FACILITY NAME: Point Store

FACILITY ID #: 44-12044

REPORT/PLAN PREPARER: Mountain Research, LLC
(Name of Company, Michael R. Crowe, P.G.
Individual & Phone #) (814) 949-2034, Ext. 210

CORRECTIVE ACTION PROGRESS REPORT/PLAN COVER SHEET

CHAPTER 245 STORAGE TANK ACT

- ☐ Site Characterization Report - Section 245.310(b)
- ☐ Site Characterization Report - Section 245.310(a)
- ■ Site Characterization Report - Site-Specific Standard SUPPLEMENTAL
- ☐ Site Characterization Report - Statewide Health or Background Standard
- ☐ Remedial Action Plan - Statewide Health or Background Standard
- ■ Remedial Action Plan - Site Specific Standard
- ☐ Remedial Action Progress Report
- ☐ Remedial Action Completion Report - Statewide Health or Background Standard
- ☐ Remedial Action Completion Report - Site-Specific Standard

(Check all that apply to the enclosed submission)

**SUPPLEMENTAL SITE CHARACTERIZATION REPORT
AND REMEDIAL ACTION PLAN**

**POINT STORE
5867 HIGHWAY 522 NORTH
DECATUR TOWNSHIP, MIFFLIN COUNTY, PENNSYLVANIA
PADEP FACILITY ID #44-12044
USTIF CLAIM #2014-0116(S)**

PROFESSIONAL CERTIFICATION:

Professional Geologist:

Print or Type Name: Michael R. Crowe, P.G.

Signature: _____

Date: September 11, 2018

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SUPPLEMENTAL SITE CHARACTERIZATION REPORT AND REMEDIAL ACTION PLAN

POINT STORE
5867 HIGHWAY 522 NORTH
DECATUR TOWNSHIP, MIFFLIN COUNTY, PENNSYLVANIA
PADEP FACILITY ID #44-12044
USTIF CLAIM #2014-0116(S)

Prepared for

MR. JEFF BELL
POINT STORE
LEWISTOWN, PENNSYLVANIA

Prepared by

MOUNTAIN RESEARCH, LLC
ALTOONA, PENNSYLVANIA

SEPTEMBER 2018

Prepared by: _____ **Reviewed by:** _____

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POINT STORE\SSCR RAP\SSCR RAP APX – SEPT 2018
Project No. 4559.15.01

September 11, 2018

Cynthia Stine, P.G.
Pennsylvania Department of Environmental Protection
Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, Pennsylvania 17110

Re: Supplemental Site Characterization Report and Remedial Action Plan
Point Store
5867 Highway 522 North
Decatur Township, Mifflin County, Pennsylvania
PADEP Facility ID #44-12044
USTIF Claim #2014-0116(S)

Dear Ms. Stine:

Please find enclosed the original of the Supplemental Site Characterization Report and Remedial Action Plan prepared by Mountain Research, LLC for the above-referenced site.

Should you have any questions regarding the enclosed report or require any additional documentation in order to complete the report review and approval process, please contact the undersigned at (814) 949-2034, Ext. 210 or via e-mail at mcrowe@mountainresearch.com.

Sincerely,
MOUNTAIN RESEARCH, LLC

Michael R. Crowe, P.G.
Project Manager III

MRC:ll
Enclosure
C: Jeff Bell – Point Store

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SUPPLEMENTAL SITE CHARACTERIZATION REPORT AND REMEDIAL ACTION PLAN

POINT STORE
5867 HIGHWAY 522 NORTH
DECATUR TOWNSHIP, MIFFLIN COUNTY, PENNSYLVANIA
PADEP FACILITY ID #44-12044
USTIF CLAIM #2014-0116(S)

1.0 EXECUTIVE SUMMARY

- A petroleum release was identified at the Point Store Property during underground storage tank (UST) removal activities conducted in August 2014 prompting site characterization activities.

- The source of the release is interpreted to be leakage from the former unleaded gasoline product dispenser. The release is believed to have been chronic in nature and the volume of released product is unknown.

- An overburden aquifer is identified at the site. Groundwater gradient within the overburden is to the southeast toward Jack's Creek.

- A shallow bedrock aquifer is identified at the site. Groundwater gradient within the shallow bedrock is to the southeast toward Jack's Creek.

- Separate phase liquid (SPL) has not been identified at the site.

- The subject property and surrounding properties are supplied water through use of private supply wells.

- Mountain Research installed soil borings, overburden monitoring wells/piezometers, bedrock monitoring wells/piezometers from October 2016 through January 2018.

- In September 2017, Mountain Research submitted a Site Characterization Report (SCR).

- Analytical results from groundwater samples collected from overburden monitoring wells identified 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, and naphthalene at concentrations above their respective Pennsylvania Department of Environmental Protection (PADEP) Residential Used Aquifer (RUA) groundwater Medium Specific Concentration (MSC) at locations on and off of the subject property.

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1.0 EXECUTIVE SUMMARY (Continued)

- Analytical results from groundwater samples collected from bedrock monitoring wells identified 1,2,4-trimethylbenzene, ethylbenzene, and total xylenes, but at concentrations below their respective PADEP RUA groundwater MSCs at off-site downgradient bedrock monitoring wells.

- Analytical results from soil samples collected from soil borings identified 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene at concentrations above their respective PADEP RUA soil to groundwater MSC at locations on and off of the subject property.

- Based upon the comprehensive soil and groundwater data set, soil and groundwater impacts have been delineated, both laterally and vertically.

- Migration vectors for petroleum impact are interpreted to include: gravel material used as a sub base beneath the macadam/gravel surface at the property, gravel fill used in UST closure activities, and the sloping bedrock surface.

- Geophysical borehole logging was completed to determine the exact construction detail of the Point Store well and the Mellott well.

- Aquifer pump testing of the Point Store well and Mellott well was completed. The Point Store Pumping test showed an influence on surrounding shallow bedrock monitoring points and no apparent influence on overburden monitoring points. The Mellott Pumping test showed no apparent influence on any of the shallow bedrock or overburden monitoring points.

- A Vapor Intrusion (VI) evaluation identified potential VI sources in soil and groundwater. Additional site characterization (site-specific VI investigation), mitigation, and/or remedial activities are warranted to address soil vapor conditions at the site.

- Groundwater sample data and quantitative fate and transport modeling indicates dissolved phase 1,2,4-trimethylbenzene, benzene, ethylbenzene, MTBE, and naphthalene are currently or will migrate beyond the bounds of the subject property at concentrations above their respective PADEP RUA groundwater MSC within 30 years. Ethylbenzene is predicted to migrate off-site beneath Route 522; 1,2,4-trimethylbenzene, benzene, MTBE, and naphthalene are predicted to migrate across Route 522 onto the Mellott property. COCs are not predicted to migrate to the area of the Mellott well or Jack's Creek within 30 years.

- At this time, the proposed remedial standard for the property is the Site Specific Standard (SSS) for soil and groundwater.

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1.0 EXECUTIVE SUMMARY (Continued)

- Proposed active remediation will consist of limited on-site and off-site soil excavation and disposal to reduce the source material with a slurry application of Regenesis Advanced Oxygen Release Compound (ORC Advanced®) prior to backfilling to aid in establishing post-excavation groundwater plume stability.

2.0 INTRODUCTION

A petroleum release was identified at the Point Store Property (subject property) during UST removal activities conducted in August 2014. Based on the presence of petroleum impacted soil and groundwater, a PADEP Site Characterization/SCR was warranted.

Mountain Research, LLC (Mountain Research) was retained by the former owner of the Point Store property (Mr. Jeff Bell) in September 2016 to complete site characterization activities for the site located in Decatur Township, Mifflin County, Pennsylvania.

Site characterization activities were conducted in accordance with Title 25, Chapter 245, Administration of Storage Tanks and Spill Prevention Program, Subchapter D, Section 309. In September 2017, Mountain Research submitted a SCR in accordance with Section 310(c).

In January and February of 2018, additional site characterization activities were conducted to further delineate soil and groundwater impacts.

The following site characterization objectives were developed by Mountain Research:

- Identify the extent of impacted groundwater.
- Identify the extent of impacted soil.
- Describe the study area geology, hydrogeology, aquifer characteristics, and physical parameters such that a remediation standard and strategy for the site can be selected.
- Develop a site conceptual model from which the fate and transport of constituents can be evaluated by modeling or analysis.
- Evaluate potential Vapor Intrusion into Buildings (VIB) risks.

The activities conducted prior to the submittal of the September 2017 SCR include the following:

- Geophysical Investigation
- Advancement of 41 soil borings
- Collection and analysis of soil samples from soil borings
- Installation of 13 overburden monitoring wells
- Collection and analysis of groundwater samples from overburden monitoring wells
- Measurement of overburden groundwater elevations and deriving direction of groundwater flow and gradient from these measurements
- Aquifer testing

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2.0 INTRODUCTION (Continued)

- Development of conceptual site model
- Fate and transport modeling
- Identification of potential preferential pathways for groundwater and/or vapor migration
- VIB risk evaluation
- Professional site survey

The following additional site characterization activities were conducted in January and February 2018:

- Advancement of 14 additional soil borings (SB-33R, SB-42 through SB-44, SB-45/MW-14, SB-46/MW-15, SB-47/PZ-1, SB-48/PZ-2BR, SB-49/MW-18, SB-50/MW-17, SB-51/MW-16, SB-52/MW-19BR, MW-20BR, and PZ-3BR)
- Collection and analysis of soil samples from soil borings
- Installation of five (5) overburden monitoring wells (MW-14 through MW-18) and one (1) overburden piezometer (PZ-1)
- Installation of two (2) bedrock monitoring wells (MW-19BR and MW-20BR) and two (2) bedrock piezometers (PZ-2BR and PZ-3BR)
- Development of all newly installed monitoring wells and piezometers
- Professionally survey and tie-in new soil borings, monitoring wells, piezometers, and off-site features on the Mellott property
- Collection and analysis of groundwater samples from overburden and bedrock monitoring wells, the Point Store well, and the Mellott well
- Measurement of overburden and bedrock groundwater elevations and deriving direction of groundwater gradient from these measurements
- Geophysical borehole investigation of the Point Store and Mellott potable wells
- Step-drawdown and constant rate pumping tests on the Point Store and Mellott potable wells
- Updated VIB evaluation
- Updated fate and transport modeling

2.1 Constituents of Concern

Groundwater and soil samples have been analyzed for the following petroleum parameters: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, cumene, and naphthalene. Based on analytical results, all of the aforementioned parameters have been identified at detectable levels in soil and groundwater and are therefore identified as the constituents of concern (COCs) in each media.

2.2 Media of Concern

Soil and groundwater are identified to contain detectable concentrations of COCs and are therefore considered media of concern at the site.

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2.3 Remediation Standard

The remediation standard goal for the property is currently the PADEP RUA Site Specific Standard (SSS) for soil and groundwater both on-site and off-site.

3.0 SITE DESCRIPTION

The subject property (or source property) consists of an approximate 1.71 acre triangular plot of land located at physical address 5867 Highway 522 North, Decatur Township, McClure, Mifflin County, Pennsylvania. The subject property is surrounded by residential properties. The subject property is located in the central portion of the USGS 7.5 Minute Series for Alfarata, Pennsylvania Topographic Quadrangle at an approximate Latitude 40°, 40', 48.52" North and Longitude 77°, 24', 41.95" West. The property has an approximate elevation of 620 feet above mean sea level. Refer to **Figure 1** for a site location map, **Figure 2** for an aerial site map, **Figure 3** for a site map (zoomed-in), and **Figure 4** for an expanded site map that includes the Mellott property.

The subject property is bound by Dormantown Road to the north and State Route 522 to the south (which merge on the west side of the property) and a residential property to the east. Residential properties are located to the north beyond Dormantown Road and to the southeast beyond State Route 522. A vacant lot is located to the south beyond State Route 522. Jack's Creek is located approximately 580 feet east/southeast from the center of the subject property.

Refer to **Figures 3** and **4** for a map showing property boundaries.

3.1 Historic and Current Operations

The subject property was purchased by the former owner, Mr. Bell, in 1987. Mr. Bell was the owner of record when the release was discovered. Prior to 1987, the property was used as a gasoline station and convenience store, and operated the associated storage tank(s) for an unknown amount of time. The subject property has consisted of one (1) gasoline dispenser (in the western portion of the property) and one (1) kerosene dispenser (west of and adjacent to the Point Store building).

Based on review of historic aerial photos, the property was developed prior to 1938 with one (1) building, assumed to be residential. The property appears to be vacant in photos from 1971 and 1977, although this interpretation cannot be confirmed due to the poor quality of the photos. Subject property features cannot be interpreted in the aerial photos from 1983 and 1987. The current building is present in aerial photos from 1990 through 2010. Refer to the September 2017 SCR for copies of the reviewed historical aerial photographs.

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3.1 Historic and Current Operations (Continued)

Prior to 1989, a previous generation of motor fuel USTs were operated at the site. The USTs and dispensing equipment are believed to have been situated in same or near location of the most recent generation of USTs. Between 1989 and 2014, four (4) USTs were present at the property. Refer to **Sections 4.1** and **4.2** for descriptions of the UST systems operated at the site from 1989 to 2014. To the best of Mountain Research's knowledge, based on a geophysical survey conducted on September 28, 2016 and subsurface investigation activities, there are no USTs are currently located at the property. The building on the subject property is currently used as a convenience/general store with a residential apartment on the second floor.

3.2 Site Features

The subject property consists of a two-story building having a buried basement only beneath the central portion of the building footprint, first floor retail space and commercial kitchen, and second floor residential space. The ground surface on the subject property is covered with gravel and/or broken macadam and slopes to the southeast. Refer to **Figures 3** and **4** for locations of site features.

3.2.1 Underground Utilities

Underground utilities located at the subject property are limited to a sewer line associated with the on-lot septic system and electric. The sewer line extends from the northeast side of the building in a northeastern direction at approximately five (5) feet below ground surface (bgs). An underground electric line is at an approximate depth of one (1) foot bgs and run from the western side of the building on the subject property to the sign located on the western-most portion of the property and from the eastern side of the building on the subject property in an eastern direction to the eastern property boundary. A potable well is located beneath the first floor kitchen floor of the Point Store building. This portion of the building does not contain the basement. Refer to **Figure 5** (On-site Utility Map) for the approximate locations of on-site underground utilities. Note that utilities on the Mellott property have not yet been mapped.

3.3 LUST Sites

Regulatory directories were reviewed to obtain information concerning historical leaking underground storage tank (LUST) sites within the vicinity of the study site. Based on a database review by Environmental Data Resources, Inc. (EDR) in November 2014, no LUST sites (excluding the subject property) are located within 0.5 miles of the site. A copy of the 2014 EDR database review is contained in the September 2017 SCR.

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4.0 INTERIM REMEDIAL ACTIONS

The following UST closures have been conducted at the subject property:

4.1 UST Closure 1998

Prior to 1989, a previous generation of motor fuel USTs were operated at the site. USTs are believed to have been situated in same or near location of the most recent generation of USTs. USTs #001 (550 gallon kerosene/diesel), #002 (2,000 gallon unleaded gasoline), and #003 (2,000 gallon unleaded gasoline) were installed at the property in October 1989. In November 1998, UST #001 was removed and replaced with a 1,000 gallon kerosene UST (#004). UST removal and replacement activities were conducted by Perry Petroleum Equipment, Ltd. (Perry). During the replacement of UST #001, obvious impact to localized soil was observed. Removed soil was stockpiled on plastic on the property. Soil samples were collected from the stockpile and beneath the removed UST. Analytical results indicated an exceedance of naphthalene present in soil stockpile sample SP-1; remaining concentrations were below the applicable standards/action levels; the removed soil was used as backfill on the property. The 1998 UST closure report is contained as an appendix in the September 2017 SCR.

4.2 UST Closure 2014

Tanks #002, #003, and #004 were deemed "Temporarily Out of Service" in November 2007 and the tanks, dispensers, and lines were removed from the property in August 2014 by Perry. Tanks #002 and #003 were removed from one (1) excavation and tank #004 was removed from a separate excavation. Petroleum odors were present, however, no obvious impacts to soil or excavation water were observed during UST removal activities.

A combined total of eight (8) soil samples were collected from the two (2) excavations, beneath the dispensers, and beneath the lines. One (1) water sample was collected from each UST excavation. Analytical results from the soil samples indicated detectable concentrations of constituents were below applicable standards/action levels. However, analytical results from both water samples indicated detected constituents were at concentrations above applicable standards/action levels. A Notice of Contamination (NOC) was submitted to PADEP by Perry in September 2014. The 2014 UST closure report is contained as an appendix in the September 2017 SCR.

5.0 SOURCE OF PETROLEUM IMPACTS

The source of the release is interpreted to be leakage from the former unleaded gasoline product dispenser. The release is believed to have been chronic in nature. The release date and the volume of released product is unknown.

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5.1 Characteristics of Regulated Substance

Based on the source of the release (unleaded gasoline dispenser), it is interpreted that the regulated substance released at the site is unleaded gasoline. 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, cumene, and naphthalene have been identified at detectable concentrations in soil and groundwater. The characteristics of the aforementioned constituents are summarized in **Appendix A**.

6.0 WATER SUPPLIES

The subject property and surrounding properties are served by potable wells. The potable well on the subject property is located beneath the first floor kitchen floor of the Point Store building and is measured to be 58 feet deep during the borehole geophysical survey. See **Section 7.2** for a summary of the borehole geophysics conducted on both the Point Store and Mellott potable wells. **Appendix B** contains the geophysical report prepared by ARM Geophysics.

The Pennsylvania Groundwater Information System (PaGWIS) and a November 2014 EDR report were reviewed to locate additional potential water supplies. The PaGWIS and EDR use data from the following sources: PADEP-Public Water Supply, United States Department of Agriculture, and United States Geological Survey Wells.

Review of PaGWIS and the EDR identified a combined total of 19 water wells within ½ mile of the subject site. Ten of the water wells were identified in both the EDR and PaGWIS searches, one (1) water well identified in the EDR search (SPA0084347) was plotted to be located over three (3) miles west of the site. It is noted that the majority of the identified wells are located upgradient of the site.

The wells plotted within a ½ mile radius of the site are as follows:

- EDR ID PASI3000115071; Point Store Well; Domestic
- PaGWIS ID 478879 0 - ¼ mile West; Unknown
- EDR ID PASI30000115103; PaGWIS ID 26660; ⅛ - ¼ mile West; Unknown
- EDR ID PASI3000115126; ⅛ - ¼ mile East; Unknown
- EDR ID SPAW0084399; PaGWIS ID 133041; ⅛ - ¼ mile East; Unknown
- EDR ID PASI30000114995; PaGWIS ID 26656 ¼ - ½ mile West/Southwest; Unknown
- EDR ID PASI30000114994; PaGWIS ID 26657 ¼ - ½ mile West/Southwest; Unknown
- EDR ID PASI30000114980; ¼ - ½ mile West/Southwest; Unknown
- EDR ID PASI30000115500; PaGWIS ID 26662 ¼ - ½ mile North/Northeast; Unknown
- EDR ID PASI30000115007; PaGWIS ID 26658 ¼ - ½ mile West/Southwest; Unknown
- EDR ID PASI30000114885; PaGWIS ID 26649 ¼ - ½ mile Southwest; Unknown
- EDR ID PASI30000114906; ¼ - ½ mile West/Southwest; Unknown
- EDR ID PASI30000114933; PaGWIS ID 26652 ¼ - ½ mile West/Southwest; Unknown
- EDR ID PASI30000115452 and SPAW0084367; PaGWIS ID 133009 ¼ - ½ mile Northeast; Unknown
- EDR ID PASI30000114807; PaGWIS ID 26646 ¼ - ½ mile Southwest; Unknown

6.0 WATER SUPPLIES (Continued)

The wells plotted within a ½ mile radius of the site are as follows (Continued):

- PaGWIS ID 521685 ¼ - ½ mile South/Southeast; Unknown
- PaGWIS ID 521676 ¼ - ½ mile Southwest; Unknown
- PaGWIS ID 505154 ¼ - ½ mile Southeast; Unknown
- PaGWIS ID 132989 ¼ - ½ mile West/Southwest; Unknown

In addition, a site reconnaissance identified one (1) well, referred to as the Mellott Well, on the south side of State Route 522, approximately 415 feet southeast of the subject property. This well was not identified in the PaGWIS or EDR searches. Based on stampings on the underside of the Mellott supply well cap, the well is 183 feet deep, with approximately 40 feet of steel casing, and is rated at six (6) gallons per minute (gpm). Refer to **Figure 4** for the locations of the Point Store well and Mellott well, and **Figure 6** for a map illustrating PaGWIS and EDR search results within ½ mile radius of the site. Refer to the September 2017 SCR for copies of the EDR and PaGWIS results.

6.1 Restore or Replacement of Affected Supplies

Replacement and restoration of water supplies was not deemed necessary at this time and has not performed.

6.2 Affected and Potentially Affected Supplies

Based on analytical results from aqueous samples collected from the Point Store well and the Mellott well (discussed in **Section 9.2.2**); these surrounding water supplies have not been impacted by the release. These potable wells will continue to be monitored in the future to verify they have not been impacted by the release.

7.0 METHODS AND EQUIPMENT

In order to delineate the extent and magnitude of petroleum impacts to media at the site, Mr. Bell retained the services of Mountain Research in September 2016 to conduct a site characterization on the subject property. The following site characterization activities were conducted and reported in the September 2017 SCR:

- Geophysical Investigation
- Advancement of 41 soil borings
- Collection and analysis of soil samples from soil borings
- Installation of 13 overburden monitoring wells
- Collection and analysis of groundwater samples from overburden monitoring wells
- Measurement of overburden groundwater elevations and deriving direction of groundwater flow and gradient from these measurements
- Aquifer testing

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7.0 METHODS AND EQUIPMENT (Continued)

- Development of conceptual site model
- Fate and transport modeling
- Identification of potential preferential pathways for groundwater and/or vapor migration
- VIB risk evaluation
- Professional site survey

The following additional site characterization activities were conducted in January and February 2018:

- Advancement of 14 additional soil borings (SB-33R, SB-42 through SB-44, SB-45/MW-14, SB-46/MW-15, SB-47/PZ-1, SB-48/PZ-2BR, SB-49/MW-18, SB-50/MW-17, SB-51/MW-16, SB-52/MW-19BR, MW-20BR, and PZ-3BR)
- Collection and analysis of soil samples from soil borings
- Installation of five (5) overburden monitoring wells (MW-14 through MW-18) and one (1) overburden piezometer (PZ-1)
- Installation of two (2) bedrock monitoring wells (MW-19BR and MW-20BR) and two (2) bedrock piezometers (PZ-2BR and PZ-3BR)
- Development of all newly installed monitoring wells and piezometers
- Professionally survey and tie-in new soil borings, monitoring wells, piezometers, and off-site features on the Mellott property
- Collection and analysis of groundwater samples from overburden and bedrock monitoring wells, the Point Store well, and the Mellott well
- Measurement of overburden and bedrock groundwater elevations and deriving direction of groundwater gradient from these measurements
- Geophysical borehole investigation of the Point Store and Mellott potable wells
- Step-drawdown and constant rate pumping tests on the Point Store and Mellott potable wells
- Updated VIB evaluation
- Updated fate and transport modeling

Refer to **Figures 3** and **4** for monitoring well and piezometer locations and for soil boring locations. Field methods for drilling, well installation, and groundwater sample collection are described in **Appendix C**. Other data collection or sampling methods are described herein.

7.1 Characterization Plans

The *Health and Safety Plan* for the site characterization and *Quality Assurance / Quality Control Plan* are available to the PADEP upon request.

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7.2 Geophysical Studies

A geophysical survey was performed by Enviroscan, Inc. on September 28, 2016. Ground penetrating radar (GPR) was utilized for the geophysical survey. The entire property was surveyed to identify the possible presence and location of historic USTs and subsurface utilities. The geophysical survey identified three utility lines and the subsurface areas that previously contained USTs. No undocumented USTs were identified during the survey. Refer to the September 2017 SCR for a copy of the geophysical survey report.

On January 26, 2018, geophysical borehole logging was completed on both the Point Store well and Mellott well by ARM Geophysics (ARM) to determine exact well depth and construction details, fracture locations, as well as groundwater flow interaction with fractures. Prior to geophysical borehole logging, temporary water supply systems were mobilized to both the Point Store and Mellott properties to provide a pressurized potable water feed to each building during geophysical borehole logging and pump testing activities. The drop tube and foot valve assembly was removed from the Point Store well and the submersible pump and tubing was removed from the Mellott well the day before geophysical borehole logging. A specialized portable borehole logging set-up was used in order to access the Point Store well located beneath the store kitchen floor. Tooling used included: gamma, fluid temperature, fluid conductivity, three (3) - arm caliper, optical televiewer (OTV), acoustic televiewer (ATV), and heat pulse flowmeter (HPFM) under static and pumping conditions.

The Point Store well construction details are as follows:

- Total Depth of Well = 58 Feet
- Casing Diameter = 6 Inches
- Depth to Bottom of Casing = 22.26 Feet

The Mellott well construction details are as follows:

- Total Depth of Well = 183 Feet
- Casing Diameter = 6 Inches
- Depth to Bottom of Casing = 39.89 Feet

Data collected from the Point Store well and Mellott well were detailed in a geophysical borehole logging report. Refer to **Appendix B** for a copy of the geophysical report. The predominant bedrock strike is east-northeast to west-southwest. Bedding plane strike/dip were calculated at N76E/3NW and N68E/66NW; based on a review of geologic maps from the area, tightly folded beds or otherwise contorted beds on a small scale; this corroborates with the variable dips observed during geophysical borehole logging. An identified fracture strike/dip was calculated at N78W/4NE.

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7.2 Geophysical Studies (Continued)

Bedding planes and/or fractures were identified in the Point Store Well at depths of 27'-31', 39', 42'-43.5', 46'-47', 51'-52', and 52.5'-54. Bedding planes and/or fractures were identified in the Mellott Well at depths of 53.5', 66'-69', 70.5', 77.5'-83', 87'-87.5', 95'-96', 100', 105.5', 110', 112', 113.5', 117.5', 120'-120.5', 132.5', 134.5', 147'-149', 150'-165.5', 170.5'-172.5', 175.5'-176', and 177'-181'.

During testing with the HPFM, no flow was detected within the Point Store well under static and pumping conditions. Although no flow was detected, the well produces water, just at a very low yield that was not detectable by ARM's HPFM. The HPFM detected three (3) producing zones (78'-81', 97'-102', and 168'-170') and two (2) receiving zones (65'-70' and 153'-168') within the Mellott well; additional detections at flow zones included open fractures observed with the televiewer, caliper, and fluid temperature or resistivity data. Several figures, charts, and copies of the borehole logs illustrating the findings are provided in the geophysical report.

7.3 Soil Boring Installation and Soil Sampling

Between October 2016 and January 2018, a combined total of 102 soil samples were obtained from 55 soil borings advanced at locations on and off of the subject property. Soil borings were advanced using direct push drilling methods to bedrock refusal with a Geoprobe®. Soil encountered within the borings was logged using the Unified Soil Classification System (USCS) and predominantly consists of yellow, tan, or grey clay and silty clay. Isolated deposits of sandy clay and sand were encountered beneath the clay and silty clay in some areas. Bedrock refusal occurred between five (5) and 23 feet bgs as interpreted from direct push and hollow stem auger refusal.

Soil cores were visually examined and scanned with a photoionization detector (PID) utilizing the headspace method. For vertical delineation, two (2) to three (3) soil samples were obtained from soil borings that exhibited elevated PID readings; one (1) soil sample from the area of the highest PID reading and one (1) soil sample from the interval above and/or below the highest PID reading. In soil borings where no PID readings were identified, one (1) soil sample was collected from either the unsaturated interval above the soil/groundwater interface or the unsaturated interval above the overburden/bedrock interval.

The soil samples were collected using dedicated, disposable approximate 5-gram soil samplers and placed in new laboratory bottle ware with the appropriate preservative. Samples were stored in an ice filled cooler during transport to Mountain Research's PADEP accredited laboratory (PADEP #07-00418) using proper chain of custody methodology. Soil samples were analyzed for site COCs via United States Environmental Protection Agency (EPA) method 8260B including: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, cumene, and naphthalene.

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7.3 Soil Boring Installation and Soil Sampling (Continued)

Upon completion of soil sampling activities, soil borings SB-3, SB-5, SB-9, SB-12, SB-17, SB-18, SB-19, SB-20, SB-26, SB-31, SB-33, SB-36, SB-41, SB-45, SB-46, SB-47, SB-48, SB-49, SB-50, SB-51, SB-52, MW-20BR, and PZ-3BR were converted to monitoring wells and piezometers. Soil boring locations are illustrated on **Figures 3** and **4**. Boring lithologic logs are included within **Appendix D**. Analytical results are discussed in **Section 9.0** of this report.

7.4 Monitoring Wells

Eighteen overburden monitoring wells (MW-1 through MW-18), two (2) bedrock monitoring wells (MW-19BR and MW-20BR), one (1) overburden piezometer (PZ-1), and two (2) bedrock piezometers (PZ-2BR and PZ-3BR) were installed at locations on and off of the subject property between October 2016 and January 2018 using hollow stem auger and/or air rotary drilling techniques. The two (2) inch diameter overburden monitoring wells and piezometer range in depth from nine (9) to 22 feet bgs. The two (2) inch diameter bedrock monitoring wells and piezometers range in depth from 20.5 to 32 feet bgs.

Following installation, each new monitoring well and piezometer was properly developed. Purge water was treated with a granular activated carbon (GAC) unit prior to discharging to pervious ground surface near each monitoring well. The gradient direction of the overburden wells in relation to the source area (former USTs and dispensers) can be summarized as follows:

- MW-1 is located on the subject property, within the source area
- MW-2 is located on the subject property, upgradient and north of the source area
- MW-3 is located on the subject property, upgradient and north of the source area
- MW-4 is located on the subject property, within the source area
- MW-5 is located on the subject property, lateral and east of the source area
- MW-6 is located on the subject property, within the source area
- MW-7 is located on the subject property, within the source area
- MW-8 is located on the subject property, sidegradient to downgradient and southwest of the source area
- MW-9 is located on the subject property, sidegradient and west/southwest of the source area
- MW-10 is located on the subject property, downgradient and east of the source area
- MW-11 is located on the Mellott property, downgradient and southeast of the source area
- MW-12 located on the Mellott property, downgradient and south/southeast of the source area
- MW-13 located on the Mellott property, downgradient and southeast of the source area
- MW-14 is located on the subject property, lateral and east of the source area
- MW-15 is located on the Mellott property, sidegradient and southwest of the source area

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7.4 Monitoring Wells (Continued)

- MW-16 is located on the Mellott property, downgradient and southeast of the source area
- MW-17 is located on the Mellott property, downgradient and southeast of the source area
- MW-18 is located on the Mellott property, downgradient and southeast of the source area
- MW-19BR is located on the Mellott property, downgradient and southeast of the source area
- MW-20BR is located on the Mellott property, downgradient and south/southeast of the source area
- PZ-1 is located on the Mellott property, downgradient and southeast of the source area
- PZ-2BR is located on the Mellott property, downgradient and southeast of the source area
- PZ-3BR is located on the subject property, lateral and east of, but near the source area

The locations of the monitoring wells are illustrated on **Figure 3** and **4**. **Table 1** summarizes the installation dates and monitoring well construction details. Well construction and lithologic logs are contained in **Appendix D**. Descriptions of drilling methods, lithological logging and soil screening are described in **Appendix C**.

7.5 Groundwater Sampling

Groundwater samples were collected from monitoring wells, potable wells, and discharge from GAC units. Each sample was collected by qualified personnel experienced in the sampling of petroleum impacted media as described in the following subsections.

7.5.1 Monitoring Well Sampling

Groundwater sampling events were conducted from November 2016 through February 2018. Monitoring wells MW-14 through MW-18, MW-19BR, and MW-20BR (installed in January 2018) were sampled two (2) times in January and February 2018. In accordance with the PADEP's *Groundwater Monitoring Guidance Manual*, each monitoring well was purged to remove stagnant groundwater from the well casing and filter pack. A minimum of three (3) well volumes was purged from each monitoring well prior to sampling. Field measurements consisting of pH, specific conductance and temperature readings were collected during purging and sampling of the wells. Each monitoring well was purged using dedicated, properly decontaminated sampling equipment. Purge water was filtered using GAC and then discharged to pervious ground surface near each monitoring well.

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7.5.2 Potable Well Sampling

Between November 2016 and February 2018, six (6) groundwater samples were collected from the potable well on the subject property and three (3) groundwater samples were collected from the potable well on the neighboring Mellott property. Each potable well sample was collected prior to treatment to collect a sample representative of actual groundwater conditions. The Point Store Well is run for approximately 10 minutes prior to sample collection; the Mellott Well is typically collected as a grab sample directly from the well casing.

7.5.3 Effluent Sampling

In accordance with the October 31, 2014 PADEP Program Clarification Memo regarding management of purge water, during groundwater sampling events, two (2) effluent samples were collected from the GAC unit, one (1) near the beginning and one (1) near the end of purging.

7.6 Groundwater Sample Analysis

Groundwater samples from monitoring wells, potable wells, and GAC units were collected in proper laboratory supplied glassware and preserved. All samples were labeled and stored in an iced cooler for transport to Mountain Research's PADEP accredited analytical laboratory and maintained under a standard chain of custody protocol. At the laboratory, the groundwater samples were analyzed for the post-March 2008 short list of unleaded gasoline compounds including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, cumene, naphthalene utilizing EPA laboratory method 8260B.

7.7 Aquifer Testing

7.7.1 Slug Testing

Rising and falling head slug tests were performed by Mountain Research in November 2016 on monitoring wells MW-3, MW-4, MW-6, and MW-7. During each slug test water level measurements were recorded with an In-Site Level Troll 300 to record changing water levels over time.

The data gathered from each slug test was programmed into AQTESOLV for Windows (Version 3.5), along with individual monitoring well information to calculate aquifer characteristics via the Bouwer and Rice Method (Bouwer and Rice, 1976). Refer to September 2017 SCR for the slug test methods description and slug test analyses.

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7.7.2 Pump Testing of the Point Store and Mellott Supply Wells

In order to aid in fate and transport modeling if impacts were identified in the bedrock aquifer; determine whether there is communication between the overburden and bedrock aquifers, and aid in the development of a remedial strategy, aquifer testing including step testing and constant rate pump testing was performed on the Point Store and Mellott potable supply wells on January 29, 2018 through February 2, 2018.

Prior to pump testing and the geophysical borehole logging, temporary water supply systems were mobilized to both the Point Store and Mellott properties to provide a pressurized potable water feed to each building during geophysical borehole logging and pump testing activities. The drop tube and foot valve assembly was removed from the Point Store well and the submersible pump and tubing was removed from the Mellott well the prior to testing, then replaced following completion of the pump testing.

Equipment setup and delivery occurred on January 29, 2018. A barometric pressure probe was set up on site to measure changes in atmospheric pressure to determine possible influences between pressure and water elevations. On January 29, 2018, Mountain Research began step testing on the Point Store well to determine an optimal flow rate for the pumping test to be completed the following day. A total of three (3) steps were used for the Point Store well: 1.0 gpm, 2.25gpm, 3.3gpm. Based on the results of step testing, and taking property usage into consideration, a conservative pumping rate of 2.0 gallons per minute was selected for constant rate pump testing. It is believed that during periods of maximum water usage, a 2.0gpm demand on the supply well is possible for short durations. On January 30, 2018, constant rate pump testing commenced on the Point Store well at a rate of 2.0gpm for a total of 16 hours 27 minutes. Step testing barometric and drawdown charts are presented in **Appendix E**; constant rate testing barometric and drawdown charts are presented in **Appendix F**.

Upon review of step test and constant rate test data, it was determined that snow melt had a significant effect on the static water level measurements of several satellite wells on the Point Store property. MW-4, located centrally in the parking area of the site, had a significantly higher static water level on January 30, the day of constant rate pump testing on the Point Store well, than measured the previous day during step testing. The shallow static water level in this well is attributed to snow melt infiltrating the pervious broken asphalt and backfill material in the former dispenser area, not far from the location of the well. In short, the infiltrated surface water created a temporary mounding effect in the vicinity of the well which over several hours following the melt dissipated. MW-7 displays a similar trend, albeit a delay due to its downgradient location.

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7.7.2 Pump Testing of the Point Store and Mellott Supply Wells (Continued)

Following the completion of the pumping test on the Point Store well, the pumping and monitoring equipment was extracted and mobilized across the road to the Mellott well. Immediately following the removal of pump test equipment from Point Store, the water supply components for the Point Store well were replaced, the well was primed and placed back into service.

Beginning on January 31, 2018, step testing of the Mellott well commenced with a total of three steps at 1.0gpm, 2.0gpm, and 3.0gpm. During the first step at the Mellott well, the transducers stopped communicating with a laptop computer used for real-time monitoring. Mountain Research planned the testing with redundant communication equipment in case of an issue such as two (2) laptop computers and two (2) transducer-laptop adapters. Significant time in the field was spent attempting to regain communication with the transducers; this resulted in an extended step at 1.0gpm while troubleshooting.

Because the transducers were all successfully started, it was believed that they were still recording data and the issue was communication with the laptop; however, it was determined subsequently that the transducers had failed. The failed transducers were returned to the rental company where they were tested, determined to be no longer functional, and all data on the transducers was lost. The cause of failure is unknown; however, multiple transducers simultaneously failed while only one (1) transducer could be connected to the laptop at a time; therefore, the cause of failure was due to the equipment.

Due to equipment failure, graphs and data are not available for all phases of the step testing in all wells. Once the failure was identified, all monitoring data was collected via hand measurements. Based on the results of step testing, and taking property usage into consideration, a conservative pumping rate of 2.0 gallons per minute was selected flow rate for constant rate pump testing. It is believed that during periods of maximum water usage, especially during gardening irrigation, a 2.0gpm demand on the supply well is possible for short durations. On February 1, 2018, pump testing commenced on the Mellott Potable well at a rate of 2.0gpm for a total of 17 hours and 8 minutes. The potable well and selected observations wells were hand monitored for the duration of the test. Aquifer test results will be presented in **Section 8.2.2**.

7.8 Site Survey

In November 2016, the subject property was surveyed by a PA licensed surveyor from Geotec, Inc. (Geotec). Geotec's survey included site boundaries, infrastructure, utilities, and the location and elevation of site monitoring wells and soil borings. Soil borings and monitoring wells installed after November 2016 were surveyed by Mountain Research personnel and tied into the existing base map. Following the January 2018 drilling mobilization, Geotec returned to the subject property to tie-in the newly installed wells and borings.

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7.9 Characterization of Waste

Soil cuttings produced during the advancement of soil borings and monitoring well installation activities was staged in 55-gallon steel drums on the subject property prior to being disposed of at a proper facility. Waste disposal certificates for soil disposal are presented in **Appendix G**.

8.0 SITE GEOLOGY

The site is located within the Appalachian Mountain Section of the Ridge and Valley Province. According to published geologic data, underlying bedrock at the site is classified as the Devonian Age Hamilton Group. The Hamilton Group is divided into the Marcellus and Mahantango Formations. The Marcellus Formation consists of a black carbonaceous shale. Rare thin limestone beds and concretions are sometimes found in the lower portions of the formation. Bedding is mostly well developed, and is fissile to thin. The limestone layers are more thickly bedded and limestone concretions tend to be massive and disrupt the bedding in their vicinity. Joints are poorly formed, moderately abundant, closely spaced, open and steeply dipping. Some joints are filled with calcite. Joint, fault, and bedding-plane openings provide a secondary porosity of low magnitude. The permeability of the Marcellus is low.

The Mahantango Formation is composed of olive to tan shale, argillaceous limestone, siltstone, fine grained sandstone and calcareous claystone. Bedding is more variable than in the Marcellus Formation, with most bedding being well developed and thin to medium bedded. The shales and siltstones tend to have thin bedding while the limestone and sandstone layers are thicker. Joints and fractures are well developed, steeply dipping and open. Joint and bedding plane openings provide a secondary porosity of moderate to low magnitude. The permeability of the Mahantango is also low. Weathered shale/shale bedrock was noted at depths ranging from 11 to 23 feet bgs during drilling activities. Based on site observations and published geologic data, uppermost ground water flow at the site is estimated to be to the southeast toward Jack's Creek.

Structurally, the site lies within a broad northeast to southwest trending syncline bounded to the northwest and southeast by ridges of the Tuscarora Formation ridges known as Shade Mountain and Jacks Mountain. Refer to **Figure 7** for a copy of the geologic map which depicts the subject property.

8.1 Soil

According to the United States Department of Agriculture (USDA), native soils at the site consist of Ernest silt loam, 8-15% slopes (ErC) and Berks-Weikert channery silt loam, 15-25% slopes (BID). Overburden material encountered during drilling predominantly consists of up to eight (8) feet of fill (gravel), yellow, tan, or grey clay and silty clay. Isolated deposits of sandy clay and sand were encountered beneath the clay and silty clay in some areas. Overburden soil ranged from five (5) feet in depth up to 23 feet bgs as interpreted from direct push and hollow stem auger refusal. During drilling, saturation was initially identified at depths ranging between 7.5 and 21.5 feet bgs. Refer to **Appendix D** for lithologic logs. A cross section location map, and cross sections A-A' and B-B' are included as **Figures 8** through **10**, respectively.

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8.2 Hydrogeology

The closest surface water body to the site is Jack's Creek which is located approximately 580 feet east/southeast from the center of the subject property (**Figure 4**). Surface drainage follows site topography which slopes slightly toward the southeast. Overburden soil saturation was initially encountered between 7.5 and 21.5 feet bgs during drilling activities. Based on data obtained during groundwater gauging events conducted between November 2016 and February 2018, overburden static water level measurements ranged between 1.18 feet below top of casing (btoc) at MW-5 and 14.06 feet btoc at MW-9. A groundwater mound in the vicinity of MW-5 is interpreted to be the result of groundwater pooling in the backfill material used to restore the kerosene UST excavation. Due to the occurrence of the groundwater mound, groundwater elevation data from MW-5 is considered anomalous and is not included in groundwater elevation contour maps. Using the comprehensive groundwater gauging datasets collected in January and February 2018, the average overburden groundwater gradient was 0.05 feet/foot between MW-3 and MW-17. Based on data obtained during groundwater gauging events conducted between January 2018 and February 2018, bedrock static water level measurements ranged between 3.15 feet btoc at PZ-2BR and 13.79 feet btoc at PZ-3BR. Using the bedrock well and piezometer gauging data from January 29, 2018, the bedrock groundwater gradient was 0.03 feet/foot between PZ-3BR and MW-19BR. Regional groundwater flow is interpreted to be in a southeast direction toward Jack's Creek (which may be the local discharge point for groundwater). Based on concentration comparisons between MW-13 and MW-20BR, located adjacent to one another, it appears that the overburden and shallow bedrock aquifers are separate zones. MW-13 contains >1,000 µg/L MTBE; whereas MW-20BR is non-detect for MTBE, indicating that vertical migration from the overburden to bedrock is limited.

Static groundwater level measurements and groundwater elevations are summarized in **Table 2**. Overburden groundwater elevation contour maps were prepared using the survey data and the static water levels measured in January and February 2018, and are included as **Figures 11** and **12**. A bedrock groundwater elevation contour map was prepared using the survey data and the static water levels measured in January 2018, and is included as **Figure 13**.

8.2.1 Slug Test Results

Time-displacement plots of rising and falling head slug test data from overburden monitoring wells MW-3, MW-4, MW-6, and MW-7 were prepared for Bouwer and Rice Method best-fit line matching analysis. The slug test data gathered from each test was programmed into AQTESOLV for Windows (Version 3.5), along with individual monitoring well information to evaluate overburden aquifer characteristics.

Copies of the slug test data, corresponding displacement data, and displacement versus time graphs are presented in **Appendix H**. Overburden aquifer hydraulic conductivity values for the rising head slug tests are summarized in **Table 3**. It is noted that some of the falling head slug test results were not used due to poor quality.

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8.2.1 Slug Test Results (Continued)

The Bouwer and Rice Method calculations yielded an average hydraulic conductivity value of **0.746 ft/day** for the **overburden** aquifer beneath the Site. Using the values of hydraulic conductivity (K) and an average aquifer thickness (b) of 12.1 feet, the calculated average transmissivity (T = Kb) is **9.2 ft^2/day**.

8.2.2 Pumping Test Results

The Cooper-Jacob Method calculations from pumping test drawdown and recovery data yielded the following average transmissivity (T) and hydraulic conductivity (K):

Bedrock – Pumping Test – Point Store Well

- T= 62.8 ft^2/day
- K= 1.740 ft/day

Bedrock – Pumping Test – Mellott Well

- T= 169.6 ft^2/day
- K= 1.195 ft/day

The observed hydraulic conductivities from the potable wells are indicative of both fractured and non-fractured sedimentary rock. During drilling, bedrock fracturing was minimal, however at greater depths than Mountain Research drilled, the potable wells contained fracturing at various depths as indicated by the geophysical logging.

The transmissivity and hydraulic conductivity values from both tests are very close between drawdown and recovery. Hydraulic conductivity values for the Point Store Well and Mellott well are within the same order of magnitude. Transmissivity was one (1) order of magnitude higher in the Mellott well compared to the Points Store Potable well, likely due to deeper construction and bedrock exposure of the Mellott well. A direct relationship exists between the Point Store Potable well and MW-20BR and PZ-3BR; pumping on the Point Store well produced drawdown in MW-20BR and PZ-3BR. Transmissivity at the Point Store well, MW-20BR, and PZ-3BR is close, ranging from an average of 56.7 ft^2/day in the bedrock monitoring points to 62.8ft^2/day in the Point Store Potable well. The overburden wells on the site, excluding MW-4 and MW-7 as explained in **Section 7.7.2**, showed only influence from changes in barometric pressure. A very clear indirect trend is illustrated between barometric pressure and static water levels in the overburden wells.

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8.2.2 Pumping Test Results (Continued)

The Mellott well exhibited a higher average transmissivity of 169.6 ft^2/day. The hydraulic conductivity shown in the Mellott potable well was slightly lower than the Point Store well but within the same order of magnitude. It should be noted that for the duration of the pumping test on the Mellott well, the overburden and shallow bedrock observation wells showed no influence from the pumping. A very clear indirect trend is illustrated between barometric pressure and static water levels in the overburden wells, as well as similar barometric pressure-related drawdown trends in shallow bedrock MW-19BR and piezometer PZ-2BR (although delayed with respect to overburden).

Hydraulic conductivity and transmissivity values derived from constant rate pump test analysis are summarized in **Table 3**.

As discussed, the Point Store Pumping test showed an influence on surrounding shallow bedrock monitoring points and no apparent influence on overburden monitoring points. The Mellott Pumping test showed no apparent influence on any of the shallow bedrock or overburden monitoring points. Barometric and drawdown plots are provided in **Appendix E**.

9.0 ANALYTICAL RESULTS

Soil and groundwater samples were analyzed using EPA approved methods for the regulated substances related to the release of unleaded gasoline including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, cumene, and naphthalene by EPA Method 8260B. Analytical results of the soil and groundwater samples are presented in the following subsections.

9.1 Soil Sampling Analytical Results

Analytical results from the 102 soil samples collected from the 55 soil borings advanced at locations on and off of the subject property between October 2016 and January 2018 identified the following constituents at concentrations above their respective PADEP RUA soil to groundwater MSC: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, and naphthalene. The aforementioned MSC exceedances were identified at depths ranging from one (1) to nine (9) feet bgs. Although detected, cumene was not identified in soil at concentrations above the PADEP RUA soil to groundwater MSC.

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9.1 Soil Sampling Analytical Results (Continued)

Each soil samples was categorized as unsaturated, periodically saturated (smear zone), or saturated. Soil samples that are deemed unsaturated were collected from a depths shallower than the range of observed groundwater elevations in the representative monitoring well used for comparison. Periodically saturated, or smear zone, soil samples were collected within the range of observed groundwater elevations in the representative monitoring well used for comparison. Saturated soil samples were collected deeper than the range of observed groundwater elevations in the representative monitoring well used for comparison. **Table 4** (Soil Boring Analytical Summary) defines the saturation zone of each soil sample and designates the monitoring well used for comparison.

Refer to **Figures 3** and **4** for soil boring locations, **Table 4** for a summary of soil analytical results and **Appendix I** for laboratory data sheets. Soil isoconcentration maps for constituents identified above their respective PADEP RUA soil to groundwater MSC including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, and naphthalene are included in **Appendix J**.

9.2 Groundwater

Analytical results from groundwater samples collected from monitoring wells, potable wells, and GAC units are summarized below.

9.2.1 Monitoring Wells

Between November 2016 and February 2018, groundwater samples were collected from monitoring wells MW-1 through MW-9. Monitoring wells MW-10 through MW-13 (installed in February 2017) were sampled from March 2017 through February 2018. Monitoring wells MW-14 through MW-18, MW-19BR, and MW-20BR (installed in January 2018) were sampled in January and February 2018. Analytical results have identified the following constituents at concentrations above their respective PADEP RUA groundwater MSC; 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, and naphthalene. Although detected, cumene has not been identified in groundwater at concentrations above the PADEP RUA groundwater MSC.

