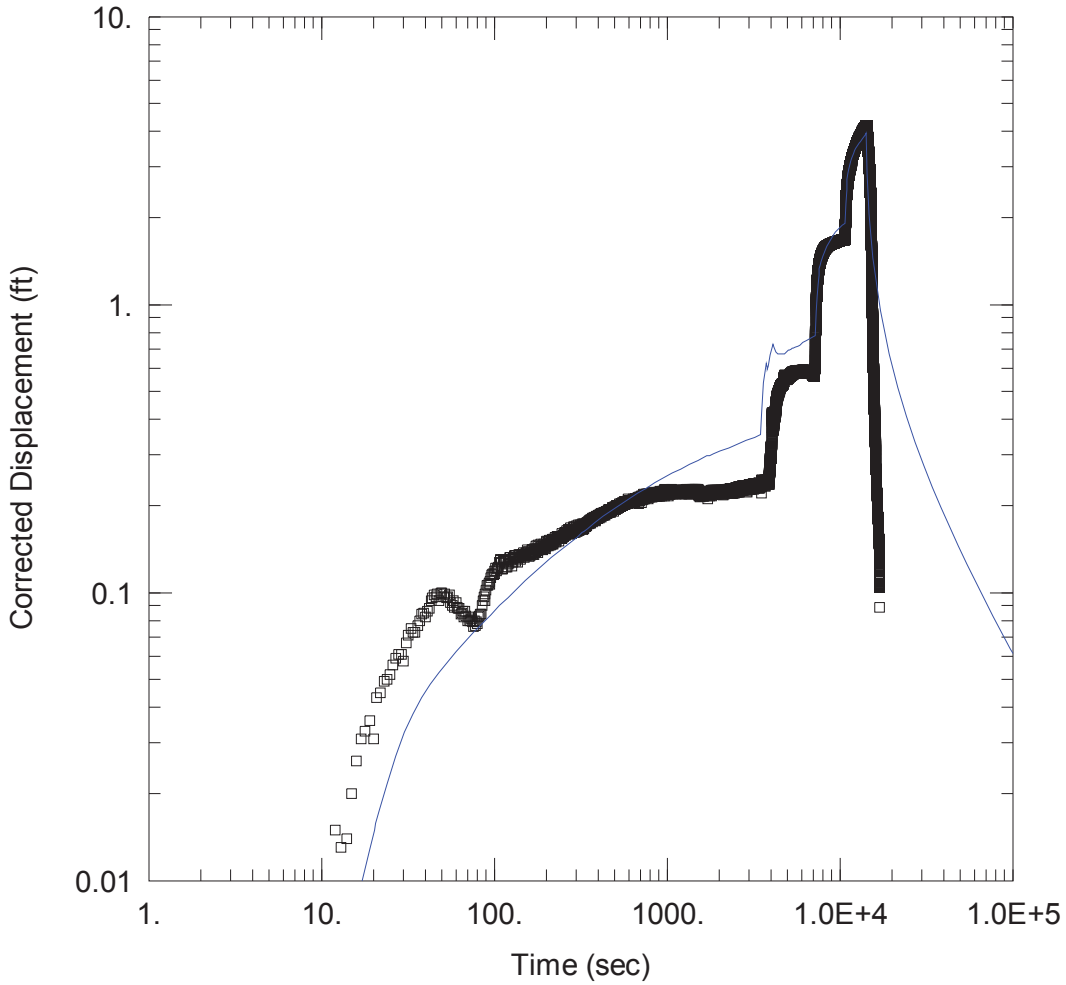
Well Name	X (ft)	Y (ft)
▫ RW-1	0	0

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 1.514 ft/day
K' = 7.487E+4 ft/day
Sw = 0.05982

Ss = 0.003751 ft^{-1}
Ss' = 0.0004919 ft^{-1}
Sf = 0.03197



WELL TEST ANALYSIS

Data Set: \...\RW-1.aqt
Date: 07/31/14 Time: 21:09:49

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

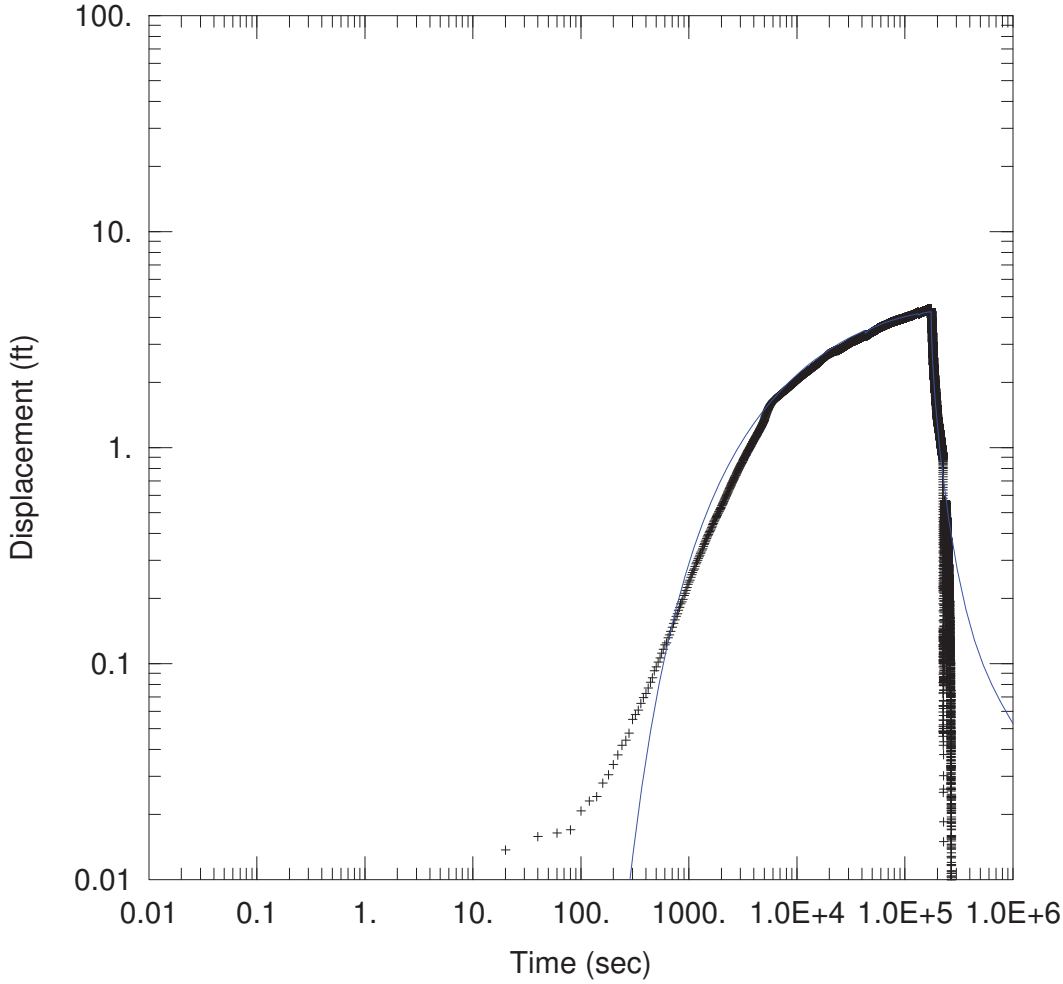
Observation Wells

Well Name	X (ft)	Y (ft)
▫ RW-1	0	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 179.4 ft^2/day
S = 0.3851
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-1 Moench.aqt
Date: 07/23/14 Time: 09:30:42

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 72.76 ft Slab Block Thickness: 10. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

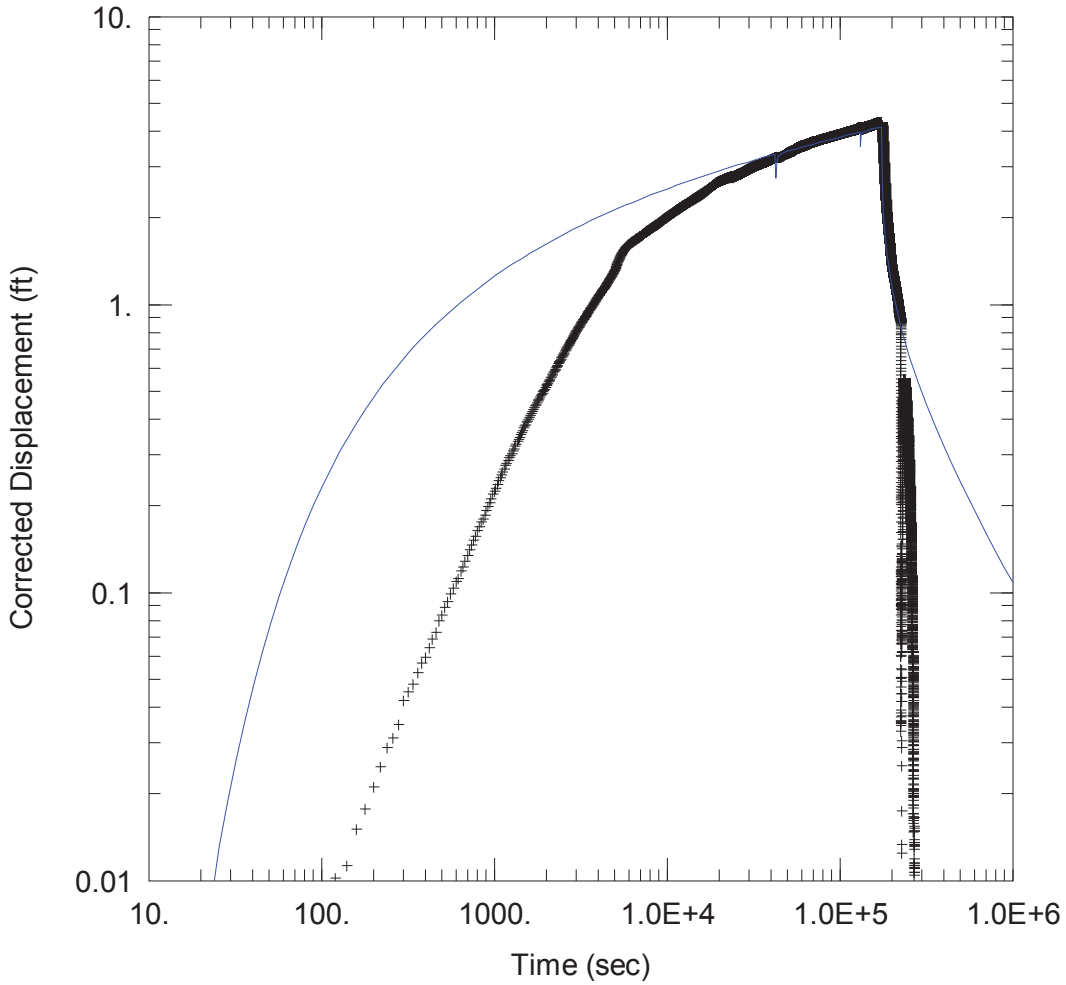
Well Name	X (ft)	Y (ft)
+ MW-1	-8.77	8.199

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 1.765 ft/day
K' = 0.0001879 ft/day
Sw = 0.05982
r(w) = 0.833 ft

Ss = 0.000517 ft^{-1}
Ss' = 1. ft^{-1}
Sf = 0.01447
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-1.aqt
Date: 08/01/14 Time: 09:23:34

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

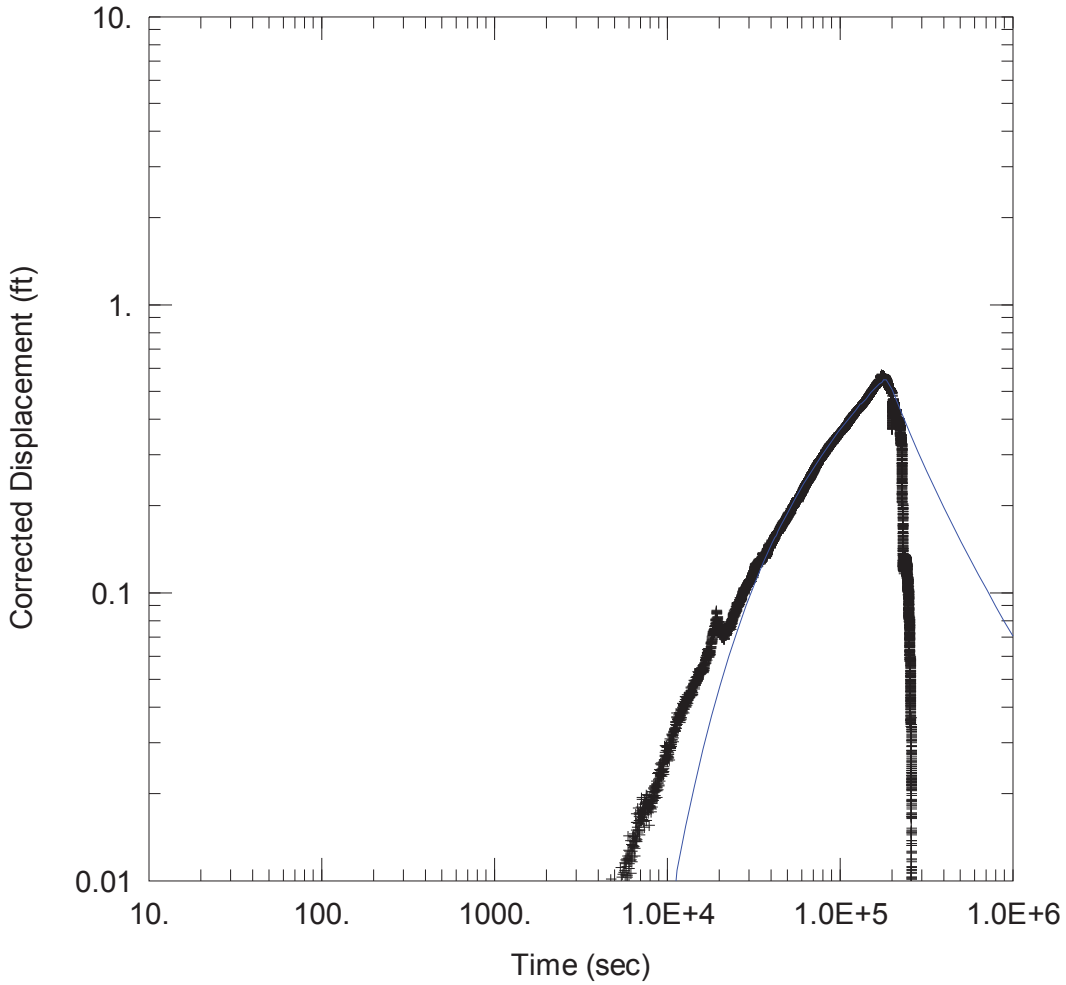
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-1	-8.77	8.199

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 271.1 ft^2/day
S = 0.005743
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-6S.aqt
Date: 08/01/14 Time: 09:29:43

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

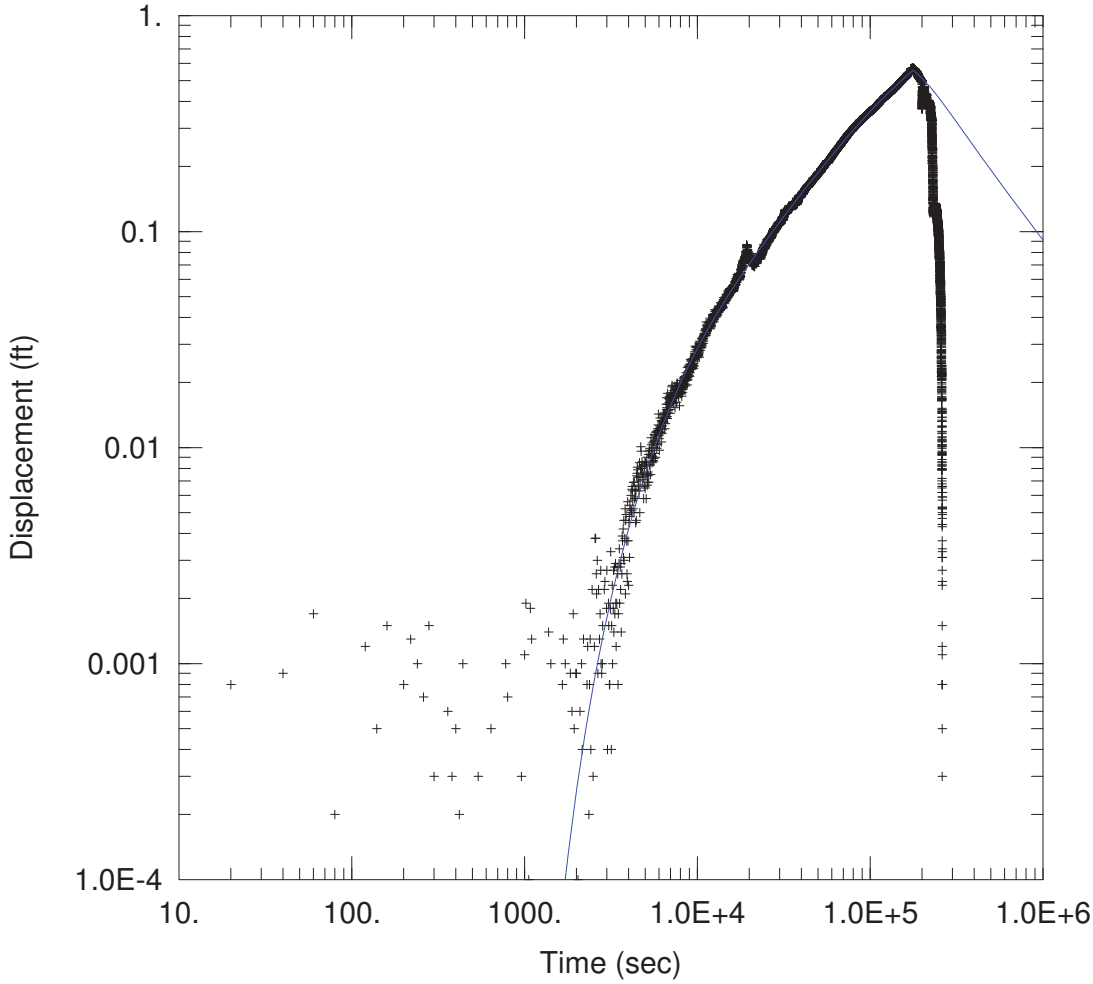
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-6S	-108.15	-20.905

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 403.7 ft^2/day
S = 0.0425
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-6S.aqt
Date: 07/23/14 Time: 09:30:20

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 72.76 ft Slab Block Thickness: 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

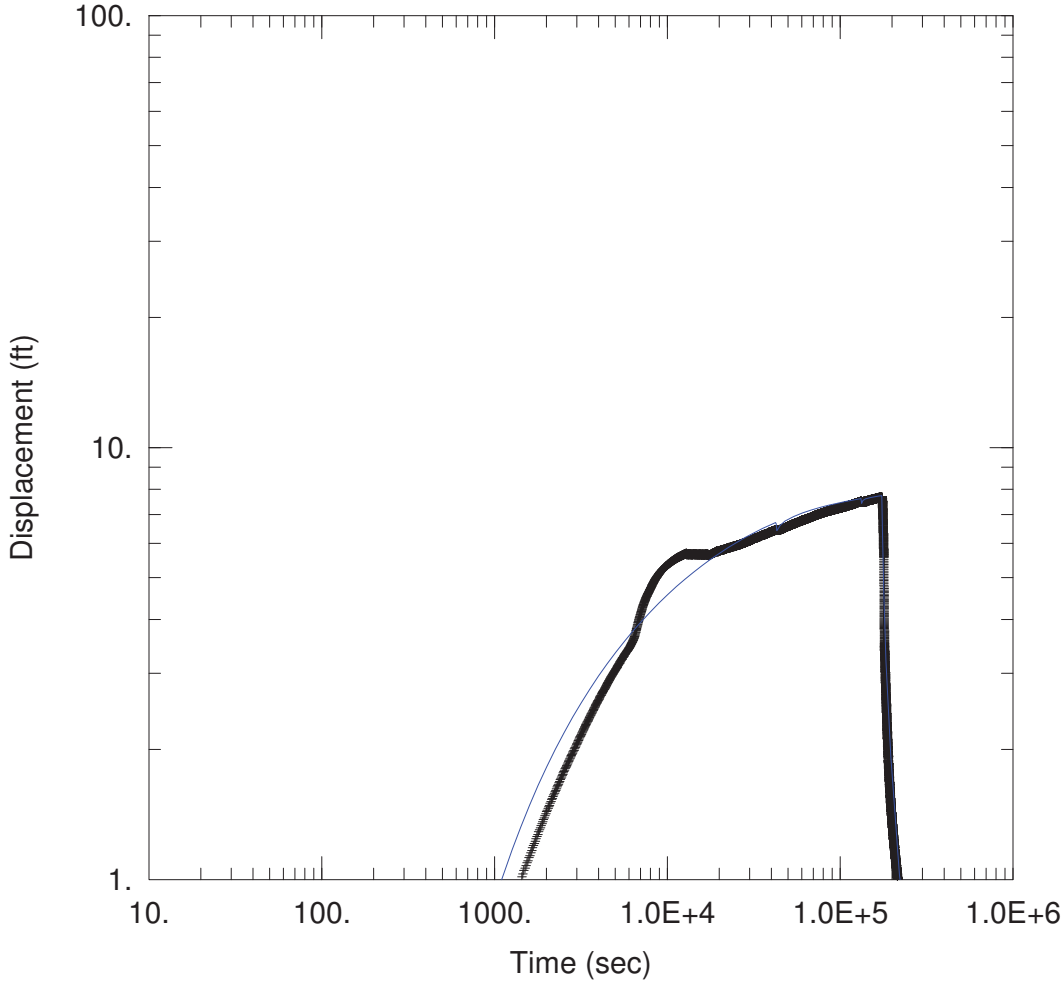
Well Name	X (ft)	Y (ft)
+ MW-6S	-108.15	-20.905

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 4.192 ft/day
K' = 0.0003028 ft/day
Sw = 0.05982
r(w) = 0.833 ft

Ss = 0.0001292 ft^{-1}
Ss' = 0.0005296 ft^{-1}
Sf = 0.005875
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-7 Moench.aqt
Date: 07/23/14 Time: 09:29:54

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 72.76 ft Slab Block Thickness: 10. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

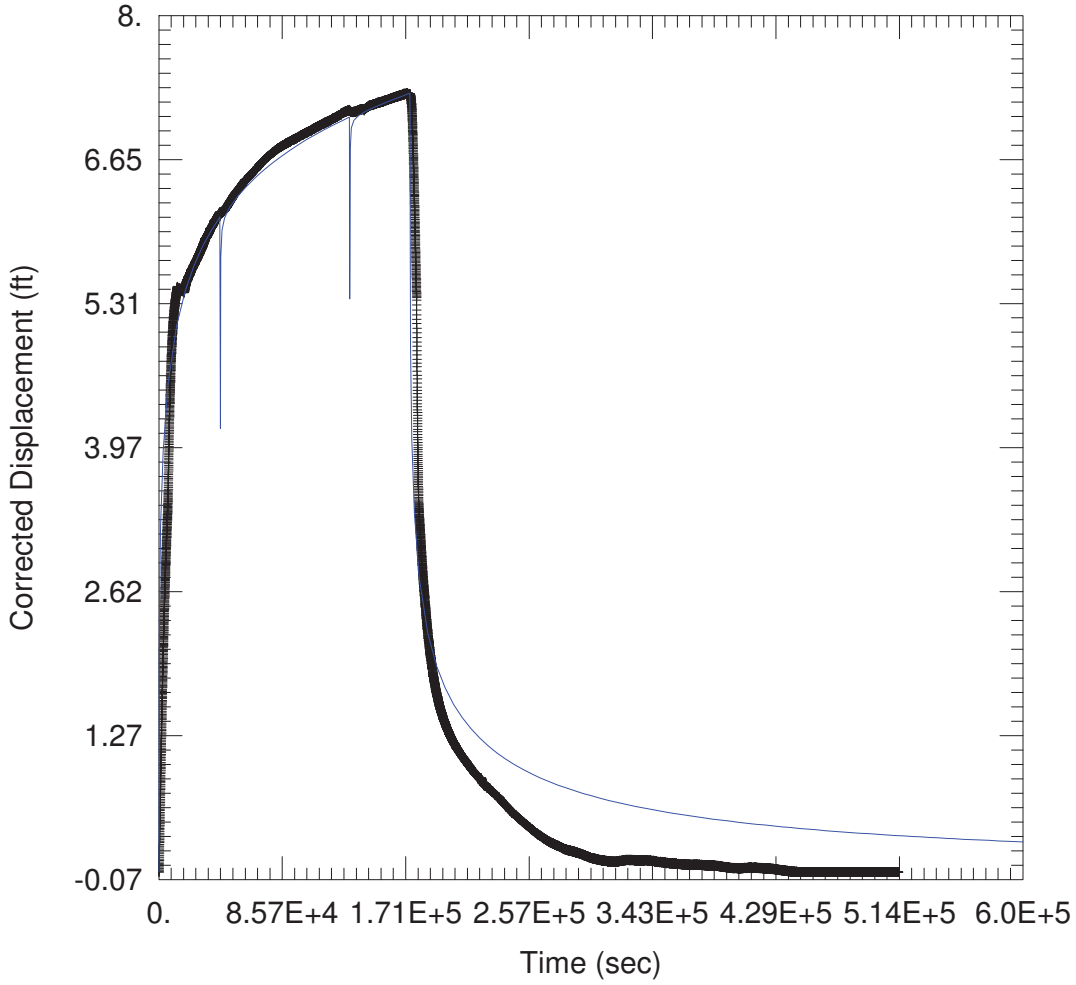
Well Name	X (ft)	Y (ft)
+ MW-7	0.28	-8.407