Refer to **Appendix K** for laboratory analytical data sheets for groundwater samples collected by Mountain Research which are summarized in **Table 5**. Isoconcentration maps for constituents identified above their respective PADEP RUA groundwater MSC during the most recent February 8, 2018 groundwater sampling event are included as **Appendix L**.

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9.2.2 Potable Wells

Between November 2016 and February 2018, six (6) groundwater samples were collected from the potable well on the subject property and three (3) groundwater samples were collected from the potable well on the neighboring Mellott property. None of the analyzed parameters were identified above laboratory detection limits (which were set to levels below each constituent's respective PADEP RUA groundwater MSC) in any of the samples collected from the potable wells with the exception of toluene in February 8, 2018. The detection of very low-level toluene within the potable wells may be attributed to the use of the rental pump during the pump test. The potable wells will continue to be part of the groundwater sampling program and will be watched closely. Refer to **Appendix K** for laboratory analytical data sheets for potable well samples collected by Mountain Research which are summarized in **Table 5**.

9.2.3 Effluent Samples

Effluent samples were collected from the GAC units during each sampling event. Analytical results identified 1,2,4-trimethylbenzene and benzene at concentrations above the PADEP RUA groundwater MSC in a sample obtained from the GAC unit on December 5, 2016, and MTBE at concentrations above the PADEP RUA groundwater MSC in samples obtained from the GAC unit on February 23 and March 6, 2017. From March 2017 to present, no identifiable concentrations above laboratory detection limits have been detected. Concentrations of 1,3,5-trimethylbenzne, toluene, ethylbenzene, total xylenes, and cumene were identified at concentrations above laboratory detection limits, but below PADEP RUA groundwater MSCs in samples obtained from the GAC units. Refer to **Appendix K** for laboratory analytical data sheets for GAC effluent samples collected by Mountain Research which are summarized in **Table 6.**

10.0 VAPOR INTRUSION INTO BUILDINGS

Assessment of potential VI exposure pathways is required under the SHS and Site Specific Standard (SSS) closure strategies. The January 2017 Land Recycling Program Technical Guidance Manual - VIB from Groundwater and Soil under Act 2 (the "VIB Guidance") was followed to perform the VI assessment for this site. Certain compounds typically associated with a release of petroleum products may represent a VI concern even at concentrations in soil below RUA soil to groundwater pathway MSCs or in groundwater below RUA groundwater MSCs. The document provides guidance in identifying potential VI sources to current and future planned buildings and determining if additional VI assessment, remedial actions, or mitigation is required to address Chapter 250 requirements.

10.1 Screening for Potential VI Sources

To determine if potential VI source(s) exist at the site, soil and groundwater sample point locations were first screened against distance criteria. If soil and/or groundwater sample locations are identified within certain distances of a building and/or preferential pathway (underground utility) constituent concentrations from those sample locations are compared to constituent and medium specific screening values. The screening process applied at the site is described in the following subsections.

10.1.1 Building Receptors

The building on the subject property is located within 30 horizontal feet of multiple soil and groundwater sample points and is used for residential and commercial purposes. The current building is constructed with a basement beneath a portion of the building footprint that is constructed of cinder block walls and concrete floor; the partial basement extends to an estimated depth of six (6) feet bgs. The portion of the building to the north of the basement is constructed as a slab on grade and to the south is constructed with a crawlspace. There are no current plans for additional building construction at the site. No significant foundation openings are present within the building.

10.1.2 Underground Utilities

Underground utilities that are currently present in the vicinity of the site include;

On-lot Sewer: A sewer line extends from the northeastern side of the building at an estimated depth of five (5) feet bgs.

Electric: Electric lines are located on the eastern and western sides of the building at an estimated depth of one (1) foot bgs.

10.1.3 Groundwater

Detectable concentrations of COCs (above and below their respective PADEP RUA groundwater MSC) have been identified in overburden groundwater. The highest static water levels recorded in the overburden between March 2017 and February 2018 ranged from 1.18 feet btoc at MW-5 to 9.81 feet btoc at MW-9.

In some areas at the source property fill material (gravel) is present to depths of up to eight (8) feet bgs. Fill material is not considered "acceptable" for the occurrence of attenuation. Native material beneath the fill consists of clay and sandy clay and is considered "acceptable" for the occurrence of attenuation.

Groundwater sample point locations were screened against proximity and/or separation distances of current building receptor and underground utility line locations at the site. SPL is not present. Therefore, the following proximity and separation distances were applied;

- petroleum constituents: 30 feet of horizontal separation and 5 feet of vertical separation, and
- non-petroleum constituents (MTBE): 100 feet of horizontal separation (there is no vertical separation distance for non-petroleum constituents).

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10.1.3 Groundwater (Continued)

According to VIB Guidance, if a sample point is located beyond either the horizontal or vertical proximity distance for petroleum constituents, no additional VI evaluation is necessary for that sample point location. Similarly, a subsurface feature (underground utility) may be eliminated as a potential preferential pathway, if either the horizontal or the vertical separation distance criteria for petroleum constituents is met. For non-petroleum constituents, the sample point location must be beyond the horizontal proximity or separation distance (100 feet) in order to be excluded from additional VI evaluation. Refer to **Figure 14** for locations of groundwater sample points, the potential building receptor, current underground utility lines, and horizontal proximity/separation distance boundaries for petroleum constituents.

The petroleum horizontal distance screen indicated that groundwater sample points MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-8, MW-9, and MW-10 are located within 30 horizontal feet of a source property building and/or utility.

The non-petroleum horizontal distance screen indicated the following groundwater sample points are located within 100 horizontal feet of a source property building and/or a utility; MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15, and MW-20BR.

The aforementioned groundwater sample points identified in the petroleum horizontal distance screen were then compared to the vertical distance screen for petroleum constituents (five [5] vertical feet from the building foundation or an underground utility). Note: there is no vertical distance screen for non-petroleum constituents (MTBE). For the vertical distance screen, the highest static water level observed in each overburden well between March 2017 and February 2018 was compared to the specified vertical screening depth. Refer to **Figure 15** and **Table 7** for an illustration and summary of the vertical distance screening process.

Results of the vertical distance screen for petroleum indicates that the following groundwater sample points are located within the specified vertical and horizontal distance from a building foundation and/or utility: MW-2, MW-3, MW-4, MW-5, MW-6, and MW-10.

Based on results from the distance screening process, petroleum constituent analytical results from MW-2, MW-3, MW-4, MW-5, MW-6, and MW-10, and non-petroleum constituent analytical results from MW-1 through MW-15, and MW-20BR, should be compared to screening values to determine if constituent concentrations identified at these groundwater sample locations represent potential VI sources.

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10.1.3 Groundwater (Continued)

The PADEP RUA groundwater MSCs, reduced by a factor of 10, were used to screen groundwater concentrations because of the following;

- SSS closure standard has been selected.
- Groundwater is less than five (5) feet below the building foundation.
- In some areas of the source property there is less than five (5) feet of soil-like material present between the groundwater and building receptor.

Groundwater sample analytical results are compared to the groundwater screening values in **Table 8.**

Detectable concentrations exceeding the VI screening values are identified and the following groundwater sample locations are considered potential VI sources: MW-1, MW-2, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, and MW-13. Because potential groundwater VI source(s) are identified, additional assessment of VI from groundwater is warranted.

10.1.4 Soil

Detectable concentrations of COCs (above and below their respective PADEP RUA soil to groundwater MSC) have been identified in soil. Soil sample locations range in depth from one (1) foot bgs to 13 feet bgs. Fill material (gravel) is present to depths of up to eight (8) feet bgs and is not considered "acceptable" for the occurrence of attenuation. Native material beneath the fill consists of clay and sandy clay and is considered "acceptable" for the occurrence of attenuation.

Soil sample locations were screened against proximity and/or separation distances of current building receptors and underground utility line locations at the site. Because SPL has not been identified in soil, the following proximity and separation distances were applied;

- petroleum constituents: 30 feet of horizontal separation and 5 feet of vertical separation, and
- non-petroleum constituents (MTBE): 100 feet of horizontal separation (there is no vertical separation distance for non-petroleum constituents).

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10.1.4 Soil (Continued)

According to VIB Guidance, if a sample point is located beyond either the horizontal or vertical proximity distance for petroleum constituents, no additional VI evaluation is necessary for that sample point location. Similarly, a subsurface feature (underground utility) may be eliminated as a potential preferential pathway, if either the horizontal or the vertical separation distance criteria for petroleum constituents is met. For non-petroleum constituents, the sample point location must be beyond the horizontal proximity or separation distance (100 feet) in order to be excluded from additional VI evaluation. Note that saturated samples collected within the zone of permanent saturation were not included in the screening process for both petroleum and non-petroleum constituents. Refer to **Figure 16** for locations of soil samples, the potential building receptor, current underground utility lines, and horizontal proximity/separation distance boundaries.

The non-petroleum horizontal distance screen indicated the following soil sample points are located within 100 horizontal feet of a source property building and/or a utility; SB-1 through SB-46, PZ-3BR, and MW-20BR.

The petroleum horizontal distance screen indicated the following soil sample points are located within 30 horizontal feet of a building and/or utility: SB-1 through SB-17, SB-19 through SB-22, SB-24 through SB-27, SB-31, SB-37 through SB-40, SB-42, and PZ-3BR. The sample depths of the soil sample points identified in the petroleum horizontal distance screen were then compared to the petroleum vertical distance screen (five [5] vertical feet from a building foundation or an underground utility). Note: there is no vertical distance screen for non-petroleum constituents (MTBE). Refer to **Figure 15** and **Table 7** for an illustration and summary of the vertical distance screening process.

Results of the vertical distance screen for petroleum indicates that the following soil sample points are located within the specified vertical distance from a building foundation and/or utility: SB-4, SB-5, SB-9, SB-10, SB-11, SB-12, SB-13, SB-14, SB-16, SB-17, SB-20, SB-21, SB-22, SB-24, SB-25, SB-26, SB-31, SB-37, SB-38, SB-39, SB-40, and PZ-3BR.

Soil boring sample locations retained following the petroleum and non-petroleum vertical and horizontal distance screening processes were compared to soil screening values to determine if constituent concentrations identified at these soil sample locations represent potential VI sources. The PADEP RUA generic soil to groundwater MSCs, reduced by a factor of 10, were used to screen soil concentrations because of the following;

- SSS closure standard has been selected.
- Not all soil sample depths are below the building foundation.

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10.1.4 Soil (Continued)

Soil sample analytical results for petroleum and non-petroleum constituents are compared to soil screening values in **Tables 9** and **10,** respectively.

Based on the comparison of constituent concentrations to the soil screen, exceedances are identified and the following soil sample locations are considered potential VI sources: SB-10, SB-11, SB-12, SB-13, SB-14, SB-17, SB-18, SB-24, SB-25, SB-28, SB-30, SB-31, SB-34, SB-36, SB-37, MW-38, MW-39, and PZ-3BR. Because, in some cases, laboratory detection limits for benzene and MTBE are above their respective screening value, additional potential VI sources may be present in soil. Because potential soil VI source(s) are identified, additional assessment of VI from soil is warranted.

10.2 Additional Assessment Options

Based on the VIB Guidance, additional assessment options under the SSS remedial standard include the following:

- Obtain vapor samples (near-source, sub-slab, or indoor air) and compare results to corresponding screening values.
- Model constituent concentrations in soil and groundwater to predict vapor conditions and compare to indoor air screening values.
- Mitigate (and ensure its success through quantitative analysis) and attach an environmental covenant to the property deed.
- Remediate and then reassess the VI pathway.

Not all assessment options listed above may be appropriate to further evaluate vapor conditions at the site. Considerations for further assessment are provided below.

- Vapor Sampling:

  - Near-source vapor sampling is best conducted at depths equal to or greater than five (5) feet bgs due to pervious ground cover (gravel and broken macadam) and related concerns of ambient air dilution during sampling of shallow vapor points. In some locations soil or groundwater sources are shallower than five (5) feet bgs.

  - Depth to water measurements collected at MW-5, MW-6 and MW-10 show groundwater may be present within one (1) to two (2) feet of the building receptor's basement slab. The presence of groundwater could prohibit collection of sub-slab vapor.

  - Some potential VI sources are located at depths that are shallower than the building's basement slab. Sub slab soil vapor samples would not fully evaluate the vapor risk of shallow source areas.

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10.2 Additional Assessment Options (Continued)

- Vapor Sampling (Continued):
  - The numerous potential background sources (heating oil tank, furnace, etc.) in the basement of the building receptor have the potential to contribute the same short list volatiles to indoor air. As a result an indoor air sample may result in a false positive or inaccurately represent (skew high) the contribution from VI into buildings.

- Modeling:
  Modeling is an option to evaluate risk associated with residual soil and/or groundwater impact.

- Mitigation:
  Mitigation may be necessary to address shallow potential vapor sources.

- Remediation:
  Remediation may be necessary to address shallow potential vapor sources.

10.3 J&E Modeling

Shallow soil and groundwater impacts were evaluated using the J&E Model. Concentrations of VOCs in soil and groundwater along with soil type are unfavorable conditions for acceptable risk; however the model was run to confirm this hypothesis being there are few remaining options to handle VI assessment of shallow impacts. Deeper impacts in soil and groundwater were not assessed using J&E because of the unlikelihood the model would yield acceptable risk and because there are alternatives for evaluating the risk of VI associated with deeper impacts.

10.3.1 J&E Model – Soil

The most elevated concentrations detected in soil during the course of the investigation from a depth of three (3) feet bgs or shallower were used to model VOCs and predict risk. Concentrations at SB-13, collected at two (2) feet bgs, were used to evaluate risk for all target constituents. Because the reporting limit for MTBE at SB-13 (3,050 µg/kg) was higher than any detection of MTBE in soil, the value of 3,049 µg/kg was used to calculate risk conservatively. It should be noted that the Residential PADEP J&E Version 6.6R April 2018 was used to calculate risk.

An error occurs if a basement scenario is selected due to the shallow sample collection depth; therefore slab-on-grade building construction was used for modeling. Other inputs include a depth of 60.96cm to the top of contamination, which is the sampling depth (two [2] feet bgs). Soil type was taken from the boring log for SB-13 showing from deep to shallow; clay immediately above the impact, followed by sandy clay and last gravel (entered as sand in the model) immediately below surface grade.

10.3.1 J&E Model – Soil (Continued)

Default entries were used for remaining parameters besides chemical number and soil concentration.

Appendix M provides J&E Model input parameters and results pages for all chemicals. **Table 11** summarizes the results for shallow soil.

The results of the J&E Model do not support that the risk of VI from a shallow soil source (three [3] feet or shallower) is acceptable.

10.3.2 J&E Model - Groundwater

Shallow groundwater (three [3] feet bgs or shallower) occurs only at MW-5. MTBE is the only constituent detected at MW-5; therefore, the most elevated concentration of MTBE detected during the course of the investigation was used to model VOCs and predict risk. It should be noted that the Residential PADEP J&E Version 6.6R April 2018 was used to calculate risk.

An error occurs if a basement scenario is selected due to the shallow sample collection depth; therefore slab-on-grade building construction was used for modeling. Other inputs include a depth of 35.97 cm to the top of contamination, which is the sampling depth (1.18 feet bgs). Soil type was taken from the boring log for SB-15 (MW-5) showing gravel (entered as sand in the model) immediately below surface grade to a depth of five (5) feet bgs. Default entries were used for remaining parameters besides chemical number and groundwater concentration.

Appendix N provides J&E Model input parameters and results pages for all chemicals. **Table 12** summarizes the results for shallow groundwater.

The results of the J&E Model support the risk of VI from a shallow groundwater source (three [3] feet or shallower) at MW-5 is acceptable.

10.4 Proposed Post-Remedial Assessment of VIB

And as mentioned previously, the sampling of vapor shallower than five (5) feet bgs is not recommended, and deeper sampling may not accurately read the volatile contribution from a shallow source. Results of J&E Modeling support acceptable risk associated with shallow groundwater at MW-5; however J&E modeling of shallow soil impact at SB-13 yields unacceptable risk. The remaining options to address shallow potential VI sources are mitigation or remediation. The current strategy (**Section 17.0**) is to complete on-site and off-site soil excavation to remediate all accessible unsaturated and periodically saturated soil impacts as well as any soil concentration within vertical and horizontal separation distances exceeding residential soil vapor screening values.

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10.4 Proposed Post-Remedial Assessment of VIB (Continued)

To recap, some potential VI sources can be evaluated further through the collection and analysis of near-source soil vapor samples collected at five (5) feet bgs or deeper. To accomplish this it is proposed that near source vapor sample points be installed post-remediation near the following to evaluate contribution from affected soil and/or groundwater subsequent to remedial excavation: SB-12/MW-4, SB-41/MW-12, and SB-33R/MW-13. However, based on the results of post-remedial soil attainment/characterization samples (**Section 17.1**), the near source vapor sampling point locations will be reevaluated prior to installation.

Potential VI sources beneath the existing building receptor can be evaluated by sampling sub-slab vapor, if feasible. Two (2) sub-slab vapor points are proposed for the portion of the building constructed with a basement. One (1) sub-slab is proposed for the portion of the building constructed as slab on grade. Further, sampling air within the crawlspace to the south of the basement area would provide further evaluation of sources beneath the building footprint. Prior to sampling a recon should be performed to determine if any potential background sources are present or other conditions that may interfere with the collection of a representative sample.

The potential VI sources that remain include shallow sources (three [3] feet bgs or shallower). Most shallow sources are expected to be remediated via excavation (**Section 17.0**) except soil impacts within the State Route 522 right of way. Excavated areas will be restored with asphalt paving therefore preventing preferential volatile migration vertically and release of the constituents to ambient air.

11.0 SITE CONCEPTUAL MODEL

Soil and groundwater analytical results indicate that petroleum hydrocarbon constituents typically associated with a release of unleaded gasoline are present at detectable concentrations above and below the current PADEP RUA MSCs. The nature and extent of the petroleum release(s) and potential migration pathways were evaluated through the comparison of the soil and groundwater analytical data in relation to site features and the geologic and hydrogeologic settings of the facility. The conceptual site model developed from the evaluation is discussed in the following sections.

11.1 Aquifer System

Based on lithologic logs, overburden soil depth ranges from five (5) to 23 feet bgs with saturation initially encountered between 7.5 and 21.5 feet bgs during drilling. According to soil boring/monitoring well logs, overburden materials predominantly consist of up to eight (8) feet of fill (gravel), yellow, tan, or grey clay and silty clay. Isolated deposits of sandy clay and sand were encountered beneath the clay and silty clay in some areas. Static water levels within the overburden range from 1.18 feet btoc at MW-5 and 14.06 feet btoc at MW-9. Groundwater gradient at the site is toward the southeast with a groundwater mound in the vicinity of MW-5.

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11.1 Aquifer System (Continued)

Overburden groundwater elevation contour maps for January and February 2018 are included as **Figures 11** and **12**. A bedrock groundwater elevation contour map for January 2018 is included as **Figure 13**. Refer to **Figure 8** for a cross section location map and **Figures 9** and **10** for cross sections A-A' and B-B'. Note: as previously mentioned, due to the occurrence of the groundwater mound, groundwater elevation data from MW-5 is considered anomalous and is not included in groundwater elevation contour maps.

11.2 Source Area and COCs

The source of the release is interpreted to be leakage from the former unleaded gasoline dispenser. The release is believed to have been chronic in nature and the volume of released product is unknown.

The following constituents have been identified at detectable concentrations and are identified as the COCs in soil and groundwater:

1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, cumene, and naphthalene.

11.3 Preferential Pathways

Preferential pathways for product migration and overburden groundwater flow may include the porous sub base beneath the macadam/gravel ground surface, fill material used in UST closure, and the overburden/bedrock interface.

11.3.1 Porous Sub Base Pathway

Gravel material used as a sub base beneath the macadam/gravel surface at the property is interpreted to have acted as a preferential pathway for product migration after it was released from the product dispenser near the surface.

11.3.2 Fill Preferential Pathway

Gravel fill used in UST closure activities may act as a preferential pathway for impacted groundwater migration in a northern direction from the former location of the product dispenser on the subject property.

11.3.3 Bedrock Interface Preferential Pathway

Depth to competent bedrock becomes greater beneath the southern portion of the subject property and State Route 522. Impacted groundwater migration may be influenced by the sloping bedrock surface as indicated by the distribution of dissolved phase impacts in a southeastern direction.

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11.4 Conceptual Constituent Migration and Groundwater Flow

Based on site data, it is interpreted that product leaked from the former product dispenser for an extended period of time. Once product entered the sub base beneath the macadam, it spread out horizontally in all directions before migrating vertically downward, as indicated by the shallow soil impacts (0 to 2 feet bgs) identified in soil samples from locations northeast and east of the dispensers (SB-10, SB-11, SB-13, SB-14, SB-17, SB-18, SB-24, SB-25, SB-31, and SB-37) and deeper soil impacts (3' to 9' bgs) identified in soil samples from locations surrounding the former dispenser location (SB-10, SB-11, SB-12, SB-13, SB-18, SB-23, SB-33, SB-34, and PZ-3BR).

As product migrated downward, it entered the periodically saturated (smear zone) zone and eventually the overburden aquifer. A combined migration mechanism appears to have occurred. A portion of the release appears to have migrated horizontally to the east/southeast via the porous sub base and road base due to sloping topography, while simultaneously migrating vertically and travelling with groundwater flow to the east/southeast where vertical distribution occurred with fluctuating groundwater.

The porous sub base preferential pathway allowed horizontal migration to the east/southeast via sloping topography; product flowed horizontally in a southeastern direction between the Point Store building and Route 522, beneath Route 522, and onto a portion of the Mellott property on the southern side of State Route 522, as evidenced by elevated constituent concentrations in shallow soil (0 to 2 feet bgs) samples obtained from soil borings SB-17, SB-24, SB-31, and SB-37 as well as bottom unsaturated zone benzene impact identified in SB-30 and SB-34 across Route 522. Atmospheric water infiltration and runoff may have also aided in the migration of product in a southeastern direction within the sub base and road base. As the product migrated, vertical migration was occurring. The progression of product release and vertical migration near SB-12/MW-4 with simultaneous horizontal migration of product within sloped sub base to the area of SB-31/MW-10, then across State Route 522 within the road base to the vicinity of SB-30 and SB-34, along with vertical migration, appears to the most reasonable explanation that explains the distribution of observed soil and groundwater impacts.

Deeper soil impacts (3 to 9 feet bgs) are identified on the southern side of the Point Store building that extend beneath State Route 522 and a portion of the Mellott property on the southern side of State Route 522.

As indicated by static water levels obtained from monitoring wells at the site, the backfilled area in the location of the former kerosene UST is acting as a "bowl" and is creating a groundwater mound by trapping water within the excavation limits. This groundwater mound is acting as a barrier that inhibits dissolved phase constituent migration in a northeastern direction.

Refer to **Appendix J** for soil isoconcentration maps and **Appendix L** for groundwater isoconcentration maps.

12.0 NUMERIC GROUNDWATER FATE AND TRANSPORT ANALYSIS

Quantitative fate and transport groundwater models were produced for the transport of dissolved phase 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene.

12.1 Computer Model and Description

The model chosen for the quantification of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene was the New Quick Domenico (QD) model, a Microsoft Excel spreadsheet application of An Analytical Model for Multidimensional Transport of a Decaying Contaminant Species, by P.A. Domenico, Journal of Hydrology, 91 (1997), pp 49-58. The *PADEP User's Manual for the Quick Domenico Groundwater Fate and Transport Manual, February 2014* was followed for setup of the models. The QD model calculates concentrations of organic substances at any point and time downgradient of a source area of known size and concentration. The model allows for first order decay, retardation and three dimensional dispersion. This model is intended for dissolved organic constituents whose fate and transport can be described or influenced by first order decay and reaction with organic carbon in the soil. Site-specific data and published chemical properties of Site COC were used to construct and calibrate the empirical predictive simulation.

12.2 Input Parameters and Calibration / Sensitivity and Analysis

The QD spreadsheet allows for the use of a single source concentration which is applied across the entire width and thickness of the source area perpendicular to groundwater flow. The spreadsheet assumes that the source area concentration is continuous, therefore QD is inherently conservative.

Over the past 6 groundwater sampling events, from November 2016 through February 2018, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene have been identified in the overburden aquifer at concentrations exceeding their respective PADEP RUA aqueous MSC. Over the past six (6) sampling events, the highest concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, ethylbenzene, xylenes, and naphthalene have been identified in MW-4, and the highest concentrations of benzene and MTBE were identified in MW-7. MW-7 is situated immediately downgradient of MW-4. Therefore, MW-4 was used as the source well for the 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, ethylbenzene, xylenes, and naphthalene models, and MW-7 was used as the source well for the benzene and MTBE models.

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12.2 Input Parameters and Calibration / Sensitivity and Analysis (Continued)

The calibration wells used in each model include the following:

Constituent	Source Well	Calibration Well	Calibration Well
1,2,4-Trimethylbenzene	MW-4	MW-7	MW-13
1,3,5-Trimethylbenzene	MW-4	MW-7	MW-13
Benzene	MW-7	MW-13	NA
Toluene	MW-4	MW-7	NA
Ethylbenzene	MW-4	MW-7	MW-13
Xylenes	MW-4	MW-7	MW-13
MTBE	MW-7	MW-13	MW-17
Naphthalene	MW-4	MW-7	MW-13

The source concentration value and calibration well concentration values used in each calibrated model follows;

Constituent	Date	Source Well	Calibration Well	Calibration Well
1,2,4-Trimethylbenzene	2/6/17	3.46 mg/L	0.279 mg/L	0.003 mg/L
1,3,5-Trimethylbenzene	2/6/17	0.992 mg/L	0.113 mg/L	0.011 mg/L
Benzene	11/21/16	14.8 mg/L	0.056 mg/L	NA
Toluene	2/6/17	17.4 mg/L	0.548 mg/L	NA
Ethylbenzene	2/6/17	2.43 mg/L	0.420 mg/L	0.334 mg/L
Xylenes	2/6/17	14.1 mg/L	0.642 mg/L	0.009 mg/L
MTBE	11/21/16	4.85 mg/L	1.330 mg/L	0.002 mg/L
Naphthalene	2/6/17	1.76 mg/L	0.085 mg/L	0.040 mg/L

13.0 PETROLEUM IMPACTED GROUNDWATER FATE AND TRANSPORT MODELING

Because overburden groundwater impact is fully delineated in a downgradient direction from the source area, dissolved phase constituent fate and transport was evaluated quantitatively. The fate and transport of each constituent identified above its respective PADEP RUA groundwater MSC over the course of the project was evaluated separately as described below. For the Quick Domenico inputs and calibrations, see **Appendix O**, and for the resultant maps displaying projections, see **Appendix P**.

1,2,4-Trimethylbenzene:

Dissolved phase 1,2,4-trimethylbenzene migration is in a southeastern direction from source area monitoring well MW-4 toward downgradient monitoring well MW-13. The 1,2,4-trimethylbenzene plume is interpreted to currently reside within the subject site and extends to the southeast onto the Mellott property near MW-13. Utilizing the 30-year model with Quick Domenico, 1,2,4-trimethylbenzene is projected to migrate approximately 138 feet downgradient from MW-4, beyond MW-13 on the Mellott property in the direction of MW-17 at concentrations above the respective PADEP RUA MSC (15 µg/L).

13.0 PETROLEUM IMPACTED GROUNDWATER FATE AND TRANSPORT MODELING (Continued)

1,3,5-Trimethylbenzene:
Dissolved phase 1,3,5-trimethylbenzene migration is in a southeastern direction from source area monitoring well MW-4 to downgradient monitoring well MW-13. The 1,3,5-trimethylbenzene plume is interpreted to currently reside within the subject site. Utilizing the 30-year model with Quick Domenico, 1,3,5-trimethylbenzene is projected to migrate approximately 7.76 feet downgradient from MW-4, in the direction of MW-7 at concentrations above the respective PADEP RUA MSC (420 µg/L). 1,3,5-trimethylbenzene is not expected to migrate off the subject property.

Benzene:
Dissolved phase benzene migration is in a southeastern direction from source area monitoring well MW-7 to monitoring well MW-13. The benzene plume is interpreted to extend onto the Mellott property beyond MW-13. Utilizing the 30 year model with Quick Domenico, benzene is projected to migrate approximately 213 feet downgradient from MW-7, in the direction of MW-17 at concentrations above the respective PADEP RUA MSC (5 µg/L).

Toluene:
Dissolved phase toluene migration is in a southeastern direction from source area monitoring well MW-4 toward monitoring well MW-7. The toluene plume is interpreted to currently reside within the subject site. Utilizing the 30 year model with Quick Domenico, toluene is projected to migrate approximately 16.6 feet downgradient from MW-4, in the direction of MW-7 at concentrations above the respective PADEP RUA MSC (1,000 µg/L). Toluene is not expected to migrate off the subject property.

Ethylbenzene:
Dissolved phase ethylbenzene migration is in a southeastern direction from source area monitoring well MW-4 toward monitoring well MW-7. The ethylbenzene plume is interpreted to currently reside within the subject site. Utilizing the 30 year model with Quick Domenico, ethylbenzene is projected to migrate approximately 65.4 feet downgradient from MW-4, in the direction of MW-13 at concentrations above the respective PADEP RUA MSC (700 µg/L).

Xylenes:
Dissolved phase xylene migration is in a southeastern direction from source area monitoring well MW-4 toward monitoring well MW-7. The xylene plume is interpreted to currently reside within the subject site. Utilizing the 30 year model with Quick Domenico, xylene is projected to migrate approximately 3.8 feet downgradient from MW-4, in the direction of MW-7 at concentrations above the respective PADEP RUA MSC (10,000 µg/L). Xylene is not expected to migrate off the subject property.

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13.0 PETROLEUM IMPACTED GROUNDWATER FATE AND TRANSPORT MODELING (Continued)

MTBE:
Dissolved phase MTBE migration is in a southeastern direction from source area monitoring well MW-7 beyond downgradient monitoring well MW-13. The MTBE plume is interpreted to extend onto the Mellott property beyond MW-13. Utilizing the 30-year model with Quick Domenico, MTBE is projected to migrate approximately 219 feet downgradient from MW-7, in the direction of MW-17 at concentrations above the respective PADEP RUA MSC (20 µg/L).

Naphthalene:
Dissolved phase naphthalene migration is in a southeastern direction from source area monitoring well MW-4 toward monitoring well MW-7. The naphthalene plume is interpreted to currently reside within the subject site. Utilizing the 30 year model with Quick Domenico, naphthalene is projected to migrate approximately 113 feet downgradient from MW-4, in the direction of MW-13 at concentrations above the respective PADEP RUA MSC (100 µg/L).

14.0 ECOLOGICAL RECEPTOR EVALUATION

Based on the selected remedial standard (SHS) an Ecological Screening Evaluation was conducted following guidance under PA code Title 25 §250.311(a) (1-4) and (b) (1-3) (Evaluation of Ecological Receptors). The first step in the process is to determine if any of the following potential receptors are present at the site:

- Individuals of threatened or endangered species as designated by the United States Fish and Wildlife Service under the Endangered Species Act (16 U.S.C.A. § § 1531—1544).
- Exceptional value wetlands as defined in PA Code Title 25 § 105.17 (relating to wetlands).
- Habitats of concern.
- Species of concern.

The Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Tool was used to assess the occurrence of threatened or endangered species, habitats of concern, and species of concern. In addition, the US Fish and Wildlife Service (USFWS) National Wetlands Inventory Mapper was used to evaluate if significant wetlands were delineated within the site boundaries. The entire site or area of concern based upon site characterization was considered in the assessment.

The results of the PNDI review identified potential impact to an endangered species under the jurisdiction of the PA Department of Conservation and Natural Resources (DCNR). No known impact was identified by the other three (3) agencies' data bases including PA Game Commission, PA Fish and Boat Commission, and US Fish and Wildlife Services. Review of the USFWS National Wetlands Inventory Mapper indicates that the closest area designated as a wetland is over 1,100 feet from the site. A copy of the PNDI Environmental Review Receipt and a print of the Wetlands Inventory Map are included for reference as **Appendix Q.**

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14.0 ECOLOGICAL RECEPTOR EVALUATION (Continued)

The next step in the evaluation of ecological receptors is to evaluate whether surface soils or sediment at the site have the potential to pose substantial ecological impact or impacts requiring further evaluation using the nine (9) step ecological screening process presented in PA code Title 25 §250.311(b) through (e). According to the first step in the ecological screening process (presented in the Guidance Document), because only light petroleum products have been identified at the site, substantial ecological impact does not exist at the site and no further ecological action is required.

15.0 CHARACTERIZATION OBJECTIVES

The following site characterization objectives were developed for site characterization:

- Identify the extent of impacted groundwater.
- Identify the extent of impacted soil.
- Describe the study area geology, hydrogeology, aquifer characteristics, and physical parameters such that a remediation standard and strategy for the site can be selected.
- Develop a site conceptual model from which the fate and transport of constituents can be evaluated by modeling or analysis.
- Evaluate potential VIB risks.

15.1 Characterization Conclusions

Based on site characterization activities, the following conclusions have been made:

- A petroleum release was identified at the Point Store Property during UST removal activities conducted in August 2014 prompting site characterization activities.

- The source of the release is interpreted to be leakage from the former unleaded gasoline dispenser. The release is believed to have been chronic in nature and the volume of released product is unknown.

- An overburden aquifer is identified at the site. Groundwater gradient within the overburden is to the southeast toward Jack's Creek. A shallow bedrock aquifer is identified at the site. Groundwater gradient within the shallow bedrock is to the southeast toward Jack's Creek.

- Analytical results from groundwater samples collected from overburden monitoring wells identified 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, MTBE, and naphthalene at concentrations above their respective PADEP RUA groundwater MSC at locations on the subject property, and 1,2,4-trimethylbenzene, benzene, and MTBE off-site at locations on the Mellott property to the southeast.

- Analytical results from groundwater samples collected from bedrock monitoring well MW-20BR (located on the Mellott property) identified detections of 1,2,4-trimethylbenzene, ethylbenzene, and total xylenes; however, concentrations were detected below respective PADEP RUA groundwater MSCs.

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15.1 Characterization Conclusions (Continued)

- Analytical results from soil samples collected from soil borings identified 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene at concentrations above their respective PADEP RUA soil to groundwater MSC at locations on the subject property and on the Mellott property to the southeast.

- Migration vectors for petroleum impact are interpreted to include: gravel material used as a sub base beneath the macadam/gravel surface at the property, gravel fill used in UST closure activities, and the sloping bedrock surface.

- Soil and groundwater impacts have been successfully delineated laterally and vertically, no additional investigative activities are warranted for soil and groundwater.

- Aquifer pump testing of the Point Store well and Mellott well was completed. The Point Store Pumping test showed an influence on surrounding shallow bedrock monitoring points and no apparent influence on overburden monitoring points. The Mellott Pumping test showed no apparent influence on any of the shallow bedrock or overburden monitoring points.

- A VI evaluation identified potential VI sources in soil and groundwater. Additional VIB investigation, mitigation, and/or remedial activities are warranted to address soil vapor conditions at the site.

- Groundwater sample data and quantitative fate and transport modeling indicates dissolved phase 1,2,4-trimethylbenzene, benzene, ethylbenzene, MTBE, and naphthalene are currently or will migrate beyond the bounds of the subject property at concentrations above their respective PADEP RUA groundwater MSC within 30 years. Ethylbenzene is predicted to migrate off-site beneath Route 522; 1,2,4-trimethylbenzene, benzene, MTBE, and naphthalene are predicted to migrate across Route 522 onto the Mellott property. COCs are not predicted to migrate to the area of the Mellott well or Jack's Creek within 30 years.

- At this time, the current remedial standard for the property is the SSS for soil and groundwater.

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15.2 Description of Further Site Characterization Needed

Based on site characterization activities and evaluation completed to date, the following additional activities consisting of a post-source removal site-specific VI investigation is proposed:

- Installation of three (3) near source vapor sample points near SB-12/MW-4, SB-41/MW-12, and SB-33R/MW-13 are proposed; the proposed locations will be reviewed and finalized based upon soil attainment / characterization samples collected following remedial excavation.

- Installation of two (2) sub-slab vapor points for the portion of the building constructed with a basement.

- Installation of one (1) sub-slab vapor point proposed for the portion of the building constructed as slab-on grade.

- Collection of indoor air samples from within the crawlspace to the south of the basement area.

- After collection of near source soil vapor samples, sub-slab samples, and crawlspace indoor air samples, VI will be reevaluated. If a VI concern remains, a vapor mitigation system(s) will be designed and installed. Testing may be required to determine if mitigation system(s) will be operate effectively.

16.0 REMEDIAL ACTION OPTIONS

The selected remedial standard for the site is the SSS. The remedial action options are presented below.

The following technologies are being considered for this site:

- *Limited soil excavation*
- *Dual phase extraction (DPE) or soil vapor extraction (SVE)*
- *Carbon-based injection with bioremediation (Trap and Treat)*
- *In-situ chemical oxidation (ISCO)*
- *Risk-based closure having limited active remediation*

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16.0 REMEDIAL ACTION OPTIONS (Continued)

The following is an evaluation of each technique being considered for this site.

Limited Soil Excavation

Soil excavation involves the removal of impacted soils from the site. The excavated soils are disposed of at a proper facility and the excavated area is backfilled with clean fill material. Soil impacted with COCs at concentrations above their respective PADEP RUA soil to groundwater MSC ranges in depth from one (1) to nine (9) feet bgs. Soil excavation is a viable remedial option for impacted soil on-site and on the off-site Mellott property at this site. Excavating impacted unsaturated and periodically saturated soil will significantly reduce the volume of source material. Limited soil excavation alone will not completely address impacted groundwater as source material will remain beneath Route 522; however, it should stabilize the plume sufficiently to allow for closure via SSS.

Dual Phase Extraction or Soil Vapor Extraction

Dual phase extraction is a process that includes extracting both groundwater and soil vapor continuously from an aquifer. Groundwater extraction through either vacuum drop tubes or submersible pumps is enhanced by a pressure gradient created by a vacuum placed on the well head. In addition to groundwater extraction the vacuum on the well is used to remove petroleum impacts from soil and groundwater by stripping petroleum vapors from these media.

Dual phase extraction is best suited for aquifers with low groundwater yield to increase groundwater recovery rates. In addition, soil petroleum impact mass is removed from soils at the same time via the vacuum system.

Where unsaturated soils are the only media of concern SVE may be employed in a similar manner. A vacuum is placed on the well head of a well screened through impacted unsaturated soils. The vacuum strips sorbed phase VOCs from the soils and extracts them in vapor phase to the surface where the vapors are treated and discharged to the atmosphere.

Capital costs are high for this type of system but may off-set the time to reach remedial goals, especially if compared to conventional groundwater extraction. This technology is best employed when direct removal of the source is not possible. Because shallow soil impacts may be difficult to treat without SVE short-circuiting and due to the low permeability of the clay overburden material, dual phase extraction technology may not the most appropriate remedial method for this site. A significant footprint of on-site source material can be directly removed via excavation as well as a small area off-site on the Mellott property. The amount of disruption and ground work required to install a remediation system would be similar to that of a limited excavation; therefore, limited excavation is preferred to the installation of a remedial system. To determine whether dual phase extraction or soil vapor extraction would be effective, a feasibility study could be performed.

16.0 REMEDIAL ACTION OPTIONS (Continued)

Carbon-Based Injection with Bioremediation (Trap and Treat)

Trap and treat involves injecting liquefied activated carbon into the subsurface to facilitate contaminant demobilization in conjunction with expedited biodegradation. Once in the subsurface, constituents' partition to the surface of the carbon particles, the mass is inhabited by contaminant degrading bacteria, and rapid biodegradation occurs. Because the overburden material consists mainly of clay (in areas not comprised of fill), trap and treat may not be an ideal primary remedial option for this site; however, it may be used in conjunction with other remedial methods such as soil excavation or as a supplemental remedy to help stabilize the groundwater plume. Prior to selecting trap and treat as a remedial strategy, a pilot study would be performed to determine the injection regimen and if additional injection points are required in order to effectively target petroleum impacts.

In-Situ Chemical Oxidation (ISCO)

ISCO consists of injection of strong oxidants into the subsurface, such as ozone, peroxides, and / or oxygen into soil and / or groundwater to promote both biological activity and chemical oxidation of organic compounds. An exothermic oxidation process breaks the chemical bonds of organic compounds and typically renders harmless by-products such as carbon dioxide and water (depending on the strength of the oxidant).

ISCO typically uses a pump to inject a known volume and concentration of oxidants or combination of oxidants into the subsurface through injection points. ISCO can be effective in remediating both adsorbed-phase and dissolved-phase petroleum hydrocarbons. ISCO may be considered a viable remedial method for this site in conjunction with soil excavation, or to help stabilize the groundwater plume after excavation. A pilot test would be needed to determine the injection regimen and the effectiveness of this technology to remediate soil and / or groundwater impacts.

Risk Based Closure

Risk based closure or SSS includes the identification of soil and groundwater impacts and the current and future risks that the impacts may pose to human health and the environment. Once a risk exposure is identified, a receptor pathway of exposure may be eliminated through institutional or engineering controls. Institutional and engineering controls would be implemented by placing an activity use limitation in the form of an environmental covenant on the property deed that follows through to all property owners requiring controls to limit exposure pathways.

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16.0 REMEDIAL ACTION OPTIONS (Continued)

Risk Based Closure (Continued)

A risk based closure may be obtained in a relatively short period of time and with relatively less capital costs. Risk based closure is a viable option for remediation and would likely entail restrictions on excavation activities and soil vapor into building mitigation plans for future development. Since groundwater impact is present on the downgradient Mellott property, the Mellott property may also require environmental covenants. It should be noted that a risk-based closure at this site may not preclude remediation via other methods to satisfy VI requirements and risk criteria.

This form of remediation has been selected as the primary remedial option for this site.

17.0 CONCEPTUAL REMEDIAL ACTION

The remedial goal established for the site is the PADEP Act 2 SSS for soil and groundwater which will be demonstrated through pathway elimination (further discussed in **Section 17.0**). Active remediation will consist of limited on-site and off-site soil excavation and disposal with application of an oxygen releasing compound to the open excavations and, if warranted based on post-excavation groundwater sampling results, a plume stability remedy may be considered post-excavation such as activated carbon based injections or ISCO. The remedial excavation strategy is such to remove all on-property and Mellott property soil containing COC concentrations above PADEP Act RUA MSCs as well as soil containing COCs that pose a VI issue even if COCs in the soil are below PADEP Act RUA MSCs.

This Remedial Action Plan (RAP) is completed to fulfill the PADEP Corrective Action Process requirements outlined in Title 25, Chapter 245, Administration of Storage Tanks and Spill Prevention Program, Subchapter D, Section 311.

17.1 Limited Soil Excavation

Based on site characterization and UST closure activities, unsaturated soil impacts (above RUA soil to groundwater MSCs) are identified between one (1) and nine (9) feet bgs on-site, and between five (5) to seven (7) feet bgs in a thin strip along the Route 522 right of way on the off-site Mellott property.

By removing the on-site soil source material through excavation, it is anticipated that groundwater quality will improve and dissolved phase concentrations will decrease and stabilize. **Figure 16** defines the proposed areas of soil removal based upon the results of soil sample analytical data and accessibility to the impacted soil. It is estimated that approximately 1,153 cubic yards of soil will be excavated on the Point Store property and approximately 334 cubic yards of soil will be excavated on the Mellott property.

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17.1 Limited Soil Excavation (Continued)

The excavation will encompass four (4) areas (Area A through Area D). Area A contains unsaturated soil impacts (above RUA soil to groundwater MSCs) down to nine (9) feet bgs; however, because Area A is the source area (former dispenser location), the excavation will extend to approximately 12 feet bgs to remove contaminants adsorbed to permanently saturated soil, which will reduce contaminant mass and aid in groundwater plume stability. Area B will encompass the area of SB-31/MW-10 and contains unsaturated soil impacts (above RUA soil to groundwater MSCs) down to seven (7) feet bgs; however, Area B will extend to approximately 10 feet to remove contaminants adsorbed to permanently saturated soil, which will reduce contaminant mass and aid in groundwater plume stability. Area C will encompass the area of SB-37 and contains unsaturated soil impacts (above RUA soil to groundwater MSCs) down to one (1) foot bgs; however, to address concentrations that contribute to VI, Area C will extend to approximately five (5) feet bgs. Area D, on the off-site Mellott property along the Route 522 right of way and contains unsaturated soil impacts (above RUA soil to groundwater MSCs) down to seven (7) feet bgs; however, to address concentrations that contribute to VI, Area D will extend to approximately nine (9) feet bgs.

Soil from the excavations will be screened and segregated for either re-use on-site as backfill or, if excessively impacted, removed from the site for proper disposal. Excavated soil will be screened, segregated, and managed based on PID head space readings. Each bucket of soil will be visually inspected and field screened with a PID. Grab samples of soil will be placed into zip-lock bags for screening purposes. Soil exhibiting PID readings of >50 parts per million by volume (ppmv) shall be directly loaded to a waste hauling truck for off-site disposal. Material exhibiting head space readings of ≤50 ppmv will be staged, managed, and reused to backfill the excavation after appropriate testing is completed to confirm soil is acceptable for re-use on-site. Mountain Research will be prepared to extend the excavation beyond the pre-defined excavation areas if warranted by field screening. Note that the excavation will not extend into the Route 522 right of way.

All excavated soil will be directly loaded onto trucks or staged on and covered with 6 mil plastic and sampled prior to transport and pending disposal.

Once excavation activities are complete, Mountain Research will collect attainment/characterization samples in a bias manner from all site walls of the excavated areas, and bottoms if the particular area is not excavated into the saturated zone. Soil attainment samples for unleaded gasoline parameters will be analyzed for the post-March 2008 short list of petroleum parameters associated with unleaded gasoline including: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, cumene, MTBE, naphthalene, via EPA SW-846 Method 8260B.

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17.1 Limited Soil Excavation (Continued)

Material stockpiled for re-use will be sampled prior to backfilling. Sampling and analysis will be conducted in accordance with PADEP guidance documents. The restoration/backfilling of the excavation will involve a combination of the reused site soil (deemed suitable for fill) and imported clean fill stone. Material will be mechanically compacted with in one (1) foot lifts to within five (5) inches of surface grade.

It is possible that water will need to be removed from the excavation. If this is the case, a vacuum extraction tanker truck will be used to extract water and transport it to a properly permitted disposal facility. Prior to removal, a water sample will be collected and analyzed for disposal parameters as required by the disposal facility.

17.2 Well/Piezometer Abandonment and Reinstallation

It is anticipated that the following monitoring wells and piezometers will fall within the excavation area: MW-4, MW-6, MW-7, MW-10, MW-11, and PZ-3BR. Each of the monitoring points will be properly abandoned in accordance with the PADEP's *Groundwater Monitoring Guidance Manual* by free-falling 3/8-inch bentonite chips into each casing. The bentonite will then be thoroughly hydrated.

All six (6) abandoned monitoring points will be reinstalled subsequent to excavation as follows:

- MW-4 will be reinstalled in the same location.
- MW-6, MW-7, and MW-10 will be reinstalled just to the south of each respective location within the unexcavated Pennsylvania Department of Transportation (PennDOT) right of way (ROW) under a PennDOT right of entry (ROE) agreement.
- MW-11 – will be reinstalled near its original location, but shifted south, just outside of the excavated area.
- PZ-3BR will be reinstalled in the same location and will be used as a bedrock groundwater monitoring well.

17.3 Oxygen Releasing Compound

Prior to backfilling each excavated area, a slurry application of Regenesis Advanced Oxygen Release Compound (ORC Advanced®) will be conducted. The ORC Advanced® will aid in the degradation of soil impacts remaining beneath State Route 522, therefore reducing post-excavation groundwater concentrations. It is estimated that 1,000 to 2,000 pound of ORC Advanced® will be applied to excavations on the Point Store and Mellott properties.

17.4 Restoration of Excavated Areas

Each excavated area will be restored in kind. Asphalt areas will be repaved, gravel areas will be graded with clean stone, and grass areas will be graded with topsoil and grass replanted.

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17.5 Groundwater Remediation

After soil excavation is complete, at least four (4) consecutive quarters of groundwater sampling will occur. If analytical results from quarterly groundwater samples indicate increasing trends and/or a non-stable plume, groundwater remediation in the form of activated carbon based injections or ISCO injections may be evaluated to address groundwater impacts.

18.0 POTENTIAL HUMAN EXPOSURE SCENARIO ASSESSMENT

Based on the chosen remedial standard (SSS) for select constituents in soil and overburden groundwater, a potential human exposure assessment was performed.

Exposure only occurs when the potential exists for a chemical to directly contact a receptor of concern or when a mechanism exists for the chemical to be transported to a receptor. Without exposure there is no risk. Existing and potential human receptor scenarios and correlated exposure pathways are examined within the subsequent sections with consideration of both current and potential future land uses.

18.1 Planned Institutional and Engineering Controls

Land usage restrictions are amenable to the site property owner and will be used to eliminate human exposure pathways by way of institutional and engineering controls. They are described below.