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 1.001 ft/day
K' = 0.000302 ft/day
Sw = 0.05982
r(w) = 0.833 ft

Ss = 0.0003929 ft^{-1}
Ss' = 1. ft^{-1}
Sf = 0.02181
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-7 Theis.aqt
Date: 07/23/14 Time: 09:29:43

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

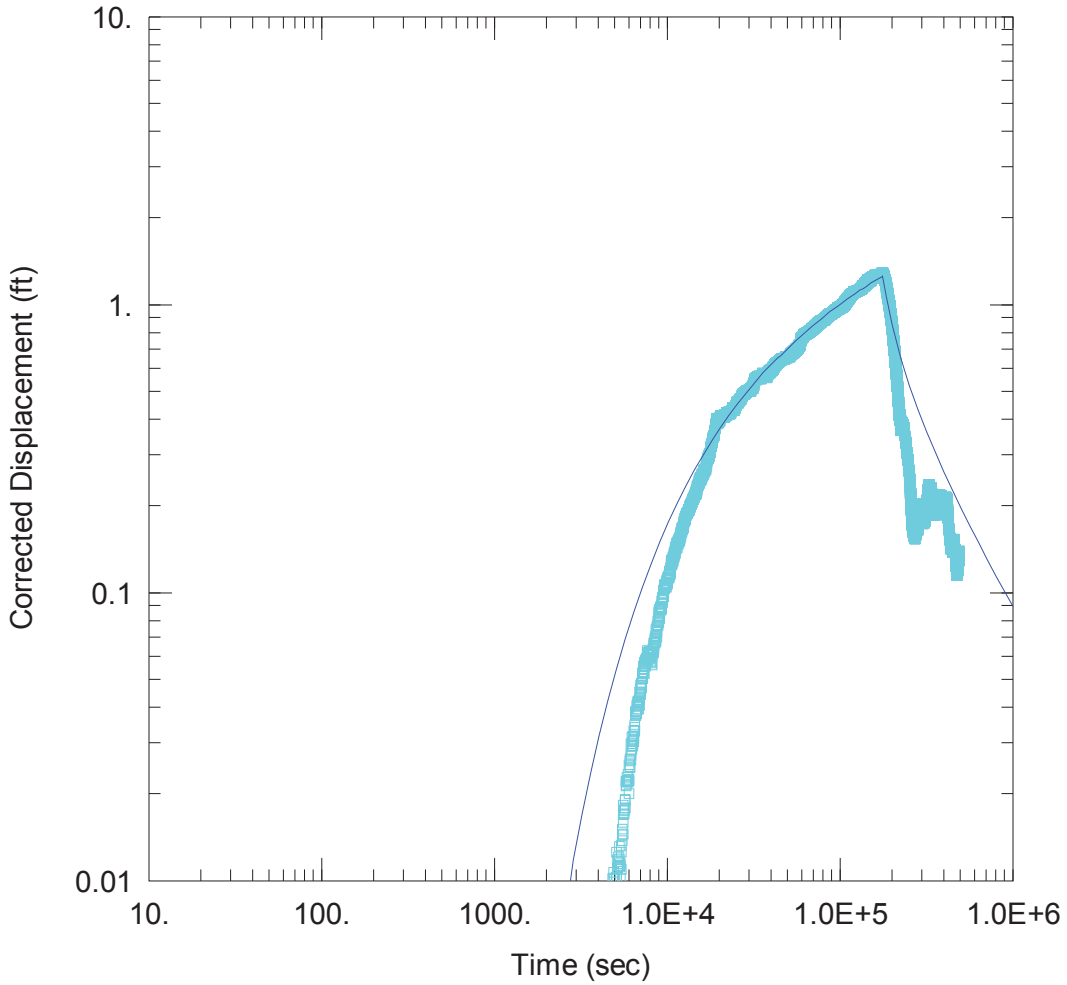
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-7	0.28	-8.407

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 186.7 ft^2/day
S = 0.001676
Kz/Kr = 0.1
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: C:\...\MW-10 Theis.aqt
Date: 08/01/14 Time: 09:31:20

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

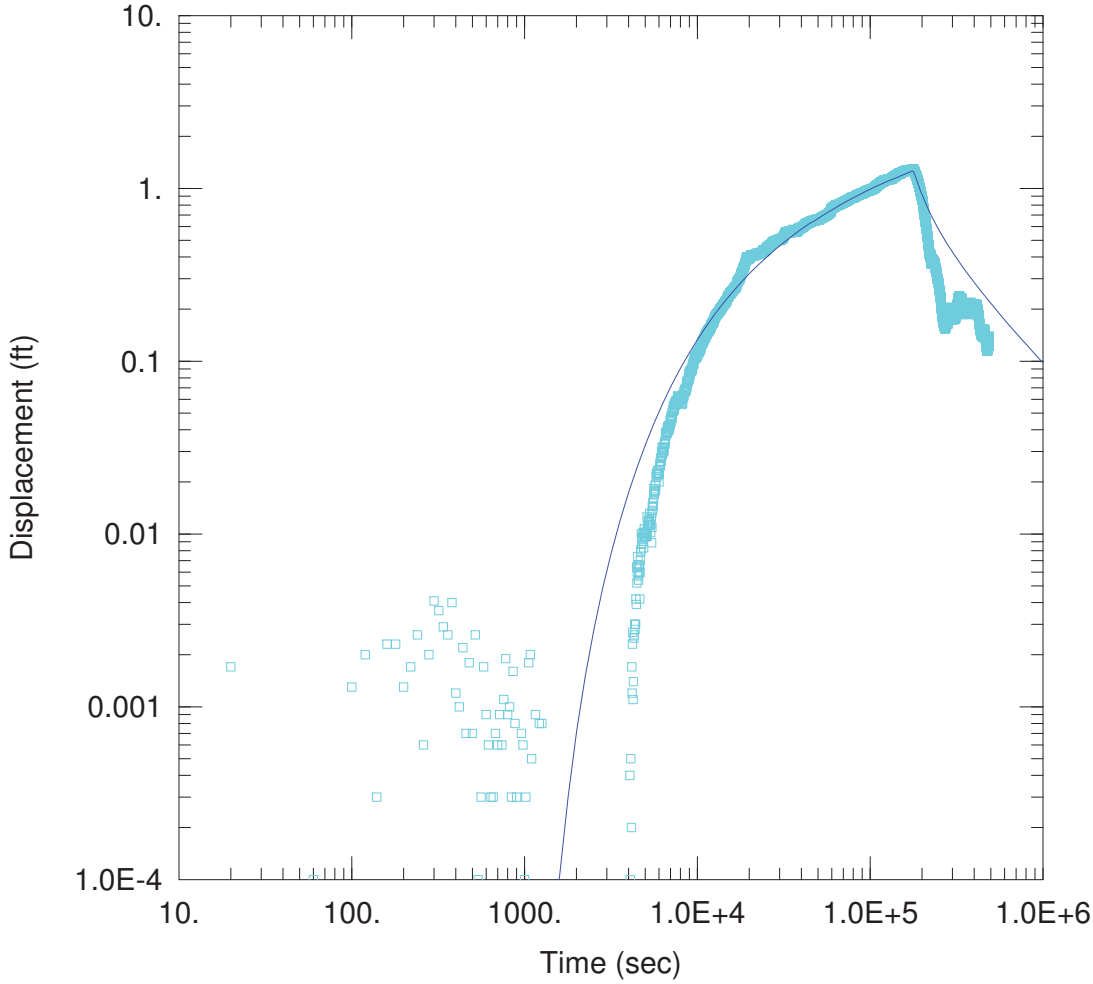
Well Name	X (ft)	Y (ft)
MW-10	-53.1	-161.5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 324.4 ft^2/day
Kz/Kr = 1.

S = 0.003752
b = 115. ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-10.aqt
Date: 07/23/14 Time: 09:28:58

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 72.76 ft Slab Block Thickness: 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

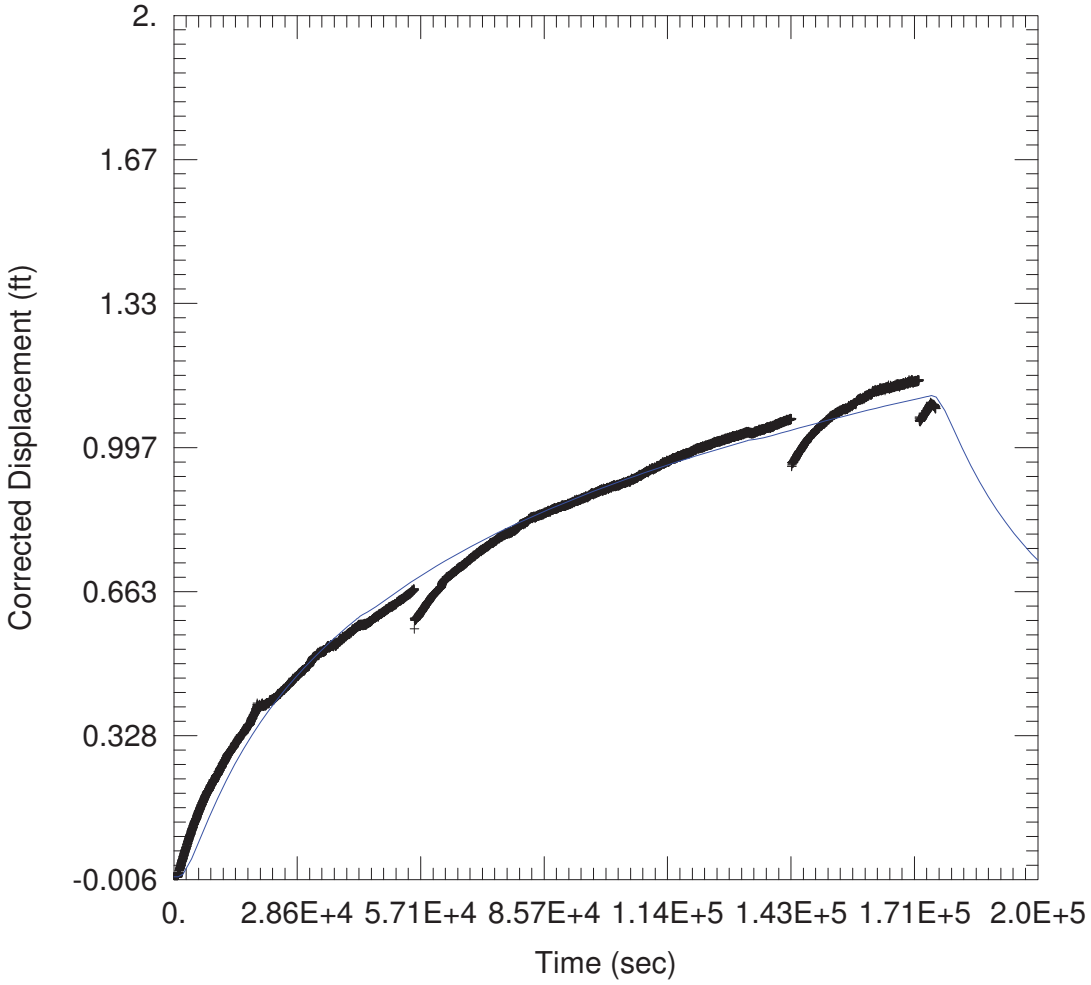
Well Name	X (ft)	Y (ft)
MW-10	-53.1	-161.5

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 4.079 ft/day
K' = 2.253E+4 ft/day
Sw = 0.05982
r(w) = 0.833 ft

Ss = 2.176E-5 ft^{-1}
Ss' = 3.723E-5 ft^{-1}
Sf = 0.
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-13.aqt
Date: 07/23/14 Time: 09:28:42

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

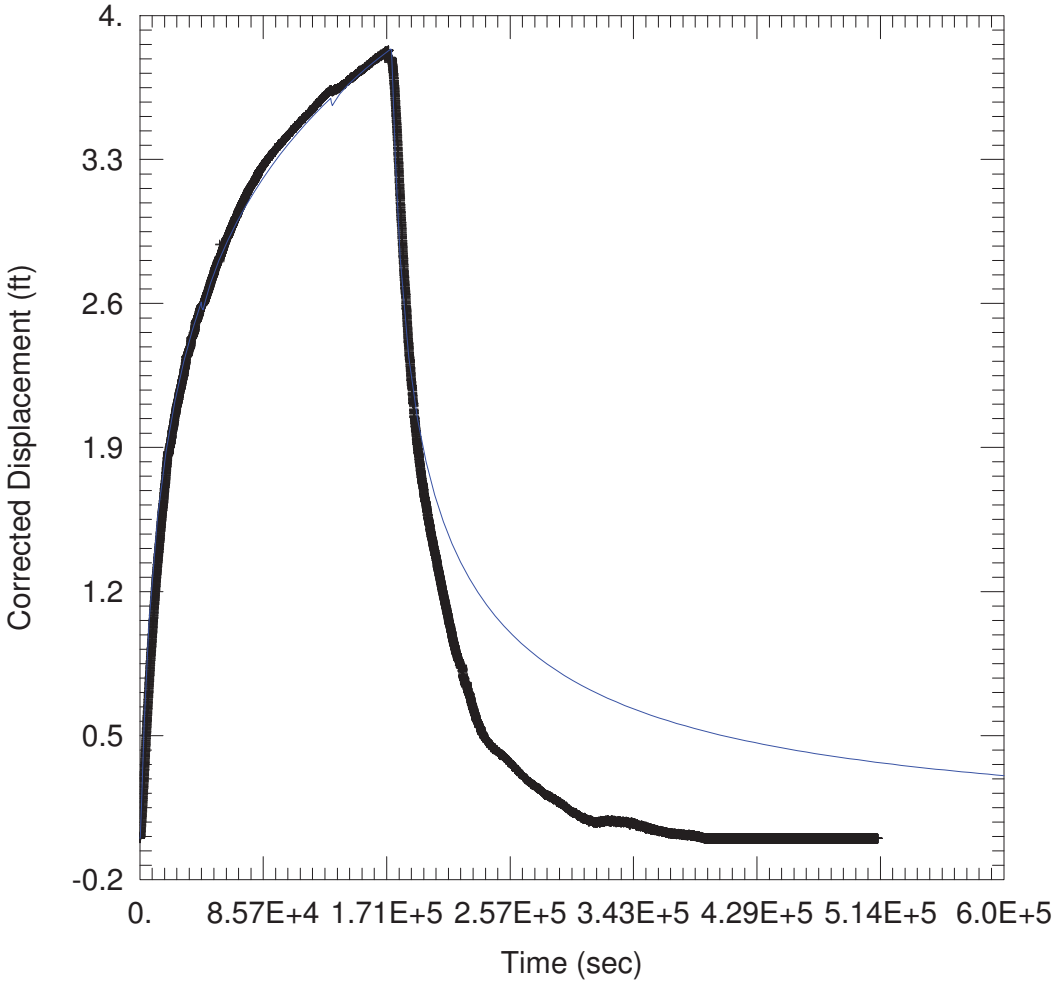
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-13	-35.5	59.6

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 387.8 ft^2/day
S = 0.02232
Kz/Kr = 0.1
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-15.aqt
Date: 07/23/14 Time: 09:28:24

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

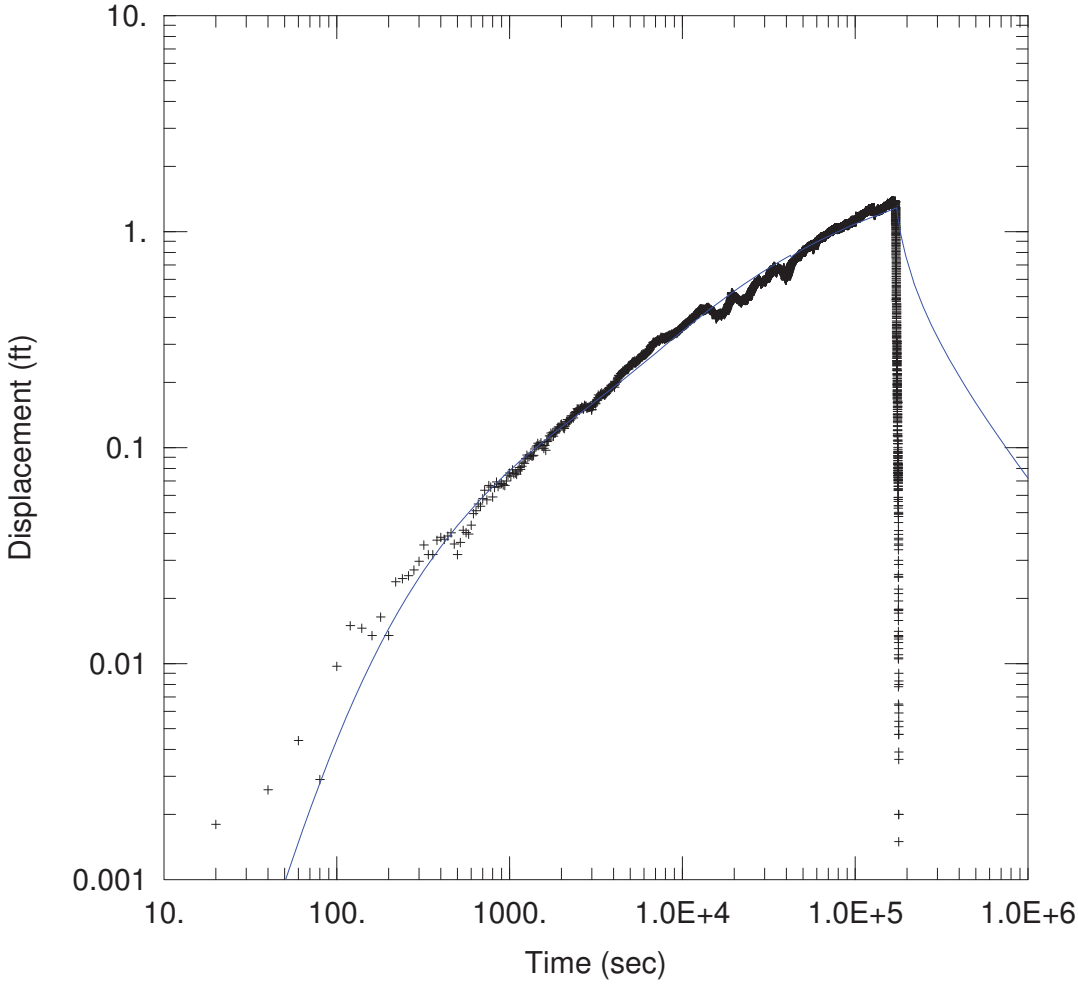
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-15	10.66	22.255

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 171.7 ft^2/day
S = 0.01735
Kz/Kr = 0.1
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-16D Moench.aqt
Date: 07/23/14 Time: 09:23:38

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 150. ft Slab Block Thickness: 10. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

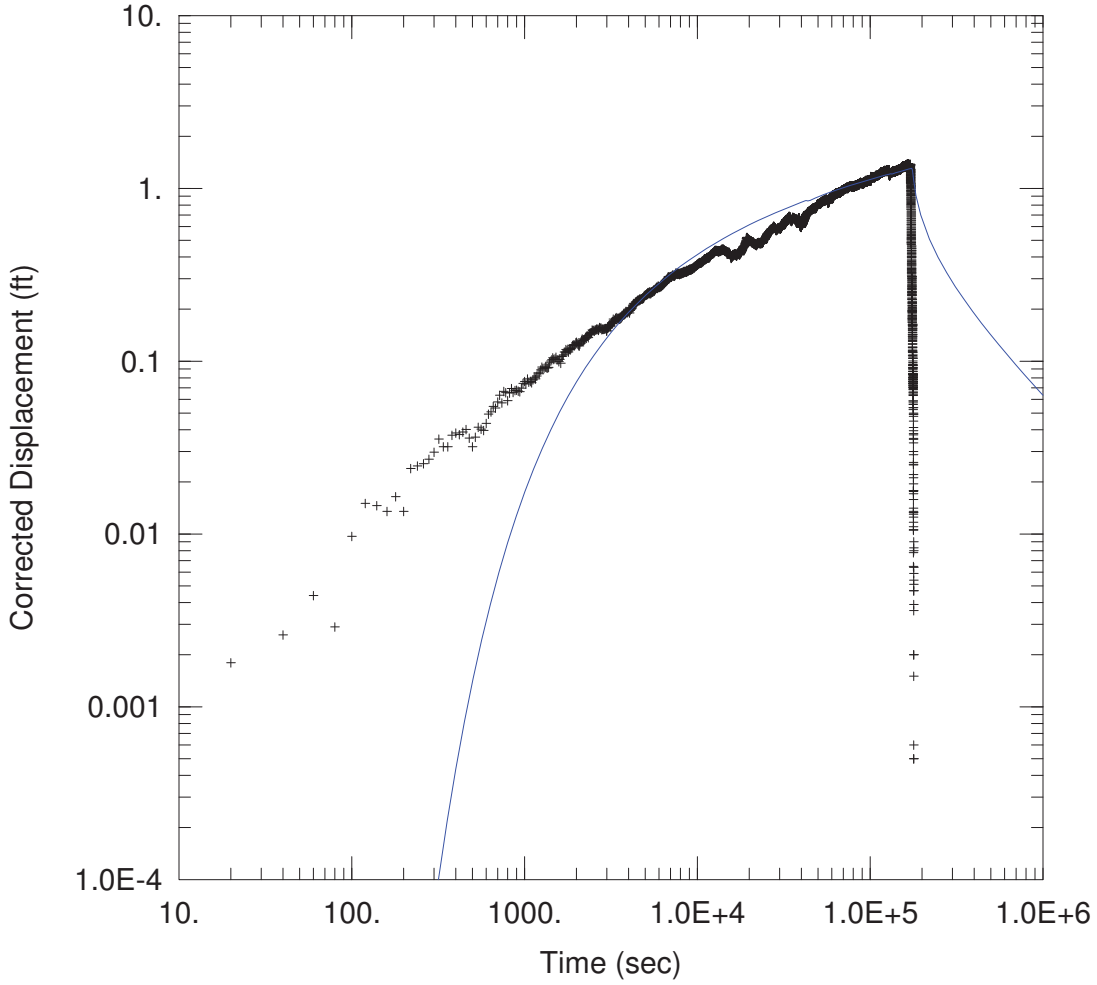
Well Name	X (ft)	Y (ft)
+ MW-16D	9.42	107.75

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 2.693 ft/day
K' = 0.009694 ft/day
Sw = 6.025
r(w) = 0.833 ft

Ss = 4.287E-12 ft^{-1}
Ss' = 3.548E-5 ft^{-1}
Sf = 0.
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-16D Theis.aqt
Date: 07/23/14 Time: 09:23:21

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

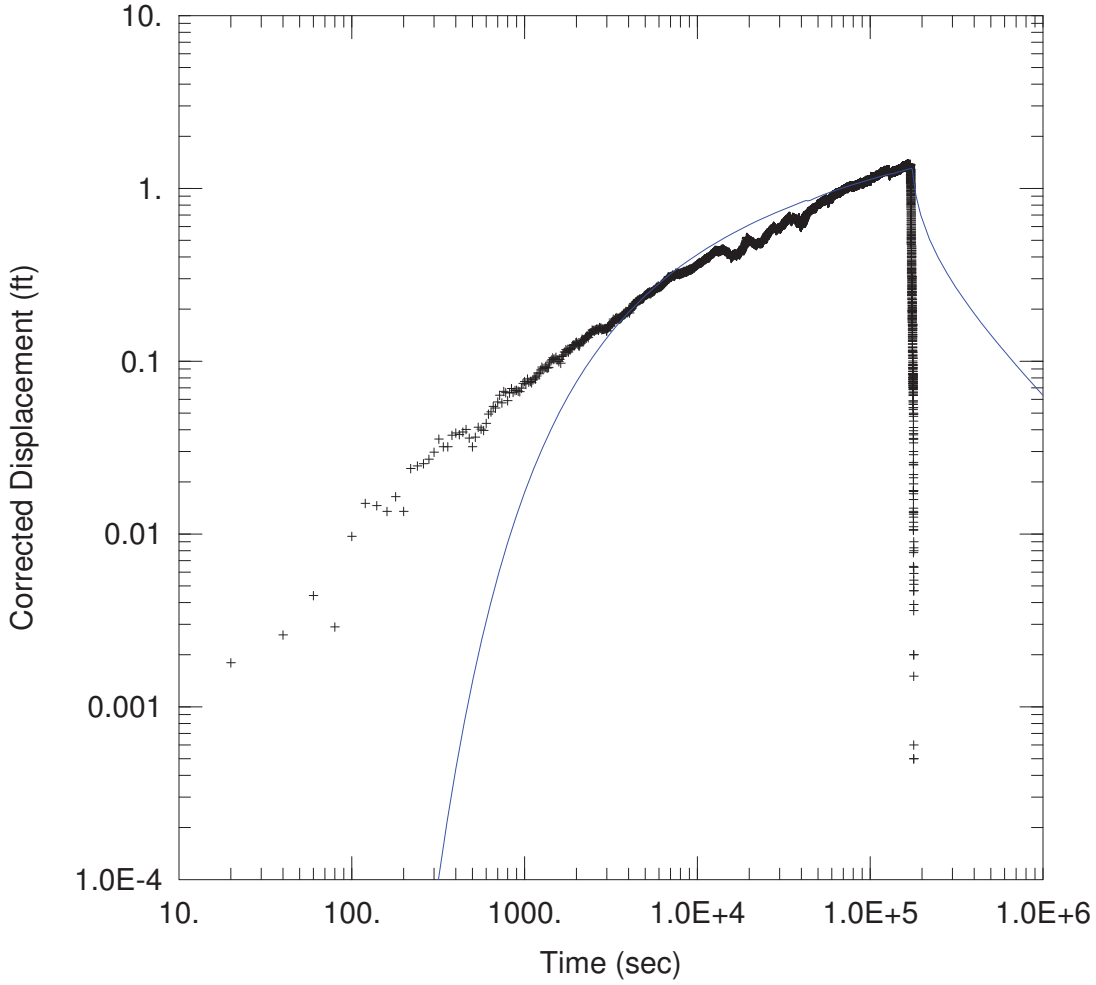
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-16D	9.42	107.75