- Environmental covenant waivers will be acquired for a portion of State Route 522 that recognizes that these areas are expected to be used as roadways in the future and eliminating the pathway for exposure to groundwater through use of a well.

- An environmental covenant will be placed on the site property that;

    - Prohibits the installation or use of a private groundwater supply well in defined areas.
    - Requires oversight by an environmental professional for any soil disturbance that occurs within the defined area of soil impact, if there are any remaining soil impacts after excavation.
    - Requires professional management of groundwater generated at the site property within a defined area.
    - Requires a newly erected structure to be constructed with petroleum vapor mitigation demonstrated to be effective at inhibiting VI and protective of human health, depending on subsurface conditions following remediation and at the time the new structure would be built.
    - Possibly requiring a maintained surface cap across a defined area, if soil impact remains after excavation.
    - Based on the results of the post-remedial VI investigation, possibly require vapor mitigation on the existing Point Store building.

18.1 Planned Institutional and Engineering Controls (Continued)

- An environmental covenant will be placed on the Mellott property that;
    - Prohibits the installation or use of a private groundwater supply well in defined areas.
    - Requires oversight by an environmental professional for any soil disturbance that occurs within the defined area of soil impact, if there are any remaining soil impacts after excavation.
    - Requires professional management of groundwater generated at the site property within a defined area.
    - Requires a newly erected structure to be constructed with petroleum vapor mitigation demonstrated to be effective at inhibiting VI and protective of human health, depending on subsurface conditions following remediation and at the time the new structure would be built.

These terms will be revisited at the time of closure.

19.0 REGULATORY PERMITS OR APPROVALS TO CONDUCT THE REMEDIAL ACTION

Regulatory approval of the RAP will be required prior to performing the remedial action. Local construction permits may be required for the proposed remedial actions.

Impacted soil wastes generated during soil excavation will be containerized and transported from the site for proper disposal. If vacuum extraction for dewatering is conducted, impacted groundwater removed will be transported from the site in the vacuum truck for proper disposal. Monitoring well purge water produced during groundwater sampling will be treated with activated carbon prior to discharging to the ground surface. No permits are required for discharge.

20.0 FEASIBILITY STUDY

Because it is uncertain if active groundwater remediation/polishing will be necessary to demonstrate plume stability for SSS attainment, feasibility studies have not been completed for activated carbon based injections or ISCO injections. If it is determined that active groundwater remediation is warranted, feasibility studies will be conducted and the results will be included within a remedial action completion report (RAPR) for PADEP review and comment prior to initializing groundwater remediation at the site.

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21.0 SCHEDULE

Following PADEP approval of the RAP, RAP implementation will be initiated once the PAUSTIF competitive bid process has been completed which is currently anticipated to occur early in the first quarter 2019. Upon contract execution with the selected bidder, excavation activities will be scheduled and are expected to occur over and approximate two (2) week period.

Quarterly performance sampling will occur once every three (3) months.

A schedule for active groundwater remediation activities will be determined and presented to the PADEP if it is determined that active groundwater remediation is warranted at the site, and a groundwater remedial method is selected.

21.1 Regulatory Monitoring

All monitoring wells will be sampled on a quarterly basis. Quarterly sampling will occur at monitoring wells MW-1 through MW-18, MW-19BR, MW-20BR, the Point Store well, and the Mellott well. Refer to **Table 5** for a groundwater analytical summary of recent and historical concentrations.

All groundwater monitoring wells will be analyzed for the post-March 2008 PADEP short-list of parameters associated with unleaded gasoline including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, cumene, MTBE, and naphthalene via EPA Method 8260B. For quality control purposes, Mountain Research will collect and analyze one (1) trip blank and one (1) blind duplicate sample per sampling event.

Upon receipt of the groundwater analytical results from each quarterly sampling event, Mountain Research will prepare and submit a quarterly RAPR signed and sealed by a Pennsylvania Professional Geologist to PADEP. The RAPR will be written in accordance with Chapter 245, Subchapter D, Section 312. Each RAPR will include:

- Documentation of data collected during the quarter
- Tabulated data on well construction, static water level measurements, groundwater elevations, and historical groundwater analytical results
- Maps including groundwater elevation contours and dissolved phase contamination isoconcentration contours
- Graphical depictions of key COC concentration trends (including exponential trend-lines projected forward in time) correlated with groundwater elevations
- Quantitative and qualitative evaluation of the groundwater plume stability
- Discussion of any remedial activities conducted during the reporting period

22.0 SELECTION OF A REMEDIAL STANDARD

The remediation standard goal for the property is the PADEP Act 2 SSS for soil and groundwater.

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23.0 MEDIA, PARAMETERS, AND ANALYTICAL METHODS

Groundwater and soil is impacted by unleaded gasoline COCs and require remediation and sampling to attain closure under the SSS. Soil and groundwater samples will be analyzed for the site COCs including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, toluene, ethylbenzene, total xylenes, cumene, MTBE, and naphthalene via EPA Method 8260B. Additionally, field pH, conductivity, and temperature will be measured during groundwater sampling of monitoring wells.

24.0 DEMONSTRATION OF ATTAINMENT

Demonstration of attainment will be outlined in a Remedial Action Completion Report (RACR) submitted to the PADEP once the attainment goals are met.

24.1 Soil SSS Attainment

Attainment of the SSS in soil will be demonstrated through elimination of pathways via institutional control, engineering control, and/or risk assessment. A covenant waiver will be required for Route 522.

24.2 Groundwater SSS Attainment

Attainment of the SSS in groundwater will be demonstrated though analytical results from groundwater samples collected following remedial soil excavation to demonstrate plume stability (stable or decreasing trends). Post-excavation groundwater monitoring will be used to update groundwater models. The groundwater models will determine the terms of environmental covenants on the site property and downgradient Mellott property.

25.0 POST REMEDIATION CARE REQUIREMENTS

Based on the anticipated closure of the site via attainment of the SSS for soil and groundwater, post remedial activities may be required, but have not been determined at this time.

26.0 ADDITIONAL ITEMS NECESSARY TO DEVELOP REMEDIAL ACTION PLAN

No additional items are necessary for the development of this RAP. Feasibility testing may be required in the future if groundwater remediation is deemed necessary for plume stability.

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Attainment of the SSS in groundwater will be demonstrated though analytical results from groundwater samples collected following remedial soil excavation to demonstrate plume stability (stable or decreasing trends). Post-excavation groundwater monitoring will be used to update groundwater models. The groundwater models will determine the terms of environmental covenants on the site property and downgradient Mellott property.

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REFERENCES

- Pennsylvania's Department of Conservation and Natural Resources Home of Geographic Information Systems (GIS). Accessed June 2017. http://www.gis.dcnr.state.pa.us/maps/
- United States Department of Agriculture Web Soil Survey. Accessed June 2017. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- Berg, T.M., Geyer, A.R., Edmunds, W.E., and other, compilers. 1980. Geologic Map of Pennsylvania. Pennsylvania Geological Survey.
- Pennsylvania Department of Environmental Protection, December 2001. Pennsylvania Code. Title 25, Chapter 245: Administration of the Storage Tank and Spill Prevention Program, Subchapter D.
- Pennsylvania Department of Environmental Protection, January 2011. Pennsylvania Code. Title 25, Chapter 250: Administration of Land Recycling Program.
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- Pennsylvania Department of Environmental Protection. Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2. Effective January 18, 2017. Technical Document: 261-0300-101
- Pennsylvania Department of Environmental Protection. Land Recycling Program Technical Guidance Manual. June 2002. Technical Document: 253-0300-100
- Pennsylvania Groundwater Well Inventory System (PaGWIS) Website: Accessed June 2017. http://www.dcnr.state.pa.us/topogeo/groundwater/pagwis/records/index.htm.

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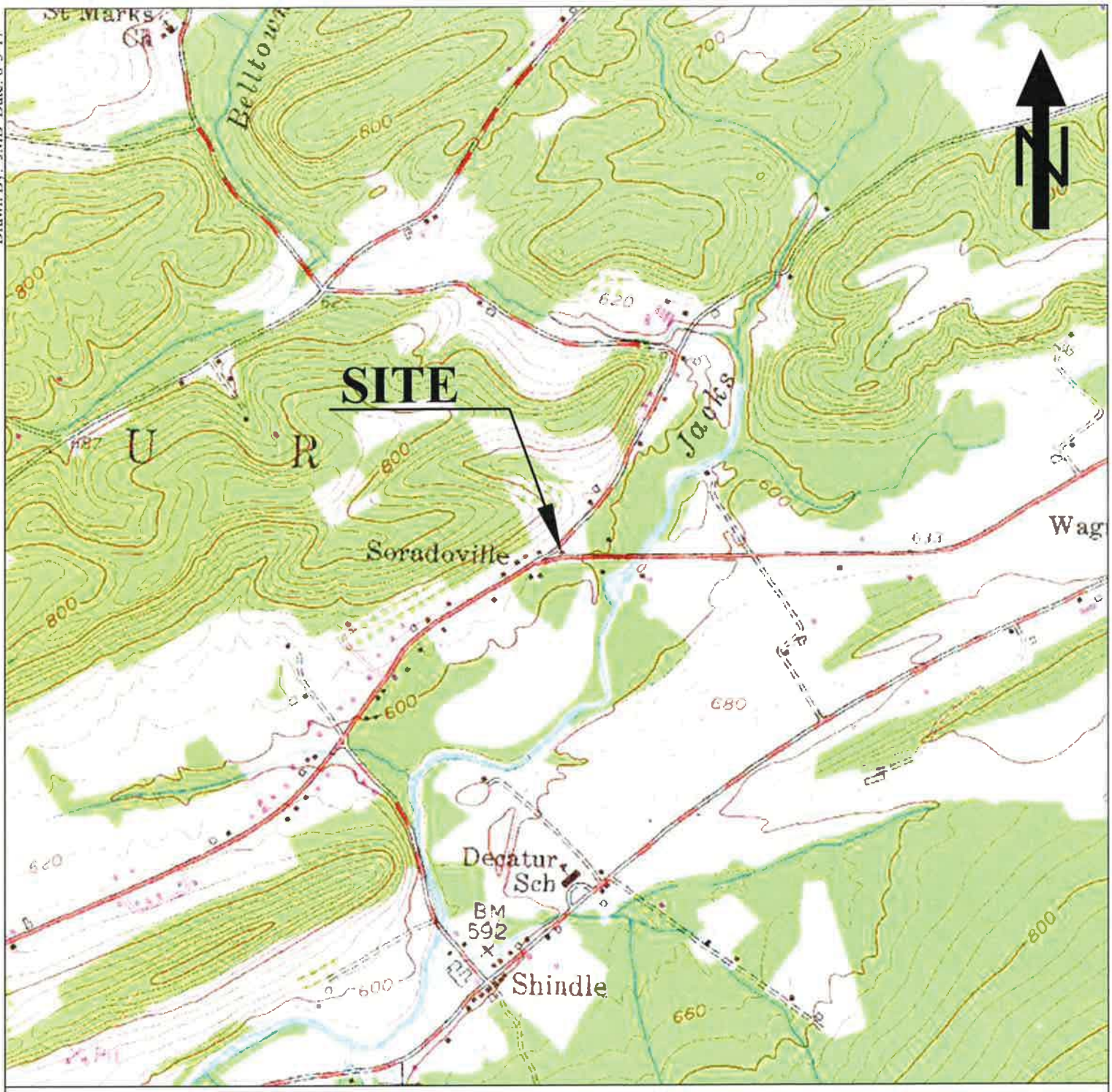
FIGURES



Portion of the Dallastown, PA U.S.G.S 7.5 Minute Topographic Quadrangle.

0 1/2 1 MILE

0 600 1,200 2,400 3,600 4,800 6,000 FEET

0 1/2 1 KILOMETER

1"=1,200'

PENNSYLVANIA

QUADRANGLE LOCATION

Site Coordinates: (40°40'48.31"N & 77°24'42.30"W)

4559.15.01

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POINT STORE

5867 Highway 522 North, Decatur Township

Mifflin County, McClure, PA

SITE LOCATION MAP

Figure 1

Drawn By: JMB Date: 6-5-17

H:\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\1 FIGURE\FIG 1 - SITE LOCATION MAP.DWG

PHOTO COURTESY OF GOOGLE EARTH PRO.

PROPERTY BOUNDARY

4559.15.01

Drawn By: JMB Date: 6-5-17

H:\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 2 - AERIAL SITE MAP.DWG

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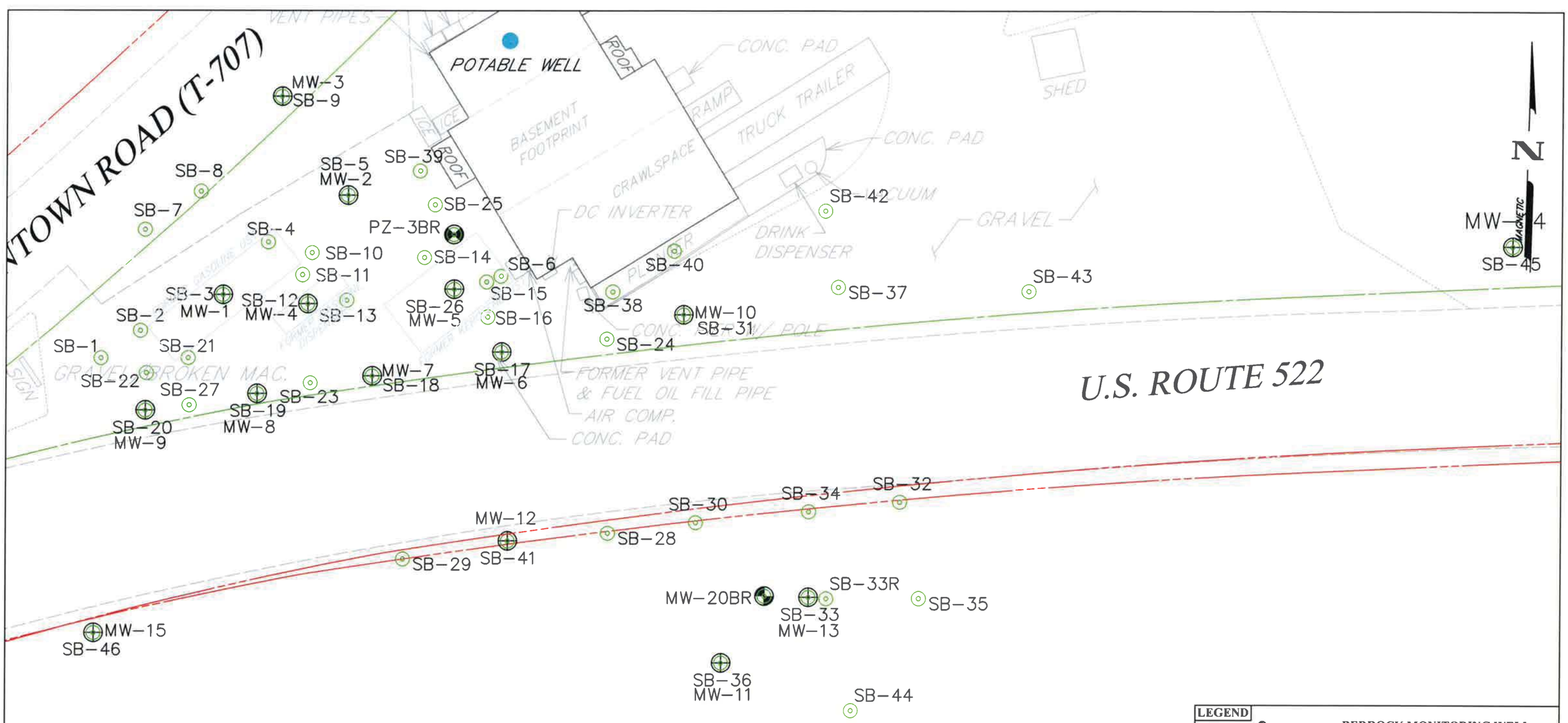
SITE AERIAL MAP

Figure 2



NOTES

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3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

SCALE: 1" = 20'

10' 0 20'

LEGEND

- BEDROCK MONITORING WELL
- BEDROCK PIEZOMETER
- OVERBURDEN PIEZOMETER
- OVERBURDEN MONITORING WELL
- SOIL BORING
- S — SANITARY SEWER LINE
- OU — OVERHEAD UTILITIES
- UE — UNDERGROUND ELECTRIC
- STORM WATER LINE
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE

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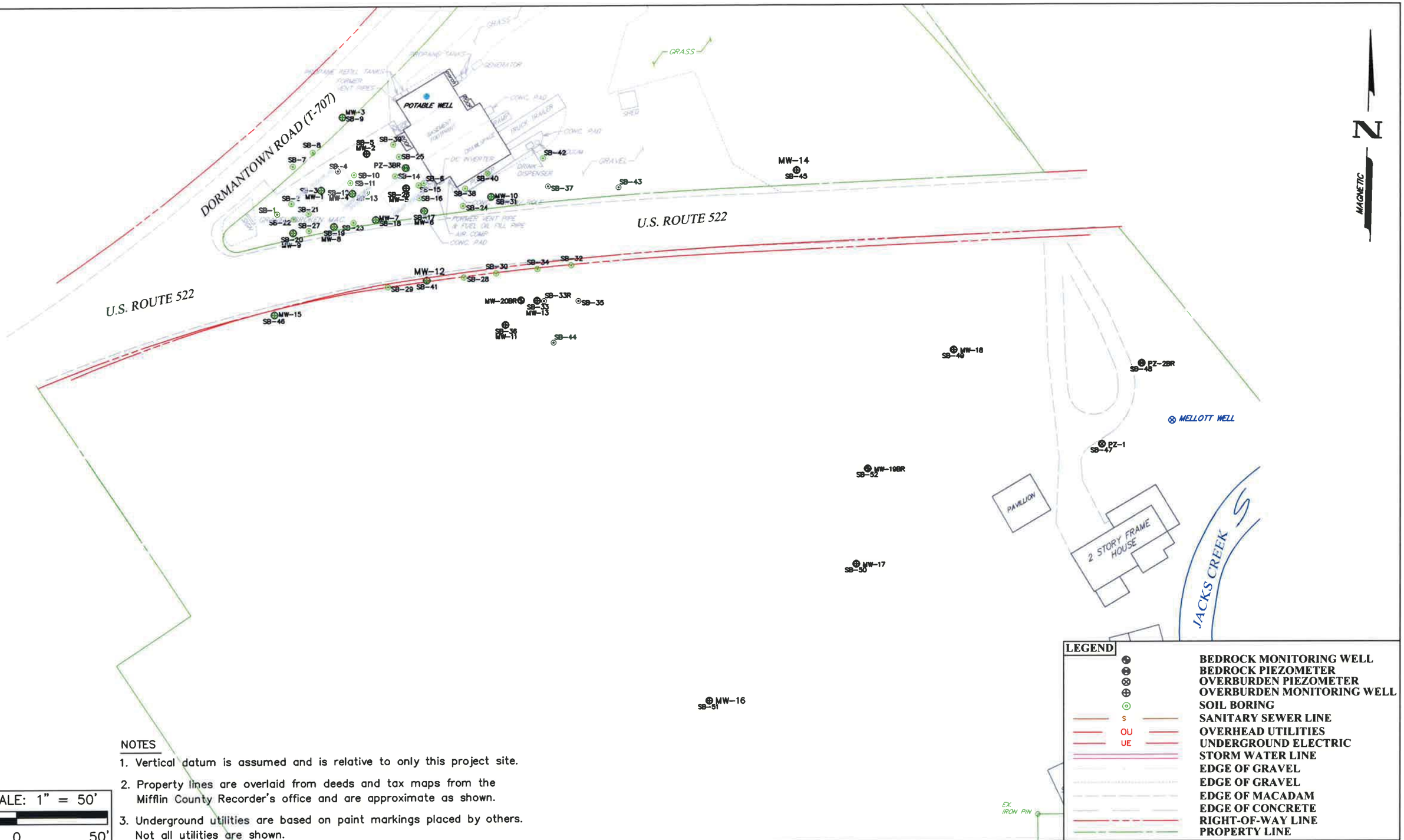
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 3 - SITE MAP ZOOMED IN.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
SITE MAP ZOOMED IN
Figure 3



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3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

SCALE: 1" = 50'

25' 0 50'

LEGEND

- BEDROCK MONITORING WELL
- BEDROCK PIEZOMETER
- OVERBURDEN PIEZOMETER
- OVERBURDEN MONITORING WELL
- SOIL BORING
- S — SANITARY SEWER LINE
- OU — OVERHEAD UTILITIES
- UE — UNDERGROUND ELECTRIC
- STORM WATER LINE
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
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H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 4 - SITE MAP ZOOMED OUT.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
SITE MAP ZOOMED OUT
Figure 4

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
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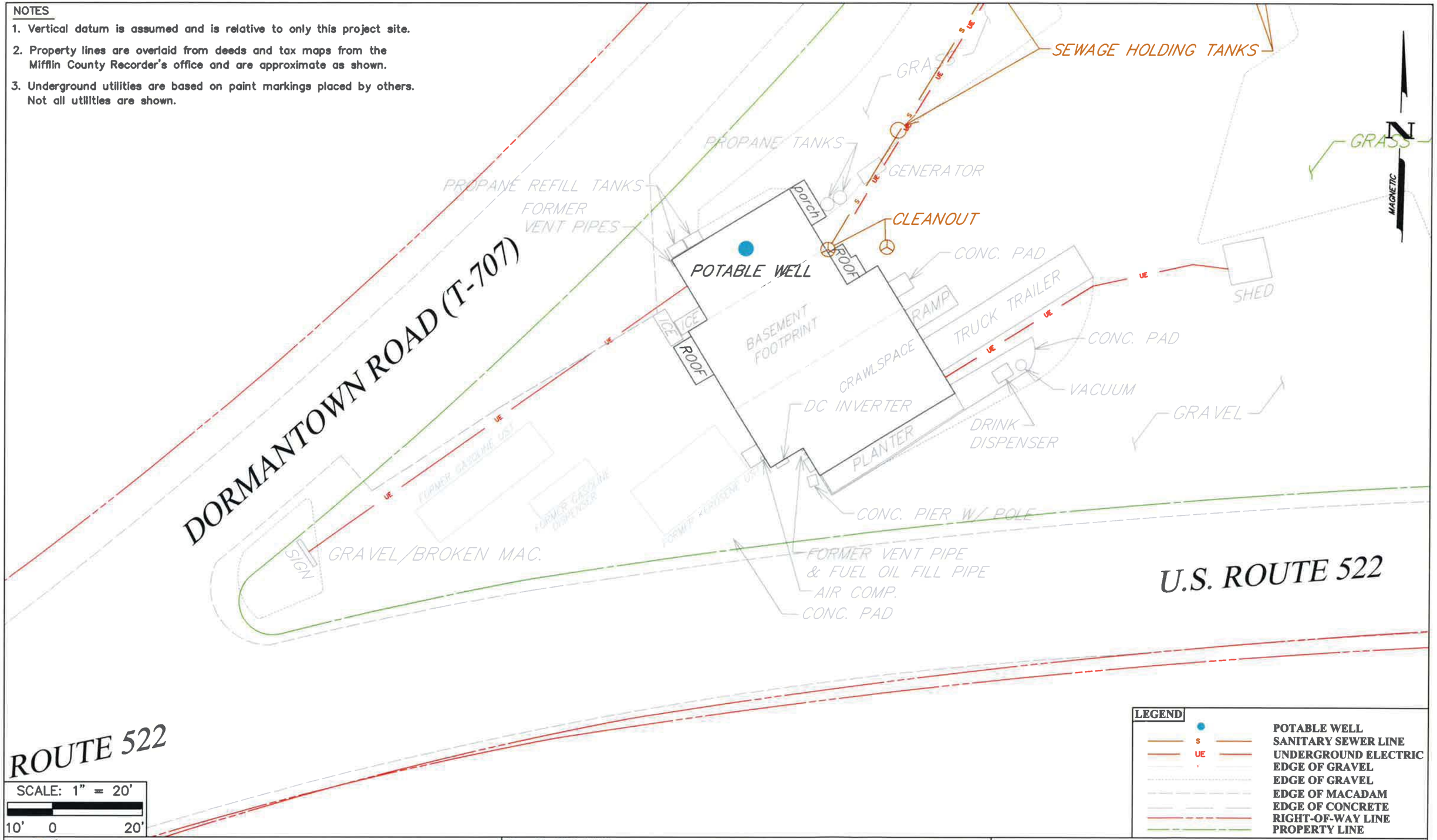

SCALE: 1" = 20'

10' 0 20'

LEGEND

- POTABLE WELL
- S — SANITARY SEWER LINE
- UE — UNDERGROUND ELECTRIC
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE

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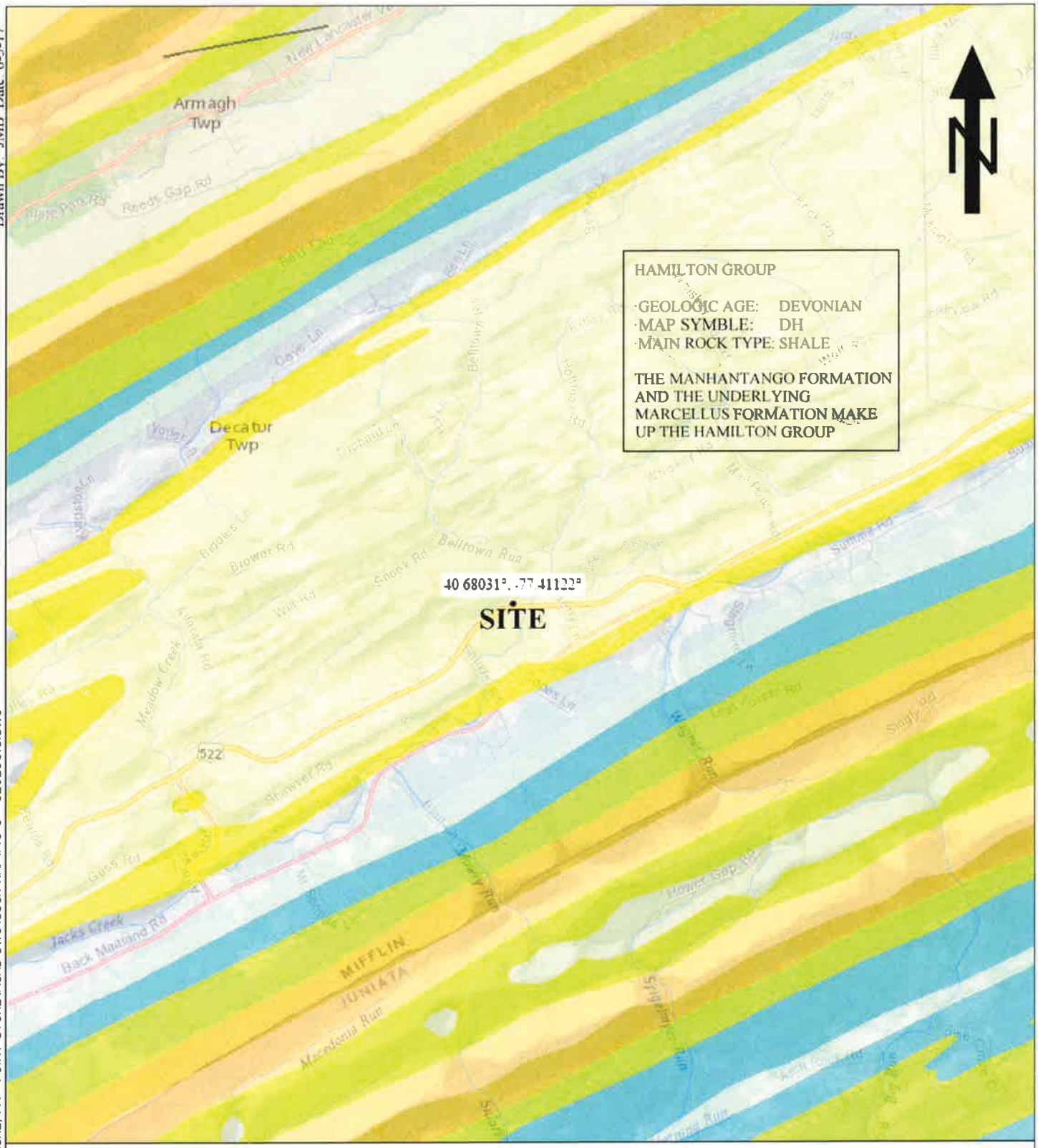
H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 5 - UTILITY MAP.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
ON-SITE UNDERGROUND UTILITIES MAP
Figure 5

PaGWIS and EDR Search Results within ½ Mile Radius of Site (5/23/2017)
Point Store, McClure, PA

Figure 6



NOT TO SCALE

4559.15.01

Drawn By: JMB Date: 6-5-17

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 6 - GEOLOGIC.DWG

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

GEOLOGIC MAP

Figure 7

NOTES

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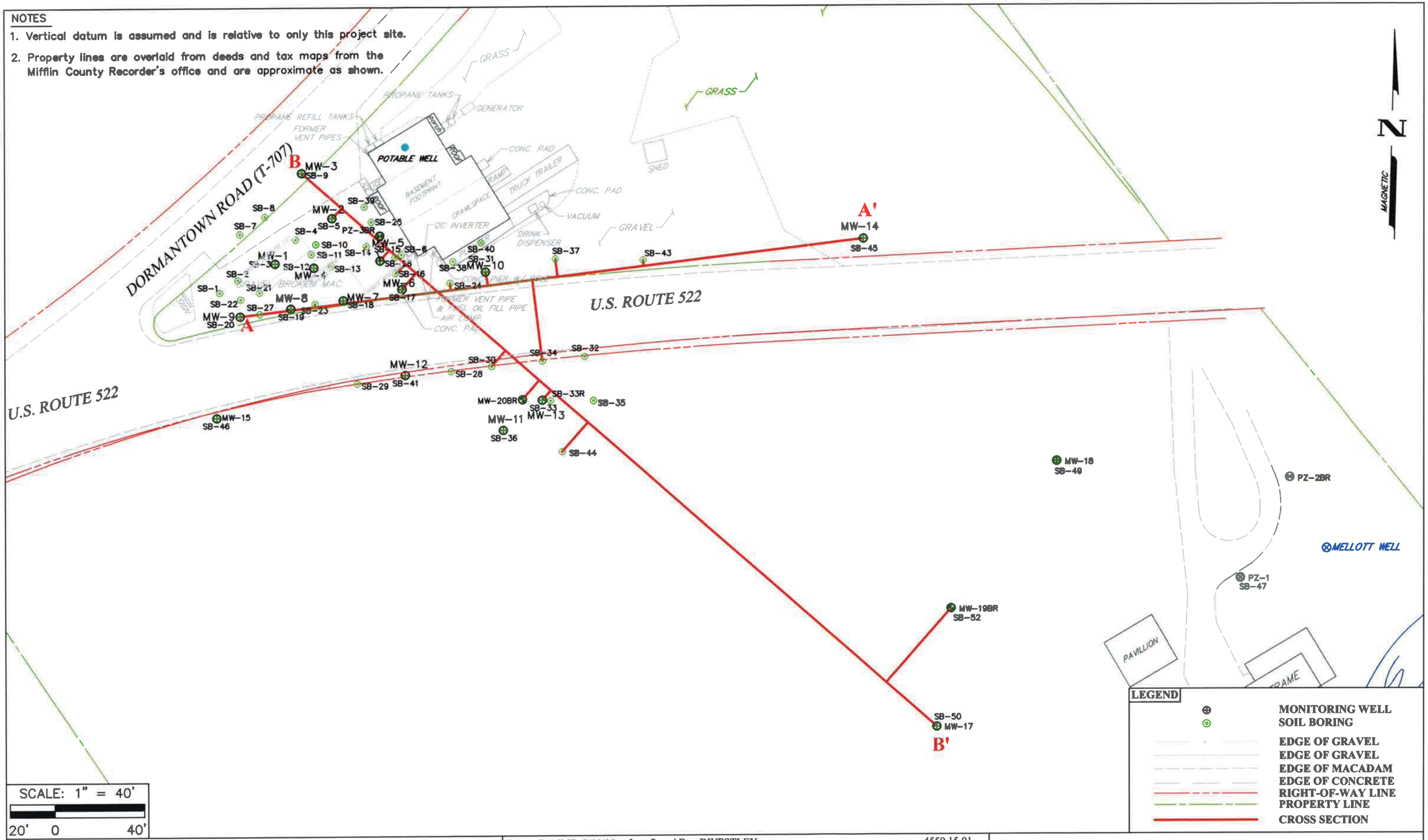
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.



SCALE: 1" = 40'

20' 0 40'

LEGEND

- MONITORING WELL
- SOIL BORING
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- CROSS SECTION

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H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 8 - CROSS SECTION LOCATION MAP.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

CROSS SECTION LOCATION MAP

Figure 8

H:\PPOINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 9 - A-A.DWG Drawn By: JMB Date: 9/11/18

A

A'

Distance Along Baseline (ft)

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

105 100 95 90 85 80 75 70 65 60

ELEVATION (in feet)

SB-20
MW-9
SB-27
SB-19
MW-8
SB-23
SB-18
MW-7
SB-17
MW-6
SB-24
SB-31
MW-10
SB-34
SB-37
SB-43
SB-45
MW-14

CLAY

CLAY

CLAY

SAND

SHALE

SHALE

Distance Along Baseline (ft)

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LEGEND

Gravel Fill | Shale | Clay | Sand

Asphalt/Concrete | Sandy Clay

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

CROSS SECTION A-A'
Figure 9

B

B'

Distance Along Baseline (ft)

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400

ELEVATION (in feet)

105 100 95 90 85 80 75 70 65 60 55

SB-9
MW-3

SB-5
MW-2

PZ-3BR

SB-15
MW-5

SB-16

SB-17
MW-6

SB-30

MW-20BR

SB-33
MW-13

SB-44

SB-52
MW-19BR

SB-50
MW-17

GRAVEL FILL

CLAY

CLAY

CLAY

SHALE

SHALE

Distance Along Baseline (ft)

Drawn By: JMB Date: 9/11/18

H:\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG 10 - B-B.DWG

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LEGEND

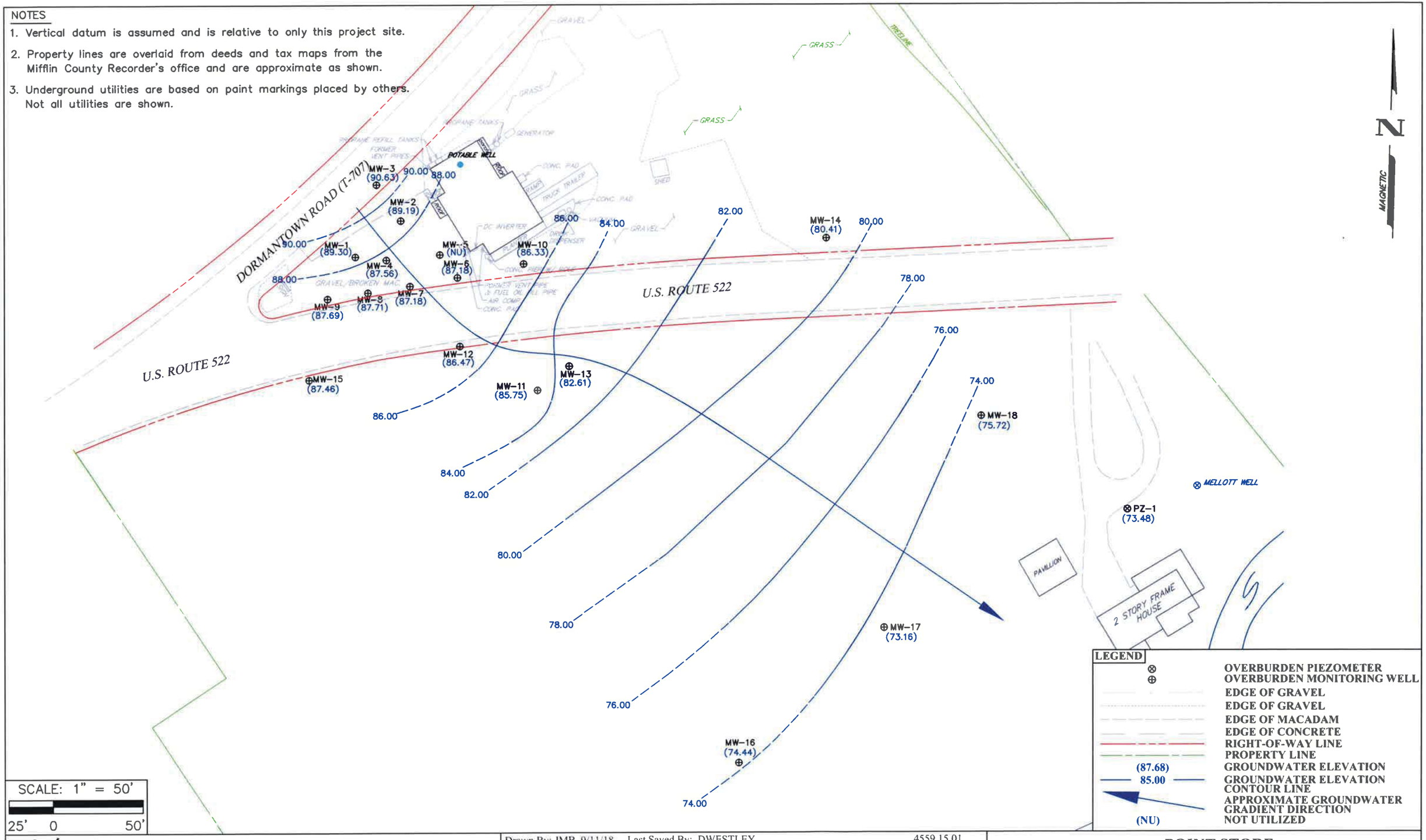
Gravel Fill
Shale
Clay
Asphalt/Concrete
Organics
Sand

POINT STORE
5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

CROSS SECTION B-B'
Figure 10

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊗ ⊕ OVERBURDEN PIEZOMETER / OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (87.68) GROUNDWATER ELEVATION
- 85.00 GROUNDWATER ELEVATION CONTOUR LINE
- APPROXIMATE GROUNDWATER GRADIENT DIRECTION
- (NU) NOT UTILIZED

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

OVERBURDEN GROUNDWATER ELEVATION CONTOUR MAP

January 29, 2018
Figure 11

NOTES

1. Vertical datum is assumed and is relative to only this project site.
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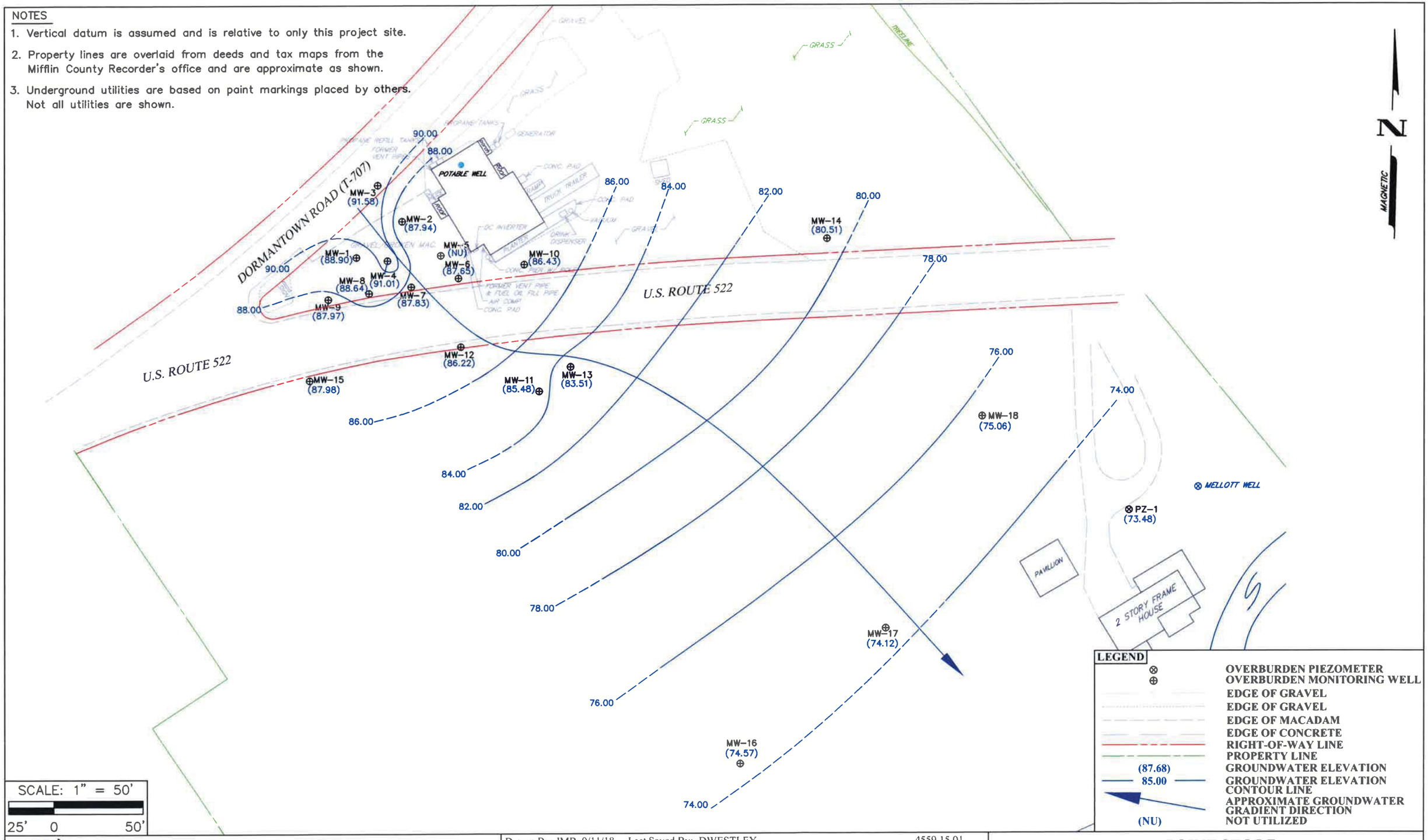
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



LEGEND

- OVERBURDEN PIEZOMETER
- OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (87.68) GROUNDWATER ELEVATION
- 85.00 GROUNDWATER ELEVATION CONTOUR LINE
- APPROXIMATE GROUNDWATER GRADIENT DIRECTION
- (NU) NOT UTILIZED

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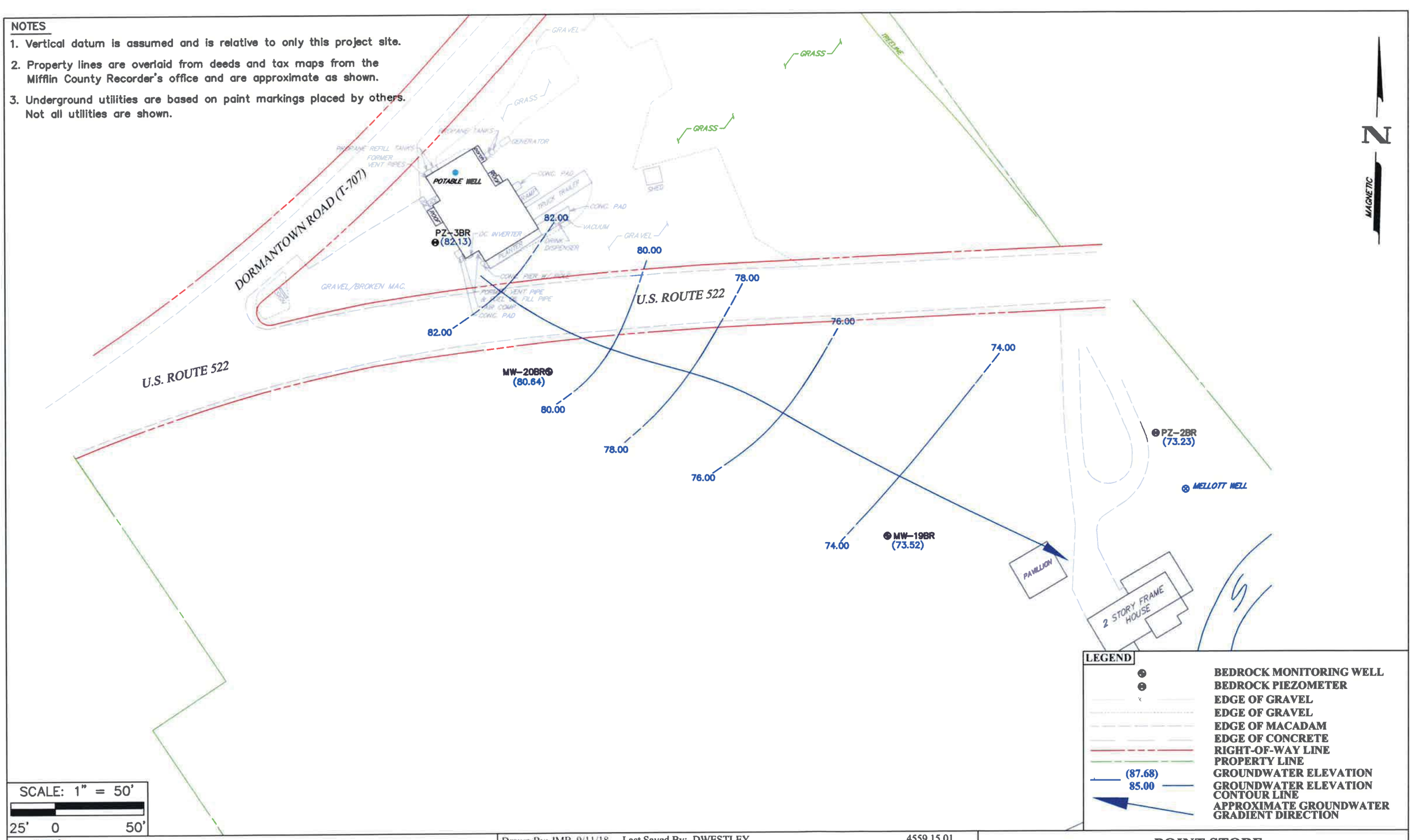
H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG-12 GWEC (2-8-18).DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
OVERBURDEN GROUNDWATER ELEVATION CONTOUR MAP
February 8, 2018
Figure 12

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 50'

25' 0 50'

LEGEND

- BEDROCK MONITORING WELL
- BEDROCK PIEZOMETER
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (87.68) GROUNDWATER ELEVATION
- 85.00 GROUNDWATER ELEVATION CONTOUR LINE
- APPROXIMATE GROUNDWATER GRADIENT DIRECTION

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Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG-13 GWEC BED.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
BEDROCK GROUNDWATER ELEVATION CONTOUR MAP
January 29, 2018
Figure 13

NOTES

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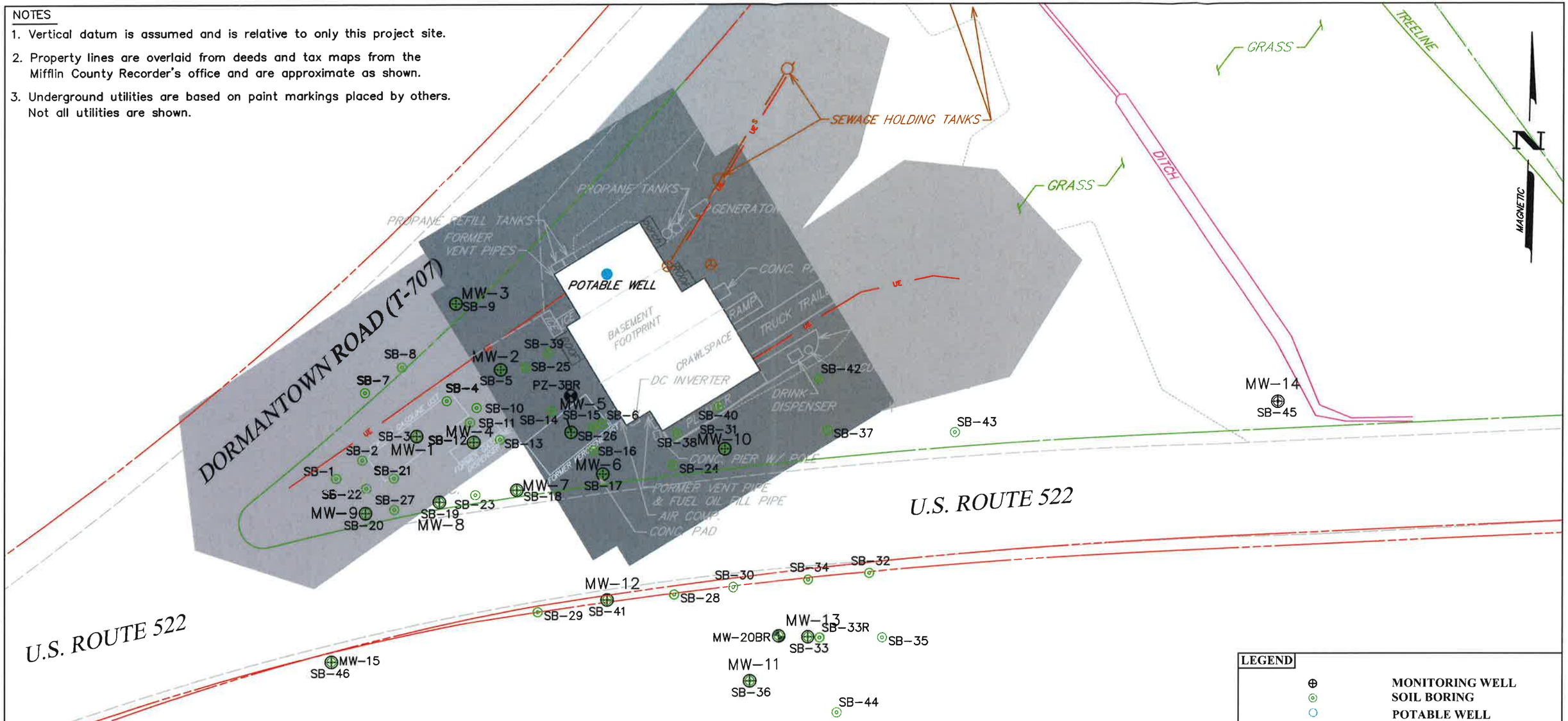