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 459.7 ft^2/day
S = 0.003556
Kz/Kr = 1.
b = 150. ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-16D.aqt
Date: 07/23/14 Time: 09:23:11

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

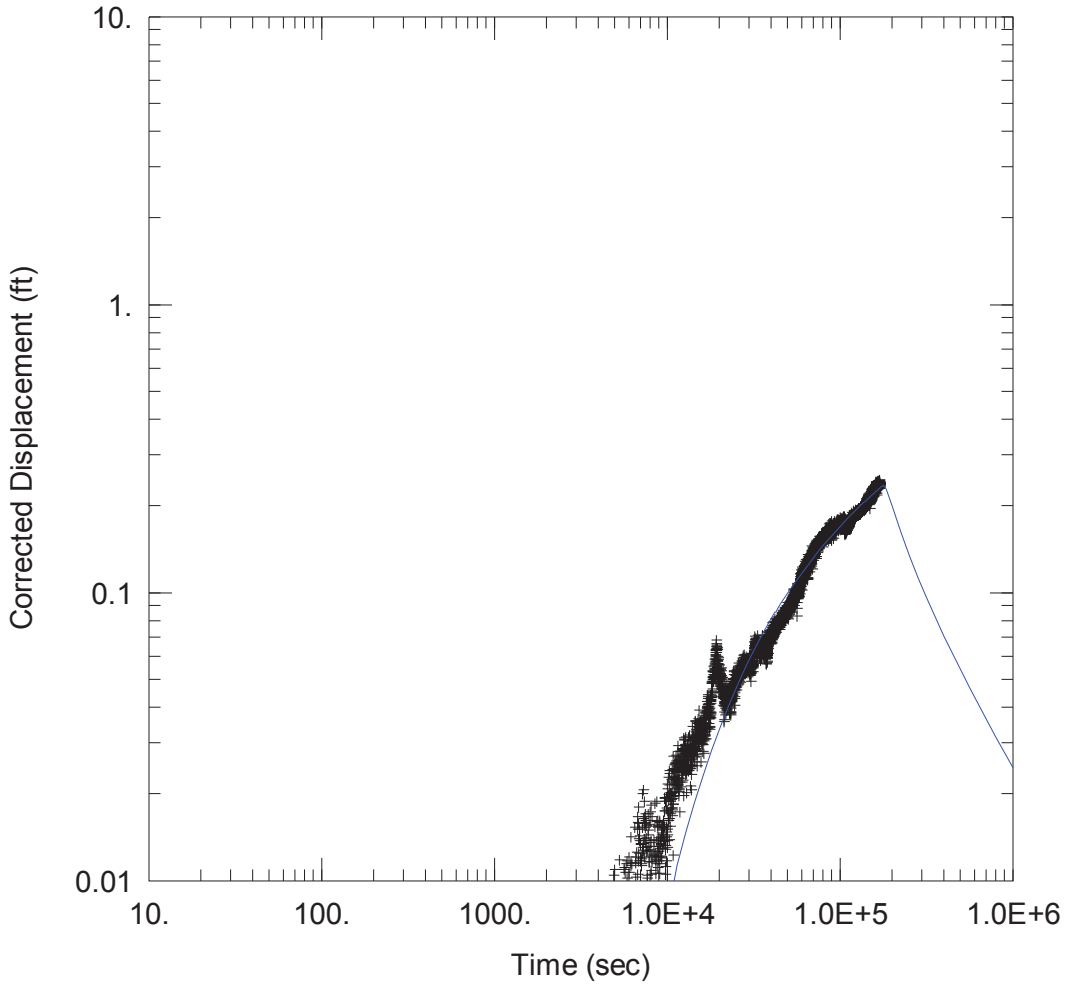
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-16D	9.42	107.75

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 459.7 ft^2/day
S = 0.003556
Kz/Kr = 1.
b = 150. ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-18D.aqt
Date: 08/01/14 Time: 09:33:50

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

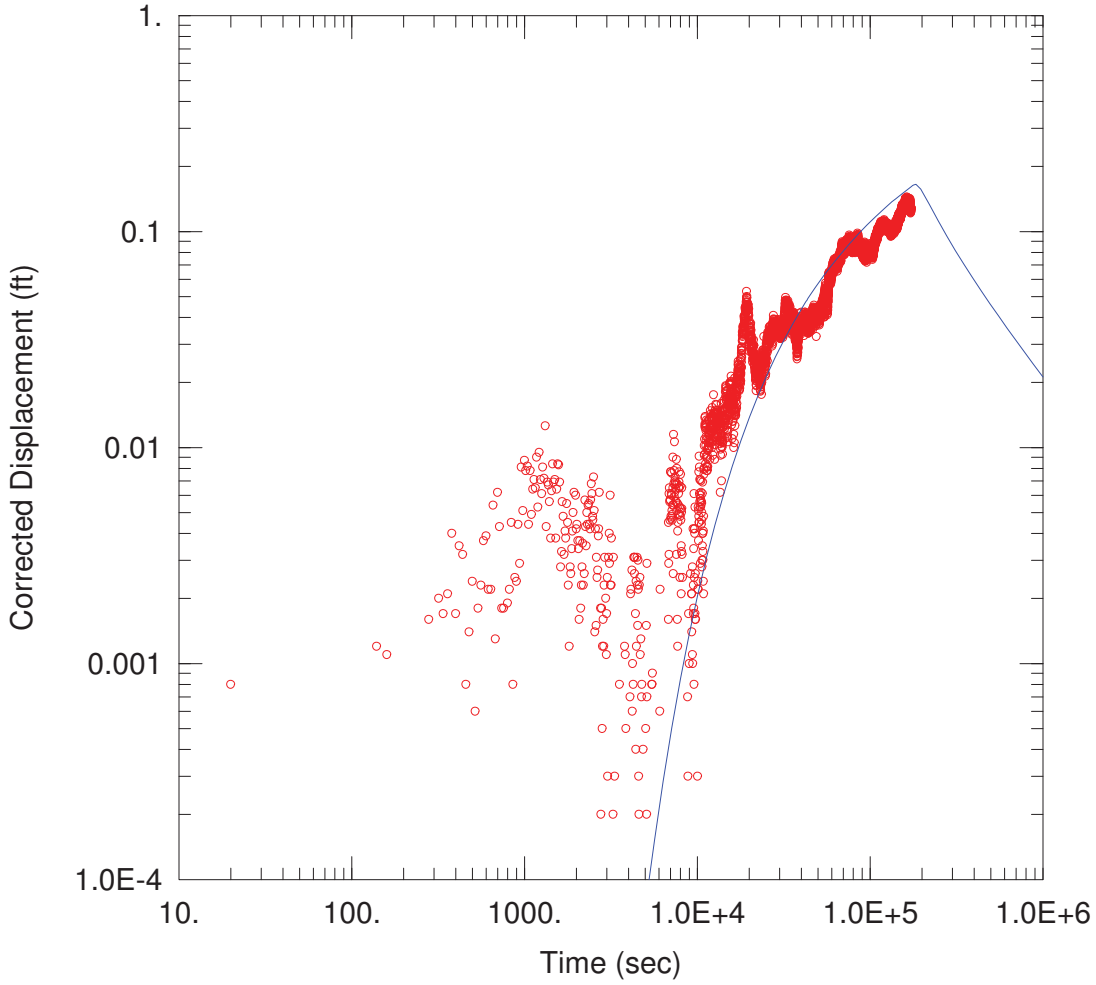
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-18D	70	106

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1160.2 ft^2/day
S = 0.06162
Kz/Kr = 1.
b = 132. ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-20D.aqt
Date: 07/23/14 Time: 09:22:40

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

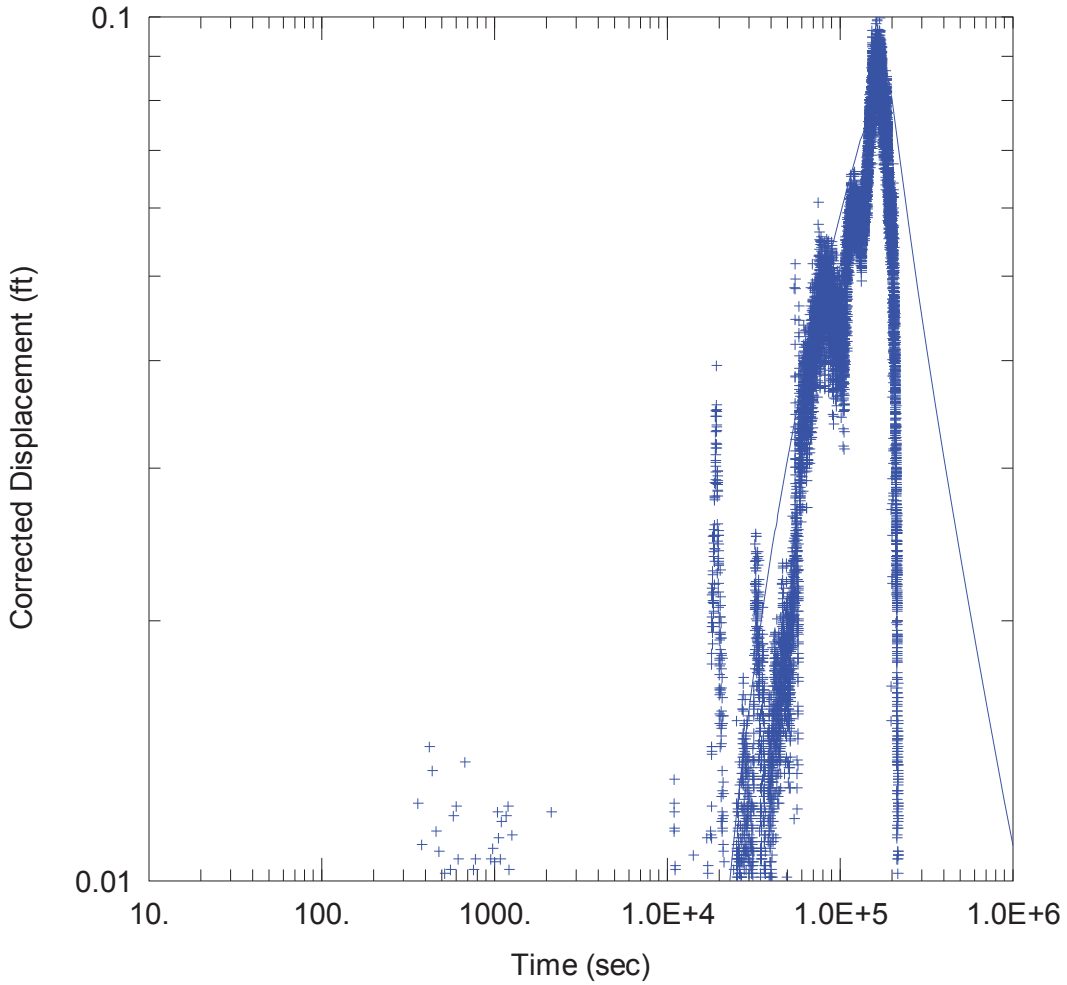
Observation Wells

Well Name	X (ft)	Y (ft)
○ MW-20D	162.6	-60.8

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1337.5 ft^2/day
S = 0.05662
Kz/Kr = 1.
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-21I.aqt
Date: 08/01/14 Time: 09:39:14

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

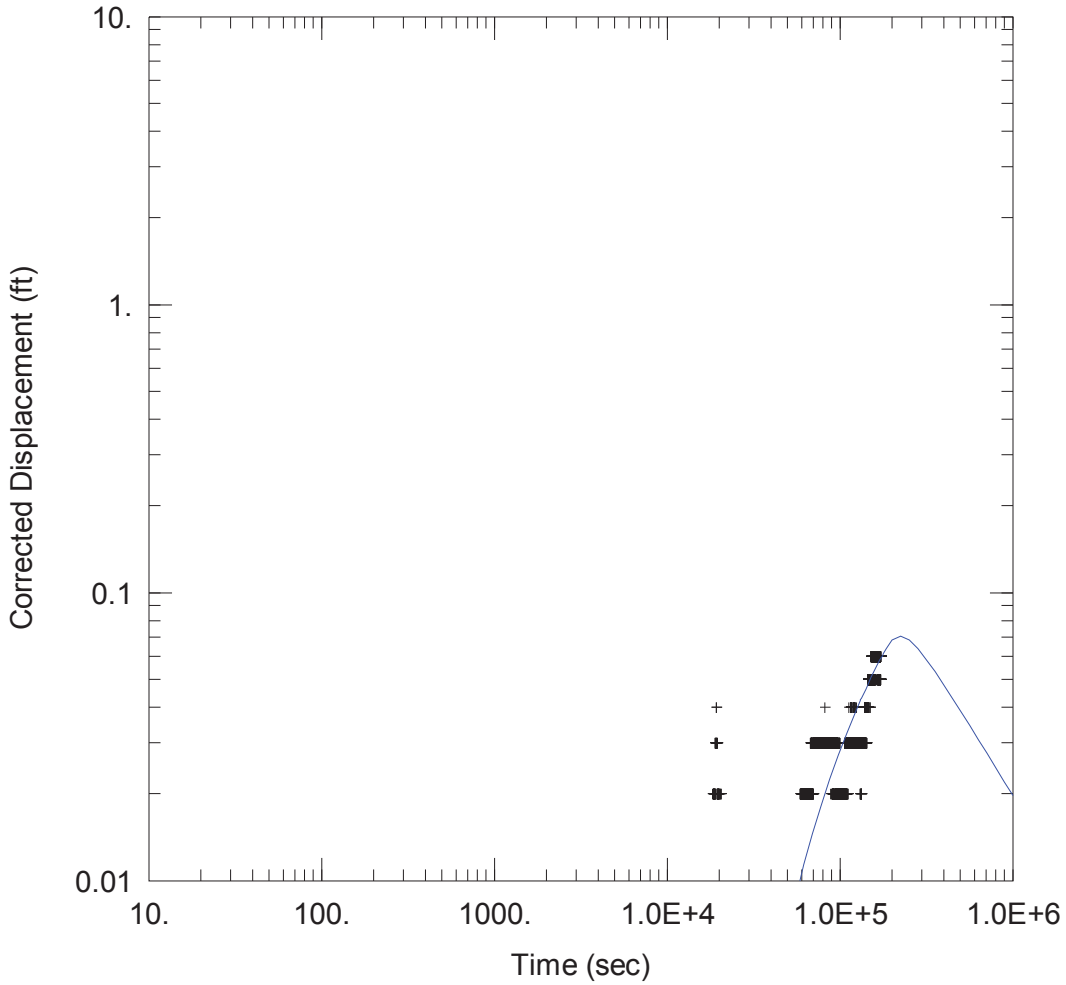
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-21I	153.7	-72.4

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 2587.8 ft^2/day
S = 0.1106
Kz/Kr = 1.
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-21S.aqt
Date: 08/01/14 Time: 09:40:11

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

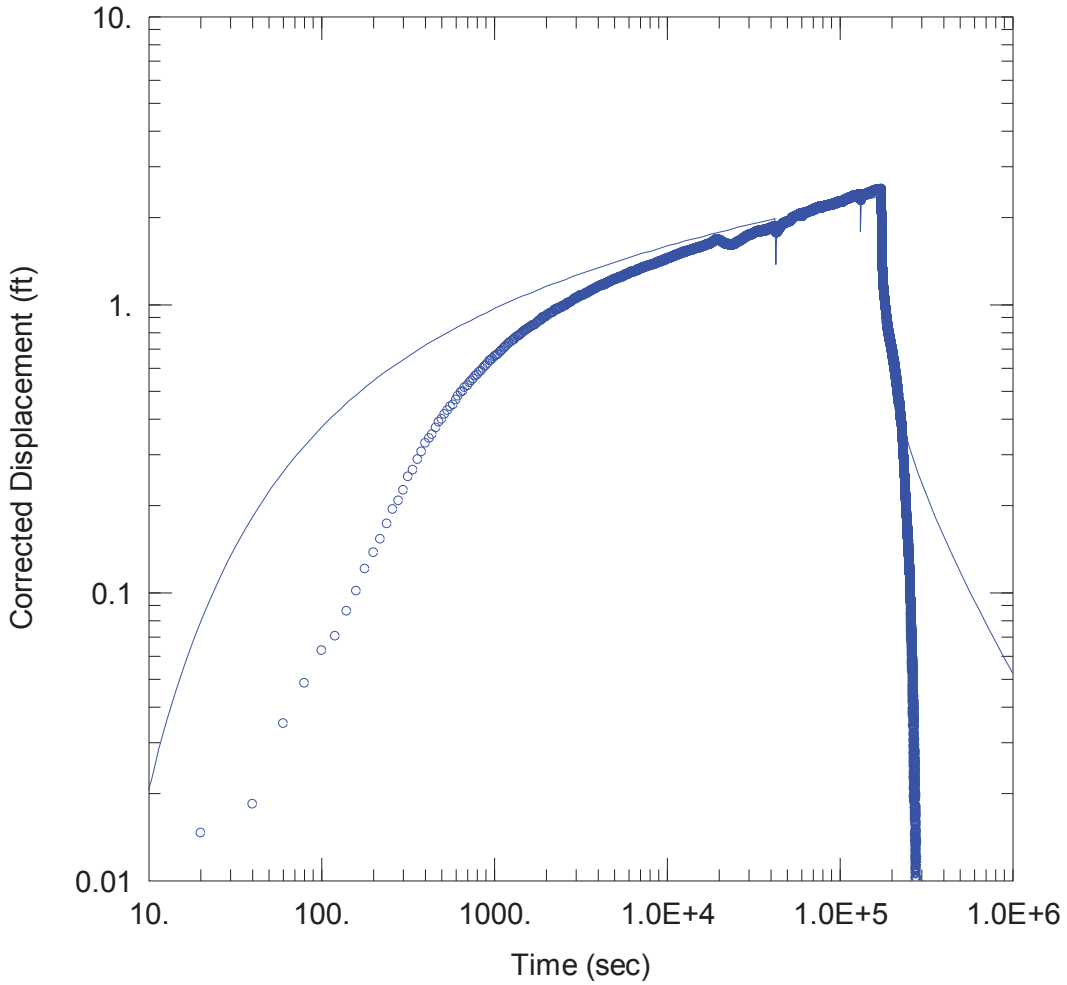
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-21S	153.7	-72.4

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1337.5 ft^2/day
S = 0.2
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-23D.aqt
Date: 08/01/14 Time: 09:43:59

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

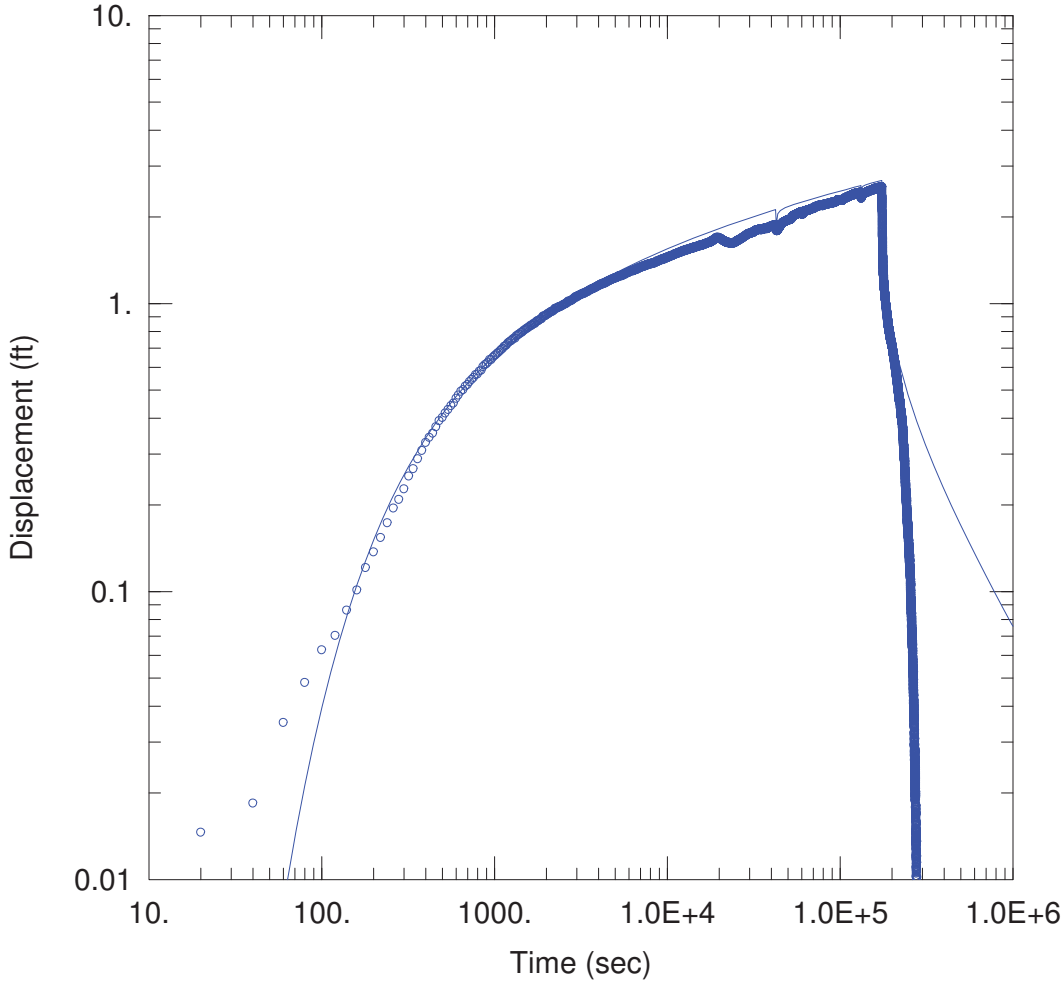
Observation Wells

Well Name	X (ft)	Y (ft)
○ MW-23D	-56	-161.5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 559. ft^2/day
S = 1.503E-5
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: U:\...\MW-23D.aqt
Date: 07/23/14 Time: 09:22:15

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 72.76 ft Slab Block Thickness: 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

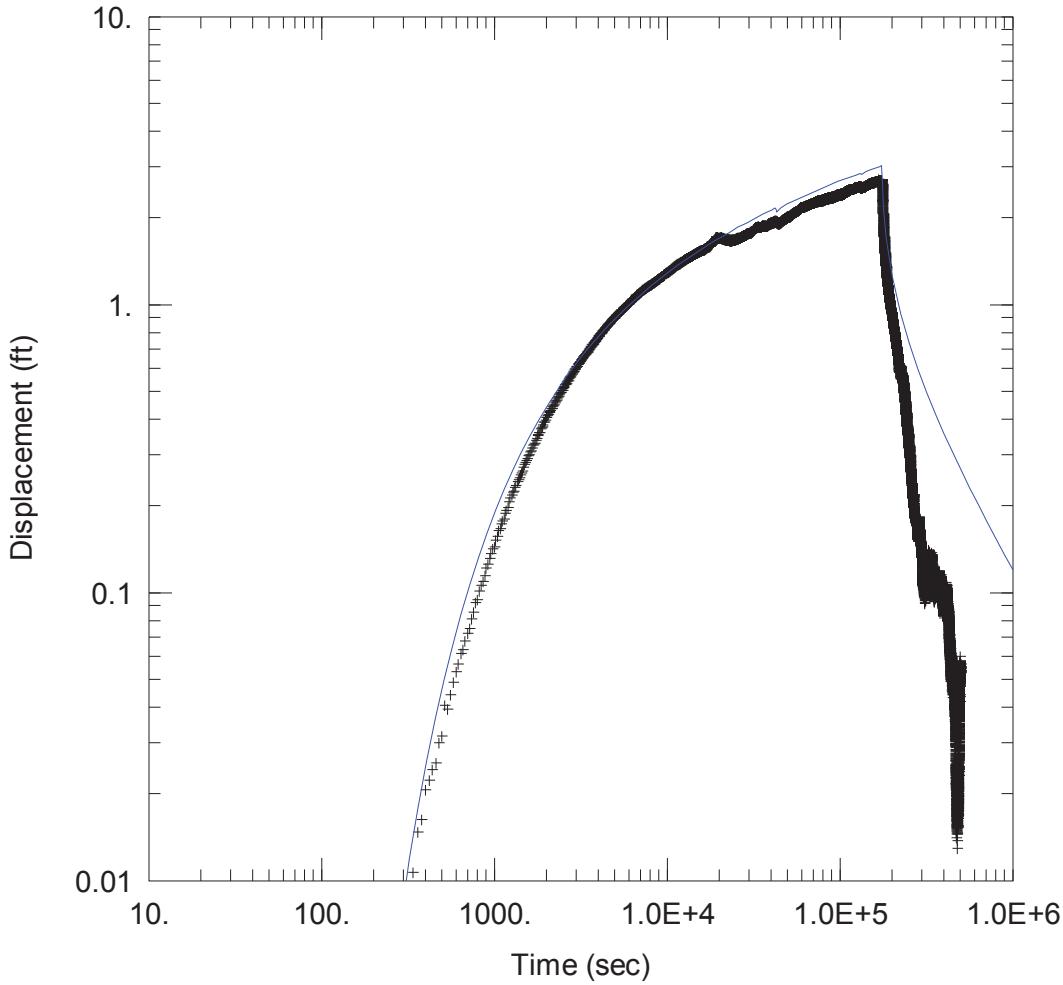
Well Name	X (ft)	Y (ft)
○ MW-23D	-56	-161.5