LEGEND

- MONITORING WELL
- SOIL BORING
- POTABLE WELL
- SANITARY SEWER LINE
- UNDERGROUND ELECTRIC
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- PROXIMITY DISTANCE 30' HORIZONTAL FROM BUILDING
- SEPARATION DISTANCE 30' HORIZONTAL FROM UNDERGROUND UTILITY

SCALE: 1" = 30'

15' 0 30'

NOTE: ALL SAMPLE POINT LOCAITONS ARE WITHIN THE PROXIMITY AND SEPARATION DISTANCES FOR NON-PETROLEUM CONSTITUENTS (100 HORIZONTAL FEET)

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Project Manager: MRC
Checked By: MRC

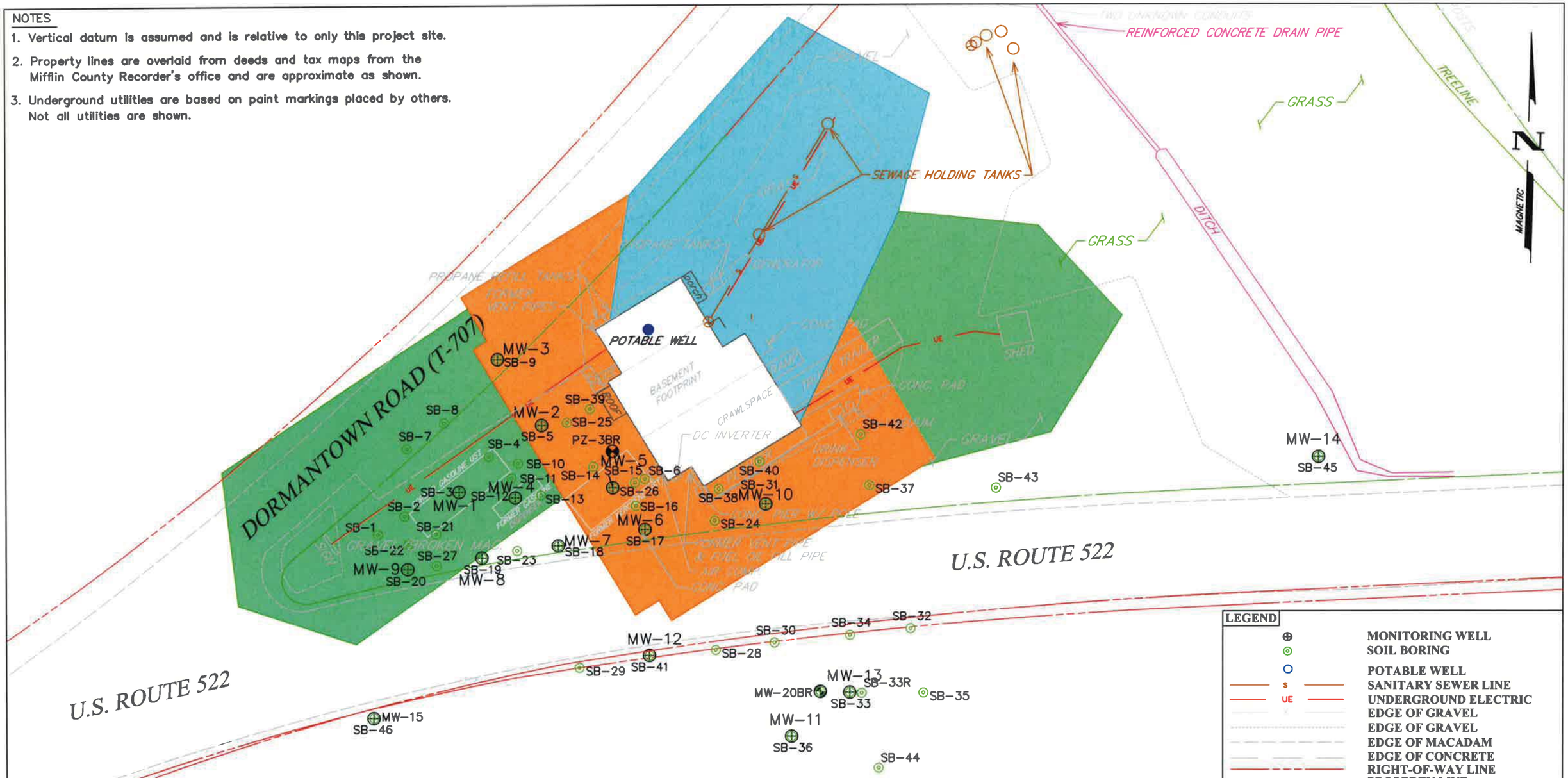
H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG-14 HORIZONTAL DISTANCE 2018.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
HORIZONTAL DISTANCE SCREEN FOR VIB
Figure 14

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 30'

15' 0 30'

NOTE: THIS FIGURE SHOULD BE REVIEWED ALONG SIDE TABLE

LEGEND

- MONITORING WELL
- SOIL BORING
- POTABLE WELL
- SANITARY SEWER LINE
- UNDERGROUND ELECTRIC
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- VERTICAL PROXIMITY DISTANCE 11' BGS (BUILDING BASEMENT 6' BGS)
- VERTICAL SEPARATION DISTANCE 6' BGS (ELECTRIC APPROXIMATE 1' BGS)
- VERTICAL SEPARATION DISTANCE 10' (SEWER APPROXIMATE 5' BGS

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Drawn By: JMB 9/11/18 Last Saved By: DWESTLEY 4559.15.01
Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG-15 VERTICAL DISTANCE 2018.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
VERTICAL DISTANCE SCREEN FOR VIB
Figure 15

DORMANTOWN ROAD (T-707)

U.S. ROUTE 522

POTABLE WELL

MW-3
SB-9
SB-8
SB-7
SB-5
MW-2
SB-39
SB-25
SB-4
PZ-3BR
SB-10
SB-14
SB-11
SB-6
SB-3
MW-1
SB-12
MW-4
SB-13
SB-26
MW-5
SB-15
SB-16
SB-2
SB-1
SB-21
SB-22
SB-27
SB-23
MW-7
SB-18
SB-17
MW-6
SB-19
MW-8
SB-20
MW-9
SB-24
SB-38
SB-40
SB-42
SB-43
SB-37
MW-10
SB-31

AREA "A"
EST. Depth 12'

AREA "B"
EST. Depth 10'

AREA "C"
EST. Depth 5'

AREA "D"
EST. Depth 9'

MW-12
SB-41
SB-29
SB-28
SB-30
SB-34
SB-32
SB-33R
SB-35
MW-20BR
SB-33
MW-13
SB-36
MW-11
SB-44
MW-15
SB-46

CONC. PAD
TRUCK TRAILER
RAMP
ROOF
ICE
BASEMENT FOOTPRINT
CRAWLSPACE
DC INVERTER
SHED
GRAVEL
DRINK DISPENSER
FORMER VENT PIPE & FUEL OIL FILL PIPE
AIR COMP.
SIGN
GRAVEL/BROKEN MAC.

N
MAGNETIC

VOLUME AREA "A" - 915 CU. YDS
VOLUME AREA "B" - 154.4 CU. YDS
VOLUME AREA "C" - 83.2 CU. YDS.
VOLUME AREA "D" - 333.3 CU. YDS

LEGEND

- BEDROCK MONITORING WELL
- BEDROCK PIEZOMETER
- OVERBURDEN PIEZOMETER
- OVERBURDEN MONITORING WELL
- SOIL BORING
- S — SANITARY SEWER LINE
- OU — OVERHEAD UTILITIES
- UE — UNDERGROUND ELECTRIC
- STORM WATER LINE
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE

SCALE: 1" = 20'
10' 0 20'

NOTES

1. Vertical datum is assumed and is relative to only this project site.
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Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\FIG-16 PROPOSED EXCAVATION MAP.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
PROPOSED SOIL EXCAVATION MAP
Figure 16

TABLES

MOUNTAIN RESEARCH, LLC

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Table 1

Monitoring Well Construction Summary
Point Store
McClure, PA

MRLLC Project No. 4559.15.01

Monitoring Well	Date Drilled	Total Depth (ft)	Casing Size (in) & Material	Slot Size (in) / Screened Interval (ft)	Depth to Screen (ft)	Drilling Method	Casing Elevation (ft)	Well Type
MW-1	10/25 & 31/ 2016	20	2" PVC	0.010/5 - 20'	5'	Direct Push/Hollow Stem Auger	98.03	Overburden
MW-2	10/25 & 31/2016	20	2" PVC	0.010/5-20'	5'	Direct Push/Hollow Stem Auger	97.34	Overburden
MW-3	10/25 & 31/2016	20.7	2" PVC	0.010/5-20.7'	5'	Direct Push/Hollow Stem Auger	100.43	Overburden
MW-4	10/25 & 31/2016	20	2" PVC	0.010/5-20'	5'	Direct Push/Hollow Stem Auger	96.66	Overburden
MW-5	10/25 & 31/2016	21	2" PVC	0.010/13-21'	13'	Direct Push/Hollow Stem Auger	95.3	Overburden
MW-6	10/25 & 31/2016	19.6	2" PVC	0.010/5-19.6'	5'	Direct Push/Hollow Stem Auger	94.53	Overburden
MW-7	10/25 & 31/2016	22	2" PVC	0.010/5-22'	5'	Direct Push/Hollow Stem Auger	95.98	Overburden
MW-8	10/25 & 31/2016	20	2" PVC	0.010/5-20'	5'	Direct Push/Hollow Stem Auger	97.06	Overburden
MW-9	10/25 & 31/2016	20	2" PVC	0.010/5-20'	5'	Direct Push/Hollow Stem Auger	98.42	Overburden
MW-10	2/23/2017	20	2" PVC	0.010/5'-20	5'	Direct Push/Hollow Stem Auger	92.68	Overburden
MW-11	2/22/2017	18.8	2" PVC	0.010/5'-18.8	5'	Direct Push/Hollow Stem Auger	88.50	Overburden
MW-12	2/23/2017	21.9	2" PVC	0.010/5'-21.9	5'	Direct Push/Hollow Stem Auger	93.02	Overburden
MW-13	2/24/2017	18.8	2" PVC	0.010/5'-18.8	5'	Direct Push/Hollow Stem Auger	88.62	Overburden
MW-14	1/3/2018	18	2" PVC	0.010/4.5-17.5'	4.5'	Direct Push/Hollow Stem Auger	86.21	Overburden
MW-15	1/4/2018	20.5	2" PVC	0.010/5-20'	5'	Direct Push/Hollow Stem Auger	97.36	Overburden
MW-16	1/16/2018	10	2" PVC	0.010/3-10'	3'	Direct Push/Hollow Stem Auger	80.02	Overburden
MW-17	1/15/2018	9.5	2" PVC	0.010/3-9.5'	3'	Direct Push/Hollow Stem Auger	79.46	Overburden
MW-18	1/12/2018	10	2" PVC	0.010/3-10'	3'	Direct Push/Hollow Stem Auger	80.35	Overburden
MW-19BR	1/16 & 17/2018	25	2" PVC	0.010/18-25'	18'	Direct Push/Hollow Stem Auger	80.82	Bedrock
MW-20BR	1/18/2018	29.5	2" PVC	0.010/22-29.5'	22'	Direct Push/Hollow Stem Auger	89.04	Bedrock
PZ-1	1/14/2018	13	2" PVC	0.010/3-13'	3'	Direct Push/Hollow Stem Auger	77.18	Overburden
PZ-2BR	1/19/2018	20.5	2" PVC	0.010/23-30.5'	23'	Direct Push/Hollow Stem Auger	76.38	Bedrock
PZ-3BR	1/18/2018	32	2" PVC	0.010/25-32'	25'	Direct Push/Hollow Stem Auger	95.73	Bedrock

Prepared By: LML 3/15/2018

Checked By: MRC 7/9/2018

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Table 2

Groundwater Elevation Summary
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

Well ID Type	Date Measured	Static Water Level (ft)	Casing Elevation (ft)	Ground Water Elevation (ft)	Comments
MW-1	11/21/2016	13.85	98.03	84.18	
	12/5/2016	13.95	98.03	84.08	
	1/5/2017	13.20	98.03	84.83	
	1/16/2017	13.10	98.03	84.93	
	1/31/2017	12.20	98.03	85.83	
	3/6/2017	11.10	98.03	86.93	
	3/22/2017	8.99	98.00	89.01	
	9/13/2017	10.15	98.00	87.85	
	1/24/2018	--	98.00	--	Inaccessible
	1/29/2018	9.70	98.00	88.30	
	2/8/2018	9.10	98.00	88.90	
MW-2	11/21/2016	12.73	97.34	84.61	
	12/5/2016	12.52	97.34	84.82	
	1/5/2017	12.30	97.34	85.04	
	1/16/2017	12.02	97.34	85.32	
	1/31/2017	11.35	97.34	85.99	
	3/6/2017	10.61	97.34	86.73	
	3/22/2017	10.29	97.34	87.05	
	1/24/2018	---	97.34	--	Inaccessible
	1/29/2018	8.15	97.34	89.19	
	2/8/2018	9.40	97.34	87.94	
MW-3	11/21/2016	13.60	100.43	86.83	
	12/5/2016	13.45	100.43	86.98	
	1/5/2017	13.31	100.43	87.12	
	1/16/2017	12.73	100.43	87.70	
	1/31/2017	11.75	100.43	88.68	
	3/6/2017	12.30	100.43	88.13	
	3/22/2017	12.00	100.43	88.43	
	9/13/2017	12.22	100.43	88.21	
	1/24/2018	10.05	100.43	90.38	
	1/29/2018	9.80	100.43	90.63	
	2/8/2018	8.85	100.43	91.58	
MW-4	11/21/2016	12.15	96.66	84.51	
	12/5/2016	12.18	96.66	84.48	
	1/5/2017	11.88	96.66	84.78	
	1/16/2017	11.67	96.66	84.99	
	2/6/2017	10.86	96.66	85.80	
	3/6/2017	10.70	96.66	85.96	Odor
	3/22/2017	7.96	96.66	88.70	Odor
	9/13/2017	5.91	96.66	90.75	
	1/24/2018	--	96.66	--	Inaccessible
	1/29/2018	9.10	96.66	87.56	
	2/8/2018	5.65	96.66	91.01	

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Table 2

Groundwater Elevation Summary
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

Well ID Type	Date Measured	Static Water Level (ft)	Casing Elevation (ft)	Ground Water Elevation (ft)	Comments
MW-5	11/21/2016	8.51	95.30	86.79	
	12/5/2016	1.40	95.30	93.90	
	1/5/2017	1.37	95.30	93.93	
	1/16/2017	1.26	95.30	94.04	
	1/31/2017	1.35	95.30	93.95	
	3/6/2017	1.53	95.30	93.77	
	3/22/2017	1.18	95.30	94.12	
	1/24/2018	--	95.30	--	Inaccessible
	1/29/2018	2.83	95.30	92.47	
	2/8/2018	5.20	95.30	90.10	
MW-6	11/21/2016	9.72	94.53	84.81	
	12/5/2016	9.34	94.53	85.19	
	1/5/2017	8.92	94.53	85.61	
	1/16/2017	7.29	94.53	87.24	
	1/31/2017	7.06	94.53	87.47	Odor
	3/6/2017	6.82	94.53	87.71	Light Odor
	3/22/2017	5.30	94.53	89.23	Light Odor
	9/13/2017	5.34	94.53	89.19	Odor
	1/24/2018	7.65	94.53	86.88	
	1/29/2018	7.35	94.53	87.18	
	2/8/2018	6.88	94.53	87.65	
MW-7	11/21/2016	11.53	95.98	84.45	
	12/5/2016	9.89	95.98	86.09	
	1/5/2017	11.17	95.98	84.81	
	1/16/2017	11.13	95.98	84.85	
	1/31/2017	10.03	95.98	85.95	Odor
	3/6/2017	9.97	95.98	86.01	Odor
	3/22/2017	8.11	95.98	87.87	Odor
	9/13/2017	8.75	95.98	87.23	
	1/24/2018	--	95.98	--	Inaccessible
	1/29/2018	8.80	95.98	87.18	
	2/8/2018	8.15	95.98	87.83	
MW-8	11/21/2016	12.41	97.06	84.65	
	12/5/2016	12.94	97.06	84.12	
	1/5/2017	12.33	97.06	84.73	
	1/16/2017	12.13	97.06	84.93	
	1/31/2017	11.82	97.06	85.24	
	3/6/2017	10.61	97.06	86.45	
	3/22/2017	7.90	97.06	89.16	
	9/13/2017	10.58	97.06	86.48	
	1/24/2018	9.64	97.06	87.42	
	1/29/2018	9.35	97.06	87.71	
	2/8/2018	8.42	97.06	88.64	

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Table 2

Groundwater Elevation Summary
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

Well ID Type	Date Measured	Static Water Level (ft)	Casing Elevation (ft)	Ground Water Elevation (ft)	Comments
MW-9	11/21/2016	13.86	98.42	84.56	
	12/5/2016	14.06	98.42	84.36	
	1/5/2017	13.73	98.42	84.69	
	1/16/2017	13.53	98.42	84.89	
	1/31/2017	12.80	98.42	85.62	
	3/6/2017	12.19	98.42	86.23	
	3/22/2017	9.81	98.42	88.61	
	9/13/2017	10.80	98.42	87.62	
	1/24/2018	--	98.42	--	Inaccessible
	1/29/2018	10.73	98.42	87.69	
	2/8/2018	10.45	98.42	87.97	
MW-10	3/6/2017	7.41	92.68	85.27	Odor
	3/22/2017	5.82	92.68	86.86	Odor
	9/13/2017	6.50	92.68	86.18	
	1/24/2018	6.64	92.68	86.04	
	1/29/2018	6.35	92.68	86.33	
	2/8/2018	6.25	92.68	86.43	
MW-11	3/6/2017	7.75	88.50	80.75	
	3/22/2017	3.26	88.50	85.24	
	9/13/2017	1.85	88.50	86.65	
	1/24/2018	2.45	88.50	86.05	
	1/29/2018	2.75	88.50	85.75	
	2/8/2018	3.02	88.50	85.48	
MW-12	3/6/2017	7.76	93.02	85.26	
	3/22/2017	5.93	93.02	87.09	
	9/13/2017	6.79	93.02	86.23	
	1/24/2018	6.91	93.02	86.11	
	1/29/2018	6.55	93.02	86.47	
	2/8/2018	6.80	93.02	86.22	
MW-13	3/6/2017	5.89	88.62	82.73	
	3/22/2017	5.63	88.62	82.99	
	9/13/2017	7.31	88.62	81.31	
	1/24/2018	6.54	88.62	82.08	
	1/29/2018	6.01	88.62	82.61	
	2/8/2018	5.11	88.62	83.51	
MW-14	1/24/2018	6.35	86.21	79.86	
	1/29/2018	5.80	86.21	80.41	
	2/8/2018	5.70	86.21	80.51	
MW-15	1/24/2018	9.84	97.36	87.52	
	1/29/2018	9.90	97.36	87.46	
	2/8/2018	9.38	97.36	87.98	
MW-16	1/24/2018	5.60	80.02	74.42	
	1/29/2018	5.58	80.02	74.44	
	2/8/2018	5.45	80.02	74.57	
MW-17	1/24/2018	5.15	79.46	74.31	
	1/29/2018	6.30	79.46	73.16	
	2/8/2018	5.34	79.46	74.12	

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Table 2

Groundwater Elevation Summary
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

Well ID Type	Date Measured	Static Water Level (ft)	Casing Elevation (ft)	Ground Water Elevation (ft)	Comments
MW-18	1/24/2018	4.74	80.35	75.61	
	1/29/2018	4.63	80.35	75.72	
	2/8/2018	5.29	80.35	75.06	
MW-19BR	1/24/2018	7.30	80.82	73.52	
	1/29/2018	7.30	80.82	73.52	
	2/8/2018	7.68	80.82	73.14	
MW-20BR	1/24/2018	8.00	89.04	81.04	
	1/29/2018	8.40	89.04	80.64	
	2/8/2018	8.13	89.04	80.91	
PZ-1	1/24/2018	3.97	77.18	73.21	
	1/29/2018	3.70	77.18	73.48	
PZ-2BR	1/24/2018	4.40	76.38	71.98	
	1/29/2018	3.15	76.38	73.23	
PZ-3BR	1/24/2018	13.79	95.73	81.94	
	1/29/2018	13.60	95.73	82.13	

NM - Well Not Measured
NS - Well Not Surveyed

Prepared By: LML 2/13/18
Checked By: MRC 7/9/18

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Table 3

Aquifer Hydraulic Values from Slug Tests and Pump Testing
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

Summary of Aquifer Test Responses and Analyses

Test Type	Well	Distance from Test Well (ft)	Test Phase	Analysis Method	Transmissivity (ft2/d)	B (ft)	K (ft/d)
Slug	MW-3	N/A	Rising Head	Bouwer & Rice	23.27	12.08	1.9260
		N/A	Falling Head	Bouwer & Rice	0.49	11.91	0.0416
	MW-4	N/A	Rising Head	Bouwer & Rice	3.71	10.75	0.3448
		N/A	Falling Head	Bouwer & Rice	3.32	10.74	0.3093
	MW-6	N/A	Rising Head	Bouwer & Rice	8.85	14.35	0.6170
		N/A	Falling Head*	Bouwer & Rice	Not Used		
	MW-7	N/A	Rising Head	Bouwer & Rice	15.54	12.57	1.2360
		N/A	Falling Head*	Bouwer & Rice	Not Used		
Pump	Point Store Potable	N/A	Pumping	Cooper & Jacob	58.96	36	1.63
			Recovery	Cooper & Jacob	66.61	36	1.85
	Mellot Potable	N/A	Pumping	Cooper & Jacob	161.59	142	1.14
			Recovery	Cooper & Jacob	177.60	142	1.25
Point Store Pump Test Observation Wells	MW-20BR	100	Observation/Pumping	Cooper & Jacob	54.77	7.5	7.30
	PZ-3BR	27	Observation/Pumping	Cooper & Jacob	58.58	7	8.37

Slug Tests	Average hydraulic conductivity (K) ft/day =			**0.746**
	Average saturated aquifer thickness (b) =		**12.1**	
	Average Transmissivity (T=Kb) (ft2/day) =	**9.2**		
Point Store Pump Test	Average hydraulic conductivity (K) ft/day =			**1.740**
	Average saturated aquifer thickness (b) =		**36**	
	Average Transmissivity (T=Kb) (ft2/day) =	**62.8**		
Point Store Observation Wells Exhibinting Influence	Average hydraulic conductivity (K) ft/day =			**7.835**
	Average saturated aquifer thickness (b) =		**7.25**	
	Average Transmissivity (T=Kb) (ft2/day) =	**56.7**		
Mellott Pump Test	Average hydraulic conductivity (K) ft/day =			**1.195**
	Average saturated aquifer thickness (b) =		**142**	
	Average Transmissivity (T=Kb) (ft2/day) =	**169.6**		

* Falling head data not used due to poor quality

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Table 4

Soil Boring Analytical Summary
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

				PADEP Residential Used Aquifer (RUA) Medium Specific Concentrations (MSC)								
Unsaturated Soils (US)				8,400	74,000	500	100,000	70,000	1,000,000	2,000	600,000	25,000
Saturated Soils (S)				1,500	42,000	500	100,000	70,000	1,000,000	2,000	84,000	10,000
Residential Direct Contact, 0-15 Feet				130,000	2,200,000	57,000	10,000,000	180,000	1,900,000	1,700,000	7,700,000	160,000
Sample Location/Sample Depth	Saturation Zone	Sample Date	Percent Solids	Sample Parameters								
				1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Cumene	Naphthalene
SB-1 / 7' (US)	Unsaturated - Based on MW-1 GW Elevations	10/25/2016	87.7	<228	<228	<228	<228	<228	<684	<228	<228	<228
SB-2 / 11' (US)	Periodically Saturated - Based on MW-1 GW Elevations	10/25/2016	76.8	<260	<260	<260	<260	<260	<781	<260	<260	<260
SB-3 - MW-1 / 12' (US)	Periodically Saturated - Based on MW-1 GW Elevations	10/25/2016	82.8	<241	<241	<241	<241	<241	<724	<241	<241	<241
SB-4 / 1' (US)	Unsaturated - Based on MW-1 GW Elevations	10/25/2016	84.8	<236	<236	<236	<236	<236	<707	<236	<236	1,010
SB-4 / 4' (US)	Unsaturated - Based on MW-1 GW Elevations	10/25/2016	88.0	<227	<227	<227	<227	<227	<682	<227	<227	<227
SB-5 - MW-2 / 11' (US)	Periodically Saturated - Based on MW-2 GW Elevations	10/25/2016	82.9	<241	<241	<241	<241	<241	<723	<241	<241	<241
SB-7 / 9.5' (US)	Periodically Saturated - Based on MW-3 GW Elevations	10/25/2016	82.8	<241	<241	<241	<241	<241	<724	<241	<241	<241
SB-8 / 14.5' (S)	Saturated - Based on MW-3 GW Elevations	10/25/2016	79.4	<252	<252	<252	<252	<252	<756	<252	<252	<252
SB-9 - MW-3 / 9.5' (US)	Periodically Saturated - Based on MW-3 GW Elevations	10/25/2016	77.7	<257	<257	<257	<257	<257	<772	<257	<257	<257
SB-10 / 2' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	80.3	<249	284	809	<249	6,340	<747	<249	1,130	6,810
SB-10 / 8' (US)	Periodically Saturated - Based on MW-4 GW Elevations	10/25/2016	86.3	72,600	20,500	372	26,100	34,000	166,000	<290	5,470	11,100
SB-10 / 9' (US)	Periodically Saturated - Based on MW-4 GW Elevations	10/25/2016	86.0	37,300	9,670	<233	6,640	9,460	51,200	<233	2,720	4,810
SB-10 / 16.5' (S)	Saturated - Based on MW-4 GW Elevations	10/31/2016	84.0	*9,180*	4,010	<238	<238	2,380	4,120	<238	768	1,600
SB-11 / 1' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	95.3	104,000	46,000	1,880	9,180	7,290	77,000	<1,050	1,370	15,400
SB-11 / 3' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	79.1	212,000	48,100	846	26,100	54,700	287,000	<316	<2,530	24,500
SB-11 / 8' (US)	Periodically Saturated - Based on MW-4 GW Elevations	10/25/2016	83.6	30,900	7,940	1,450	36,900	13,800	71,200	<239	2,140	4,910
SB-11 / 17.5' * (S)	Saturated - Based on MW-4 GW Elevations	10/31/2016	Wet Analysis Only	*6,920*	2,650	<200	<200	2,300	4,240	<200	501	1,390
SB-12 - MW-4 / 2' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	83.6	<239	<239	<239	<239	<239	<718	<239	<239	<239
SB-12 - MW-4 / 3' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	88.3	56,900	17,100	538	10,500	18,700	88,200	<227	2,770	8,870
SB-12 - MW-4 / 5' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	86.3	99,300	22,600	1,850	54,800	28,700	145,000	<1,160	4,230	14,100
SB-12 - MW-4 / 17.0' (S)	Saturated - Based on MW-4 GW Elevations	10/31/2016	84.1	*52,000*	15,400	*<2,380*	<2,380	34,700	63,300	<2,380	3,310	*14,900*
SB-13 / 1' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	78.9	2,930	755	3,500	3,820	3,030	7,110	<253	402	1,690
SB-13 / 2' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	82.0	1,170,000	346,000	107,000	1,380,000	495,000	2,640,000	<3,050	61,700	214,000
SB-13 / 8' (US)	Periodically Saturated - Based on MW-4 GW Elevations	10/25/2016	86.8	18,500	7,460	2,570	17,400	9,190	35,200	<230	1,470	4,180
SB-13 / 17.5' (S)	Saturated - Based on MW-4 GW Elevations	10/31/2016	83.2	531	<240	*3,090*	7,600	698	3,650	<240	<240	337
SB-14 / 1' (US)	Unsaturated - Based on MW-4 GW Elevations	10/25/2016	79.0	11,400	3,500	510	<253	4,860	17,800	<253	356	3,160
SB-14 / 7' (US)	Periodically Saturated - Based on MW-4 GW Elevations	10/25/2016	85.9	<233	<233	309	<233	304	<699	<233	<233	411
SB-15 / 12' (S)	Saturated - Based on MW-6 GW Elevations	10/25/2016	86.7	564	<231	<231	<231	<231	<692	<231	259	<231
SB-16 / 9' (US)	Periodically Saturated - Based on MW-6 GW Elevations	10/25/2016	84.7	<236	<236	<236	<236	<236	<708	<236	<236	<236
SB-17 - MW-6 / 2' (US)	Unsaturated - Based on MW-6 GW Elevations	10/25/2016	91.0	260,000	72,300	40,100	60,700	94,100	446,000	<275	7,850	60,900
SB-17 - MW-6 / 6' (US)	Periodically Saturated - Based on MW-6 GW Elevations	10/25/2016	86.6	<231	<231	<231	<231	<231	<693	<231	<231	<231
SB-18 - MW-7 / 1' (US)	Unsaturated - Based on MW-7 GW Elevations	10/25/2016	83.2	20,300	5,090	6,150	6,810	10,000	26,000	999	1,420	6,510
SB-18 - MW-7 / 2' (US)	Unsaturated - Based on MW-7 GW Elevations	10/25/2016	62.6	525,000	154,000	53,000	457,000	208,000	1,040,000	2,070	21,800	78,100
SB-18 - MW-7 / 9' (US)	Periodically Saturated - Based on MW-7 GW Elevations	10/25/2016	87.2	14,300	3,660	1,750	8,670	3,690	21,100	374	472	2,720
SB-18 - MW-7 / 22' (S)	Saturated - Based on MW-7 GW Elevations	10/31/2016	88.2	331	<227	<227	409	<227	<680	<227	<227	<227
SB-19 - MW-8 / 10' (US)	Periodically Saturated - Based on MW-8 GW Elevations	10/25/2016	84.4	<237	<237	<237	<237	<237	<711	<237	<237	<237
SB-20 - MW-9 / 3' (US)	Unsaturated - Based on MW-9 GW Elevations	10/25/2016	81.7	<245	<245	<245	<245	<245	<734	<245	<245	<245
SB-21 / 2' (US)	Unsaturated - Based on MW-1 and MW-9 GW Elevations	10/25/2016	85.0	<235	<235	<235	<235	<235	<706	<235	<235	<235
SB-21 / 4' (US)	Unsaturated - Based on MW-1 and MW-9 GW Elevations	10/25/2016	75.4	<265	<265	<265	<265	<265	<796	<265	<265	<265
SB-21 / 5' (US)	Unsaturated - Based on MW-1 and MW-9 GW Elevations	10/25/2016	82.9	<241	<241	<241	<241	<241	<723	<241	<241	<241
SB-22 / 3' (US)	Unsaturated - Based on MW-9 GW Elevations	10/25/2016	83.2	<240	<240	<240	<240	<240	<721	<240	<240	<240
SB-23 / 3' (US)	Unsaturated - Based on MW-8 GW Elevations	10/26/2016	88.8	33,200	10,000	896	2,670	9,430	38,700	<225	1,970	7,300
SB-23 / 3' - Duplicate (US)	Unsaturated - Based on MW-8 GW Elevations	10/26/2016	85.5	65,100	21,300	2,400	837	17,000	32,500	<234	3,160	12,700
SB-23 / 7' (US)	Unsaturated - Based on MW-8 GW Elevations	10/26/2016	87.4	39,900	13,300	2,730	20,400	18,400	85,500	<1,140	2,690	10,300
SB-23 / 7' - Duplicate (US)	Unsaturated - Based on MW-8 GW Elevations	10/26/2016	86.8	40,600	13,000	3,580	31,100	20,000	94,600	<231	2,580	7,730
SB-23 / 9' (US)	Periodically Saturated - Based on MW-8 GW Elevations	10/26/2016	86.5	20,500	6,620	2,350	17,800	8,590	42,600	<231	1,230	4,230
SB-23 / 9' - Duplicate (US)	Periodically Saturated - Based on MW-8 GW Elevations	10/26/2016	85.2	19,100	5,730	2,870	17,900	7,750	39,000	<235	1,060	3,070
SB-23 / 16' (S)	Saturated - Based on MW-8 GW Elevations	10/31/2016	83.3	809	244	*2,890*	4,680	628	3,360	275	<240	307
SB-24 / 2' (US)	Unsaturated - Based on MW-10 GW Elevations	10/26/2016	78.4	<255	<255	1,250	<255	6,630	<766	<255	893	5,620
SB-24 / 7' (US)	Periodically Saturated - Based on MW-10 GW Elevations	10/26/2016	84.9	704	903	<235	<235	1,450	<706	<235	<235	1,230
SB-24 / 8.5' (S)	Saturated - Based on MW-10 GW Elevations	10/26/2016	86.3	<232	2,200	<232	<232	477	<695	<232	360	354
SB-24 / 13' (S)	Saturated - Based on MW-10 GW Elevations	10/31/2016	86.6	<231	<231	<231	<231	<231	<693	<231	<231	<231
SB-25 / 1' (US)	Unsaturated - Based on MW-2 GW Elevations	10/26/2016	76.1	72,400	23,800	1,380	469	29,300	84,700	<263	2,380	11,300
SB-25 / 8' (US)	Periodically Saturated - Based on MW-2 GW Elevations	10/26/2016	86.3	<232	<232	245	<232	510	<695	<232	<232	297
SB-26 - MW-5 / 5' (US)	Unsaturated - Based on MW-4 and MW-6 GW Elevations	10/26/2016	85.2	<235	<235	<235	<235	<235	<705	<235	<235	<235
SB-27 / 16' * (S)	Saturated - Based on MW-9 GW Elevations	10/31/2016	Wet Analysis Only	<200	<200	<200	<200	<200	<600	<200	<200	<200
SB-28 / 1' (US)	Unsaturated - Based on MW-12 GW Elevations	2/20/2017	78.7	<25.4	<25.4	<25.4	<25.4	<25.4	<76.3	395	<25.4	<25.4
SB-28 / 9-11' (S)	Saturated - Based on MW-12 GW Elevations	2/20/2017	86.7	<23.1	<23.1	<23.1	<23.1	<23.1	69.2	454	<23.1	<23.1

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Table 4

Soil Boring Analytical Summary
Point Store
McClure, Pennsylvania

MRLLC Project No. 4559.15.01

				PADEP Residential Used Aquifer (RUA) Medium Specific Concentrations (MSC)								
Unsaturated Soils (US)				8,400	74,000	500	100,000	70,000	1,000,000	2,000	600,000	25,000
Saturated Soils (S)				1,500	42,000	500	100,000	70,000	1,000,000	2,000	84,000	10,000
Residential Direct Contact, 0-15 Feet				130,000	2,200,000	57,000	10,000,000	180,000	1,900,000	1,700,000	7,700,000	160,000
Sample Location/Sample Depth	Saturation Zone	Sample Date	Percent Solids	Sample Parameters								
				1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Cumene	Naphthalene
SB-28 / 22' (S)	Saturated - Based on MW-12 GW Elevations	2/20/2017	86.3	<232	<232	250	<232	<232	<696	<232	<232	<232
SB-29 / 1' (US)	Unsaturated - Based on MW-12 GW Elevations	2/20/2017	81.4	<24.6	<24.6	<24.6	<24.6	<24.6	<73.7	<24.6	<24.6	<24.6
SB-29 / 9-11' (S)	Saturated - Based on MW-12 GW Elevations	2/20/2017	87.9	<22.7	<22.7	<22.7	<22.7	<22.7	<68.2	<22.7	<22.7	<22.7
SB-30 / 1' (US)	Unsaturated - Based on MW-12 GW Elevations	2/20/2017	86.0	<23.2	<23.2	<23.2	<23.2	87.6	344	<23.2	<23.2	<23.2
SB-30 / 5-7' (US)	Unsaturated - Based on MW-12 GW Elevations	2/20/2017	87.6	<22.8	<22.8	874	<22.8	1,220	701	794	162	682
SB-30 / 7-9' (US)	Periodically Saturated - Based on MW-12 GW Elevations	2/20/2017	85.3	622	551	94.3	<23.5	1,390	513	1,030	808	849
SB-31 - MW-10 / 1' (US)	Unsaturated - Based on MW-10 GW Elevations	2/20/2017	88.7	925	383	2,940	388	7,240	3,000	<226	659	835
SB-31 - MW-10 / 5-7' (US)	Periodically Saturated - Based on MW-10 GW Elevations	2/20/2017	87.8	41,100	13,000	432	4,980	11,200	54,300	<228	1,420	7,640
SB-31 - MW-10 / 9-11' (S)	Saturated - Based on MW-10 GW Elevations	2/20/2017	86.9	189	74.5	120	205	192	510	155	<23.0	132
SB-32 / 11-13' (S)	Saturated - Based on MW-12 GW Elevations	2/21/2017	85.7	<23.3	<23.3	<23.3	<23.3	<23.3	81.6	166	<23.3	24.3
SB-33 - MW-13 / 5-7' (US)	Periodically Saturated - Based on MW-13 GW Elevations	2/21/2017	86.6	258	<231	<23.1	<23.1	806	<69.3	<23.1	364	301
SB-33 - MW-13 / 7-9' (US)	Periodically Saturated - Based on MW-13 GW Elevations	2/21/2017	86.8	20,900	8,570	<230	<230	4,760	8,110	<230	1,070	3,050
SB-33 - MW-13 / 9-11' (S)	Saturated - Based on MW-13 GW Elevations	2/21/2017	84.4	<237	<237	<237	<237	<237	<711	<237	<237	<237
SB-33R / 7-9' (US)	Periodically Saturated - Based on MW-13 GW Elevations	1/2/2018	86.7	233	1,680	<231	<231	1,600	<692	<231	286	409
SB-33R / 7-9' Duplicate (US)	Periodically Saturated - Based on MW-13 GW Elevations	1/2/2018	86.6	1,830	6,560	<231	<231	5,560	2,620	<231	1,150	1,610
SB-34 / 5-7' (US)	Unsaturated - Based on MW-12 GW Elevations	2/21/2017	86.9	68.3	270	1,040	<23.0	925	<69.0	464	456	661
SB-34 / 9-11' (S)	Saturated - Based on MW-12 GW Elevations	2/21/2017	86.4	1,050	1,310	<232	<232	<232	<695	<232	242	<232
SB-35 / 13-15' (S)	Saturated - Based on MW-13 GW Elevations	2/21/2017	48.4	<41.3	<41.3	85.8	<41.3	90.6	<124	551	481	<41.3
SB-36 - MW-11 / 1' (US)	Unsaturated - Based on MW-11 GW Elevations	2/21/2017	78.6	<25.5	<25.5	<25.5	<25.5	51.3	255	<25.5	<25.5	<25.5
SB-36 - MW-11 / 7-9' (US)	Periodically Saturated - Based on MW-11 GW Elevations	2/21/2017	87.1	<23.0	<23.0	<23.0	<23.0	<23.0	<68.9	617	<23.0	24.8
SB-37 / 1' (US)	Unsaturated - Based on MW-10 GW Elevations	2/21/2017	87.4	<229	<229	758	<229	1,390	<687	<229	<229	325
SB-37 / 5' (US)	Unsaturated - Based on MW-10 GW Elevations	2/21/2017	88.0	<22.7	<22.7	39.5	<22.7	23.2	<68.1	471	<22.7	60.3
SB-38 / 3' (US)	Unsaturated - Based on MW-10 GW Elevations	2/22/2017	81.6	25.7	<24.5	130	<24.5	453	<73.6	101	219	281
SB-38 / 7-9' (US)	Periodically Saturated - Based on MW-10 GW Elevations	2/22/2017	85.2	<23.5	154	63.4	<23.5	3,410	<70.4	29.0	2,950	<23.5
SB-38 / 9-11' (S)	Saturated - Based on MW-10 GW Elevations	2/22/2017	85.5	<23.4	<23.4	<23.4	<23.4	44.9	<70.2	<23.4	58.0	<23.4
SB-39 / 2' (US)	Unsaturated - Based on MW-2 GW Elevations	2/22/2017	79.6	<25.1	<25.1	122	<25.1	<25.1	120	<25.1	<25.1	<25.1
SB-40 / 2' (US)	Unsaturated - Based on MW-10 GW Elevations	2/22/2017	80.6	<248	<248	<248	<248	<248	<744	<248	<248	<248
SB-40 / 7' (US)	Periodically Saturated - Based on MW-10 GW Elevations	2/22/2017	87.8	<22.8	<22.8	<22.8	<22.8	<22.8	<68.4	<22.8	46.6	261
SB-41 - MW-12 / 2' (US)	Unsaturated - Based on MW-12 GW Elevations	2/20/2017	80.2	70.5	145	134	<24.9	211	<74.8	<24.9	47.2	<24.9
SB-41 - MW-12 / 9-11' (S)	Saturated - Based on MW-12 GW Elevations	2/20/2017	85.6	<23.4	<23.4	107	<23.4	<23.4	<70.1	<23.4	<23.4	<23.4
SB-42 / 18-19' (S)	Saturated - Based on MW-10 GW Elevations	1/2/2018	84.3	<2.37	<2.37	<2.37	6.37	<2.37	<7.12	<2.37	<2.37	<2.37
SB-43 / 16-17' (S)	Saturated - Based on MW-10 GW Elevations	1/2/2018	59.5	<3.36	<3.36	<3.36	9.62	<3.36	<10.1	21.1	<3.36	<3.36
SB-44 / 8-10' (US)	Unsaturated - Based on Field Observations	1/17/2018	86.0	<2.32	<2.32	<2.32	<2.32	<2.32	<6.97	12.8	<2.32	3.00
SB-44 / 10-12' (US)	Unsaturated - Based on Field Observations	1/17/2018	86.3	<2.32	<2.32	<2.32	<2.32	<2.32	<6.95	63.4	<2.32	<2.32
SB-44 / 12-14' (S)	Saturated - Based on Field Observations	1/17/2018	81.5	<2.46	<2.46	<2.46	<2.46	<2.46	<7.37	390	<2.46	<2.46
SB-45 - MW-14 / 12-13' (S)	Saturated - Based on MW-14 GW Elevations	1/3/2018	85.0	<2.35	<2.35	<2.35	3.23	<2.35	<7.06	<2.35	<2.35	<2.35
SB-46 - MW-15 / 15-17' (S)	Saturated - Based on MW-15 GW Elevations	1/4/2018	82.9	<2.41	<2.41	<2.41	2.71	<2.41	<7.23	<2.41	<2.41	<2.41
SB-47 - PZ-1 / 7' (S)	Saturated - Based on PZ-1 GW Elevations	1/4/2018	90.9	<2.20	<2.20	<2.20	<2.20	<2.20	<6.60	<2.20	<2.20	<2.20
SB-48 - PZ-2BR / 2-5' (US)	Unsaturated - Based on PZ-1 GW Elevations	1/9/2018	89.2	<2.24	<2.24	<2.24	<2.24	<2.24	<6.73	<2.24	<2.24	<2.24
SB-49 - MW-18 / 10' (S)	Saturated - Based on MW-18 GW Elevations	1/12/2018	85.8	<2.33	<2.33	<2.33	<2.33	<2.33	<6.99	<2.33	<2.33	<2.33
SB-50 - MW-17 / 8-9.5' (S)	Saturated - Based on MW-17 GW Elevations	1/15/2018	85.8	<2.33	<2.33	<2.33	<2.33	<2.33	<7.00	<2.33	<2.33	<2.33
SB-51 - MW-16 / 7' (S)	Saturated - Based on MW-16 GW Elevations	1/16/2018	89.3	<2.24	<2.24	<2.24	<2.24	<2.24	<6.72	<2.24	<2.24	<2.24
SB-52 - MW-19BR / 8-9' (S)	Saturated - Based on MW-17 GW Elevations	1/16/2018	84.4	<2.37	<2.37	<2.37	<2.37	<2.37	<7.11	<2.37	<2.37	<2.37
MW-20 BR / 4-6' (US)	Periodically Saturated - Based on MW-13 GW Elevations	1/17/2018	87.3	8,350	2,870	<229	854	2,160	12,400	<229	342	1,470
MW-20 BR / 6-8' (US)	Periodically Saturated - Based on MW-13 GW Elevations	1/17/2018	86.0	6,340	4,350	<233	1,590	3,560	17,500	<233	<233	2,320
MW-20 BR / 8-10' (S)	Saturated - Based on MW-13 GW Elevations	1/17/2018	85.6	7.44	2.73	<2.34	2.44	3.67	16.2	80.1	<2.34	<2.34
PZ-3BR / 3' (US)	Unsaturated - Based on MW-2 GW Elevations	1/18/2018	82.6	30,100	8,720	1,250	448	13,600	54,700	<242	920	9,670
PZ-3BR / 9' (US)	Periodically Saturated - Based on MW-2 GW Elevations	1/18/2018	71.5	231,000	79,000	3,310	8,400	110,000	404,000	<349	9,410	41,400

All concentrations and standards expressed in µg/kg
Bold = Detected Concentration
Blue = Concentration exceeds Direct Contact Standard
Red = Detection Limit exceeds PADEP RUA MSC
Dark Shaded and Bold = Concentration exceeds Unsaturated PADEP RUA MSC
Light Shaded, Bold, and Italic = Concentration exceeds Saturated PADEP RUA MSC
Green = Indicates a Saturated Sample
GW = Groundwater
* Wet Analysis Only

Prepared By: MRC 2/19/18
Checked By: MRC 2/19/18

Table 5

Groundwater Analytical Summary
Point Store
McClure, PA

MRLLC Project No. 4559.15.01

Well Location	Sample Date	PADEP Residential Used Aquifer (RUA) Groundwater Medium Specific Concentration (MSC)								
		15	420	5	1,000	700	10,000	20	840	100
		Sample Parameter								
		1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Cumene	Naphthalene
MW-1	11/21/2016	1,340	363	79.5	1,660	340	4,840	14.9	58.2	313
	12/5/2016	670	272	33.1	334	99.0	2,580	11.2	20.6	89.5
	1/31/2017	416	175	42.0	928	359	1,880	12.0	30.4	58.7
	3/6/2017	315	111	<50.0	581	286	1,330	<50.0	<50.0	<50.0
	9/13/2017	239	82.2	21.4	<10.0	206	276	<10.0	18.7	64.5
	2/8/2018	115	55.1	13.8	11.8	188	115	<10.0	13.4	39.6
MW-2	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	6.34	<2.00	<2.00
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	2.08	<2.00	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-3	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	9/13/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-4	11/21/2016	1,280	404	2,220	8,220	1,390	7,280	82.3	<100	118
	12/5/2016	937	287	1,760	5,550	1,220	5,200	<100	<100	211
	2/6/2017	3,460	992	5,120	17,400	2,430	14,100	<500	<500	1,760
	3/6/2017	1,120	295	2,200	6,690	1,140	6,120	<100	<100	341
	9/13/2017	1,390	383	3,330	5,630	1,200	5,700	<100	<100	329
	2/8/2018	105	51.8	39.2	120	31.2	271	<10.0	<10.0	13.8
MW-5	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	14.4	<2.00	<2.00
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	13.4	<2.00	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	7.84	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	6.27	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	3.54	<2.00	<2.00
MW-6	11/21/2016	1,670	472	600	86.2	98.5	3,880	1,850	32.4	243
	12/5/2016	481	191	210	<50.0	134	1,160	436	<50.0	53.4
	1/31/2017	34.6	22.6	89.2	2.00	45.6	96.8	29.8	2.26	6.43
	3/6/2017	51.7	24.9	49.5	<20.0	38.0	86.0	29.4	<20.0	<20.0
	9/13/2017	<20.0	<20.0	117	<20.0	172	<60.0	35.5	<20.0	32.3
	2/8/2018	<2.00	<2.00	29.7	<2.00	140	<8.00	76.0	22.0	2.08
MW-7	11/21/2016	1,470	389	14,800	6,350	881	6,350	4,850	89.0	456
	12/5/2016	823	283	3,220	3,020	104	4,590	818	<50.0	90.5
	1/31/2017	1,110	363	816	7,570	818	6,230	1,500	<50.0	234
	3/6/2017	798	232	7,590	5,110	695	4,920	1,590	<200	<200
	9/13/2017	724	<200	3,940	<200	705	846	377	<200	226
	2/8/2018	279	113	3,420	548	420	842	474	19.4	85.4
MW-8	11/21/2016	113	74.4	92.8	115	73.0	455	24.3	7.92	20.0
	12/5/2016	10.6	11.1	24.2	18.4	26.7	62.7	11.4	<10.0	<10.0
	1/31/2017	53.0	26.1	34.9	54.9	56.7	230	7.57	6.32	15.8
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	9/13/2017	4.35	<2.00	3.85	<2.00	64.7	8.98	6.10	9.26	27.5
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<8.00	<2.00	<2.00	<2.00
MW-9	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	14.3	<2.00	<2.00
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	12.7	<2.00	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	8.24	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	7.67	<2.00	<2.00
	9/13/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	6.05	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<8.00	4.07	<2.00	<2.00
MW-10	3/6/2017	99.8	32.2	43.9	75.2	55.3	215	62.8	3.85	14.7
	3/22/2017	86.3	29.4	66.2	128	78.1	274	75.6	4.79	8.94
	9/13/2017	4.11	<2.00	7.03	<2.00	5.21	12.2	23.9	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	19.9	<2.00	<2.00
MW-11	3/6/2017	<2.00	<2.00	3.77	2.84	<2.00	<6.00	721	<2.00	<2.00
	3/22/2017	<2.00	<2.00	3.62	<2.00	<2.00	<8.00	807	<2.00	<2.00
	9/13/2017	<2.00	<2.00	4.42	<2.00	<2.00	<8.00	278	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<8.00	122	<2.00	<2.00
MW-12	3/6/2017	<2.00	<2.00	3.33	12.1	<2.00	8.27	85.3	<2.00	<2.00
	3/22/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	93.6	<2.00	<2.00
	9/13/2017	<2.00	<2.00	9.50	<2.00	<2.00	<6.00	59.6	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	52.5	<2.00	<2.00
MW-13	3/6/2017	11.2	23.0	25.5	<2.00	71.1	25.8	899	10.0	10.9
	3/22/2017	24.0	35.8	57.0	<2.00	131	57.6	1,350	17.9	23.4
	9/13/2017	36.7	14.4	65.5	<2.00	224	49.6	1,060	21.6	50.0
	2/8/2018	3.37	11.5	56.4	<2.00	334	9.66	1,330	28.9	40.4
MW-14	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-15	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-16	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-17	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-18	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-19BR	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-20BR	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	4.74	<2.00	<2.00	<2.00	2.31	10.3	<2.00	<2.00	<2.00
Duplicate	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
Potable Well	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<8.00	<2.00	<2.00	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<8.00	<2.00	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	9/13/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	3.10	<2.00	<6.00	<2.00	<2.00	<2.00
Mellot Well	4/20/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	9/13/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<8.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	30.5	<2.00	<8.00	<2.00	<2.00	<2.00