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 5.311 ft/day
K' = 0.9692 ft/day
Sw = 0.05982
r(w) = 0.833 ft

Ss = 8.308E-7 ft^{-1}
Ss' = 1.274E-7 ft^{-1}
Sf = 0.
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-24.aqt
Date: 08/01/14 Time: 10:02:31

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 115. ft Slab Block Thickness: 10. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

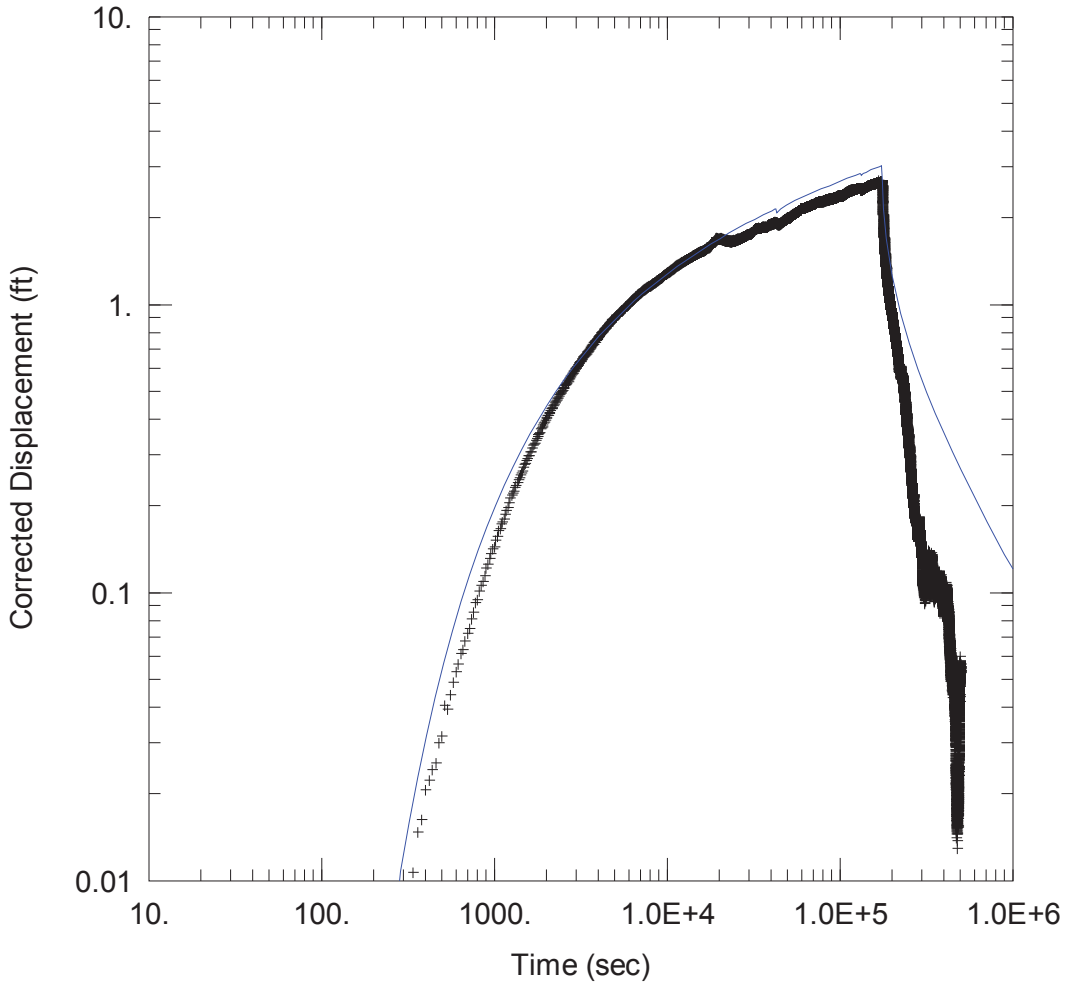
Well Name	X (ft)	Y (ft)
+ MW-24	-39.8	-159.8

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 2.12 ft/day
K' = 8.64E+4 ft/day
Sw = 0.05982

Ss = 7.857E-7 ft^{-1}
Ss' = 2.053E-6 ft^{-1}
Sf = 2.815E-5



WELL TEST ANALYSIS

Data Set: C:\Users\NStevens\Desktop\Projects\Internal\Great Falls, VA\RW-1 Pump Test\MW-24.aqt
Date: 08/01/14 Time: 10:04:13

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

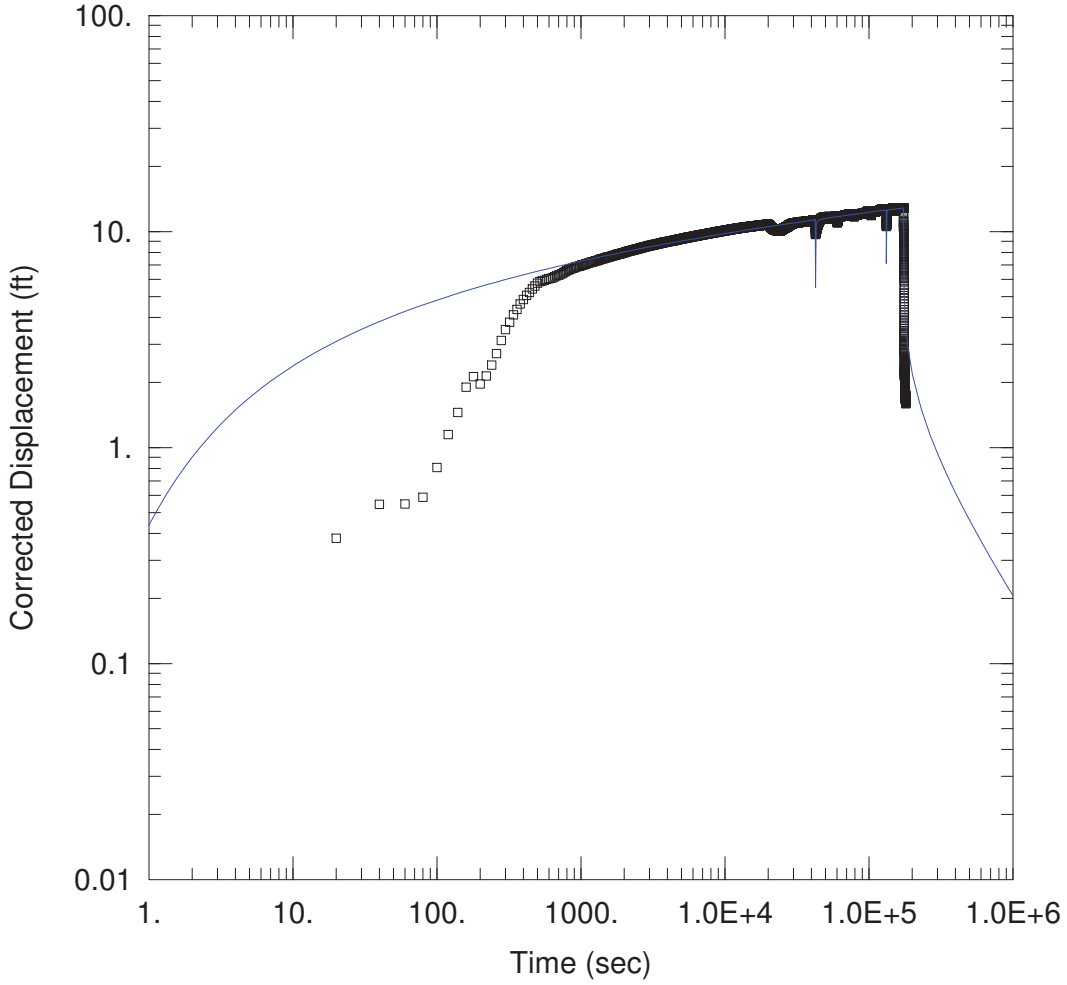
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-24	-39.8	-159.8

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 243.3 ft^2/day
S = 0.000335
Kz/Kr = 1.
b = 115. ft



WELL TEST ANALYSIS

Data Set: U:\...\RW-1 Theis.aqt
Date: 07/23/14 Time: 09:21:48

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

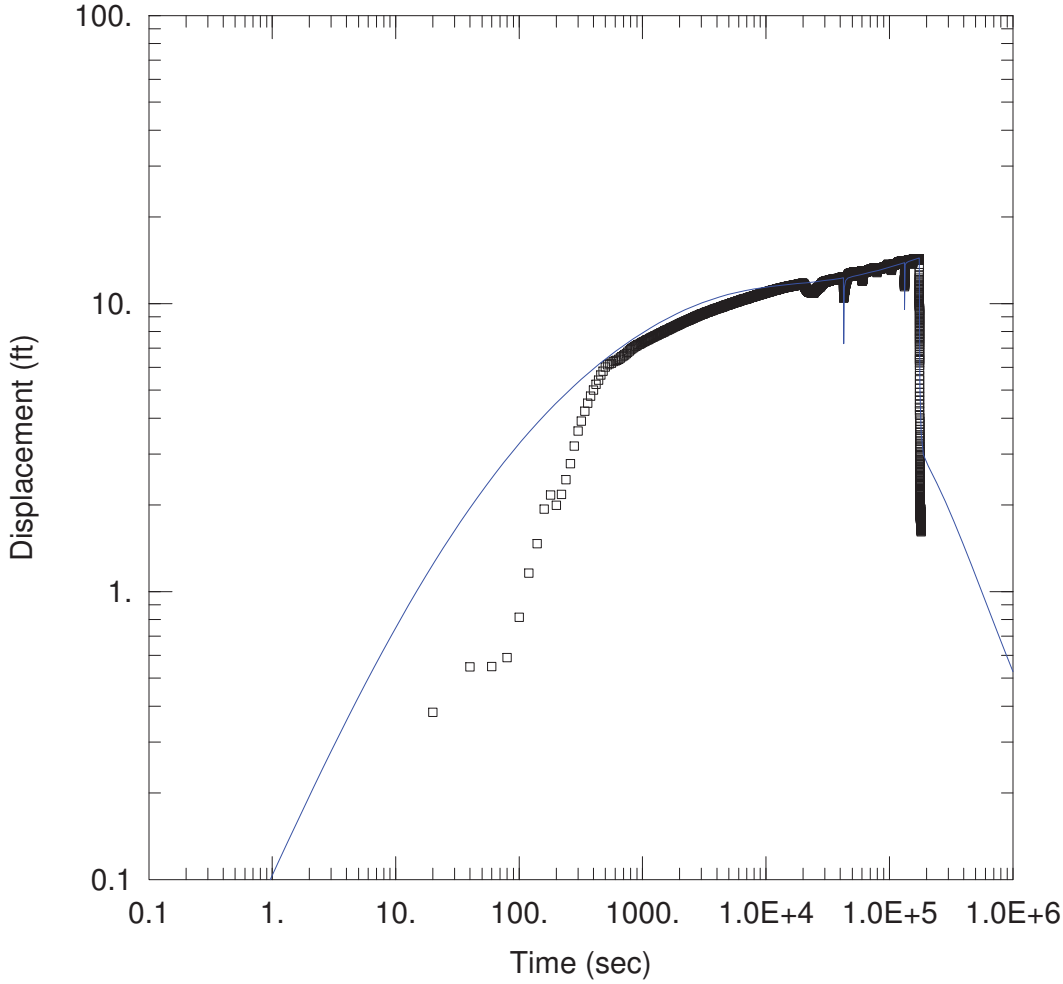
Observation Wells

Well Name	X (ft)	Y (ft)
▫ RW-1	0	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 141.7 ft^2/day
S = 0.006241
Kz/Kr = 1.
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: U:\...\RW-1.aqt
Date: 07/23/14 Time: 09:21:35

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

AQUIFER DATA

Saturated Thickness: 72.76 ft Slab Block Thickness: 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