All results presented in µg/L
Bold: Constituent detected
Bold and Shaded: Constituent concentration exceeds respective PADEP RUA MSC
Red Text: Laboratory detection limit is above respective PADEP RUA MSC

Prepared By: LML 3/14/18
Checked By: [signature] 9/1/18

Results presented in micrograms per liter (µg/L)
PADEP = Pennsylvania Department of Environmental Protection
Bold = Detected
Shaded and Bold = PADEP MSC Exceedance

MOUNTAIN RESEARCH, LLC

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Table 6

GAC Analytical Summary
Point Store
McClure, PA

MRLLC Project No. 4559.15.01

Sample ID	Sample Date	PADEP Residential Used Aquifer (RUA) Medium Specific Concentration (MSC)								
		15	420	5	1,000	700	10,000	20	840	100
		Sample Parameter								
		1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Cumene	Naphthalene
GAC Effluent 1	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/23/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	53.4	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	9/13/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
GAC Effluent 2	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	12/5/2016	19.5	7.84	64.1	254	36.9	159	5.44	2.27	<2.00
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	2.44	<2.00	<2.00
	2/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	57.3	<2.00	<2.00
	3/22/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	9/13/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00

Prepared By: BDA 2/21/18
Checked By: LML 3/6/18

Results presented in ug/L.
PADEP = Pennsylvania Department of Environmental Protection

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Table 7
Petroleum Vertical Distance Screen for
Potential Vapor Intrusion Sources in Soil and/or Groundwater

Point Store, McClure, PA

MRLLC Project Number 4559.15.01

Distance Screen Criteria	Sample Location	Installation / Advancement Date	Soil Sample Depth	Highest Static Water Level
Vertical Proximity Distance 11' bgs (building with basement 6' bgs)	MW-2	10/25/2016	NA	8.15
	MW-3	10/25/2016	NA	8.85
	MW-5	10/25/2016	NA	1.18
	MW-6	10/25/2016	NA	5.34
	MW-10	2/23/2017	NA	6.25
	SB-5	10/25/2016	11.0	NA
	~~SB-6~~	~~NA~~	~~No Sample~~	~~NA~~
	SB-9	10/25/2016	9.5	NA
	SB-14	10/25/2016	1.0	NA
	SB-14	10/25/2016	7.0	NA
	~~SB-15~~	~~10/25/2016~~	~~12.0~~	~~NA~~
	SB-16	10/25/2016	9.0	NA
	SB-17	10/25/2016	2.0	NA
	SB-17	10/25/2016	6.0	NA
	SB-24	10/26/2016	2.0	NA
	SB-24	10/26/2016	7.0	NA
	~~SB-24~~	~~10/26/2016~~	~~8.5~~	~~NA~~
	~~SB-24~~	~~10/31/2016~~	~~13.0~~	~~NA~~
	SB-25	10/26/2016	1.0	NA
	SB-25	10/26/2016	8.0	NA
	SB-26	10/26/2016	5.0	NA
	SB-31	2/20/2017	1.0	NA
	SB-31	2/20/2017	5-7.0	NA
	~~SB-31~~	~~2/20/2017~~	~~9-11.0~~	~~NA~~
	SB-37	2/21/2017	1.0	NA
	SB-37	2/21/2017	5.0	NA
	SB-38	2/22/2017	3.0	NA
	SB-38	2/22/2017	7.0-9.0	NA
	~~SB-38~~	~~2/22/2017~~	~~9.0-11.0~~	~~NA~~
	SB-39	2/22/2017	2.0	NA
	SB-40	2/22/2017	2.0	NA
	SB-40	2/22/2017	7.0	NA
	~~SB-42~~	~~1/2/2018~~	~~18-19~~	~~NA~~
	PZ-3BR	1/18/2018	3.0	NA
	PZ-3BR	1/18/2018	9.0	NA
Vertical Separation Distance 6' bgs (electric line)	~~MW-1~~	~~10/25/2016~~	~~NA~~	~~8.99~~
	MW-4	10/25/2016	NA	5.65
	~~MW-8~~	~~10/25/2016~~	~~NA~~	~~7.9~~
	~~MW-9~~	~~10/25/2016~~	~~NA~~	~~9.81~~
	~~SB-1~~	~~10/25/2016~~	~~7.0~~	~~NA~~
	~~SB-2~~	~~10/25/2016~~	~~11.0~~	~~NA~~
	~~SB-3~~	~~10/25/2016~~	~~12.0~~	~~NA~~
	SB-4	10/25/2016	1.0	NA
	SB-4	10/25/2016	4.0	NA
	~~SB-7~~	~~10/25/2016~~	~~9.5~~	~~NA~~
	~~SB-8~~	~~10/25/2016~~	~~14.5~~	~~NA~~
	SB-10	10/25/2016	2.0	NA
	~~SB-10~~	~~10/25/2016~~	~~8.0~~	~~NA~~
	~~SB-10~~	~~10/25/2016~~	~~9.0~~	~~NA~~
	SB-11	10/25/2016	1.0	NA
	SB-11	10/25/2016	3.0	NA
	~~SB-11~~	~~10/25/2016~~	~~8.0~~	~~NA~~
	SB-12	10/25/2016	2.0	NA
	SB-12	10/25/2016	3.0	NA
	SB-12	10/25/2016	5.0	NA
	SB-13	10/25/2016	1.0	NA
	SB-13	10/25/2016	2.0	NA
	~~SB-13~~	~~10/25/2016~~	~~8.0~~	~~NA~~
	~~SB-19~~	~~10/25/2016~~	~~10.0~~	~~NA~~
	SB-20	10/25/2016	3.0	NA
	SB-21	10/25/2016	2.0	NA
	SB-21	10/25/2016	4.0	NA
	SB-21	10/25/2016	5.0	NA
	SB-22	10/25/2016	3.0	NA
	~~SB-27~~	~~10/31/2016~~	~~16.0~~	~~NA~~

~~Indicates sample location is beyond the vertical proximity / separation distance~~
Indicates sample is saturated and potentially reflective of groundwater impact

NA: Not Applicable

Sample depths and water levels are measured in feet.

Checked By: AJM 4/5/2018

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Table 8

Groundwater Analytical Summary for Monitoring Well Locations Retained after Vapor Intrusion Distance Screen

Point Store
McClure, PA

MRLLC Project No. 4559.15.01

Well ID	Sample Date	PADEP Residential Used Aquifer (RUA) Groundwater Medium Specific Concentration (MSC) Reduced by a Factor of 10								
		1.5	42	0.5	100	70	1,000	84	10	2
		Sample Parameter								
		1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Toluene	Ethylbenzene	Total Xylenes	Cumene	Naphthalene	MTBE
MW-1	11/21/2016	Beyond the Petroleum Distance Screen								14.9
	12/5/2016									11.2
	1/31/2017									12.0
	3/6/2017									<50.0
MW-2	11/21/2016	Beyond the Petroleum Distance Screen								8.34
	12/5/2016									2.08
	1/31/2017									<2.00
	3/6/2017									<2.00
MW-3	11/21/2016	Beyond the Petroleum Distance Screen								<2.00
	12/5/2016									<2.00
	1/31/2017									<2.00
	3/6/2017									<2.00
MW-4	11/21/2016	Beyond the Petroleum Distance Screen								82.3
	12/5/2016									<100
	2/6/2017									<500
	3/6/2017									<100
MW-5	11/21/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	14.4
	12/5/2016	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	13.4
	1/31/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	7.64
	3/6/2017	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	6.27
MW-6	11/21/2016	1,670	472	600	86.2	96.5	3,880	32.4	243	1,650
	12/5/2016	481	191	210	<50.0	134	1,160	<50.0	53.4	436
	1/31/2017	34.6	22.6	89.2	2.00	45.6	96.8	2.26	6.43	29.8
	3/6/2017	51.7	24.9	49.8	<20.0	38.0	86.0	<20.0	<20.0	29.4
MW-7	11/21/2016	Beyond the Petroleum Distance Screen								4,850
	12/5/2016									618
	1/31/2017									1,500
	3/6/2017									1,590
MW-8	11/21/2016	Beyond the Petroleum Distance Screen								24.3
	12/5/2016									11.4
	1/31/2017									7.57
	3/6/2017									<2.00
MW-9	11/21/2016	Beyond the Petroleum Distance Screen								14.3
	12/5/2016									12.7
	1/31/2017									8.24
	3/6/2017									7.67
MW-10	3/6/2017	99.8	32.2	43.9	75.2	55.3	215	3.65	14.7	62.8
	3/22/2017	86.3	29.4	66.2	128	76.1	274	4.79	8.94	75.6
MW-11	3/6/2017	Beyond the Petroleum Distance Screen								721
	3/22/2017									807
MW-12	3/6/2017	Beyond the Petroleum Distance Screen								85.3
	3/22/2017									93.6
MW-13	3/6/2017	Beyond the Petroleum Distance Screen								899
	3/22/2017									1,350
MW-14	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
MW-15	1/24/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00
	2/8/2018	<2.00	<2.00	<2.00	<2.00	<2.00	<6.00	<2.00	<2.00	<2.00

Bold: constituent detected
Shaded: concentration exceedes respective soil vapor screening value for groundwater
Red Text: laboratory detection limit exceeds respective soil vapor screening value for groundwater
SWL: Static Water Level

Prepared By: AJM 4/5/18
Checked By: _____

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Table 9

Soil Sample Analytical Summary for Soil Sample Locations within Horizontal and Vertical Proximity and/or Separation Distances for Petroleum

Point Store
McClure, PA
Project No. 4559.15.01

			PADEP Residential Statewide Health Standard Generic MSCs for Soil to Groundwater Reduced by a Factor of 10							
			840	7,400	13	4,400	4,600	99,000	60,000	2,500
			Sample Parameters							
Sample Location	Soil Sample Depth (feet)	Sample Date	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Toluene	Ethylbenzene	Total Xylenes	Cumene	Naphthalene
SB-4	1.0	10/25/2016	<236	<236	<236	<236	<236	<707	<236	1,010
SB-4	4.0	10/25/2016	<227	<227	<227	<227	<227	<682	<227	<227
SB-5	11.0	10/25/2016	<241	<241	<241	<241	<241	<723	<241	<241
SB-9	9.5	10/25/2016	<257	<257	<257	<257	<257	<772	<257	<257
SB-10	2.0	10/25/2016	<249	284	809	<249	6,340	<747	1,130	6,810
SB-11	1.0	10/25/2016	104,000	46,000	1,880	9,180	7,290	77,000	1,370	15,400
SB-11	3.0	10/25/2016	212,000	48,100	<2,530	26,100	54,700	287,000	<2,530	24,500
SB-12	2.0	10/25/2016	<239	<239	<239	<239	<239	<718	<239	<239
SB-12	3.0	10/25/2016	56,900	17,100	538	10,500	18,700	88,200	2,770	8,870
SB-12	5.0	10/25/2016	99,300	22,600	1,850	54,800	28,700	145,000	4,230	14,100
SB-13	1.0	10/25/2016	2,930	755	3,500	3,820	3,030	7,110	402	1,690
SB-13	2.0	10/25/2016	1,170,000	346,000	107,000	1,380,000	495,000	2,640,000	61,700	214,000
SB-14	1.0	10/25/2016	11,400	3,500	510	<253	4,860	17,800	356	3,160
SB-14	7.0	10/25/2016	<233	<233	309	<233	304	<699	<233	411
SB-16	9.0	10/25/2016	<236	<236	<236	<236	<236	<708	<236	<236
SB-17	2.0	10/25/2016	260,000	72,300	40,100	60,700	94,100	446,000	7,850	60,900
SB-17	6.0	10/25/2016	<231	<231	<231	<231	<231	<693	<231	<231
SB-20	3.0	10/25/2016	<245	<245	<245	<245	<245	<734	<245	<245
SB-21	2.0	10/25/2016	<235	<235	<235	<235	<235	<706	<235	<235
SB-21	4.0	10/25/2016	<265	<265	<265	<265	<265	<796	<265	<265
SB-21	5.0	10/25/2016	<241	<241	<241	<241	<241	<723	<241	<241
SB-22	3.0	10/25/2016	<240	<240	<240	<240	<240	<721	<240	<240
SB-24	2.0	10/26/2016	<255	<255	1,250	<255	6,630	<766	893	5,620
SB-24	7.0	10/26/2016	704	903	<235	<235	1,450	<706	<235	1,230
SB-25	1.0	10/26/2016	72,400	23,800	1,380	469	29,300	84,700	2,380	11,300
SB-25	8.0	10/26/2016	<232	<232	245	<232	510	<695	<232	297
SB-26	5.0	10/26/2016	<235	<235	<235	<235	<235	<705	<235	<235
SB-31	1.0	2/20/2017	925	383	2,940	388	7,240	3,000	659	835
SB-31	5.0-7.0	2/20/2017	41,100	13,000	432	4,980	11,200	54,300	1,420	7,640
SB-37	1.0	2/21/2017	<229	<229	758	<229	1,390	<687	<229	325
SB-37	5.0	2/21/2017	<22.7	<22.7	39.5	<22.7	23.2	<68.1	<22.7	60.3
SB-38	3.0	2/22/2017	25.7	<24.5	130	<24.5	453	<73.6	219	281
SB-38	7.0-9.0	2/22/2017	<23.5	154	63.4	<23.5	3,410	<70.4	2,950	<23.5
SB-39	2.0	2/22/2017	<25.1	<25.1	122	<25.1	<25.1	120	<25.1	<25.1
SB-40	2.0	2/22/2017	<248	<248	<248	<248	<248	<744	<248	<248
SB-40	7.0	2/22/2017	<22.8	<22.8	<22.8	<22.8	<22.8	<68.4	46.6	261
PZ-3BR	3.0	1/18/2018	30,100	8,720	1,250	448	13,600	54,700	920	9,670
PZ-3BR	9.0	1/18/2018	231,000	79,000	3,310	8,400	110,000	404,000	9,410	41,400

Generic Values obtained from Appendix A, Table 3B (TDS ≤2500) of PADEP Chapter 250 (Act 2) Revisions (effective August 27, 2016)
All Concentrations and standards expressed in µg/kg unless noted otherwise.
Bold = Constituent identified at detectable concentrations
Shaded = Concentration exceeds screening value
Red Text = Laboratory detection limit exceeds screening value
PADEP = Pennsylvania Department of Environmental Protection

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Table 10

Soil Sample Analytical Summary for Soil Sample Locations within Horizontal Proximity and/or Separation Distances for Non-Petroleum

Point Store
McClure, PA

MRLLC Project No. 4559.15.01

PADEP Residential Statewide Health Standard Generic MSCs for Soil to Groundwater Reduced by a Factor of 10			28
Sample Location	Sample Depth (feet)	Sample Date	MTBE
SB-1	7.0	10/25/2016	<228
SB-2	11.0	10/25/2016	<260
SB-3 -MW-1	12.0	10/25/2016	<241
SB-4	1.0	10/25/2016	<236
SB-4	4.0	10/25/2016	<227
SB-5 -MW-2	11.0	10/25/2016	<241
SB-7	9.5	10/25/2016	<241
SB-9 - MW-3	9.5	10/25/2016	<257
SB-10	2.0	10/25/2016	<249
SB-10	8.0	10/25/2016	<2,320
SB-10	9.0	10/25/2016	<233
SB-11	1.0	10/25/2016	<1,050
SB-11	3.0	10/25/2016	<2,530
SB-11	8.0	10/25/2016	<239
SB-12 -MW-4	2.0	10/25/2016	<239
SB-12 -MW-4	3.0	10/25/2016	<227
SB-12 -MW-4	5.0	10/25/2016	<1,160
SB-13	1.0	10/25/2016	<253
SB-13	2.0	10/25/2016	<3,050
SB-13	8.0	10/25/2016	<230
SB-14	1.0	10/25/2016	<253
SB-14	7.0	10/25/2016	<233
SB-16	9.0	10/25/2016	<236
SB-17 -MW-6	2.0	10/25/2016	<2,200
SB-17 -MW-6	6.0	10/25/2016	<231
SB-18 -MW-7	1.0	10/25/2016	999
SB-18 -MW-7	2.0	10/25/2016	2,070
SB-18 -MW-7	9.0	10/25/2016	374
SB-19 -MW-8	10.0	10/25/2016	<237
SB-20 -MW-9	3.0	10/25/2016	<245
SB-21	2.0	10/25/2016	<235
SB-21	4.0	10/25/2016	<265
SB-21	5.0	10/25/2016	<241
SB-22	3.0	10/25/2016	<240

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Table 10

Soil Sample Analytical Summary for Soil Sample Locations within Horizontal Proximity and/or Separation Distances for Non-Petroleum

Point Store
McClure, PA

MRLLC Project No. 4559.15.01

PADEP Residential Statewide Health Standard Generic MSCs for Soil to Groundwater Reduced by a Factor of 10			28
Sample Location	**Sample Depth (feet)**	**Sample Date**	**MTBE**
SB-23	3.0	10/26/2016	<225
SB-23 (Duplicate)	3.0	10/26/2016	<234
SB-23	7.0	10/26/2016	<1,140
SB-23 (Duplicate)	7.0	10/26/2016	<231
SB-23	9.0	10/26/2016	<231
SB-23 (Duplicate)	9.0	10/26/2016	<235
SB-24	2.0	10/26/2016	<255
SB-24	7.0	10/26/2016	<235
SB-25	1.0	10/26/2016	<263
SB-25	8.0	10/26/2016	<232
SB-26	5.0	10/26/2016	<235
SB-28	1.0	2/20/2017	395
SB-29	1.0	2/20/2017	<24.6
SB-30	1.0	2/20/2017	<23.2
SB-30	5.0-7.0	2/20/2017	794
SB-30	7.0-9.0	2/20/2017	1,030
SB-31	1.0	2/20/2017	<226
SB-31	5.0-7.0	2/20/2017	<228
SB-33	5.0-7.0	2/21/2017	<23.1
SB-33	7.0-9.0	2/21/2017	<230
SB-34	5.0-7.0	2/21/2017	464
SB-36	1.0	2/21/2017	<25.5
SB-36	7.0-9.0	2/21/2017	617
SB-37	1.0	2/21/2017	<229
SB-37	5.0	2/21/2017	471
SB-38	3.0	2/22/2017	101
SB-38	7.0-9.0	2/22/2017	29.0
SB-39	2.0	2/22/2017	<25.1
SB-40	2.0	2/22/2017	<248
SB-40	7.0	2/22/2017	<22.8
SB-41	2.0	2/20/2017	<24.9
MW-20BR	4.0-6.0	1/17/2018	<229
MW-20BR	6.0-8.0	1/17/2018	<233
PZ-3BR	3.0	1/18/2018	<242
PZ-3BR	9.0	1/18/2018	<349

Generic Values obtained from Appendix A, Table 3B (TDS ≤2500) of PADEP Cha
Revisions (effective August 27, 2016)
All Concentrations and standards expressed in µg/kg unless noted otherwise.
Bold = Constituent identified at detectable concentrations
Shaded = Concentration exceeds screening value
Red Text: Laboratory detection Limit exceeds screening value
PADEP = Pennsylvania Department of Environmental Protection

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Table 11

J&E Modeling Summary - Shallow Soil (0-3 feet bgs)
Point Store
McClure, PA

MRLLC Project No. 4559.15.01

Compound	Sample Location (depth)	Incremental Risk From Vapor Intrusion to Indoor Air, Carcinogen (Unitless)	Hazard Quotient From Vapor Intrusion to Indoor Air, Non-carcinogen (Unitless)
Benzene	SB-13 (2')	1.00E+00	1.00E+04
Cumene			2.10E+01
Ethylbenzene		1.30E-01	1.20E+02
MTBE		2.50E-04	7.60E-01
Naphthalene		1.60E-02	3.60E+02
Toluene			7.70E+01
1,2,4-Trimethylbenzene			5.00E+02
1,3,5-Trimethylbenzene			6.20E+02
Total Xylenes			9.60E+02
TOTAL	-	**1.15E+00**	**1.27E+04**
		FAIL	FAIL
PADEP Accepted Risk Levels using Site Specific Standard		**1.00E-05**	**1.00E+00**

Note that risk was evaluated using a slab on grade contruction scenario. Sample depth for SS-13 was 2 feet bgs.

Risk was calculated using Residential exposure assumptions.

A soil type of clay (C), sandy clay (SC) and sand (S) were used for all calulations.

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Table 12

J&E Modeling Summary - Shallow Groundwater (0-3 feet bgs)
Point Store
McClure, PA

MRLLC Project No. 4559.15.01

Compound	Sample Location (depth)	Incremental Risk From Vapor Intrusion to Indoor Air, Carcinogen (Unitless)	Hazard Quotient From Vapor Intrusion to Indoor Air, Non-carcinogen (Unitless)
MTBE	MW-5 (1.18 feet bgs)	4.80E-08	1.40E-04
TOTAL	-	**4.80E-08**	**1.40E-04**
		PASS	PASS
PADEP Accepted Risk Levels using Site Specific Standard		**1.00E-05**	**1.00E+00**

Note that risk was evaluated using a slab on grade contruction scenario.

Risk was calculated using Residential exposure assumptions.

A soil type of sand (S) was used for all calulations.

APPENDIX A

CHARACTERISTICS OF CONSTITUENTS OF CONCERN

1,2,4 – TRIMETHYLBENZENE

Water Solubility (WS)	Density (d)
Organic Carbon Coefficient (Koc)	Vapor Pressure (VP)
Lower Explosive Limit (LEL)	

1. 1,2,4 - TRIMETHYLBENZENE (CAS 95-63-6)

WS	= 56 ppm	d	= 0.876 g/ml
Koc	= 2,200	VP	= 4.5 mm Hg @ 20°C
LEL	= 9,ppm		

1,2,4 – Trimethylbenze (TMB) is primarily released into the environment through spills of petroleum products. TMB is considered volatile, therefore when released onto surface water(s) and soil(s) TMB will be lost to evaporation and microbial degradation. The high Koc and low solubility values indicate that TMB has little affinity for water leading to the conclusion that TMB will largely remain in the soil in the event of a sub-surface release. Additionally, density (d) of TMB is less than 1 indicating it is lighter than water.

TMB is moderately toxic to humans targeting the nervous system. TMB is not classified as a carcinogen. The non-residential Statewide Health Standard established for TMB is 35 ppb in ground water.

1,3,5 – TRIMETHYLBENZENE

Water Solubility (WS)	Density (d)
Organic Carbon Coefficient (Koc)	Vapor Pressure (VP)
Lower Explosive Limit (LEL)	

1. 1,3,5 - TRIMETHYLBENZENE (CAS 108-67-8)

WS	= 48.9 ppm	d	= 0.8637 g/ml
Koc	= 660	VP	= 2 mm Hg @ 20°C
LEL	= Not listed in Niosh Pocket Guide		

1,3,5 – Trimethylbenze (TMB) is primarily released into the environment through spills of petroleum products. TMB is considered volatile, therefore when released onto surface water(s) and soil(s) TMB will be lost to evaporation and microbial degradation. The high Koc and low solubility values indicate that TMB has little affinity for water leading to the conclusion that TMB will largely remain in the soil in the event of a sub-surface release. Additionally, density (d) of TMB is less than 1 indicating it is lighter than water.

TMB is moderately toxic to humans targeting the nervous system. TMB is not classified as a carcinogen. The non-residential Statewide Health Standard established for TMB is 420 ppb in ground water.

BENZENE

Aqueous Solubility (AS)

Organic Carbon Coefficient (Koc)

Degradation Coefficient (K)

Specific Gravity (SG)

Vapor Pressure (VP)

Lower Explosive Limit (LEL)

Benzene (CAS 71-43-2) (Ref. 1)

AS = 1,780.5 mg/L (Ref. 1)
Koc = 58 (Ref. 1)
K = 0.35 (yr^{-1}) (Ref. 1)

SG = 0.88 (Ref. 2)
VP = 75 mm Hg (Ref. 2)
LEL = 1.2% (Ref. 2)

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

TOLUENE

Aqueous Solubility (AS)

Specific Gravity (SG)

Organic Carbon Coefficient (Koc)

Vapor Pressure (VP)

Degradation Coefficient (K)

Lower Explosive Limit (LEL)

Toluene (CAS 108-88-3) (Ref. 1)

AS = 532.4 mg/L (Ref. 1)

Koc = 130 (Ref. 1)

K = 9.01 (yr^{-1}) (Ref. 1)

SG = 0.87 (Ref. 2)

VP = 21 mm Hg (Ref. 2)

LEL = 1.1% (Ref. 2)

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

ETHYLBENZENE

Aqueous Solubility (AS)

Organic Carbon Coefficient (Koc)

Degradation Coefficient (K)

Specific Gravity (SG)

Vapor Pressure (VP)

Lower Explosive Limit (LEL)

Ethylbenzene (CAS 100-41-4) (Ref. 1)

AS = 161 mg/L (Ref. 1)
Koc = 220 (Ref. 1)
K = 1.11 (yr^{-1}) (Ref.1)

SG = 0.87 (Ref. 2)
VP = 7 mm Hg (Ref.2)
LEL = 0.8% (Ref. 2)

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

XYLENES

Aqueous Solubility (AS)

Organic Carbon Coefficient (Koc)

Degradation Coefficient (K)

Specific Gravity (SG)

Vapor Pressure (VP)

Lower Explosive Limit (LEL)

Xylenes (total) (CAS 1330-20-7) (Ref. 1)

AS = 175 mg/L (Ref. 1)
Koc = 350 (Ref. 1)
K = 0.69 (yr^{-1}) (Ref. 1)

SG = 0.87 (average) (Ref. 2)
VP = 8.3 mmHg (average) (Ref. 2)
LEL = 1.0% (average) (Ref. 2)

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

MTBE

Aqueous Solubility (AS)

Organic Carbon Coefficient (Koc)

Degradation Coefficient (K)

Specific Gravity (SG)

Vapor Pressure (VP)

Lower Explosive Limit (LEL)

Methyl-tert-butyl-ether (CAS 1634-04-4) (Ref. 1)

AS	= 45000 (mg/L) (Ref. 1)	SG	= NL (Ref. 2)
Koc	= 12 (Ref. 1)	VP	= NL (Ref. 2)
K	= 0.693 (yr^{-1}) (Ref. 1)	LEL	= NL (Ref. 2)

NL – Not Listed

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

CUMENE

Aqueous Solubility (AS)

Specific Gravity (SG)

Organic Carbon Coefficient (Koc)

Vapor Pressure (VP)

Degradation Coefficient (K)

Lower Explosive Limit (LEL)

Cumene (CAS 98-82-8) (Ref. 1)

AS = 50 mg/L (Ref. 1)

Koc = 2800 (Ref. 1)

K = 15.81 (yr^{-1}) (Ref. 1)

SG = 0.86 (Ref. 2)

VP = 8 mm Hg (Ref. 2)

LEL = 0.9% (Ref. 2)

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

NAPHTHALENE

Aqueous Solubility (AS)

Organic Carbon Coefficient (Koc)

Degradation Coefficient (K)

Specific Gravity (SG)

Vapor Pressure (VP)

Lower Explosive Limit (LEL)

Naphthalene (CAS 91-20-3) (Ref. 1)

AS = 30 mg/L (Ref. 1)
Koc = 950 (Ref. 1)
K = 0.98 (yr^{-1}) (Ref. 1)

SG = 1.15 (Ref. 2)
VP = 0.08 mm Hg (Ref. 2)
LEL = 0.9% (Ref. 2)

References:

1. Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Land Recycling and Cleanup Program. "Title 25. Environmental Protection, Department of Environmental Protection Chapter 250. Administration of Land Recycling Program," November 24, 2001.

2. Department of Health and Human Services, Centers for Disease Control and Prevention and National Institute for Occupational and Health. NIOSH Pocket Guide to Chemical Hazards and Other Databases, Publication No. 2001-145, August 2001.

APPENDIX B

GEOPHYSICAL REPORT

February 16, 2018

Mr. Ben Azar
Mountain Research, LLC
825 25th Street
Altoona, PA 16601

Subject: Results of Geophysical Borehole Logging
Two Boreholes (Mellott & Storewell)
McClure, PA
ARM Project: 180159

Dear Mr. Azar,

ARM Geophysics (ARM) is pleased to present this letter report that summarizes the results of geophysical borehole logging performed at the above referenced site on January 26, 2018. The objectives of the logging were to identify water-bearing zones and to measure the depth and orientation of fractures and bedding planes in the above mentioned boreholes. To achieve these objectives, ARM acquired standard borehole logs and images as discussed below.

LOGGING METHODS

The logs that ARM completed for this investigation include:

- Natural Gamma
- Fluid Temperature
- Fluid Conductivity
- 3-Arm Caliper
- Optical Televiewer (OTV)
- Acoustic Televiewer (ATV)
- Heat Pulse Flowmeter (HPFM) under ambient & pumping conditions

ARM has provided a summary of these logging methods in Attachment A. ARM acquired all the logs using a Matrix acquisition system and tools manufactured by Mount Sopris Instrument Company.

INTERPRETATION

BASIC LOG DESCRIPTIONS

The geophysical borehole logs acquired during this investigation are presented in Attachment B. All log depths are referenced to ground surface as indicated in the header of each log. The majority of the acquired data are presented as standard curves that represent the change in measured parameter with depth. The format of the heat pulse flowmeter and televiewer logs are discussed in the following paragraphs.

The Vertical Flow track in the Hydro Log provides a record of the rate of vertical fluid movement derived from the heat pulse flowmeter tool. The X-axis represents the magnitude of flow in gallons/min that was recorded at depths indicated by the posted value. It is calculated during acquisition by dividing the distance between the grid and thermistors by the travel time. Negative and positive values indicate downward and upward flow, respectively.

The televiewer logs contain borehole images and structural information obtained from the OTV tool. The *Optical View* track is an "unwrapped" photographic image of the borehole wall (Figure 1). In this case, the cylindrical borehole surface is unzipped along the north azimuth and unrolled to a flat strip. The compass orientation (with respect to true north) is presented at the top of the log. The unwrapped format is distorted like any projection of a curved surface on a flat one. Horizontal and vertical planes will be undistorted. However, dipping planes will be represented as a sine wave: the greater the dip, the greater the wave amplitude.

The Plane Projection track presents the fracture signatures that are digitized from the unwrapped *Optical View* track. The *Dip & Dip Direction* log is a presentation in which the vertical axis is depth and the horizontal is dip angle from 0° to 90°. As shown in Figure 2, the dip direction is indicated by the orientation of the tadpole tail, measured in a clockwise direction from north.

INTERPRETATION OF STRUCTURAL DIAGRAMS

The structural data are presented on polar and rose diagrams for statistical analysis and pattern visualization. Polar diagrams are used in this report to plot the dip and dip direction of planar features. Zero degree dip is represented at the center of the diagram and 90° at the circumference. The dip direction is indicated by the compass azimuth, measured clockwise from north (0°), as shown in Figure 3. This format is sometimes referred to as a dip vector plot but it is essentially the same as a stereonet with an upper hemisphere projection.

The rose diagram graphically illustrates the strike distribution of a set of planes. Radiating rays are drawn with lengths proportional to number of strike measurements within each 10° sector. It is important to recognize that in this report, the polar diagram represents dip and dip direction, whereas the rose diagram represents strike. Using the right-hand-rule convention, strike equals the dip direction minus 90°.

RESULTS AND DISCUSSION

ORIENTATION ANALYSIS OF PLANAR FEATURES

The optical and acoustic images were used to measure the depth and orientations of bedding and fracture planes. The digitized planar features were corrected for borehole deviation and magnetic declination. The measured plane projections and orientations are shown in the plane projection logs. A tabulated listing of the bedding and fracture orientations is presented in Attachment C. Stereographic analysis was performed on the planar orientation data acquired from the image logs. A listing of the calculated mean orientations of all bedding and fracture planes are presented in Table 1. The results from the boreholes are presented in the polar and rose diagrams, and charts shown in Figure 4 through 9. Predominant groups or "sets" are indicated by the clustering of data points in the polar diagrams.

Figure 4 presents a polar diagram showing the dip and dip direction of all planes measured during this investigation. ARM has classified the planes by symbols corresponding to bedding and fracture plane sets. Figure 5 presents the same data, with the data set(s) categorized by borehole.

ARM used statistical contouring to identify windows in which to calculate the mean orientation of all bedding and fracture planes. Figure 6 presents a polar diagram with statistical contouring of bedding plane orientations. The mean bedding dip/dip directions are shown to the right of the diagram. The rose diagram in Figure 8 shows a predominant ENE/WSW strike direction.

Figure 7 presents a polar diagram with statistical contouring of all fracture plane orientations. The mean fracture plane dip/dip directions are shown to the right of the diagram. Similarity in the bedding set 1 and the fracture set orientations suggest the latter may be bedding partings. The rose diagram in Figure 9 shows a predominant ENE/WSW strike direction.

The mean orientations for all bedding planes and fracture sets are shown in Table 1.

Table 1: Statistical mean of dip and dip direction of bedding and fracture planes.

Planes	Dip	Dip Direction	Strike/Dip
Bedding Set 1	3	346	N76E/3NW
Bedding Set 2	66	338	N68E/66NW
Fracture	4	12	N78W/4NE

INTERPRETATION OF WATER PRODUCING OR RECEIVING ZONES

Water producing or receiving zones are typically identified in the acquired logs by a combination of the following parameters:

A. Start or increase in upward or downward fluid flow identified by heat pulse flowmeter data suggests water-producing zone.
B. End or decrease in upward or downward fluid flow identified by heat pulse flowmeter data suggests water-receiving zone.
C. Open fractures observed in televiewer data.
D. Deflections in caliper curve (suggests fractures).
E. Deflections or change in slope in fluid temperature or fluid resistivity curve.
F. Decrease in formation resistivity.

Table 2 presents the interpreted flow zones based on the indicators above. The most convincing evidence of water producing or receiving zones are heat pulse flowmeter, fluid temperature, and fluid resistivity deflections since they can indicate flow in the borehole. Fractures observed in televiewer images or caliper curves can indicate water-bearing zones although the evidence is more indirect. A fracture may be observed in the borehole wall that may have been opened or enlarged during the drilling process but may be tight and contain little or no water a short distance into the formation. A decrease in formation resistivity may be caused by an increase in water content but may also be caused by lithologic changes such as an increase in clay mineral content. For this reason, resistivity deflections are compared to the gamma ray curve to identify lithologic changes. A combination of the above indicators provides the highest level of confidence for identifying water-bearing zones.

No flow was detected in Storewell under ambient or pumping conditons. Upflow was detected in Mellott under both ambient & pumping conditions. Interpreted zone types can be found in Table 2 below.

ARM GEOPHYSICS

Table 2: Interpreted water producing or receiving zones and indicators. Letters in Indicators column correspond to the selection parameters shown below.

Borehole	Depth (Feet)	Indicators	Type
Mellott	65-70	B, C, D	Receiving zone
Mellott	78-81*	A, C	Producing zone
Mellott	97-102	A, C	Producing zone
Mellott	153-168**	B, C, D, E	Receiving zone
Mellott	168-170**	A	Producing zone

*Ambient Conditions Only
**Pumping Conditions Only

CLOSING

The data collection and interpretation methodologies used in this investigation are consistent with standard practices applied to similar geophysical investigations. The correlation of geophysical responses with probable subsurface features is based on the past results of similar surveys although it is possible that some variation could exist at this site.

Please contact us if you have any questions regarding this survey. We appreciate your business and look forward to working with you again.

Kind regards,
ARM Geophysics

Roy M. Gecelosky
Project Geophysicist II

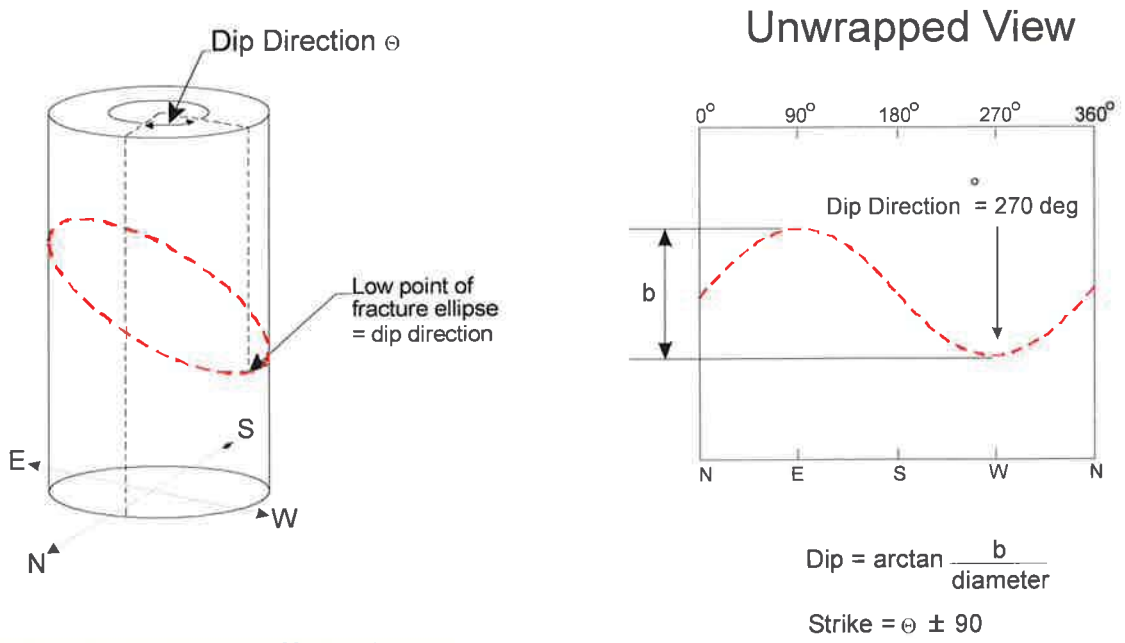


Figure 1: Diagram illustrating unwrapped view of fracture signature.

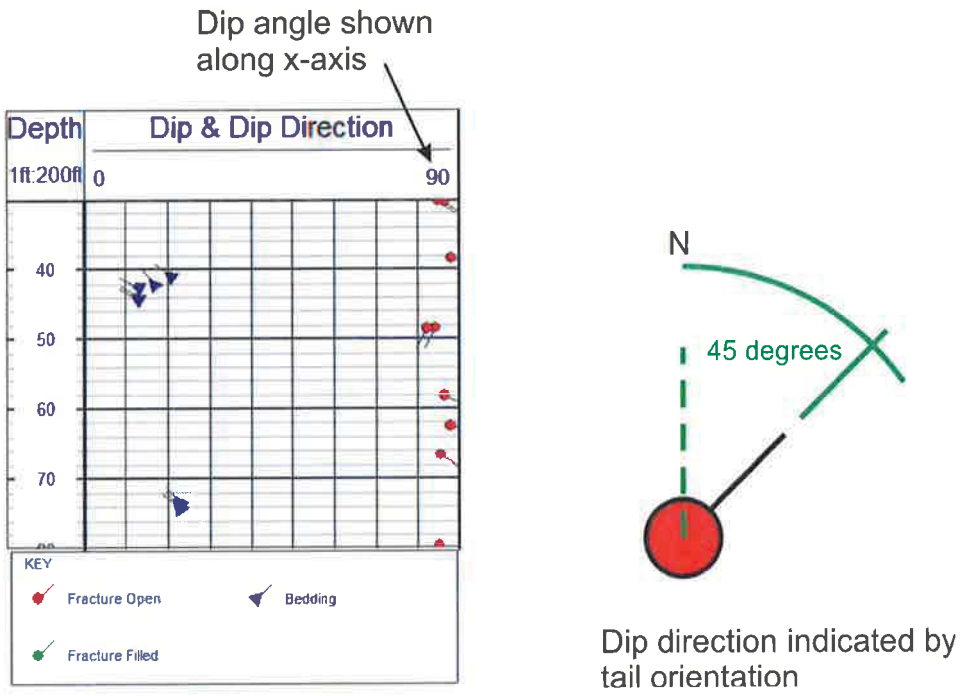


Figure 2: Dip & dip direction determination from the tadpole plot.

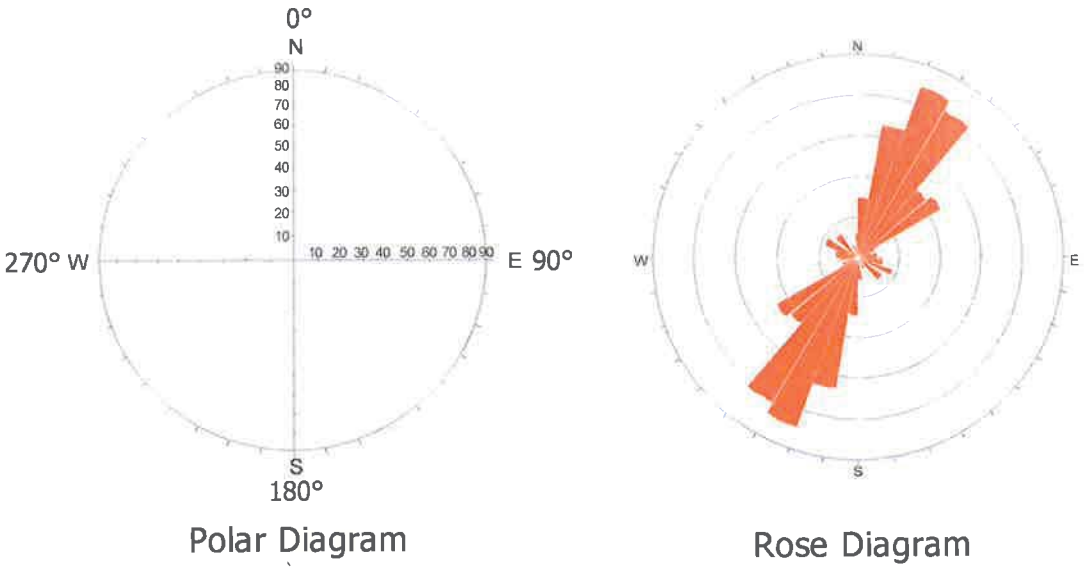


Figure 3: Example polar and rose diagrams. Polar diagram is used in this report for plotting dip and dip direction. Rose diagrams are used for plotting the frequency or number of strike measurements per sector.

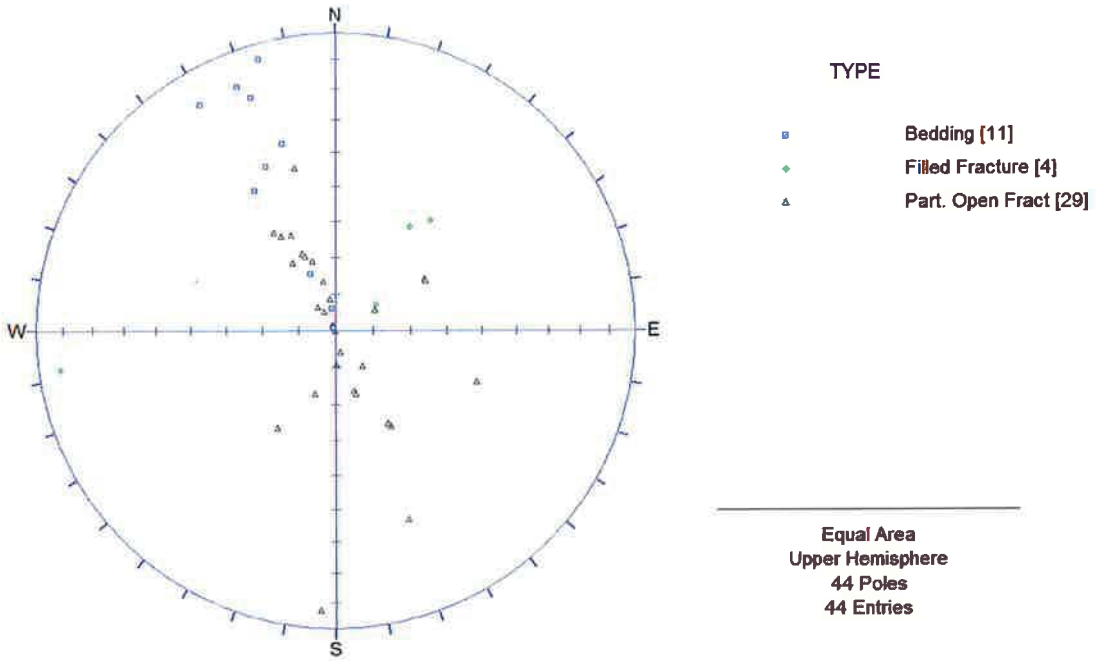


Figure 4: A polar diagram plotting dip and dip direction of all planes categorized by plane type.

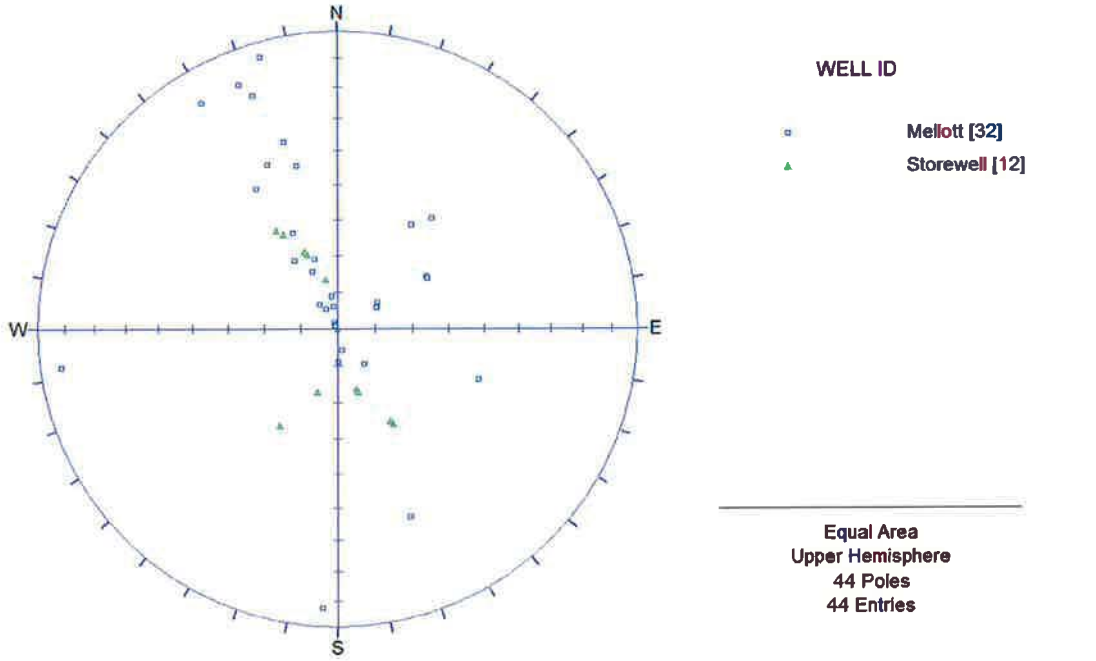
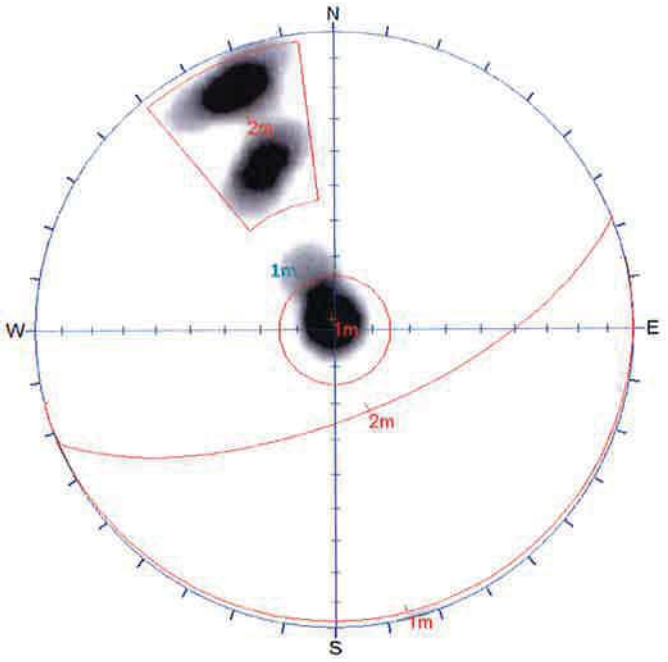


Figure 5: A polar diagram plotting dip and dip direction of all planes categorized by borehole.

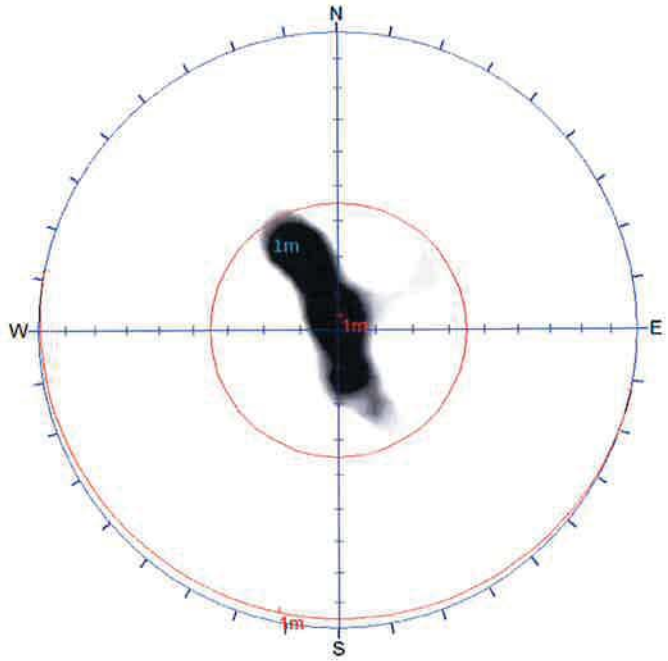


Orientations

ID		Dip / Direction
1	m	03 / 346
2	m	66 / 338

Equal Area
Upper Hemisphere
11 Poles
11 Entries

Figure 6: A polar diagram with statistical contouring of all bedding planes. The calculated mean dip angle and direction is shown at the right of the diagram.

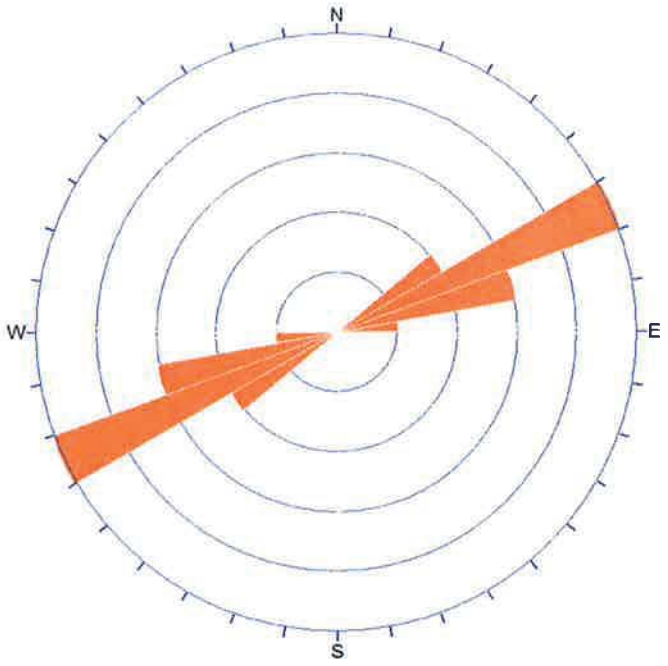


Orientations

ID		Dip / Direction
1	m	04 / 012

Equal Area
Upper Hemisphere
33 Poles
33 Entries

Figure 7: A polar diagram with statistical contouring of all fracture planes. The calculated mean dip angle and direction is shown at the right of the diagram.



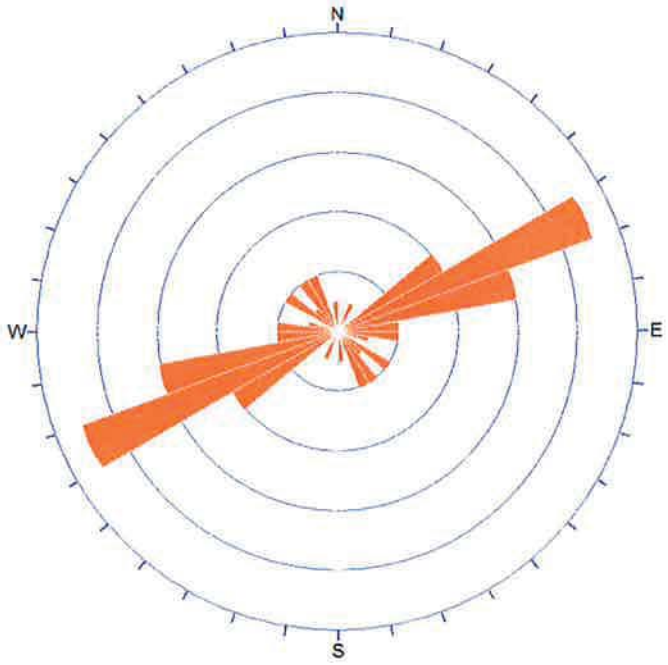
Apparent Strike
5 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

11 Planes Plotted
Within 0 and 90
Degrees of Viewing
Face

Figure 8: A rose diagram illustrating strike distribution of all bedding planes.



Apparent Strike
10 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

33 Planes Plotted
Within 0 and 90
Degrees of Viewing
Face

Figure 9: A rose diagram illustrating strike distribution of all fracture planes.

ATTACHMENT A
LOGGING METHODS

1129 West Governor Road, PO Box 797
Hershey, PA 17033-0797
Voice: (717) 533 - 8600
Fax: (717) 533 - 8605

APPENDIX A: OVERVIEW OF LOGGING METHODS

CALIPER LOGS

The caliper log measures variations in borehole size as a function of depth in a well. Some example responses of in a caliper log is shown in Figure A- 1 (Rider, 2002[1]) The log data enables (a) the detection of competent or fractured geologic units, (b) the location of washouts or tight zones, (c) the optimal placement of well screen, sand, and bentonite, and (d) the establishment of appropriate borehole correction factors to be applied to other well log curves. Further, when run in combination with other logs, the caliper log may be an indicator of lithologic makeup and degree of consolidation. The typical caliper response in a fractured, weathered, or karstic unit is a relatively abrupt increase in borehole size.

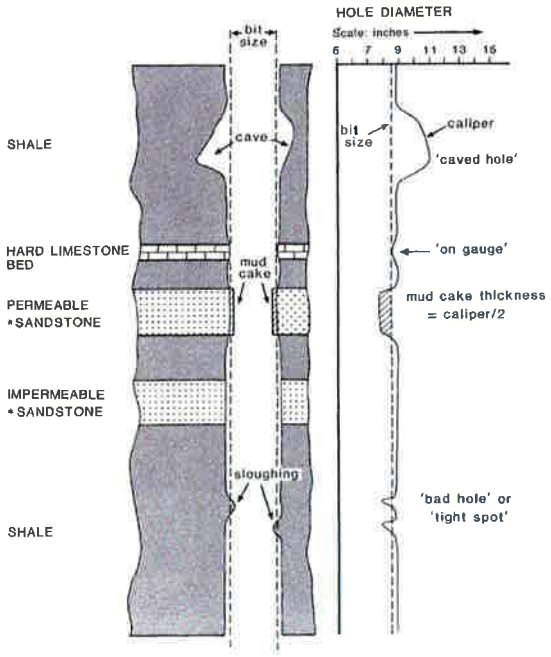


Figure A- 1: The caliper log showing some typical responses. (From Rider, 2002).

SPONTANEOUS POTENTIAL (SP) LOGS

The SP log measures the natural voltages that are created within the borehole due to the presence of borehole fluids, formation fluids, and formation matrix materials. It is recorded by measuring the difference in electrical potential in millivolts between an electrode in the borehole and a grounded electrode at the surface. The SP log is commonly used to 1) detect permeable beds, 2) detect boundaries of permeable beds, 3) determine formation water resistivity, and 4) determine the volume of shale in permeable beds. The constant SP readings observed in thicker shale units define the shale base line, a reference line from which further formation matrix and formation fluid property calculations may be completed. Although this log is consistently used in oil and gas applications, its effectiveness in water wells is limited since the method requires a contrast in salinity between borehole and formation fluids (Figure A- 2). This condition is often not met in ground water wells.

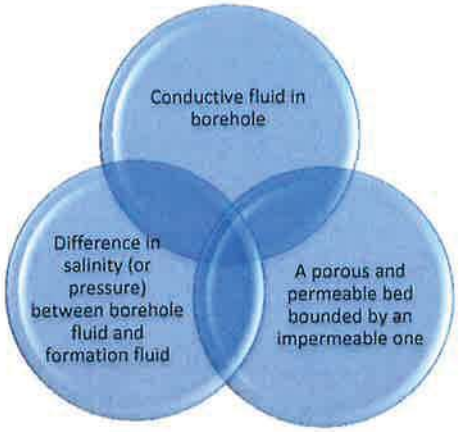


Figure A- 2: Conditions required to produce an SP response.

1 Rider, M. (2006) The Geological Interpretation of Well Logs, *Rider-French Consulting, Ltd.*, 280pp.

The SP log can be qualitatively used for permeability recognition. SP deflections from the shale base line commonly indicate the presence of a permeable bed. The magnitude and direction of the deflection is dependent upon the relative resistivity (or salinity) values of the borehole fluid and the formation fluid. If the formation fluid resistivity is less than the borehole fluid resistivity, then the relative SP values will decrease in a porous, coarse-grained unit. Alternately, if the formation fluid resistivity is greater than the borehole fluid resistivity, the relative SP values will increase in the same body, and the curve shape is referred to as a "reversed SP". If both fluid resistivities are equal, no SP deflection will occur.

GAMMA RAY LOGS

The gamma ray log is a passive instrument that measures the amount of naturally occurring radioactivity from geologic units within the borehole. Commonly occurring radioelements include potassium, thorium, and uranium; the two former elements are predominant within a common fine-grained rock sequence. The gamma ray log is also an excellent lithologic indicator because fine-grained clays and shales contain a higher radioelement concentration than limestones or sands. Gamma ray values are often used to assess the percentage of clay materials (indurated or non-indurated) that are present within a formation by utilizing empirically derived equations and sand-shale base line information.

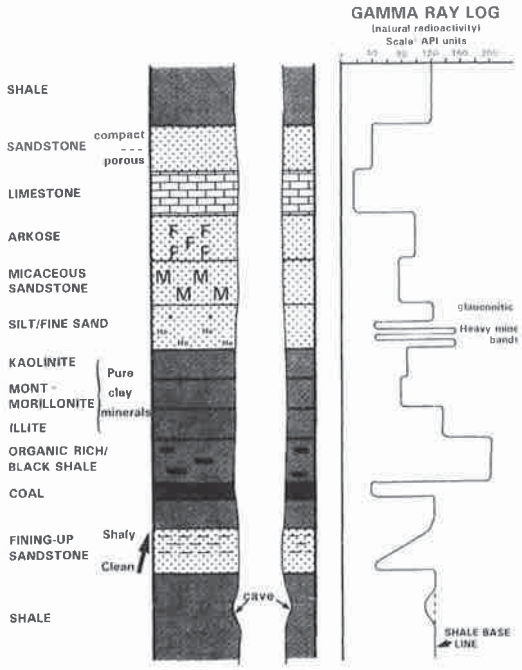


Figure A- 3: Characteristic gamma ray responses. (From Rider, 2002).

NORMAL RESISTIVITY LOGS

Resistivity is a measure of how well an electric current passes through a material. Formation resistivity is an intrinsic property of rocks and depends on the porosity and resistivity of the interstitial fluid and rock matrix. The spacing between the transmitter and receiver on the tool determines the depth of investigation into the surrounding formation; the greater the spacing, the deeper the penetration of electrical current into the formation.

In sedimentary rocks, the resistivity values of shales (5 - 30 ohm-m) is generally lower than the resistivity of sandstone (30 – 100 ohm-m), which is lower than the resistivity limestone (75 – 300 ohm-m). The resistivity log often shows a picture of the overall depositional sequence in sedimentary environment. Resistivity of igneous and metamorphic rocks is extremely high when compared to resistivity in sedimentary rocks, with values that are commonly thousands of ohm-meters. Example resistivity log responses are shown in Figure A- 4.

FLUID RESISTIVITY LOGS

Fluid resistivity, which is the reciprocal of fluid conductivity, provides data related to the concentration of dissolved solids in the fluid column. Although the quality of the fluid column may not reflect the quality of adjacent

interstitial fluids, information can be quite useful when combined with other logs. For example, change in fluid resistivity associated with a water-producing zone that is corroborated by other logs may indicate the inflow of ground water.

SINGLE-POINT RESISTANCE LOGS

Single point resistance measurements are made by passing a constant current between two electrodes and recording the voltage fluctuations as the probe is moved up the borehole. The resistance variations measured in the borehole is primarily due to variations in the immediate vicinity of the downhole electrode.

The resistance log is strongly affected by the resistance of the drilling fluid and variations in borehole diameter. It is extremely useful for detecting fractures in boreholes with relatively constant diameter. In sedimentary environments, the resistance log generally follows the variations in resistivity of the formation. Shales in clay generally exhibit low values, sandstones have intermediate values, while coal and limestone beds have high resistance values.

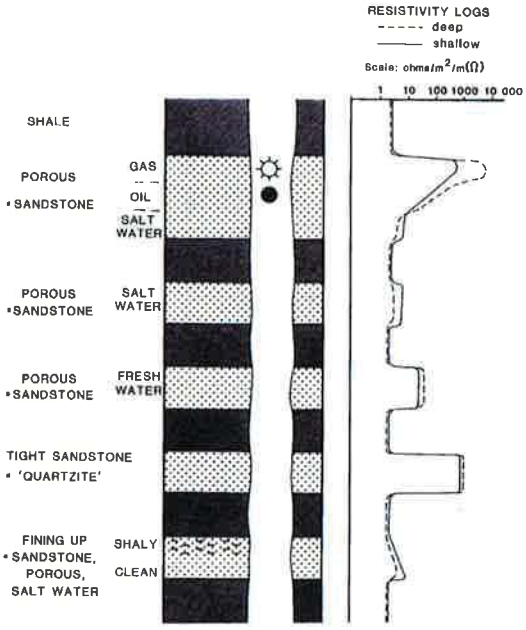


Figure A- 4: Characteristic resistivity responses. (From Rider, 2002)

TEMPERATURE LOGS

Temperature logs measure the change in fluid temperature within the borehole as a function of depth. This log can indicate the location of water- producing strata or fracture zones within the well. The inherent assumption of this technique is that the fluids entering the borehole from water producing zones are either cooler or warmer than the fluid in the borehole. In this case, it is possible to relate a temperature anomaly to a depth range in which waters of different temperature are emanating from a water-producing/receiving or fractured lithologic unit.

HEAT PULSE FLOWMETER (HPFM) LOGS

The heat pulse flowmeter measures the vertical flow rates within a borehole. The log may be used to identify contributing fracture zones under natural and pumping conditions. The system operates by heating a wire grid that is located between two thermistors. The heated body of water moves toward one of the thermistors under the effect of the vertical component of flow within the well. Positive and negative values on the log represent upward and downward flow, respectively. Measurements are recorded while the tool is stationary and the logs are presented as a bar graph (mud log) as shown in Figure A- 5.

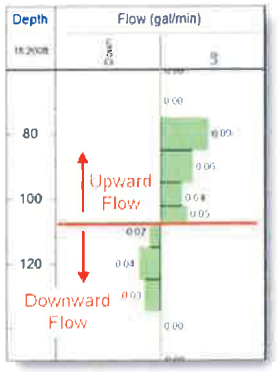


Figure A- 5: Example heat pulse flowmeter log.

A number of techniques have been attempted for measuring horizontal flow in wells without much success. The techniques may not represent the true hydrogeologic conditions due to variations in flow caused by the well.

OPTICAL TELEVIEWER (OTV) LOGS

The optical televiewer probe combines the axial view of a downward looking digital imaging system with a precision ground hyperbolic mirror to obtain an undistorted 360° view of the borehole wall. The probe records one 360° line of pixels at 0.003-ft depth intervals. The sample circle can be divided into 720 or 360 radial samples to give 0.5° or 1° radial resolution. For this investigation, the highest radial resolution (0.5°) was used. The line of pixels is aligned with respect to True North and digitally stacked to construct a complete, undistorted, and oriented image of the borehole walls. The data are 24 -bit true color and may be used for lithologic determination as part of the interpretation. Since the acquired image is digitized and properly oriented with respect to borehole deviation and tool rotation, it allows data processing to provide accurate strike and dip information of structural features. The borehole image is often shown as an "unwrapped" 360° image in which the cylindrical borehole image is sliced down the northern axis and flattened out as shown in Figure A- 6.

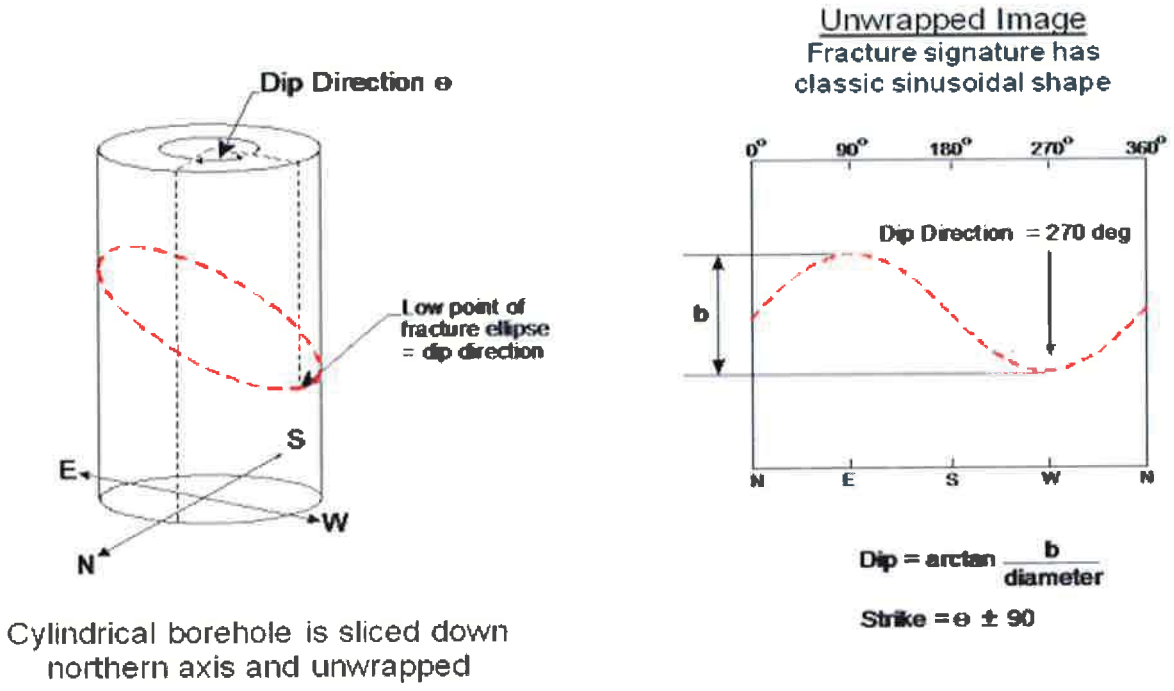


Figure A- 6: Schematic showing the sinusoidal fracture signature in the unwrapped borehole view.

ACOUSTIC TELEVIEWER (ATV) LOGS

Acoustic televiewer provides a 360° acoustic image of the borehole walls that can be used to identify and determine the orientation of planar features such as bedding and fractures. The data can also indicate the relative degree of hardness of formation materials. As shown in Figure A-7, Ultrasonic pulses are transmitted from a rotating transducer inside the tool. The transmitted pulses reflect off the borehole wall and return to the tool where the travel time and amplitude of the acoustic signal are measured. In order for the acoustic waves to travel to and from the borehole wall, the well must be fluid filled. Greater travel time can indicate openings in the rock. Strong amplitude suggests smooth, competent rock. Weaker amplitudes suggest rough or less competent rock.

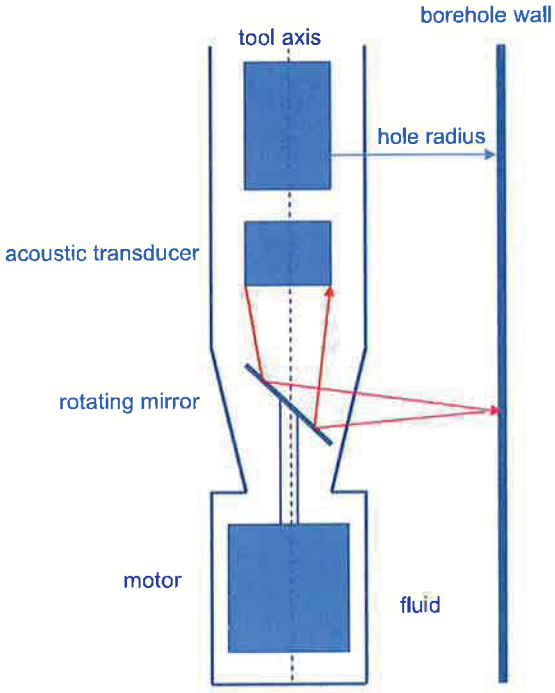


Figure A- 7: Schematic of the acoustic televiewer tool.

ATTACHMENT B
BOREHOLE LOGS

Hydro Log

ARM GEOPHYSICS
Surface & Borehole Services

COMP Mountain Research, LLC
WELL Mellott
FLD McClure
CNTY Snyder
STAT PA
ARM 180159
API N/A

COMPANY: Mountain Research, LLC STATE: PA
WELL ID: Mellott ARM NO.: 180159
FIELD/SITE: McClure API NO.: N/A
COUNTY: Snyder

LOCATION:
NORTHING:
EASTING:
SEC: TWP: QUAD:

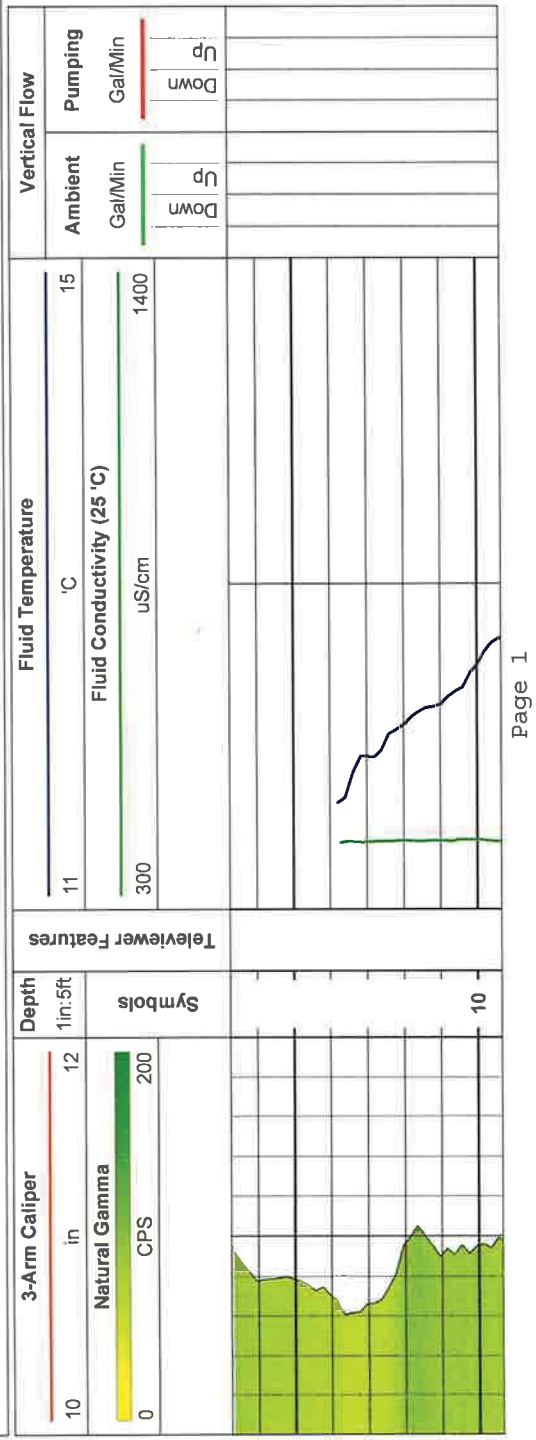
OTHER SERVICES

PERMANENT DATUM: Top of Casing ELEVATION: K.B.
LOG MEASURED FROM: Top of Casing ABOVE PERM. DATUM: D.F.
DRILLING MEAS. FROM: STICK UP: 0 G.L.

LOGGING DATE	01.26.2018	01.26.2018	01.26.2018	01.26.2018	
RUN NO	1	4	5	6	
TYPE LOG	FTC.GR	CAL	HPFM A	HPFM P	
DRILLER DEPTH (FT)	180	180	180	180	
ARM DEPTH (FT)	182.95	182.99	N/A	N/A	
BTM LOGGED INTERVAL (FT)	182.95	182.99	174	174	
TOP LOGGED INTERVAL (FT)	6.13		39	39	
CASING SIZE (IN)/DEPTH (FT)	6/40	6/40	6/40	6/40	
CASING ARM (FT)	39.89	39.89	39.89	39.89	
BIT SIZE (IN)					
FLUID LEVEL IN HOLE (FT)					
MAG. DECLINATION (DEG)	11.05 W	11.05 W	11.05 W	11.05 W	
RECORDED BY	C. Lash	C. Lash	C. Lash	C. Lash	
WITNESSED BY					

REMARKS:

Symbols
Bottom of Casing



Televiewer Logs

ARM GEOPHYSICS
Surface & Borehole Services

COMP Mountain Research, LLC
WELL Mellott
FLD McClure
CNTY Snyder
STAT PA
ARM 180159
API N/A

COMPANY: Mountain Research, LLC STATE: PA
WELL ID: Mellott ARM NO.: 180159
FIELD/SITE: McClure API NO.: N/A
COUNTY: Snyder

LOCATION:
NORTHING:
EASTING:
SEC: TWP: QUAD:

OTHER SERVICES

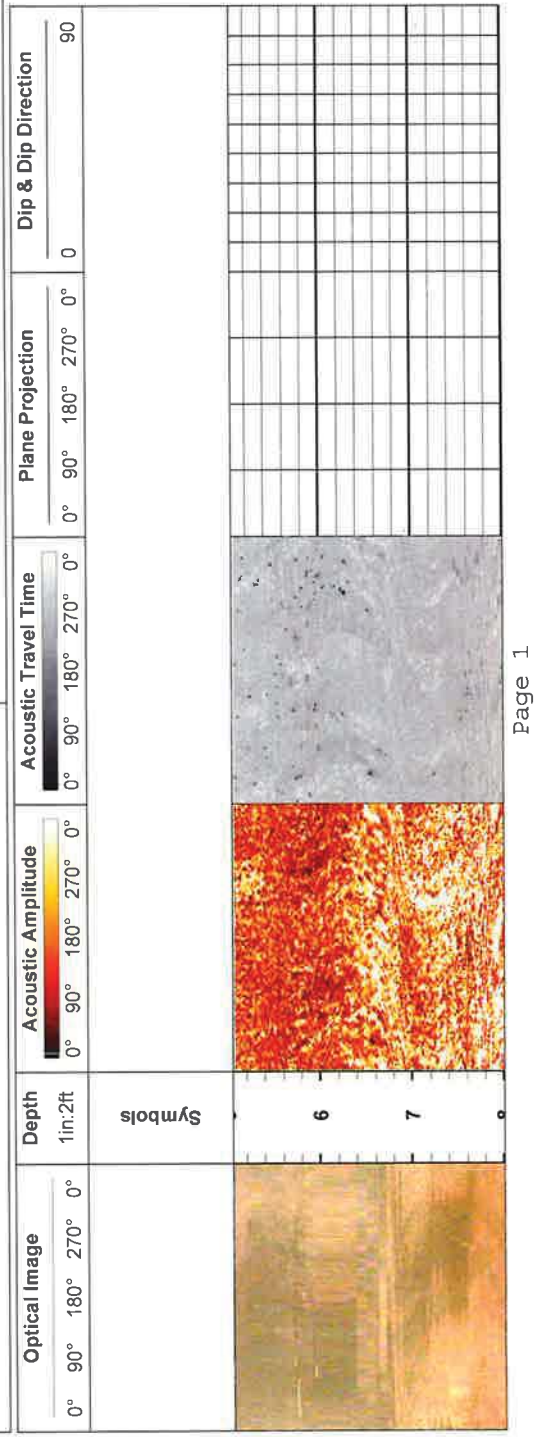
PERMANENT DATUM: Top of Casing ELEVATION: K.B.
LOG MEASURED FROM: Top of Casing ABOVE PERM. DATUM: D.F.
DRILLING MEAS. FROM: STICK UP: 0 G.L.

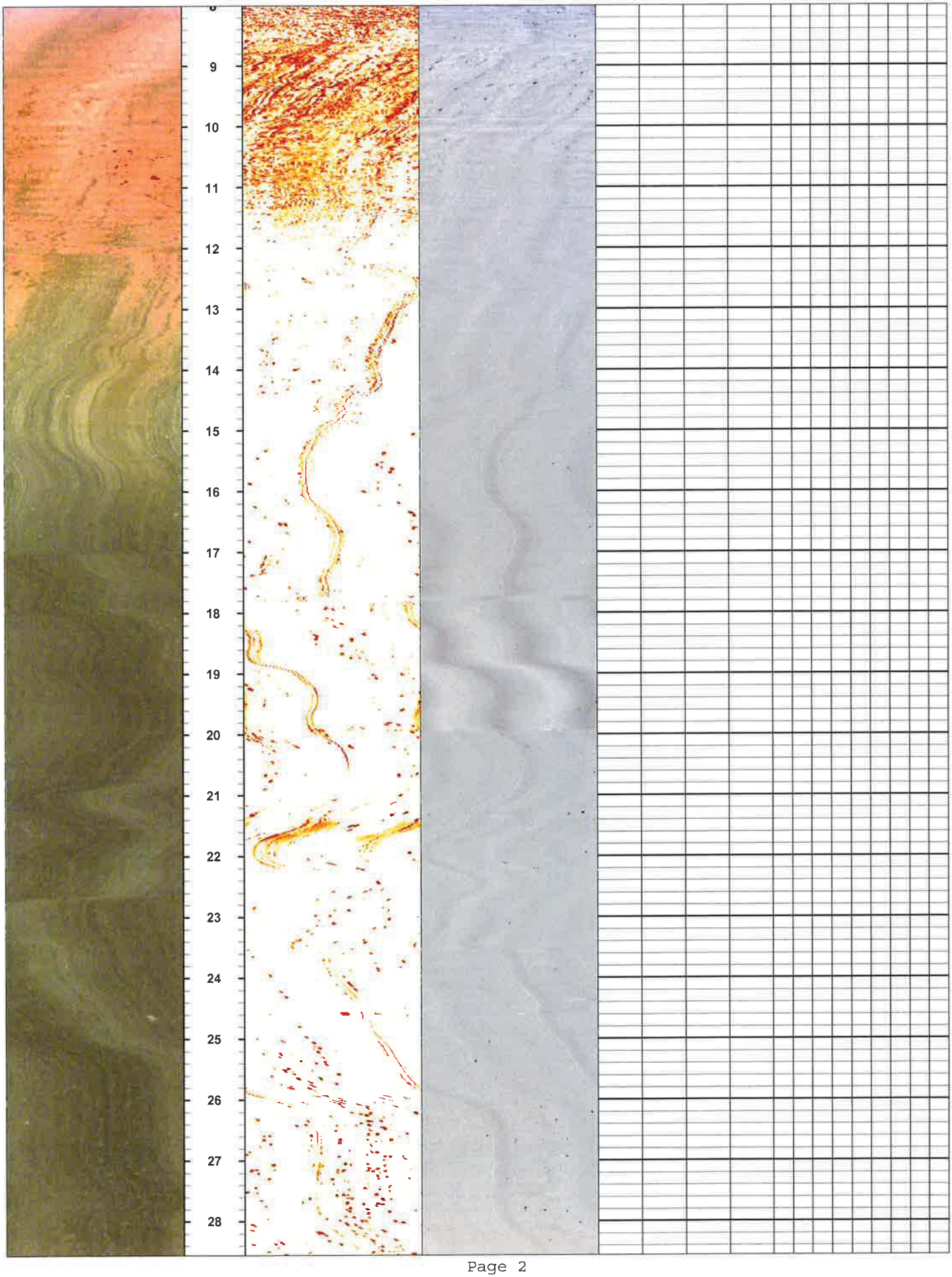
LOGGING DATE	01.26.2018	01.26.2018			
RUN NO	2	3			
TYPE LOG	OTV.GR	ATV.GR			
DRILLER DEPTH (FT)	180	180			
ARM DEPTH (FT)	182.32	182.5			
BTM LOGGED INTERVAL (FT)	182.32	182.5			
TOP LOGGED INTERVAL (FT)	5.15	5.58			
CASING SIZE (IN)/DEPTH (FT)	6/40	6/40			
CASING ARM (FT)	39.89	39.89			
BIT SIZE (IN)					
FLUID LEVEL IN HOLE (FT)					
MAG. DECLINATION (DEG)	11.05 W	11.05 W			
RECORDED BY	C. Lash	C. Lash			
WITNESSED BY					

REMARKS:

Structure
Bedding
Part. Open Fract
Filled Fracture

Symbols
Bottom of Casing

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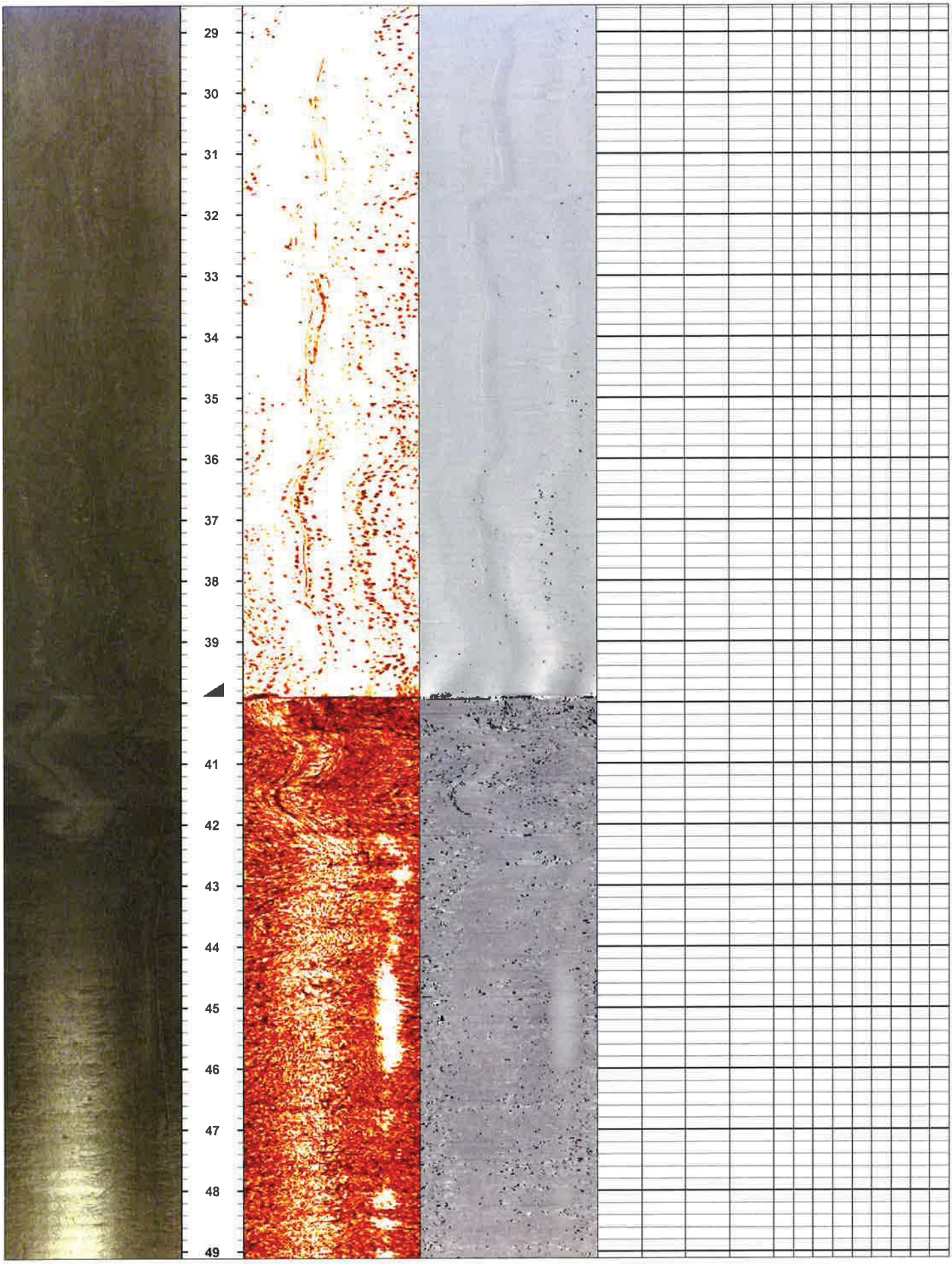
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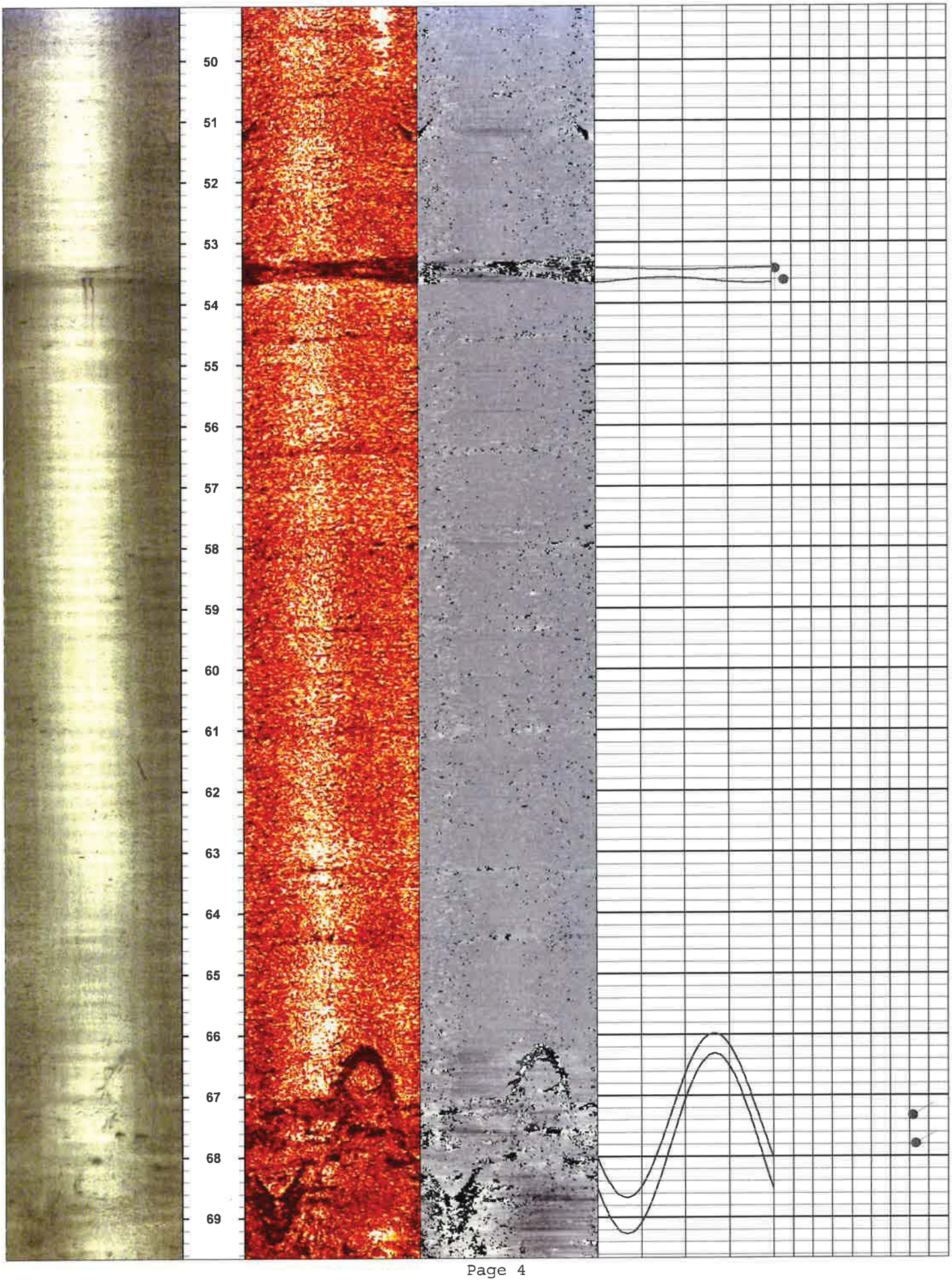
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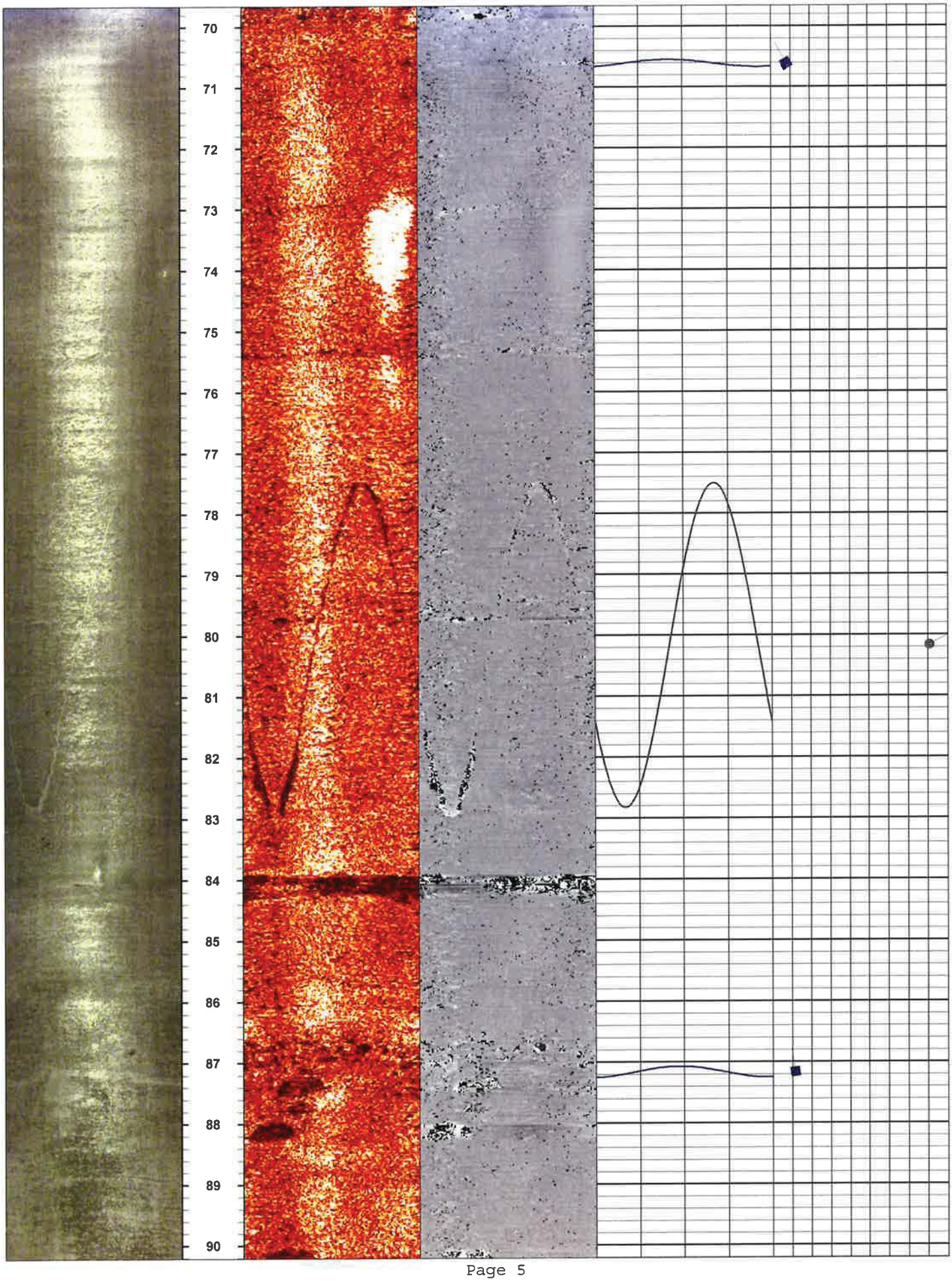
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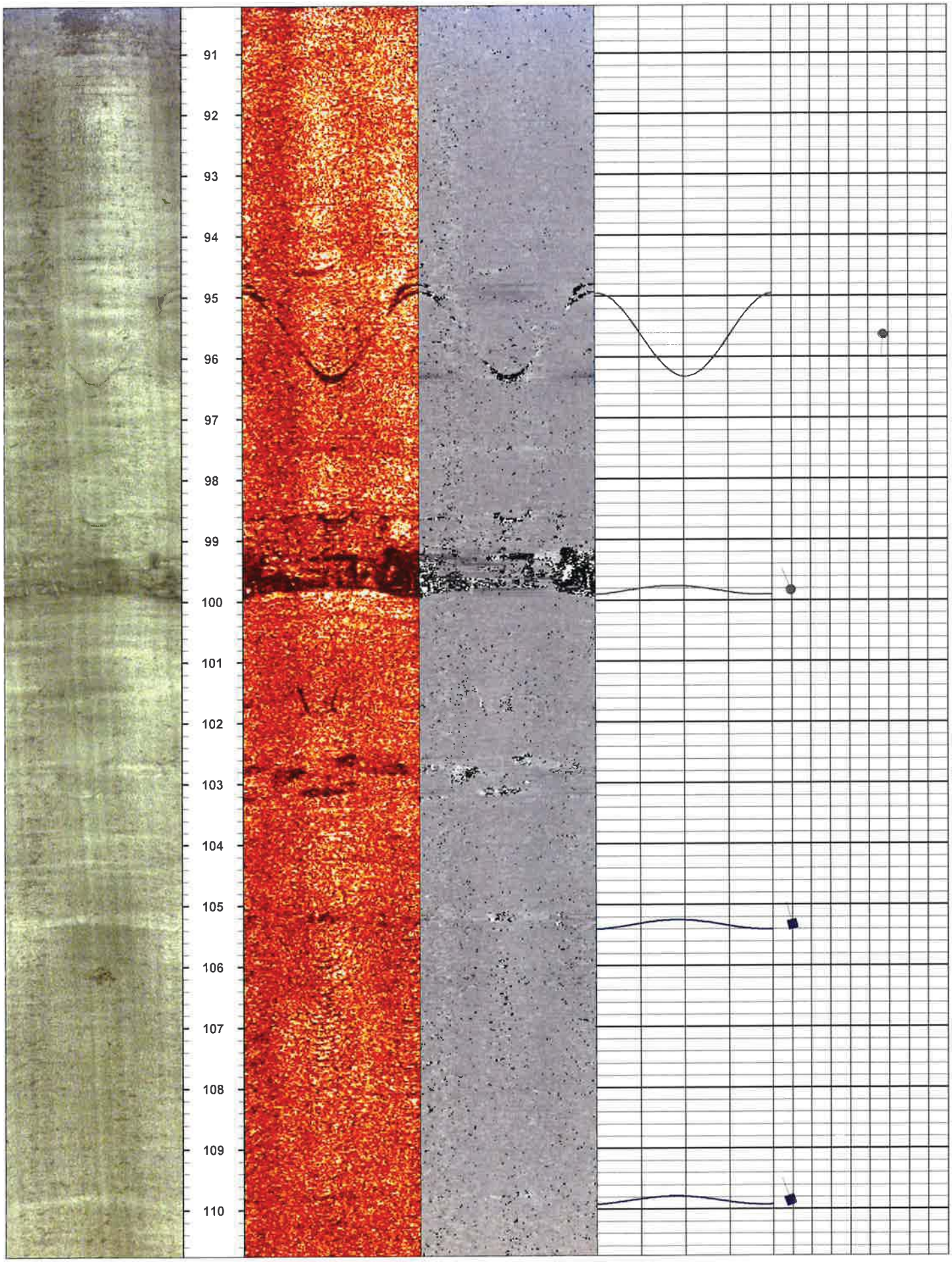
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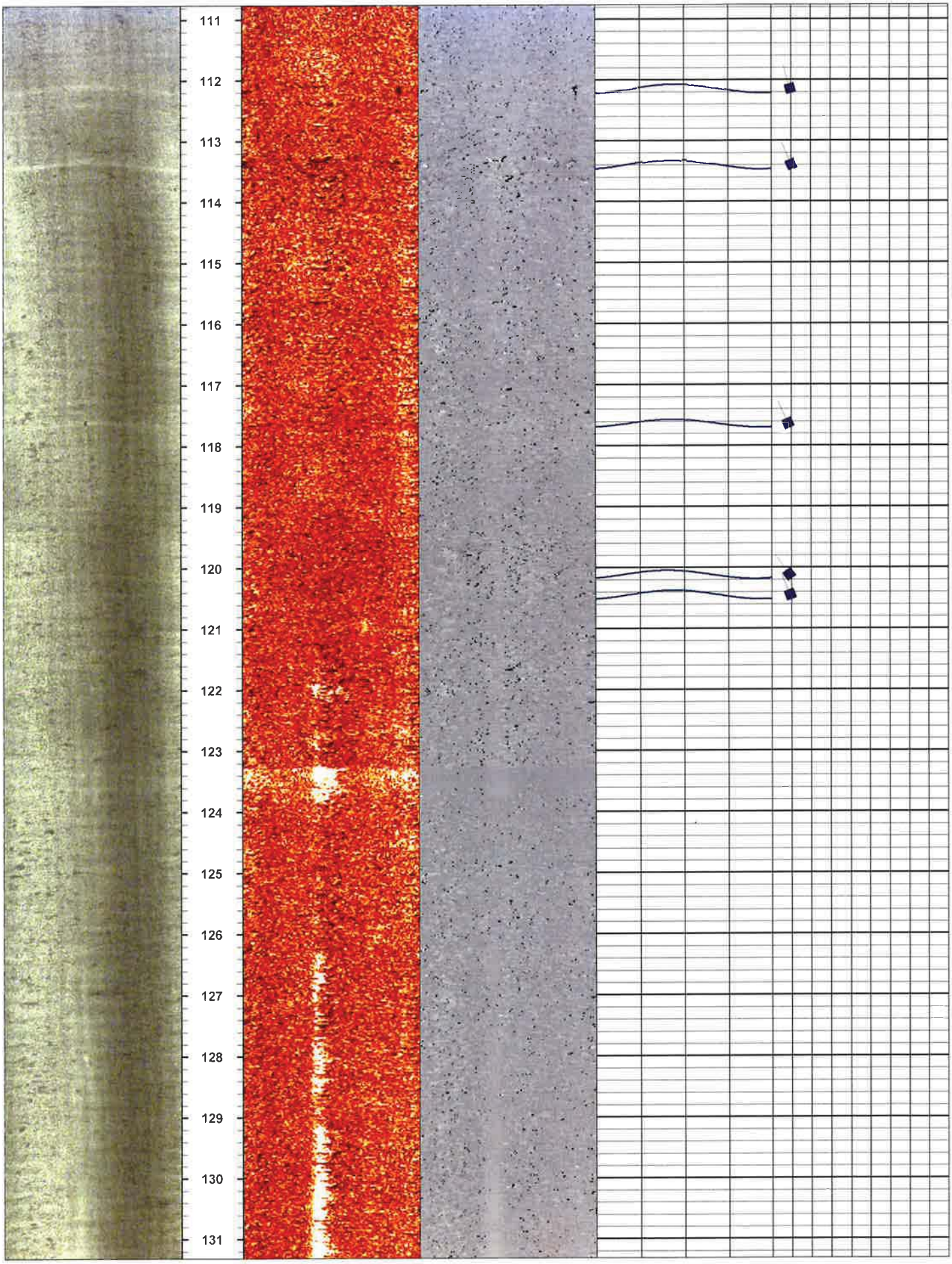
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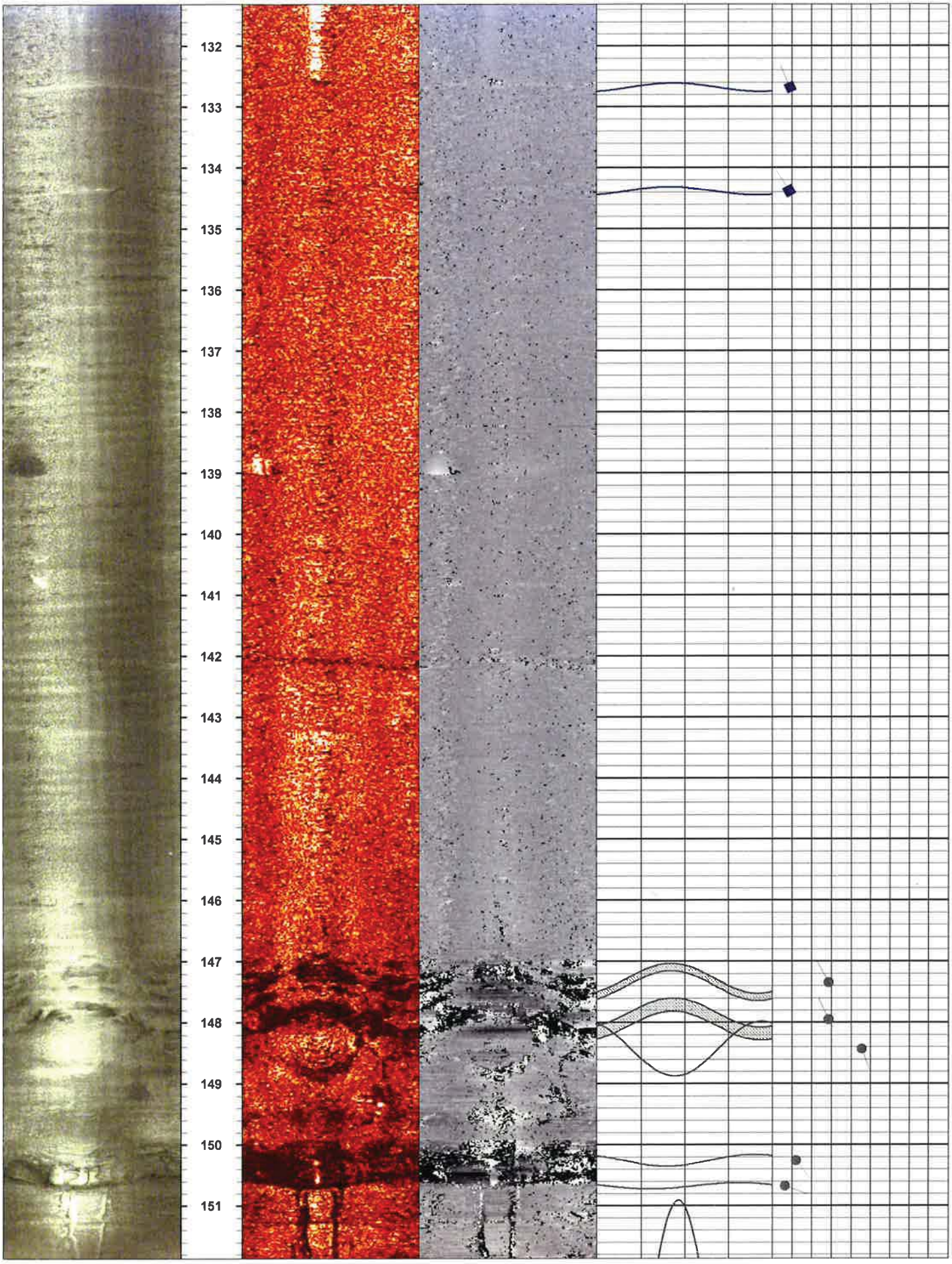
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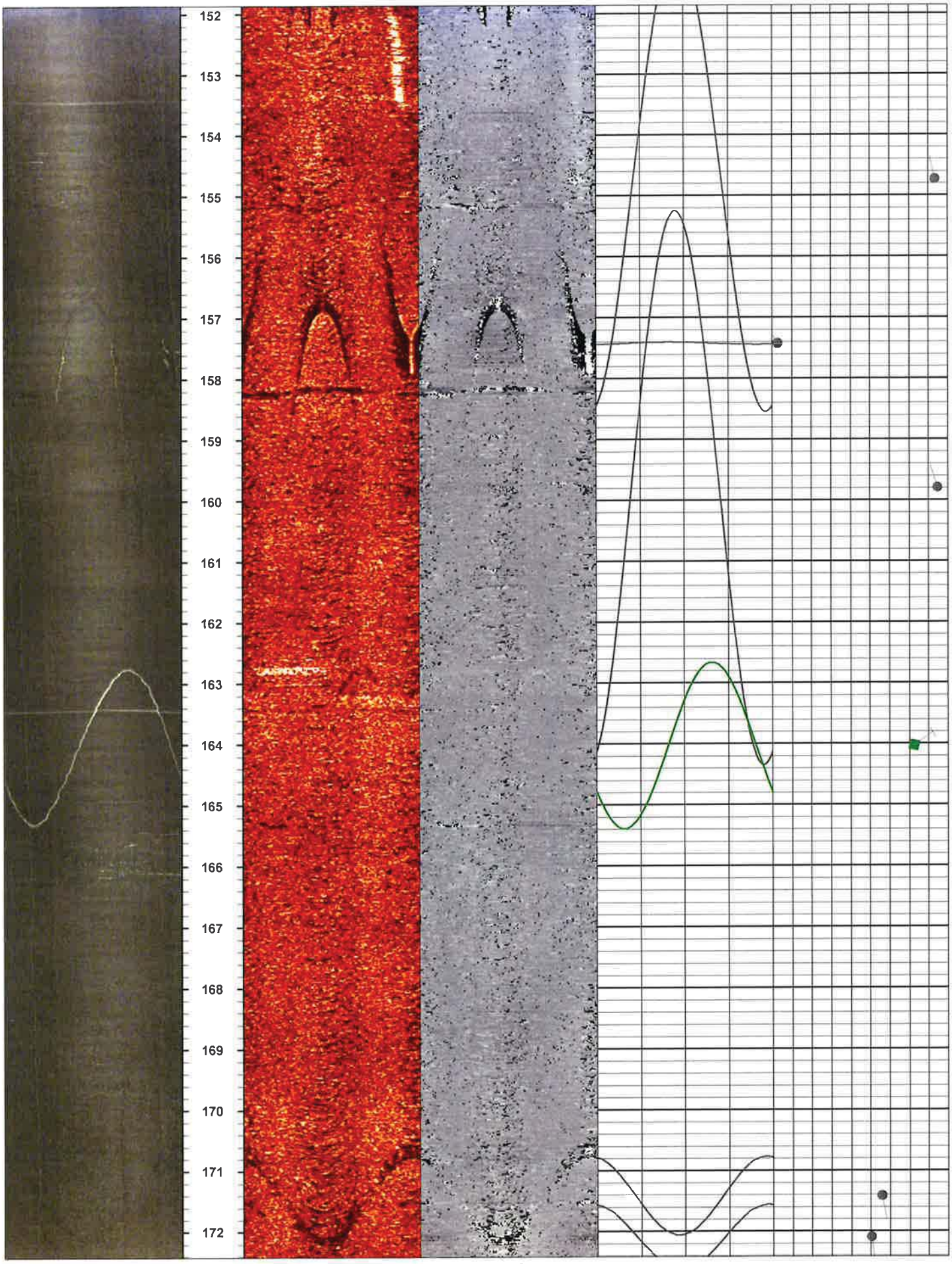
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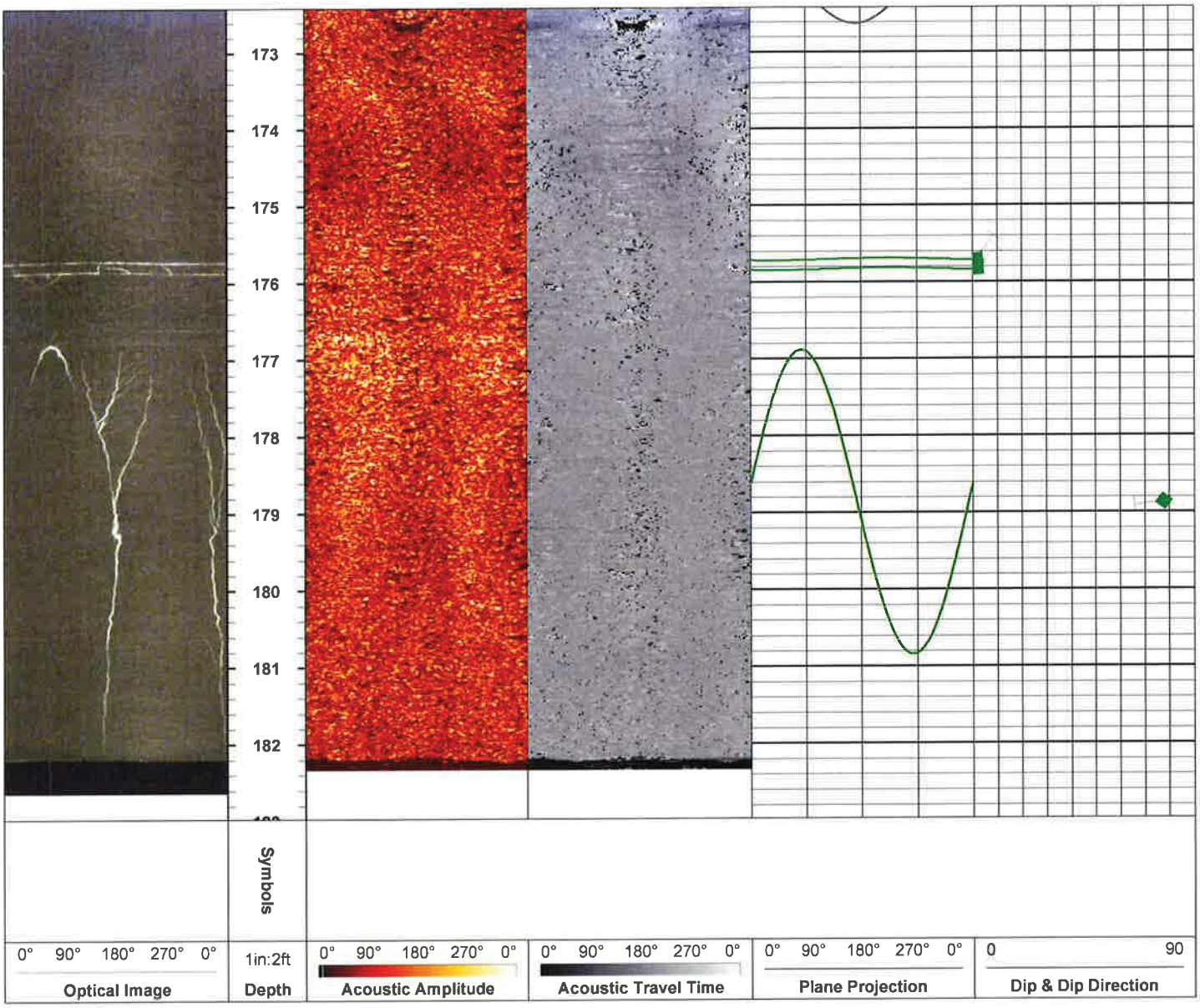
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Depth
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Plane Projection
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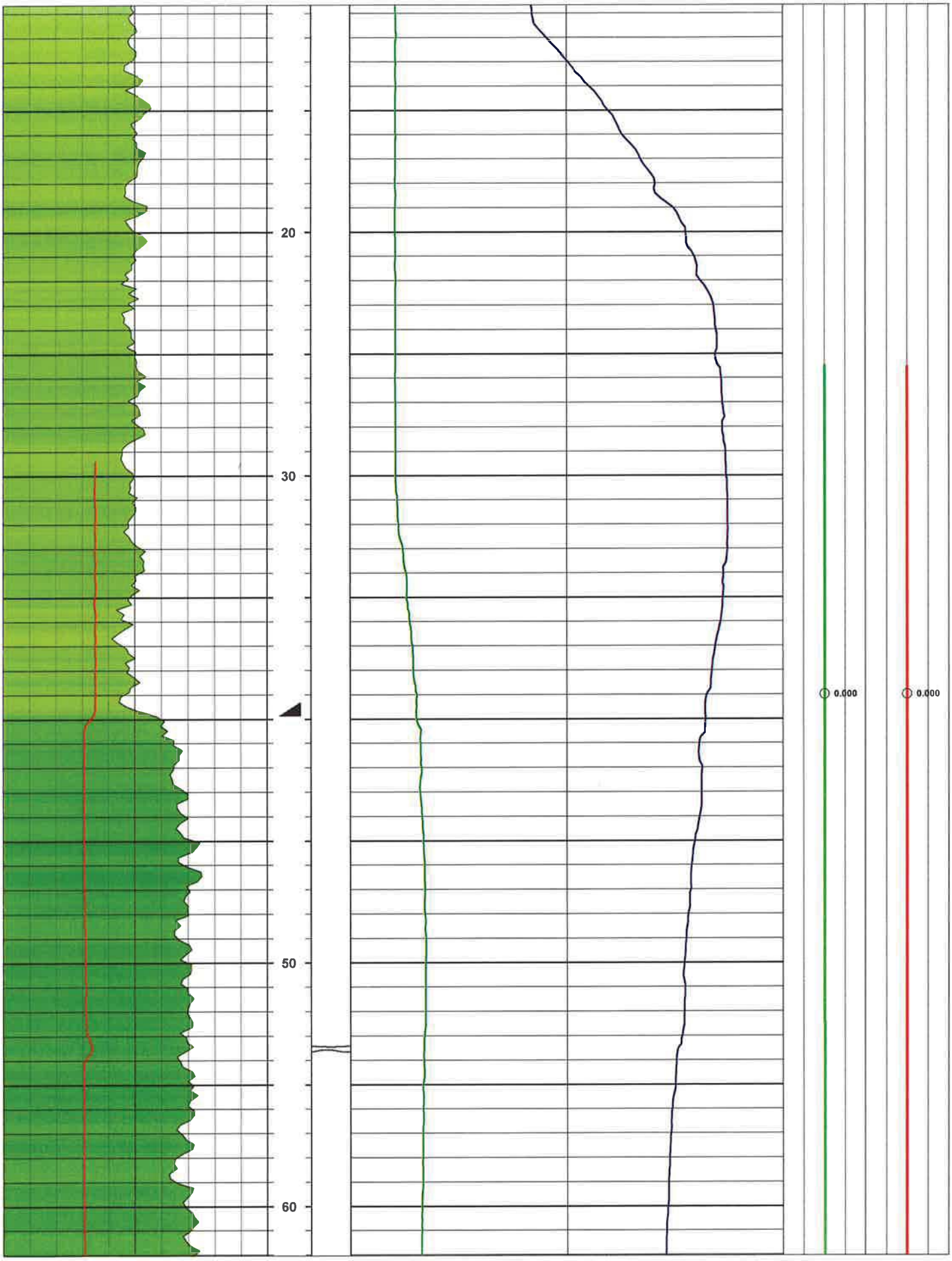
Dip & Dip Direction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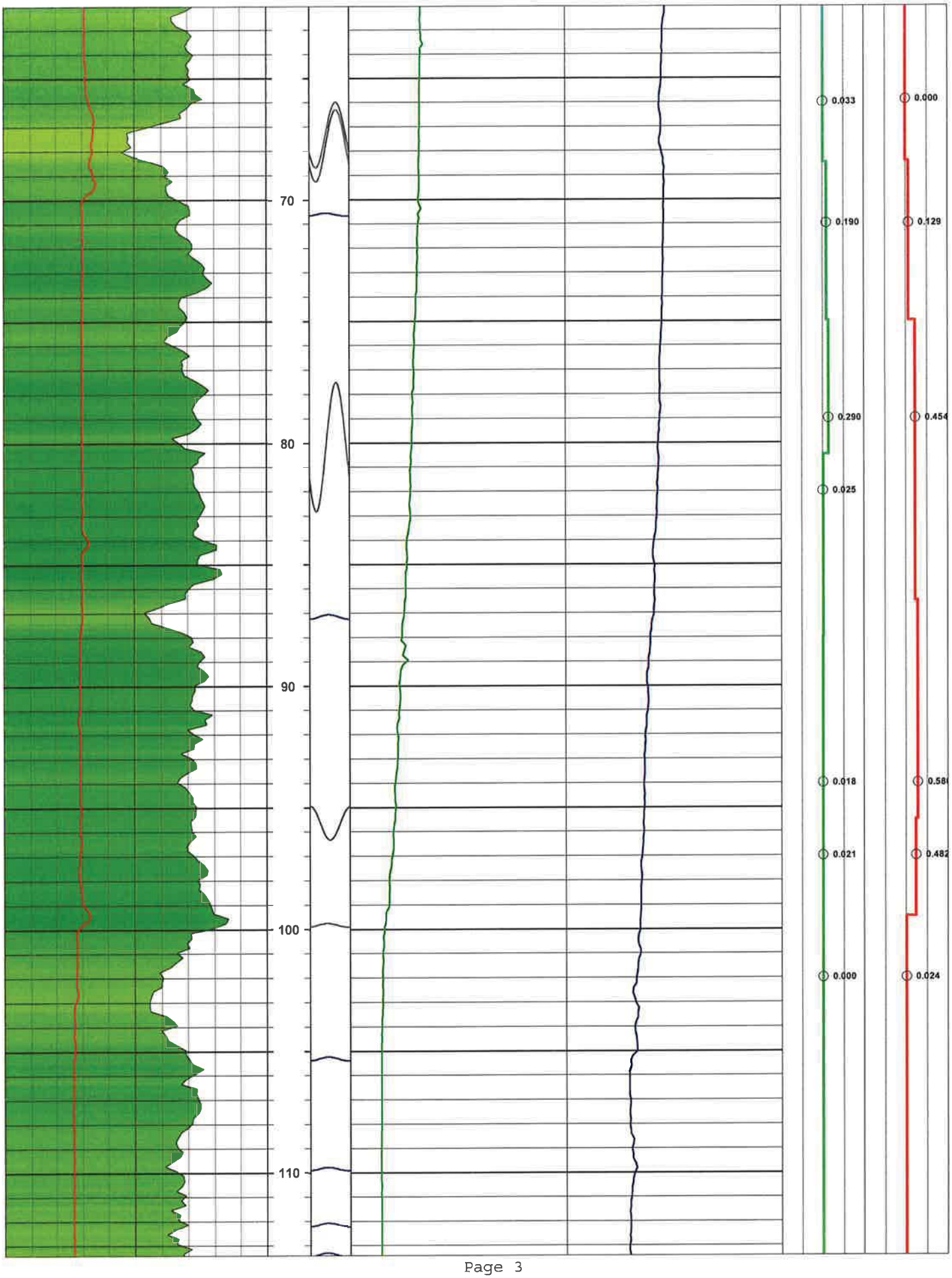
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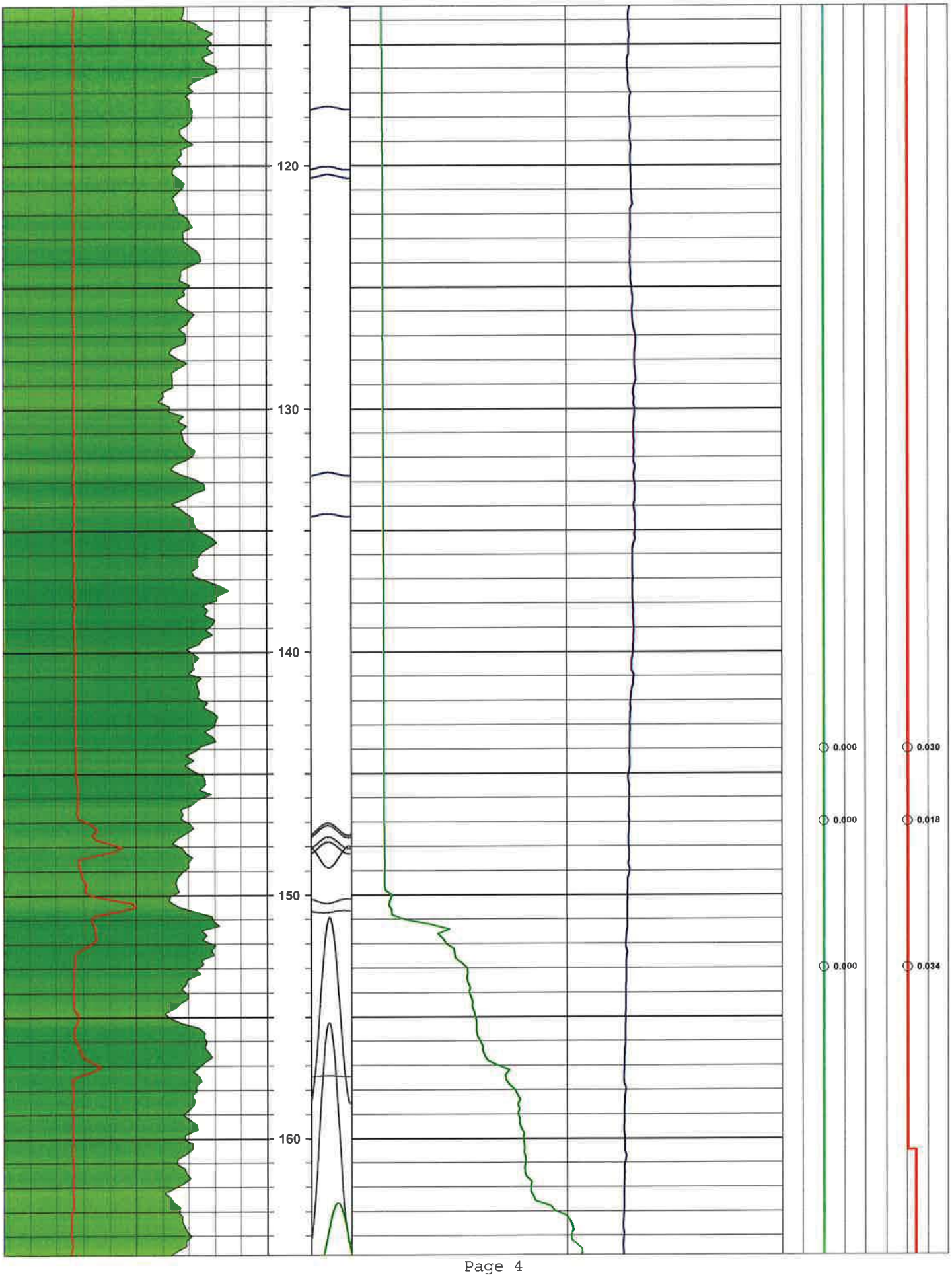
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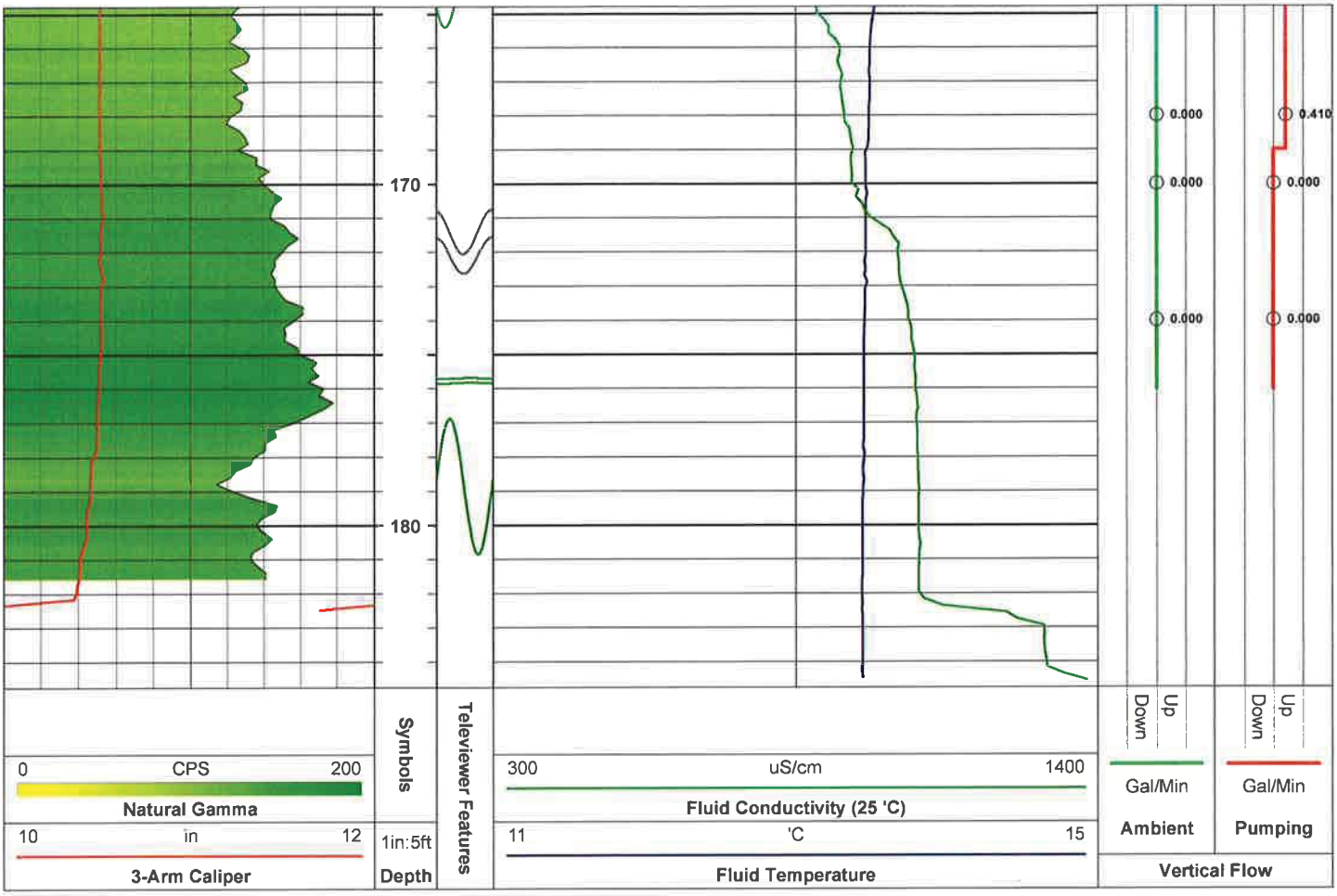
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CPS
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Natural Gamma
10
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12
3-Arm Caliper
Symbols
1in:5ft
Depth
Televiewer Features
300
uS/cm
1400
Fluid Conductivity (25 'C)
11
'C
15
Fluid Temperature
Down
Up
Gal/Min
Ambient
Down
Up
Gal/Min
Pumping
Vertical Flow

Hydro Log

ARM GEOPHYSICS
Surface & Borehole Services

COMP Mountain Research, LLC
WELL Storewell
FLD McClure
CNTY Snyder
STAT PA
ARM 180159
API N/A

COMPANY: Mountain Research, LLC STATE: PA
WELL ID: Storewell ARM NO.: 180159
FIELD/SITE: McClure API NO.: N/A
COUNTY: Snyder

LOCATION:
NORTHING:
EASTING:
SEC: TWP: QUAD:

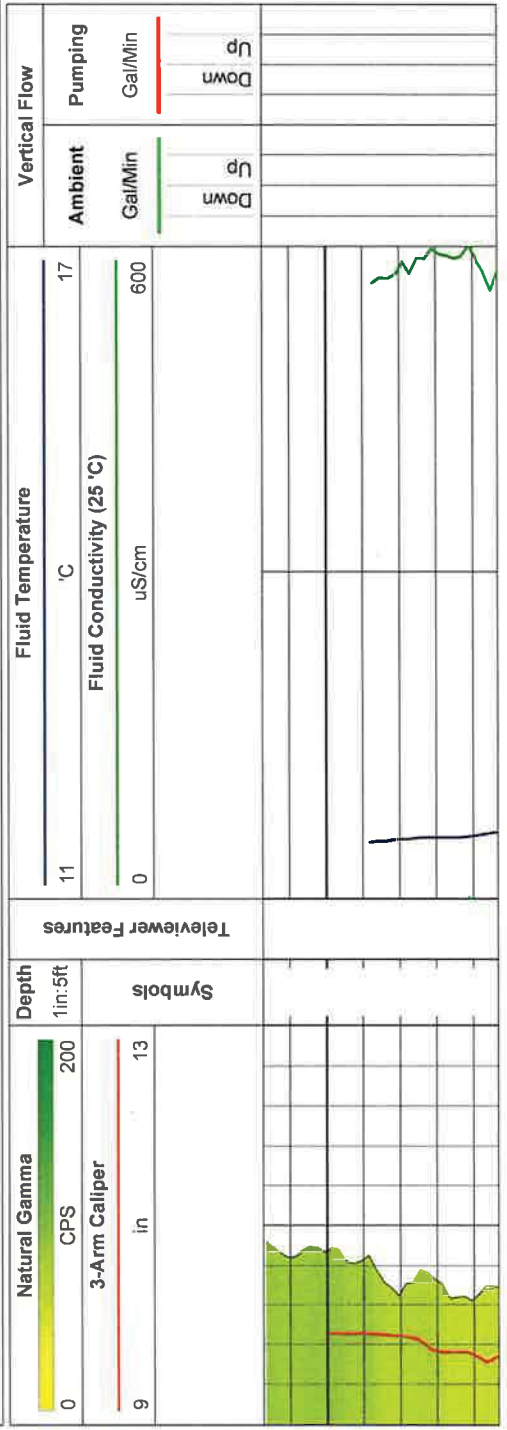
OTHER SERVICES

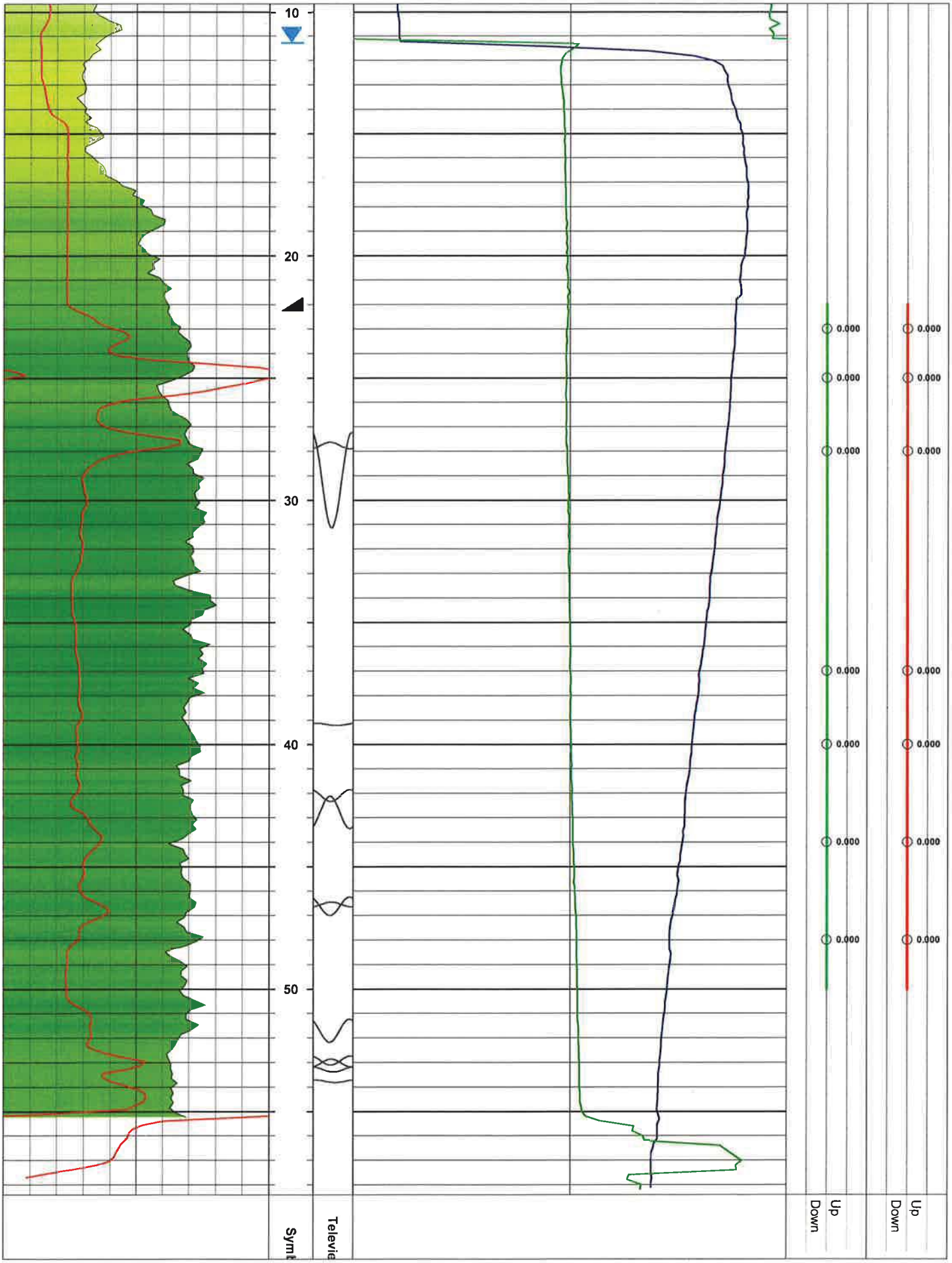
PERMANENT DATUM: Top of Casing ELEVATION: K.B.
LOG MEASURED FROM: Top of Casing ABOVE PERM. DATUM: D.F.
DRILLING MEAS. FROM: STICK UP: 0 G.L.

LOGGING DATE	01.26.2018	01.26.2018	01.26.2018	01.26.2018	
RUN NO	1	4	5	6	
TYPE LOG	FTC.GR	CAL	HPFM A	HPFM P	
DRILLER DEPTH (FT)	58	58	58	58	
ARM DEPTH (FT)	58.03	58.41	N/A	N/A	
BTM LOGGED INTERVAL (FT)	58.03	58.41	48	48	
TOP LOGGED INTERVAL (FT)	6.13		23	23	
CASING SIZE (IN)/DEPTH (FT)	6/22	6/22	6/22	6/22	
CASING ARM (FT)	22.26	22.26	22.26	22.26	
BIT SIZE (IN)					
FLUID LEVEL IN HOLE (FT)	11.23				
MAG. DECLINATION (DEG)	11.05 W	11.05 W	11.05 W	11.05 W	
RECORDED BY	C. Lash	C. Lash	C. Lash	C. Lash	
WITNESSED BY					

REMARKS:

Symbols
Bottom of Casing
Fluid Level

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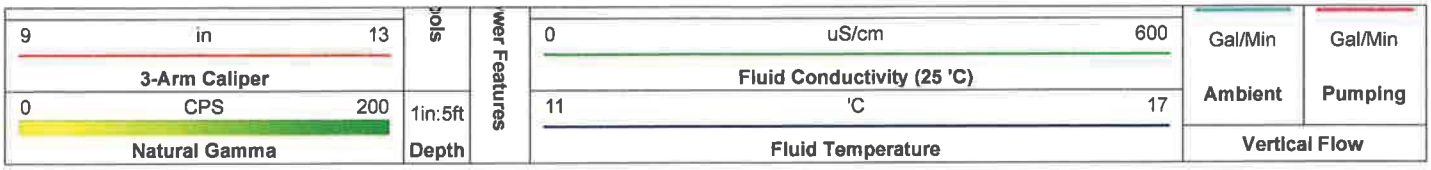
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3-Arm Caliper
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Fluid Conductivity (25 'C)
11
'C
17
Fluid Temperature
Gal/Min
Ambient
Gal/Min
Pumping
Vertical Flow

Televiewer Logs

ARM GEOPHYSICS
Surface & Borehole Services

COMP Mountain Research, LLC
WELL Storewell
FLD McClure
CNTY Snyder
STAT PA
ARM 180159
API N/A

COMPANY: Mountain Research, LLC STATE: PA
WELL ID: Storewell ARM NO.: 180159
FIELD/SITE: McClure API NO.: N/A
COUNTY: Snyder

LOCATION:
NORTHING:
EASTING:
SEC: TWP: QUAD:

OTHER SERVICES

PERMANENT DATUM: Top of Casing ELEVATION: K.B.
LOG MEASURED FROM: Top of Casing ABOVE PERM. DATUM: D.F.
DRILLING MEAS. FROM: STICK UP: 0 G.L.

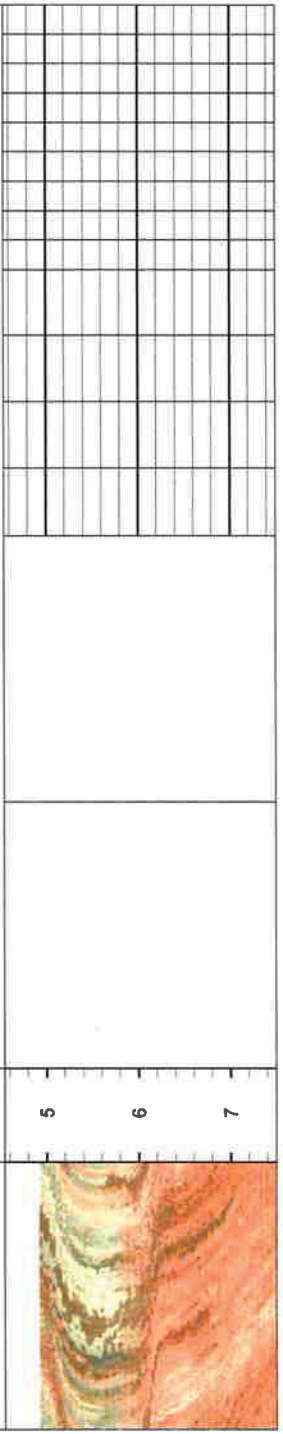
LOGGING DATE	01.26.2018	01.26.2018			
RUN NO	2	3			
TYPE LOG	OTV.GR	ATV.GR			
DRILLER DEPTH (FT)	58	58			
ARM DEPTH (FT)	55	55.92			
BTM LOGGED INTERVAL (FT)	55	55.92			
TOP LOGGED INTERVAL (FT)	5.15	5.58			
CASING SIZE (IN)/DEPTH (FT)	6/22	6/22			
CASING ARM (FT)	22.26	22.26			
BIT SIZE (IN)					
FLUID LEVEL IN HOLE (FT)	11.06				
MAG. DECLINATION (DEG)	11.05 W	11.05 W			
RECORDED BY	C. Lash	C. Lash			
WITNESSED BY					

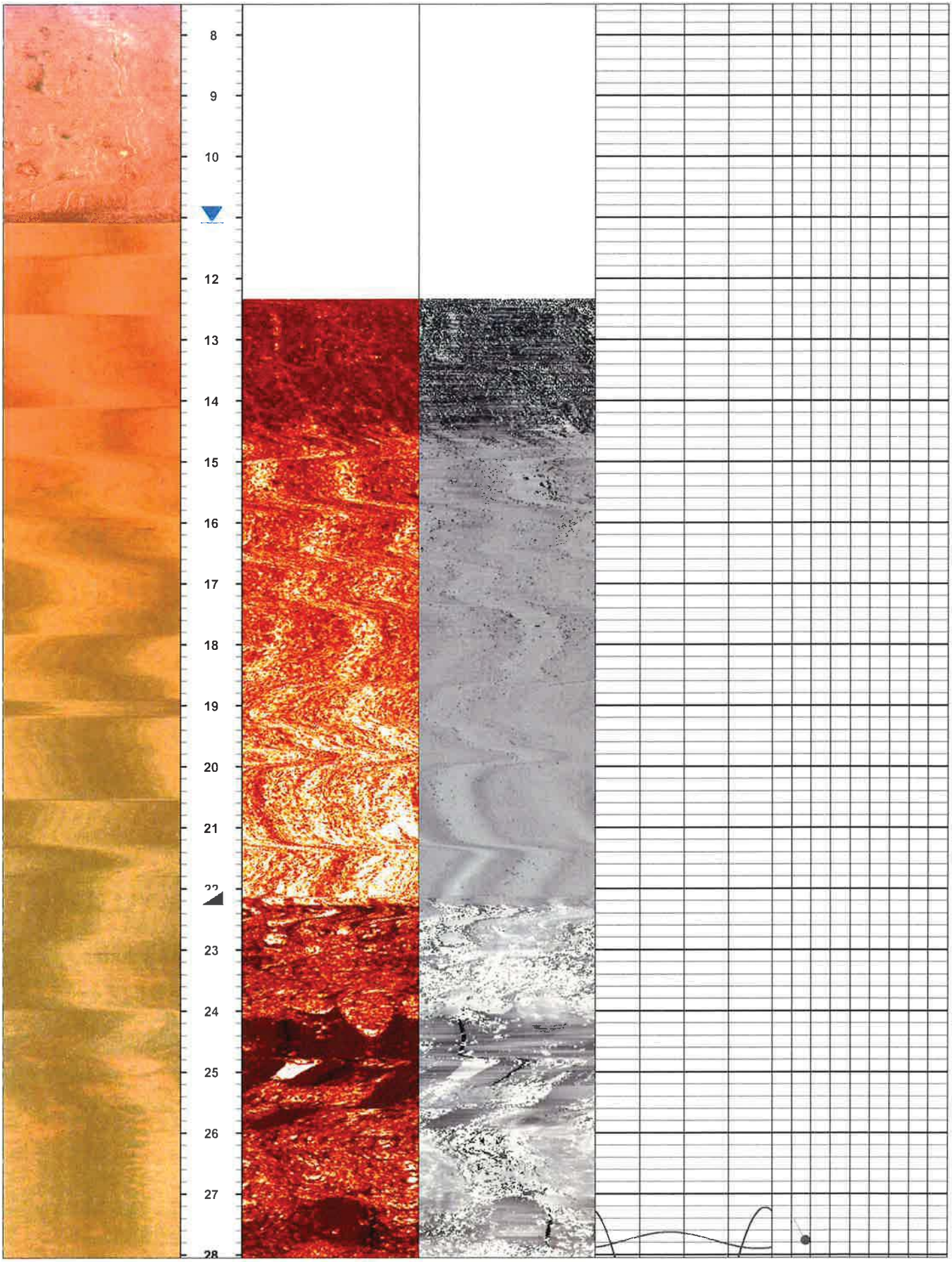
REMARKS:

Structure
Part. Open Fract

Symbols
Bottom of Casing
Fluid Level

Dip & Dip Direction 0 90
Plane Projection 0° 90° 180° 270° 0°
Acoustic Travel Time 0° 90° 180° 270° 0°
Acoustic Amplitude 0° 90° 180° 270° 0°
Depth 1in:2ft
Symbols
Optical Image 0° 90° 180° 270° 0°

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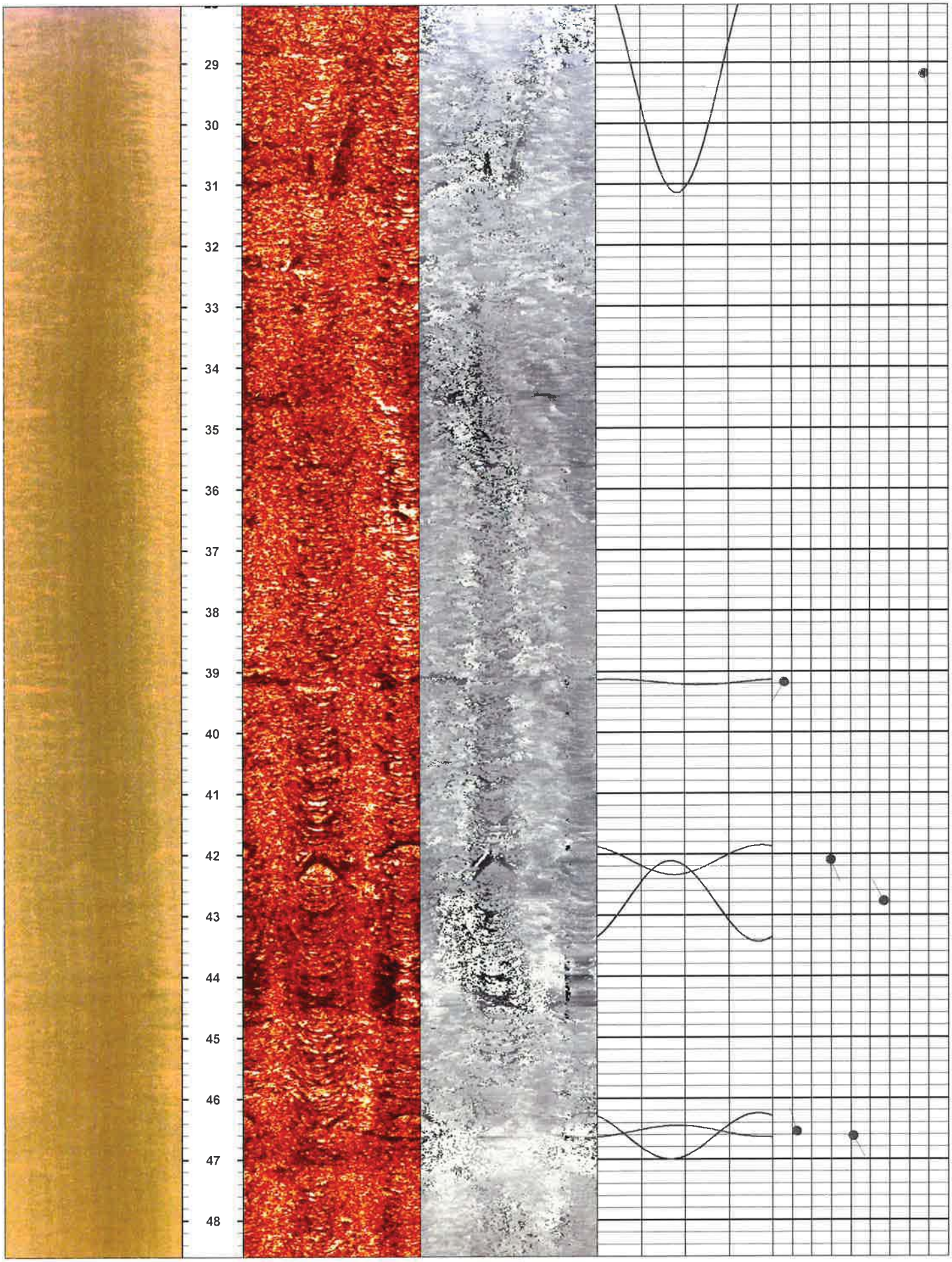
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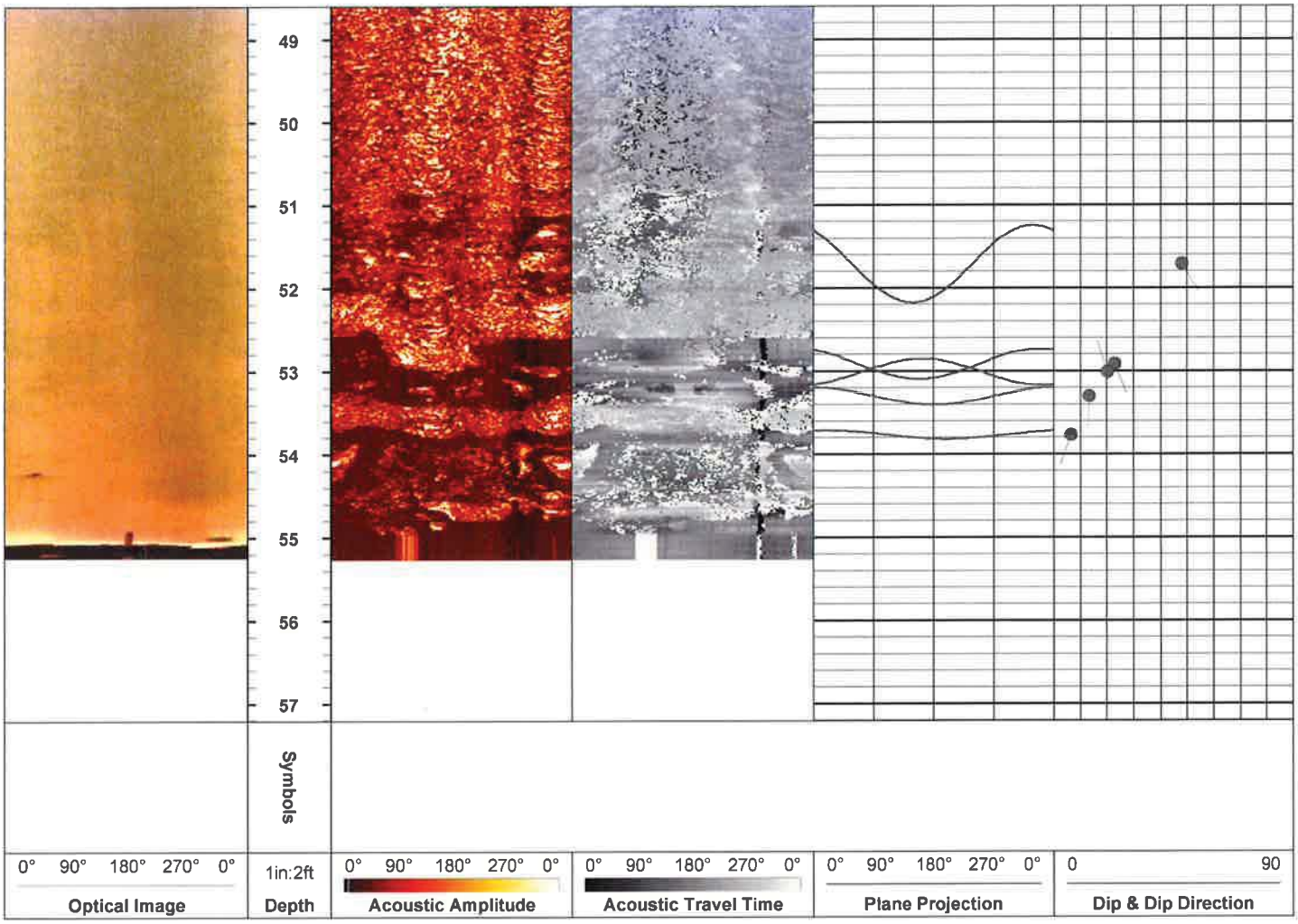
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Symbols
0° 90° 180° 270° 0°
Optical Image
1in:2ft
Depth
0° 90° 180° 270° 0°
Acoustic Amplitude
0° 90° 180° 270° 0°
Acoustic Travel Time
0° 90° 180° 270° 0°
Plane Projection
0 90
Dip & Dip Direction

APPENDIX C

FIELD METHODS

Drilling, Soil Sampling, Well Construction Methods

Boring/monitoring well locations were selected based on site physical constraints (i.e., overhead and underground utilities, property boundaries, locations of removed tanks and distribution system, and structures). In addition to the location of potential soil and ground water contamination, borings were advanced during the site study using the following drilling methods:

Air Rotary

Air rotary drill rigs were used to advance borings for monitoring well installation. Boring diameters ranged from 10 inches to 8 inches in diameter. Soil/monitoring boring logs were constructed by identification of drill cuttings using the Unified Soil Classification System (USCS).