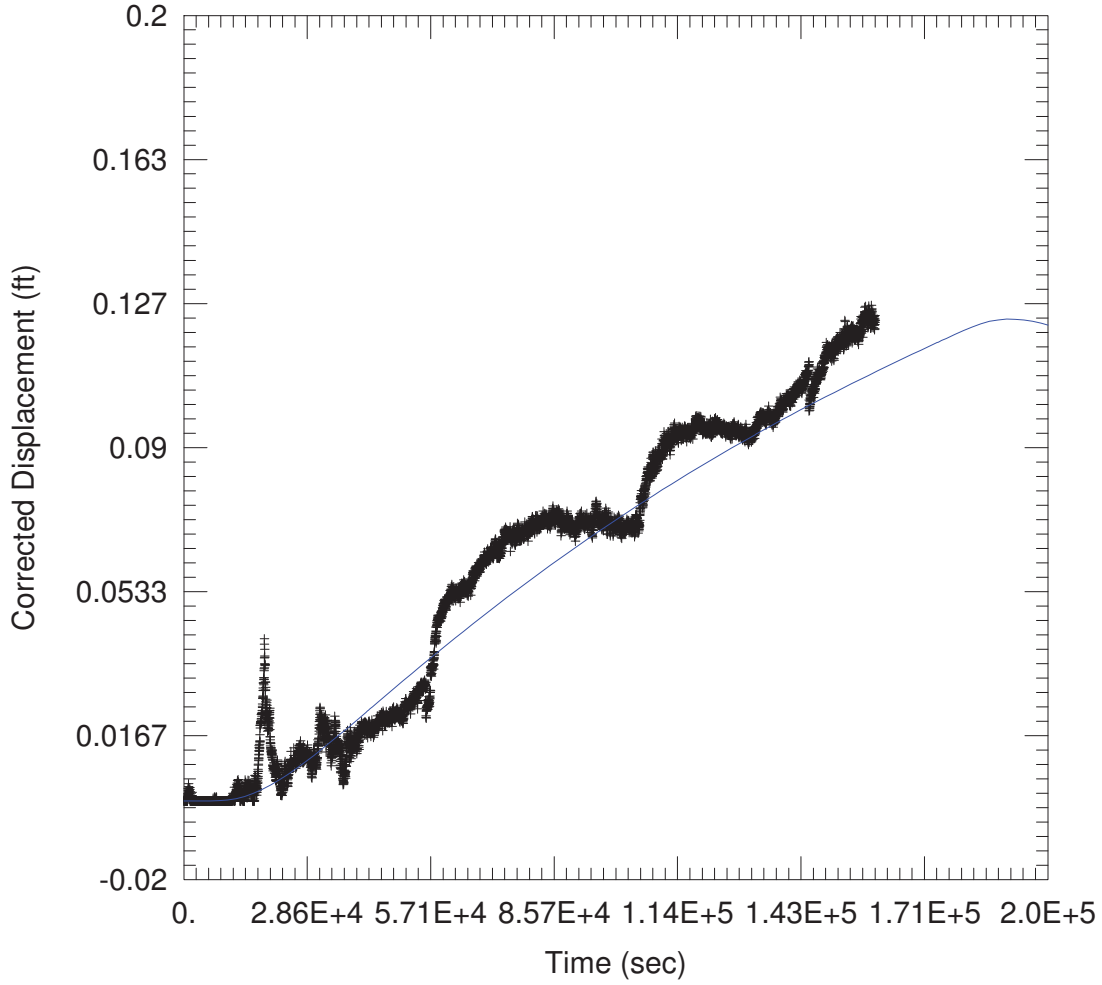
Well Name	X (ft)	Y (ft)
▫ RW-1	0	0

SOLUTION

Aquifer Model: Fractured Solution Method: Moench w/slab blocks

K = 0.7551 ft/day
K' = 0.07783 ft/day
Sw = 0.05982
r(w) = 0.833 ft

Ss = 0.001921 ft^{-1}
Ss' = 0.03405 ft^{-1}
Sf = 9.964
r(c) = 0.25 ft



WELL TEST ANALYSIS

Data Set: U:\...\W-2.aqt
Date: 07/23/14 Time: 09:21:21

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

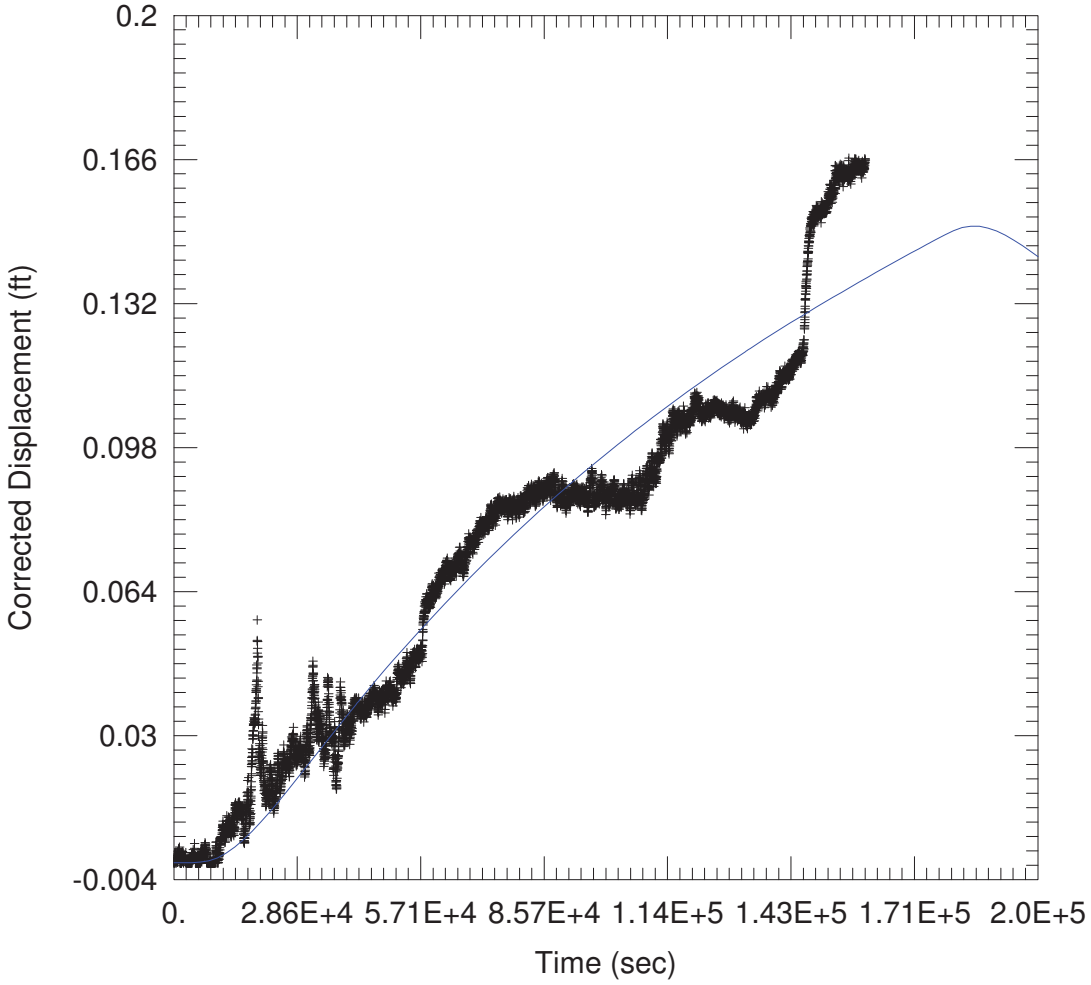
Observation Wells

Well Name	X (ft)	Y (ft)
+ W-2	115.7	22.5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1337.5 ft^2/day
S = 0.2
Kz/Kr = 1.
b = 72.76 ft



WELL TEST ANALYSIS

Data Set: U:\...\W-6.aqt
Date: 07/23/14 Time: 09:16:04

PROJECT INFORMATION

Company: Kleinfelder
Client: Fairfax Petroleum
Location: Great Falls, VA
Test Well: RW-1
Test Date: 29 April 2014

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-1	0	0

Observation Wells

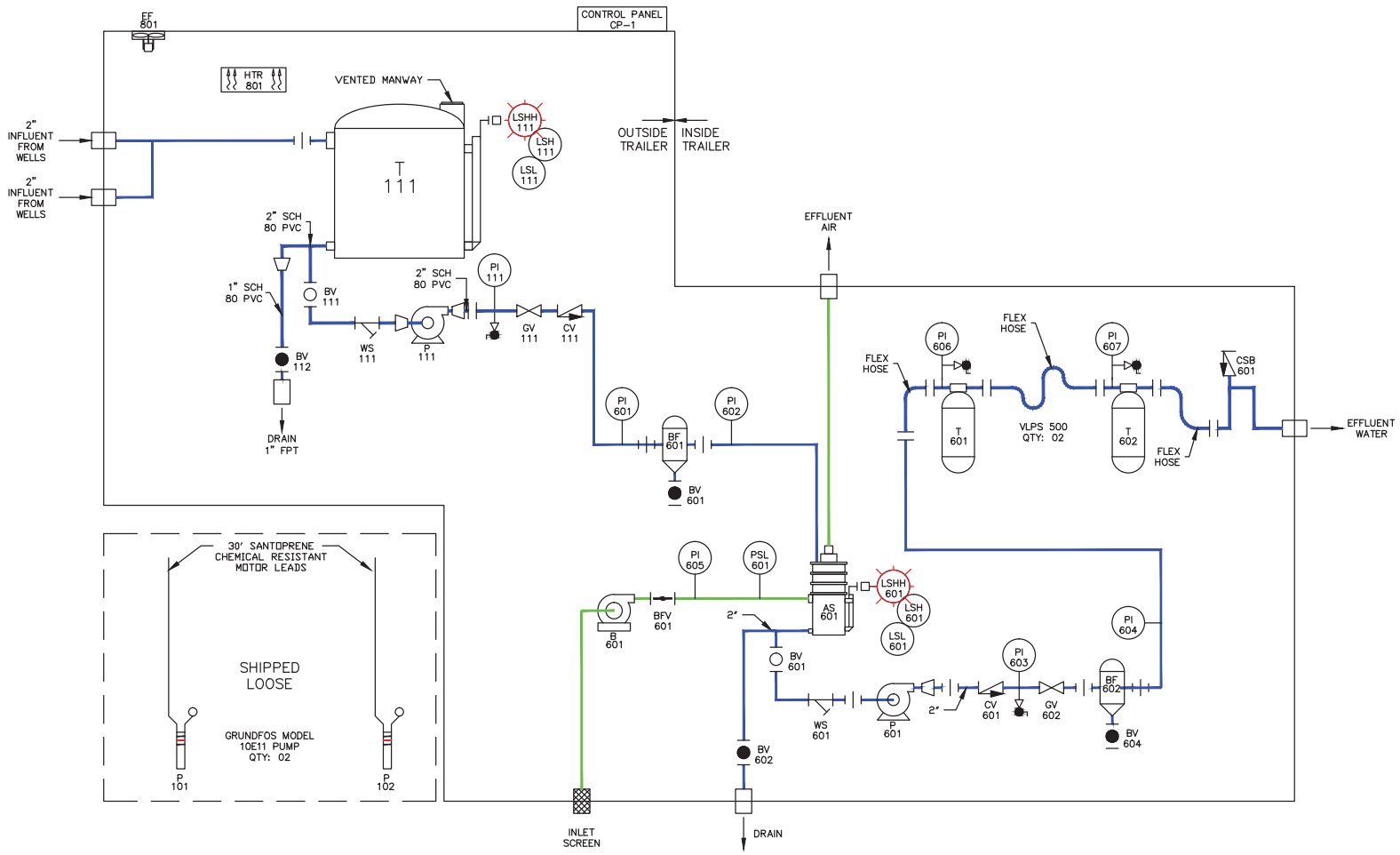
Well Name	X (ft)	Y (ft)
+ W-6	119.3	-97.6

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1337.5 ft^2/day
S = 0.08499
Kz/Kr = 1.
b = 72.76 ft

Appendix G
Process and Instrumentation Diagram



LINE COLOR CODE

- MULTIPHASE
- AIR PIPING
- AIR VENT PIPING
- LIQUID PIPING

LEGEND

LSHH XXX	LEVEL SWITCH HIGH HIGH	FQ XXX	FLOW TOTALIZER	BV XXX	BALL VALVE		CAMLOCK		SAMPLE PORT
LSH XXX	LEVEL SWITCH HIGH	PI XXX	PRESSURE INDICATOR	GV XXX	GATE VALVE	B XXX	BLOWER 3HP 240V/3P	BF XXX	BAG FILTER
LSL XXX	LEVEL SWITCH LOW	CSB XXX	CHECK SIPHON BREAK	CV XXX	CHECK VALVE	CONTROL PANEL CP-1	CONTROL PANEL	AS XXX	AIR STRIPPER AS-2-2-4 2" MNPT INLET 2" MNPT OUTLET
PSL XXX	PRESSURE SWITCH LOW		CRITICAL DEVICE	WS XXX	WYE STRAINER		REDUCER		
					UNION	P XXX	PUMP 3/4HP 240V/3P		

ESD Waste & Water, Inc.
495 Oak Road
Ocala, FL 34472

PREPARED FOR: ESD RENTAL DIVISION

PROJECT NAME: R-30 AIR STRIPPER SYSTEM

TITLE: P&ID

DRAWN BY: PMG

ENGINEERING: MF

MFG:

QC:

DATE: 06/30/14

DWG NO:

SCALE: NTS

SHEET: 01 OF 01