Hollow Stem Auger

Hollow stem auger drilling was used to advance borings for the purpose of collecting soil samples and to install monitoring wells. The auger size used was 4 inch inside diameter (7.25 inch outside diameter). Boring logs were constructed by direct observation of the split spoon and core soil samples. Soils were described using the USCS.

Direct Push Drilling

Direct push drilling was used to collect soil samples using a continuous core. Soil samples were collected in a 5 foot x 2 inch diameter PVC tube. Lithologic logs were constructed by direct observation of the continuous soil sampling liners. Soils were described using the USCS.

Soil Sample Collection

Drill cuttings from air rotary borings were scanned for volatile organic compounds (VOCs) using a photoionization detector (PID). However, these PID measurements from the air rotary drilling method should be considered qualitative due to the high potential for volatilization of compounds in the air stream. Also, the air stream was scanned during drilling advancement in order to monitor breathing zones for health and safety protocol.

Soil samples from hollow steam auger and direct push borings were screened for VOCs using a PID. Soil samples were collected from each boring on the basis of PID measurements and visual observations. Soil samples were collected for VOC by inserting an Encore® sampler or TerraCore® Sampler into the soil core. The soil from the sampler was deposited in a laboratory provided 40-milliliter glass container and preserved with methanol. For semi-volatile analysis soils were collected into a laboratory provided 4-ounce glass jar. The samples were labeled, stored in a chilled cooler, and transported to the analytical laboratory under a chain of custody.

Monitoring Well Construction

Monitoring wells were constructed of 2 inch or 4 inch diameter PVC/Steel/Wire Wrap casing. Screened intervals were constructed of .010 machine slotted casing. Appropriately sized PVC blank riser extended wells to the ground surface. The annuli between the boreholes and screened intervals was packed with clean quartz sand. The sand pack was extended approximately two feet above the top of the screened interval. The remaining vertical interval above the sand pack was Bentonite sealed to the surface. Each well was completed in a flush mounted manway.

Groundwater Sampling Methods

The sample collection methodology used by Mountain Research was designed to comply with US Environmental Protection Agency (EPA) SW-846 protocol and the Pennsylvania Groundwater Monitoring Guidance Manual, December 1, 2001. Prior to sampling, all field sampling equipment was properly cleaned to avoid sample contamination. The static water level (SWL) of each well was measured as the first step in sampling. These measurements were used to calculate groundwater elevation at each well.

Each well was purged of at least three well volumes of fluid, or until the monitoring well went dry, using a submersible pump or dedicated disposable bailer. Samples were then collected using the dedicated disposable bailer. Groundwater was decanted from the bailer into appropriate, laboratory supplied containers. The samples were labeled and stored in an ice cooler for transport to the analytical laboratory.

APPENDIX D

BORING LITHOLOGIC LOGS

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-1**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 14.5' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0				
		1.1	0 - 1' - SANDY CLAY (CLS): YELLOW-BROWN; LOW MOISTURE.	
		0.7	2 - 6' - SANDY CLAY (CLS): YELLOW-ORANGE; MIXED WITH SANDSTONE GRAVEL; MORE MOIST.	
		0.0		
		3.1		
5		0.0		
		1.1		
	SB-1 (7')	2.4	6 - 11' - CLAY (CLS): YELLOW; TIGHT; DRY; VERY LOW PLASTICITY.	
		0.6		
		1.3		
10		0.0		
		0.0		
		0.0	11 - 14.5' - GRAVEL (GW): MOSTLY GRAVEL - MIXED WITH GREY CLAY INCLUSIONS.	
		0.0		
		0.0		
15			14.5' - REFUSAL AT 14.5' BGS - SANDSTONE BASE.	
			B---A	
			12/2	
20				
25				
30				
35				

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-2**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 15' BGS.
SATURATED ZONE: 13' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0				
		1.3	0 - 1' - FILL/GRAVEL.	
		0.0	1 - 3' - SANDY SOIL (SW): LOW PLASTICITY; LOW MOISTURE.	
		0.2		
		0.0	3 - 5' - SANDY CLAY (CLS): MEDIUM PLASTICITY; HIGHER MOISTURE; SOFT DIG REFUSAL AT 3.5' BGS.	
5		11.1	5 - 10' - NO RECOVERY.	
10	SB-2 (10.75')		10 - 12' - SANDY CLAY (CLS): YELLOW.	
			12 - 15' - GRAVEL (GW): LARGE PARTICLES; SANDIER; SATURATION AT 13' BGS.	
15			15' - REFUSAL AT 15' BGS - GRAVEL.	
20				
25				
30				
35				

B.A
12/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-3/MW-1

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 12' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0.0	0 - 3' - FILL: GRAVEL/FILL.
		0.0	
		0.0	
		1.3	3 - 3.5' - CONCRETE.
5		0.0	3.5 - 4' - CLAY (CL): YELLOW - ORANGE; MIXED WITH FILL/GRAVEL.
		0.1	4 - 5' - CLAY (CL): YELLOW - ORANGE; DRY.
		0.0	5 - 11.5' - CLAY (CL): YELLOW - ORANGE; MEDIUM PLASTICITY; DRY.
		0.0	
		0.0	
10		0.0	
	SB-3/MW-1 (12')	0.0	11.5 - 12' - SANDY CLAY (CLS): VERY SANDY; DRY.
			12' - REFUSAL AT 12' BGS - WHITE CLAY.
15			
20			
25			
30			
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 0 - 1'
- BENTONITE 1 - 3'
- PVC RISER DIA 2" 0 - 4'
- WELL SCREEN DIA 2" SLOT 0.010 4 - 12'
- FILTER SAND 3 - 12'

B -- A

12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-4

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 14.5' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-4 (1')	350	0 - 0.5' - ASPHALT.	
		189	0.5 - 1' - SANDY CLAY (CLS): TIGHT; DRY; LOW PLASTICITY; ODOR.	
		156	1 - 3' - SANDY CLAY (CLS): GREY IN COLOR; MORE MOIST; HIGHER PLASTICITY; STROND ODOR; CLAYIER.	
	SB-4 (4')	288	3 - 5' - SANDY CLAY (CLS): YELLOW - ORANGE, WITH GREY/WHITE INCLUSIONS; MESS MOIST; LOWER PLASTICITY; SANDIER CLAY.	
5		2.6		
		27.5	5 - 12' - CLAY (CL): YELLOW - ORANGE; LOW PLASTICITY; DRY.	
		2.4		
		16.7		
		2.8		
10		0.7		
		0.6		
		0.5		
		0.0	12 - 14.5' - CLAY (CL): YELLOW - ORANGE; LOW PLASTICITY; DRY; LARGE GRAVEL INCLUSIONS.	
		0.0		
15			14.5' - REFUSAL AT 14.5' BGS.	
20				
25				
30				
35				

12/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-5/MW-2

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL - 11' BGS/TERMINATED - 20' BGS.
SATURATED ZONE: N/A
TOC ELEVATION: 97.34

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HOLLOW STEM AUGER
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25 & 31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0			0 - 1' - ASPHALT.
		4.1	1 - 2' - CLAY (CL): GREY IN COLOR; DRY; LOW TO NO PLASTICITY; NO ODOR.
		5.3	
		2.0	2 - 3' - CLAY (CH): GREY IN COLOR; HIGH PLASTICITY; MOIST.
		0.8	
5		0.0	3 - 4' - SANDY CLAY (CLS): YELLOW IN COLOR; DRIER; MEDIUM PLASTICITY.
		0.2	4 - 5' - SANDY CLAY (CLS): YELLOW IN COLOR; SANDIER.
		0.0	
		0.0	5 - 6' - SANDY CLAY (CLS): YELLOW IN COLOR; LOW MOISTURE; LOW PLASTICITY.
		0.1	6 - 8' - SANDY CLAY (CLS): YELLOW IN COLOR; DRY; SANDIER; MORE GRAVEL INCLUSIONS; NO PLASTICITY.
10	SB-5/MW-2	0.0	
		0.0	8 - 11' - SANDY CLAY (CLS): ORANGE IN COLOR; MIXED WITH SILT.
			11' - PROBE REFUSAL AT 11' BGS ON 10/25/2016; ADDITIONAL DRILLING CONDUCTED ON 10/31/2016 - LITHOLOGY FROM 11 TO 20' NOT RECORDED.
15			
20			20' - AUGER TERMINATION AT 20' BGS ON 10/31/2016.
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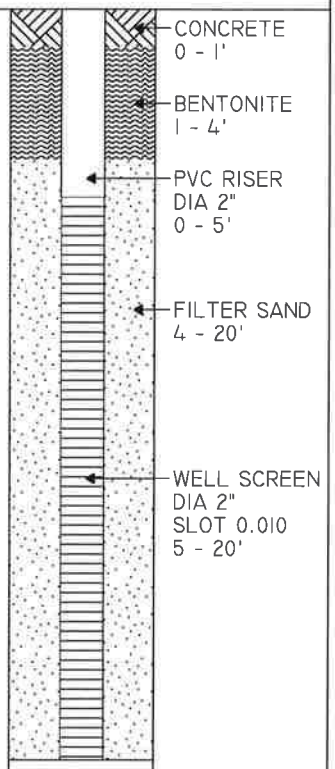

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-6

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 12' BGS.
SATURATED ZONE: 2' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.4	0 - 0.5' - FILL: GRAVEL FILL.	
		0.0	0.5 - 2' - GRAVEL (GW): MOSTLY GRAVEL AND DARK SAND; LOW PLASTICITY; SATURATION AT 2' BGS.	
		0.0	2 - 5' - NO RECOVERY.	
		0.0		
5		0.0	5 - 10' - CLAY (CL): YELLOW-ORANGE IN COLOR; 15% RECOVERY.	
		0.0		
		0.0		
		0.0		
		0.0		
10		0.0		
		0.0	10 - 12' - HOLE COLLAPSE.	
		0.3	12' - REFUSAL AT 12' BGS - CLAY.	
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12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-7**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9.5' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.0	0 - 0.5' - ASPHALT/CONCRETE.	
		0.0	0.5 - 8' - CLAY (CL): YELLOW; SMALL WHITE CLAY INCLUSIONS; LOW TO MEDIUM PLASTICITY; DRIER FROM 3 TO 5' BGS.	
		0.0		
		0.0		
5		0.0		
		0.0		
		0.0		
		0.0	8 - 9' - CLAY (CH): GREY/WHITE; HIGH PLASTICITY.	
	SB-7 (9.5')	0.0	9 - 9.5' - CLAY (CL): YELLOW; LOW PLASTICITY; DRY.	
10			9.5' - REFUSAL AT 9.5' BGS.	
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12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-8**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 14.5' BGS.
SATURATED ZONE: 7.5' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.0	0 - 0.5' - CONCRETE.	
		0.0	0.5 - 2.5' - CLAY (CH): YELLOW; MEDIUM MOISTURE CONTENT; HIGH PLASTICITY.	
		0.0		
		0.0	2.5 - 5' - CLAY (CH): YELLOW; HIGH PLASTICITY; DRIER.	
		0.0		
5		0.0		
		0.0	5 - 10' - CLAY (CH): YELLOW; HIGH PLASTICITY; SOME WHITE CLAY INCLUSIONS; MORE MOIST; 7.5' BGS - SMALL SATURATED SAND ZONE - 1/4 INCH.	
		0.0		
		0.0		
		0.0		
10		0.0		
		0.0	10 - 14.5' - CLAY (CH): YELLOW; HIGH PLASTICITY; SOME WHITE CLAY INCLUSIONS.	
		0.0		
		0.0		
	SB-8 (14')	0.0		
15			14.5' - REFUSAL AT 14.5' BGS - CLAY.	
			12/2	
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MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-9/MW-3

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9.5' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG	WELL CONSTRUCTION DETAILS
0		0.0	0 - 0.5' - CONCRETE/ASPHALT.		
		0.0	0.5 - 1' - SILTY CLAY (CL-ML): YELLOW-BROWN; DRY.		
		0.0	1 - 2.5' - CLAY (CH): GREY; HIGH PLASTICITY; MOIST.		
		0.0	2.5 - 4.5' - CLAY (CL): TAN/ORANGE, WITH GREY INCLUSIONS.		
5		0.0	4.5 - 6' - SANDY CLAY (CLS): REDDISH IN COLOR.		
		0.0	6 - 8' - CLAY (CL): REDDISH-WHITE; MOTTLED; NO PLASTICITY; VERY DRY.		
		0.0			
	SB-9/MW-3 (9')	0.0	8 - 9.25' - CLAY (CL): WHITE; MOTTLING; DRY.		
10			9.25 - 9.5' - SILTY CLAY (CL-ML): GREY; VERY MOIST.		
			9.5' - REFUSAL AT 9.5' BGS - SILTY CLAY.		
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-10

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 19.5' BGS.
SATURATED ZONE: 17' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		28.9	0 - 0.5' - GRAVEL (GW): GRAVEL FILL.	
	SB-10 (2')	398.0	0.5 - 1.5' - CLAY (CH): GREY; HIGH PLASTICITY.	
		320.0	1.5 - 2.5' - CLAY (CL): GREY-WHITE IN COLOR.	
		386.9	2.5 - 4' - CLAY (CL): TAN-ORANGE; DRY.	
5		420.3	4 - 5' - CLAY (CL): BROWN/TAN; DRY.	
		836	5 - 6' - CLAY (CL): GREY/TAN; DRY.	
		935	6 - 13' - CLAY (CL): GREY TO RED; DRY.	
	SB-10 (8')	1448		
	SB-10 (9')	322		
10		52.9		
		12.6		
		58.1		
		46.2		
		2.3	13 - 14' - SANDY CLAY (CLS): GREY; LARGE ANGULAR GRAVEL INCLUSIONS.	
15		11.8	14 - 17' - SANDY CLAY (CLS): GREY; MORE CLAY.	
		1767		
		55.3		
		2.8	17 - 19.5' - SILTY CLAY (CL-ML): RED; SANDY; TRANSITIONS TO RED COARSE CLAYEY SAND.	
		0.0		
20			19.5' - REFUSAL AT 19.5' BGS.	
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B - A

12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-11

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: 18' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0	SB-11 (1')	598	0 - 0.5' - GRAVEL (GW): GRAVEL FILL.
		2688	0.5 - 1' - SILTY CLAY (CL-ML): GREY; MOIST.
	SB-11 (3')	6437	1 - 2' - CLAY (CL): YELLOW/TAN IN COLOR.
		4127	2 - 7' - CLAY (CL): TAN; LOW PLASTICITY; DRY.
5		2388	
		3197	
		1827	
	SB-11 (8')	1806	7 - 8' - GRAVELLY CLAY (CLG): TAN CLAY; LOW PLASTICITY; MIXED WITH SUB-ANGULAR GRAVEL.
		1808	8 - 13' - CLAY (CL): TAN; LOW PLASTICITY; DRY; NO GRAVEL.
10		1707	
		683.0	
		242.1	
		19.5	
		130.1	13 - 13.5' - GRAVELLY SAND (SWG): TAN SAND, MIXED WITH GRAVEL.
15		120.1	13.5 - 15' - CLAY (CL): BROWN/YELLOW/ORANGE; TRANSITIONS TO GREY CLAY; DRY; LOW PLASTICITY; MIXED WITH MEDIUM ANGULAR GRAVEL, WITH RED SANDSTONE INCLUSIONS.
		0.0	15 - 17' - SLUFF.
	SB-11 (17')	1570	
		1029	17 - 18' - CLAY (CL): BROWN/YELLOW/ORANGE; TRANSITIONS TO GREY CLAY; LOW PLASTICITY; MIXED WITH MEDIUM ANGULAR GRAVEL, WITH RED SANDSTONE INCLUSIONS; SATURATED AT 18' BGS.
		284.5	
20		53.8	18 - 20' - SANDY CLAY (CLS): BROWN/YELLOW; COARSE SAND; SATURATED.
			20' - REFUSAL AT 20' BGS - WEATHERED SHALE.
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GRAPHIC LOG

12/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-12/MW-4

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: 18' BGS.
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		10	0 - 0.5' - GRAVEL (GW): GRAVEL FILL.
	SB-12/MW-4 (2')	470.3	0.5 - 1' - SANDY GRAVEL (GWS): DARK STAINED GRAVEL, WITH SAND MATRIX.
	SB-12/MW-4 (3')	209.2	1 - 1.5' - SAND (SW): WHITE/GREY; HIGH MOISTURE CONTENT.
5	SB-12/MW-4 (5')	2168	1.5 - 2.5' - CLAYEY GRAVEL (GW-GC): BLACK GRAVEL, MIXED WITH CLAY.
		3764	
		3079	2.5 - 7' - CLAY (CL): YELLOW/ORANGE; MEDIUM PLASTICITY; STRONG ODOR; DRIER.
		187.6	
		2007	7 - 8' - CLAY (CL): YELLOW/ORANGE; NO PLASTICITY; VERY DRY.
		2374	8 - 12' - CLAY (CL): YELLOW/ORANGE; LOW PLASTICITY; MORE MOIST.
10		1874	
		2259	
		972.4	
		591.4	12 - 13' - CLAY (CL): YELLOW/ORANGE; LOW PLASTICITY; SANDIER.
		482.6	13 - 17' - CLAY (CL): YELLOW/ORANGE; LOW PLASTICITY.
15		1915	
		293.5	
	SB-12/MW-4 (17')	1596	
		101.2	17 - 20' - CLAY (CL): YELLOW/ORANGE; MORE MIST; SANDIER; SATURATION FROM 18 TO 20' BGS.
		59.6	
20		2.5	20' - REFUSAL AT 20' BGS - WEATHERED SHALE.
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GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 1
- BENTONITE 1 - 4'
- PVC RISER DIA 2" 0 - 5'
- FILTER SAND 4 - 19'
- WELL SCREEN DIA 2" SLOT 0.010 5 - 20'

12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-13

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 21' BGS.
SATURATED ZONE: 18' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-13 (1')	180	0 - 0.5' - GRAVEL (GW): GRAVEL FILL.	
		3945	0.5 - 1.5' - SANDY CLAY (CLS): GREY; SILTY; HIGH PLASTICITY.	
	SB-13 (2')	1436	1.5 - 2' - CLAY (CL): YELLOW; STRONG ODOR.	
		1675	2 - 3' - CLAY (CL): BROWN; STAINED PRODUCT.	
		2894	3 - 5' - CLAY (CL): YELLOW; LOW PLASTICITY.	
5		1040	5 - 7' - CLAY (CL): YELLOW; GRAVEL INCLUSIONS; ANGULAR; LOW PLASTICITY.	
		294		
	SB-13 (8')	2541	7 - 10' - CLAY (CL): RED; LOW PLASTICITY; DRY.	
		660		
10		2182		
		2332	10 - 18' - CLAY (CL): YELLOW; DRY; LOW PLASTICITY; RED SANDSTONE INCLUSIONS; STRONG ODORS.	
		2412		
		498.2		
		576.7		
15		1137		
		612.4		
		471.4		
	SB-13 (18')	129.2		
		39.4	18 - 21' - SANDY CLAY (CLS): SATURATED.	
20		30.3		
		246.4		
			21' - REFUSAL AT 21' BGS.	
25			B. Azar 12/2	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-14**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 8' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-14 (1')	1777	0 - 1' - GRAVEL (GW): GRAVEL FILL.	
		1318	1 - 2.5' - SILTY CLAY (CL-ML): TAN; LOW PLASTICITY; DRY.	
		722	2.5 - 5' - SILTY CLAY (CL-ML): TAN; LOW PLASTICITY; DRIER THAN PREVIOUS INTERVAL.	
		143.4		
5		85.9		
		224.1	5 - 5.5' - SILTY CLAY (CL-ML): TAN; LOW PLASTICITY; MIXED WITH SANDSTONE COBBLES.	
	SB-14 (7')	90.1	5.5 - 8' - SILTY CLAY (CL-ML): YELLOW; LOW PLASTICITY; DRY.	
		4.0		
10			8' - REFUSAL AT 8' BGS.	
15				
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25				
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B--A
12/2

MOUNTAIN RESEARCH, LLC

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-15**

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL - 12.5'/TERMINATED - 21' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HOLLOW STEM AUGER
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25 & 31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		18.2	0 - 5' - GRAVEL (GW): LESS THAN 10% RECOVERY; SATURATED GRAVEL.	
		1.2		
		0.0		
		0.0		
5		0.0	5 - 12.5' - CLAY (CH): RED TO TAN; 25% RECOVERY FROM 5 TO 10' BGS; HIGH PLASTICITY; LOW MOISTURE CONTENT.	
		0.0		
		0.0		
		0.0		
		0.0		
10		0.0		
		121.2		
	SB-15	163.5		
			12.5' - PROBE REFUSAL AT 12.5' BGS ON 10/25/31 - CLAY; ADDITIONAL DRILLING CONDUCTED ON 10/31/16 - LITHOLOGY FROM 12.5 TO 21' NOT RECORDED.	
15				
20			21' - AUGER TERMINATION AT 21' BGS ON 10/31/2016.	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-16**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		1.4	0 - 8' - GRAVEL (GW): GRAVEL FILL; 25% RECOVERY.	
		0.0		
		0.0		
		0.0		
5		0.0		
		0.0		
		0.0		
		1.8		
	SB-16 (9')	0.0	8 - 9' - CLAY (CL): TAN; WHITE INCLUSIONS; MOIST TO DRY.	
10			9' - REFUSAL AT 9' BGS.	
15				
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B — A

B/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-17/MW-6

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 19.6' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG	WELL CONSTRUCTION DETAILS
0		0.0	0 - 5' - GRAVEL (GW): GRAVEL FILL; 50% RECOVERY.		CONCRETE 0 - 1'
	SB-17/MW-6 (2')	1871			BENTONITE 1 - 4'
		0.0			
		0.0			
5		301	5 - 19.6' - CLAY (CL): YELLOW/TAN IN COLOR.		PVC RISER DIA 2" 0 - 5'
	SB-17/MW-6 (6')	27.5			
		12.9			
		38.4			
10		35.4			
15					WELL SCREEN DIA 2" SLOT 0.010 5 - 19.6' FILTER SAND 4 - 19.6' BGS.
20			19.6' - REFUSAL AT 19.6' BGS - CLAY.		
25					
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12/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-18/MW-7

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 22' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0	SB-18/MW-7 (1')	113.1	0 - 1' - GRAVEL (GW): GRAVEL FILL.
		268.4	1 - 2' - CLAY (CL): MEDIUM PLASTICITY; MOIST.
	SB-18/MW-7 (2')	716	2 - 9.5' - SILTY CLAY (CL-ML): TIGHT; LOW PLASTICITY; DRY.
		1048	
5		1007	
		1640	
		1908	
		730	
	SB-18/MW-7 (9')	708	
10		1635	9.5 - 15' - SILTY CLAY (CL-ML): TIGHT; LOW PLASTICITY; SANDIER.
		2390	
		2782	
		223.5	
		332.0	
15		387.6	15 - 18' - CLAY (CL): GREY; LOW PLASTICITY; MEDIUM MOISTURE CONTENT.
		544.6	
		331.5	
		329.7	18 - 20' - CLAY (CL): GREY; HIGH PLASTICITY; MORE MOISTURE CONTENT.
		82.6	
20		24.4	20 - 22' - SHALE: GREY/BLACK; WEATHERED.
		287.7	
	SB-18/MW-7 (22')	149.3	22' - REFUSAL AT 22' BGS - SHALE.
25			
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GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 0 - 1'
- BENTONITE 1 - 4'
- PVC RISER DIA 2" 0 - 5'
- WELL SCREEN DIA 2" SLOT 0.010 5 - 22'
- FILTER SAND 4 - 22'

12/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-19/MW-8

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 10' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG	WELL CONSTRUCTION DETAILS
0		0.0	0 - 1' - GRAVEL (GW): GRAVEL FILL, WITH GREY CLAY INCLUSIONS; DRY.		CONCRETE 0 - 1'
		0.0	1 - 2' - CLAY (CH): GREY/TAN; HIGH PLASTICITY; SLIGHT MOTTLING.		BENTONITE 1 - 4'
		0.0	2 - 7' - CLAY (CL): GREY/TAN; LOW PLASTICITY; DRY.		
		0.0			PVC RISER DIA 2" 0 - 5'
5		0.0			
		0.1	7 - 9' - CLAY (CL): MORE RED IN COLOR; LOW PLASTICITY; DRY; SANDIER.		
		0.3			
		0.4	9 - 10' - CLAY (CL): MORE RED IN COLOR; LOW PLASTICITY; DRY; TIGHTER.		
10	SB-19/MW-8 (10')	0.2	10' - REFUSAL AT 10' BGS.		WELL SCREEN DIA 2" SLOT 0.010 5 - 20'
					FILTER SAND 4 - 20'
15					
20					
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B -- A

12/2

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-20/MW-9

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MONITORING WELL
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		6.7	0 - 0.5' - GRAVEL (GW): GRAVEL FILL.
		0.9	0.5 - 1.5' - CLAY (CL): DARK GREY/BLACKISH IN COLOR.
	SB-20/MW-9 (3')	2.5	1.5 - 3' - CLAY (CL): TAN/YELLOW IN COLOR; LOW PLASTICITY.
		0.6	
5		0.7	3 - 7' - CLAY (CL): TAN/YELLOW IN COLOR; DRIER.
		0.6	
		1.3	7 - 9' - CLAY (CL): TAN/YELLOW IN COLOR; GREY INCLUSIONS; MORE MOIST.
		0.6	
		1.1	
10			9' - REFUSAL AT 9' BGS - CLAY.
15			
20			
25			
30			
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GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 0 - 1'
- BENTONITE 1 - 4'
- PVC RISER DIA 2" 0 - 5'
- WELL SCREEN DIA 2" SLOT 0.010 5 - 20'
- FILTER SAND 4 - 20'

B - A

12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-21

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.0	0 - 1' - GRAVEL (GW): GRAVEL FILL.	
	SB-21 (2')	0.0	1 - 3' - SANDY CLAY (CLS): DARK GREY.	
		0.0		
	SB-21 (4')	246.3	3 - 4.5' - SANDY CLAY (CLS): DARK GREY; MOIST.	
5	SB-21 (5')	34.5	4.5 - 8' - SANDY CLAY (CLS): TAN; DRIER; LOW PLASTICITY.	
		148.5		
		0.0		
		23.9		
		0.0	8 - 9' - CLAY (CL): RED; VERY DRY.	
10			9' - REFUSAL AT 9' BGS - CLAY.	
15				
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12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-22

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 8' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/25/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.0	0 - 1.5' - ASPHALT/GRAVEL FILL.	
	SB-22 (3')	43.2	1.5 - 2.5' - CLAY (CL): TAN/YELLOW IN COLOR, WITH WHITE INCLUSIONS; HIGH PLASTICITY; MOIST.	
		44.7	2.5 - 6' - CLAY (CL): TAN/YELLOW IN COLOR; LOW PLASTICITY; DRY.	
5		2.8		
		0.4		
		0.0	6 - 8' - CLAY (CL): TAN/YELLOW IN COLOR; DRIER; RED SANDSTONE INCLUSIONS.	
		0.4		
		0.2		
			8' - REFUSAL AT 8' BGS.	
10				
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12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-23**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 22' BGS.
SATURATED ZONE: 18' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.0	0 - 0.5' - ASPHALT/CONCRETE.	
		2.1	0.5 - 1' - GRAVEL (GW): GRAVEL FILL/SUB-BASE.	
	SB-23 (3')	125.4	1 - 7.5' - CLAY (CL): GREY TO YELLOW-ORANGE CLAY; MEDIUM MOISTURE; STRONG ODOR.	
		1481		
5		867.4		
		833.4		
	SB-23 (7')	2211		
		1711	7.6 - 8' - SANDSTONE GRAVEL.	
	SB-23 (9')	159.0	8 - 9' - CLAY (CL): GREY TO YELLOW-ORANGE CLAY; MEDIUM MOISTURE.	
10		175	9 - 14' - CLAY (CL): GREY TO YELLOW-ORANGE CLAY; DRIER.	
		1902		
		690.7		
		735		
		1194		
15		603	14 - 15' - CLAY (CL): GREY TO YELLOW-ORANGE; SANDIER TO HEAVIER.	
	SB-23 (16')	558	15 - 16.5' - CLAY (CL): GREY TO YELLOW-ORANGE; SANDIER; VERY MOIST, BUT NOT SATURATED.	
		416	16.5 - 18' - SANDY CLAY (CLS): YELLOW-ORANGE TO RED; DRY.	
		722.8		
		61.2	18 - 20' - SAND (SW): COARSE SANDS; VERY HIGH MOISTURE CONTENT; SATURATED SAND AT 20' BGS.	
20		24.9		
		81.3	20 - 22' - GRAVEL (GW): GRAVEL/SAND MIX; FINE; SUBANGULAR.	
		23.1	22' - REFUSAL AT 22' BGS - BLACK SHALE.	
25				
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-24

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 22' BGS.
SATURATED ZONE: 21.5' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		11.1	0 - 0.5' - CONCRETE.	
	SB-24 (2')	35.1	0.5 - 1' - GTAVEL (GW): GRAVEL SUB-BASE FILL.	
		168.8	1 - 2' - CLAY (CL): GREY TO TAN; LOW TO MID-PLASTICITY.	
		208.8	2 - 5' - CLAY (CL): GREY TO TAN; MORE MOIST AT TOP OF INTERVAL - DRIER AT BOTTOM OF INTERVAL.	
5		138.6	5 - 10' - CLAY (CL): GREY TO TAN; LOW TO MID-PLASTICITY; MORE DRY.	
		335.5		
	SB-24 (7')	370.2		
		21.7		
	SB-24 (9')	337.2		
10		63.8	10 - 13' - SLUFF.	
		NR		
		NR		
		3.2	13 - 15' - CLAY (CL): RED/ORANGE; DRY; SANDSTONE GRAVEL INCLUSIONS.	
		0.8		
15		0.2	15 - 17' - SLUFF.	
		0.0		
		0.0		
		0.2	17 - 19' - SILTY CLAY (CL-ML); YELLOW-ORANGE IN COLOR.	
		0.0		
20		0.0	19 - 20' - SANDY CLAY (CLS); YELLOW CLAY TO GREY/WHITE SANDY CLAY; LOW PLASTICITY; HIGH MOISTURE CONTENT.	
		0.0	20 - 21' - SANDY CLAY (CLS): GREY/WHITE IN COLOR; LOW PLASTICITY; DRY.	
		0.0	21 - 21.5' - SAND (SW): WHITE/GREY IN COLOR; MORE MOISTURE.	
			21.5 - 22' - SAND (SW): WHITE/GREY IN COLOR; SATURATED.	
			22' - REFUSAL AT 22' BGS - SAND.	
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B — A

12/2

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-25**

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9.5' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/26/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-25 (1')	676	0 - 1' - GRAVEL (GW): GRAVEL FILL.	
		287	1 - 5' - CLAY (CL): YELLOW/TAN; MEDIUM PLASTICITY; HIGH ODORS; 50% RECOVERY.	
		NR		
		311		
5		311.2		
		NR	5 - 9.5' - SANDY CLAY (CLS): YELLOW; DRY; ODORS; 50% RECOVERY.	
		354.2		
	SB-25 (8')	164.7		
		NR		
10			9.5' - REFUSAL AT 9.5' BGS - SANDY CLAY.	
15				
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Ben Azar
12/2

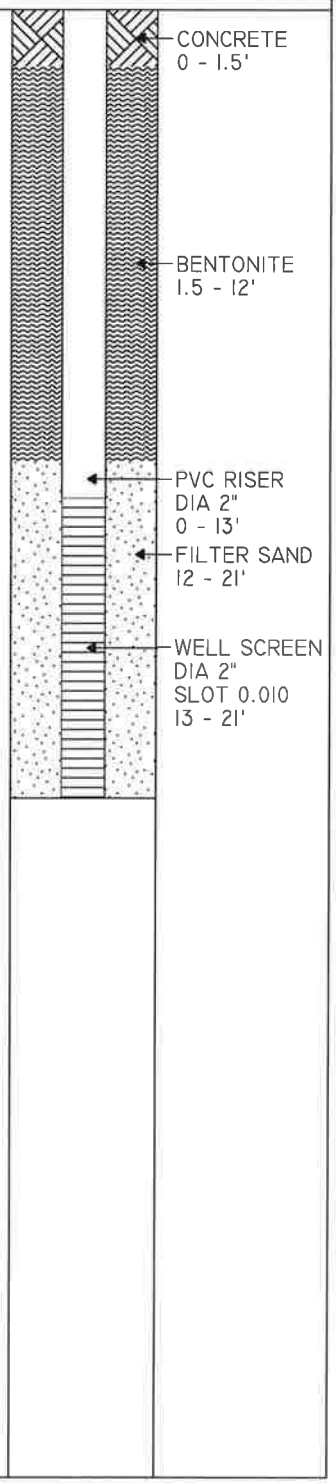
MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-26/MW-5

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 8' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/26/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		NR	0 - 5' - NO RECOVERY.	
		NR		
		NR		
		NR		
	SB-26/MW-5	NR		
5		0.0	5 - 8' - CLAY (CL): YELLOW/TAN; 50% RECOVERY.	
		0.0		
		0.0		
			8' - REFUSAL AT 8' BGS - CLAY.	
10				
15				
20				
25				
30				
35				



MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-27

PROJECT NO.: 1204.10.14
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 23' BGS.
SATURATED ZONE: 19' BGS.

WEATHER: SUN/40'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 10/31/2016
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0.0	0 - 0.5' - ASPHALT/CONCRETE.	
		0.0	0.5 - 1' - GRAVEL (GW): GRAVEL FILL/SUB-BASE.	
		0.0	1 - 7.5' - CLAY (CL): GREY TO YELLOW/TAN; MEDIUM MOISTURE; STRONG ODOR.	
		0.0		
		0.0		
5		0.0		
		0.0		
		0.0		
		0.0	7.5 - 8' - SANDSTONE GRAVEL.	
		0.0	8 - 9' - CLAY (CL): GREY TO YELLOW/TAN; MEDIUM MOISTURE; STRONG ODOR.	
		0.0	9 - 13' - CLAY (CL): YELLOW/ORANGE; MEDIUM TO LOW MOISTURE CONTENT; TIGHT.	
10		0.0		
		0.0		
		0.0		
		0.0	13 - 14' - SANDY CLAY (CLS): GRAVEL INCLUSIONS; ANGULAR.	
		0.0	14 - 15' - CLAY (CL): YELLOW/ORANGE; TIGHT.	
15	SB-27 (16')	0.0	15 - 18' - SLUFF.	
		0.0		
		0.0		
		0.0	18 - 19' - CLAY (CL): YELLOW/ORANGE; SOFTER; HIGH PLASTICITY; MORE MOISTURE.	
		0.0	19 - 20' - CLAY (CL): YELLOW/ORANGE; HIGH MOISTURE CONTENT - SATURATION AT 19' BGS.	
20		0.0		
		0.0	20 -23' - SANDY CLAY (CLS): YELLOW TO ORANGE - TRANSITIONS TO BLACK; HIGH MOISTURE CONTENT; NO ODORS.	
		0.0		
		0.0	23' - REFUSAL AT 23' BGS - BLACK SHALE BEDROCK.	
25			B - A	
			12/2	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-28

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 22' BGS.
SATURATED ZONE: N/A

WEATHER: 40'S/CLOUDY
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/20/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-28 (1')	29.4	0 - 0.5' - ASPHALT/GRAVEL.	
		13.5	0.5 - 1' - SILTY CLAY (CL-ML): GREY; MEDIUM MOISTURE; MEDIUM PLASTICITY; ODOR.	
		3.0	1 - 2' - SILTY CLAY (CL-ML): MORE TAN IN COLOR; MEDIUM PLASTICITY; HIGHER MOISTURE CONTENT.	
		7.6	2 - 3' - SILTY CLAY (CL-ML): GREY/TAN IN COLOR; DRIER THAN PREVIOUS INTERVAL; LESS ODOR.	
5		6.0	3 - 5' - CLAY (CL): ORANGE; MOTTLED; LOW PLASTICITY.	
		4.7 5 - 7'	5 - 7' - CLAY (CL): ORANGE; LESS MOTTLING; LOW PLASTICITY; MIXED WITH SANDSTONE COBBLES.	
		11.4 7 - 9'	7 - 9' - CLAY (CL): TAN/RED; TIGHTER; LESS MOTTLING; LOW PLASTICITY.	
10	SB-28 (9-11')	9.5 9 - 11'	9 - 11' - CLAY (CL): TAN/RED; TIGHTER; LESS MOTTLING; LOW PLASTICITY; DRIER.	
		5.9 11 - 13'	11 - 13' - CLAY (CL): TAN/RED; LESS MOTTLING; HIGHER PLASTICITY CLAY NEAR 13' BGS.	
		0.9 13 - 15'	13 - 15' - SANDY CLAY (CLS): SANDIER CLAY MIX; MORE MOISTURE.	
15		0.3 15 - 17'	15 - 19' - SANDY CLAY (CLS): SANDIER CLAY MIX - GREY/WHITE SAND.	
		0.0 17 - 19'		
20		5.7 19 - 21'	19 - 22' - SANDY CLAY (CLS): TAN/RED CLAY; MORE RED SANDS AT 20' BGS; MEDIUM PLASTICITY; DRIER AT 22' BGS.	
	SB-28 (22')	19.7	22' - REFUSAL AT 22' BGS / SHALE.	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-29**

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 21.9' BGS.
SATURATED ZONE: N/A

WEATHER: 40'S/CLOUDY
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/20/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-29 (1')	5.0	0 - 0.5' - ASPHALT GRAVEL.	
		4.9	0.5 - 1' - SILTY CLAY (CL-ML): GREY/BLACK; LOW PLASTICITY; MEDIUM MOISTURE.	
		8.2	1 - 3' - SILTY CLAY (CL-ML): GREY/TAN CLAY; LOW PLASTICITY; MEDIUM MOISTURE.	
		4.7	3 -7'- SILTY CLAY (CL-ML): LIGHT GREY IN COLOR; LOW PLASTICITY; MEDIUM MOISTURE; DRIER FROM 4 TO 5' BGS.	
5		3.2		
		1.0 5 - 7'		
	SB-29 (8')	0.3 7 - 9'	7 - 11' - SILTY CLAY (CL-ML): LIGHT GREY IN COLOR; LOW PLASTICITY; MEDIUM MOISTURE; MIXED WITH ANGULAR SANDSTONE GRAVEL.	
10		0.0 9 - 11'		
		0.0 11 - 13'	11 - 13' - SILTY CLAY (CL-ML): LIGHT GREY IN COLOR; HIGHER PLASTICITY; HARDER WITH DIRECT PUSH; RED SANDSTONE INCLUSIONS.	
		0.0 13 - 15'	13 - 15' - SILTY CLAY (CL-ML): LIGHT GREY IN COLOR; MORE MOISTURE; HIGHER PLASTICITY.	
15		0.0 15 - 17'	15 - 17' - SILTY CLAY (CL-ML): LIGHT GREY; MORE MOISTURE; HIGHER PLASTICITY; MOTTLED.	
		0.0 17 - 19'	17 - 19' - SILTY CLAY (CL-ML): GREY SILTY CLAY; MORE MOISTURE; HIGHER PLASTICITY; NEAR 19' BGS - GREY CLAY MIXED WITH ORANGE SAND.	
20		0.0 19 - 21'	19 - 21.9' - SANDY CLAY (CLS): GREY CLAY, MIXED WITH ORANGE SAND; MORE MOISTURE AT 21' BGS.	
			21.9' - REFUSAL AT 21.9' BGS.	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-30

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 19.5' BGS.
SATURATED ZONE: N/A

WEATHER: 40'S/CLOUDY
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/20/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-30 (1')	49.7	0 - 0.5' - ASPHALT/GRAVEL.	
		39.6	0.5 - 1' - GRAVEL (GW): GRAVEL; SOME SILTY CLAY NEAR 1' BGS.	
		12.2	1 - 2' - SILTY CLAY (CL-ML): GREY; MEDIUM MOISTURE; MEDIUM PLASTICITY; ODOR.	
		20.0	2 - 3' - SILTY CLAY (CL-ML): GREY; SOME MOTTLING; MEDIUM MOISTURE; TIGHTER.	
		38.4	3 - 4' - SILTY CLAY (CL-ML): GREY; LESS PLASTICITY.	
5	SB-30 (5-7')	47.9 5 - 7'	4 - 5' - SILTY CLAY (CL-ML): GREY; DRIER.	
			5 - 7' - SILTY CLAY (CL-ML): GREY; ODOR.	
	SB-30 (7-9')	131.2 7 - 9'	7 - 9' - SILTY CLAY (CL-ML): GREY; STRONGER ODOR; MIXED WITH ANGULAR SANDSTONE GRAVEL.	
10		113.8 9 - 11'	9 - 11' - SILTY CLAY (CL-ML): GREY; STRONG ODOR; MIXED WITH ANGULAR GRAVEL; PRIMARILY GRAVEL FROM 10 TO 11' BGS.	
		9.4 11 - 13'	11 - 13' - SILTY CLAY (CL-ML): GREY; MEDIUM MOISTURE; LOW PLASTICITY.	
		6.1 13 - 15'	13 - 15' - CLAY (CL): ORANGE - GREY; MOTTLED.	
15		8.7 15 - 17'	15 - 17' - CLAY (CL): ORANGE - GREY; HIGHER PLASTICITY.	
		4.0 17 - 19.5'	17 - 19.5' - CLAY (CL): GREY - WHITE FINE SANDY CLAY; MEDIUM MOISTURE; DARKER IN COLOR AT 19.5 BGS - NEAR BEDROCK.	
20			19.5' - REFUSAL AT 19.5' BGS - SHALE.	
25				
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MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-31/MW-10

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: 40'S/CLOUDY
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 2/20/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0	SB-31/MW-10 (1')	43	0 - 0.5' - GRAVEL AND ASPHALT.
		310.6	0.5 - 1' - SAND (SW): DARK GREY; FINE.
		101.5	1 - 2' - SAND (SW): DARK GEY; HIGHER MOISTURE CONTENT.
		1022	2 - 3' - CLAY (CL): TAN/GREY; MOTTLED; LOW MOISTURE.
5	SB-31/MW-10 (5-7')	1250	3 - 5' - CLAY (CL): TAN/GREY; MOTTLED; STRONG ODOR; DRIER.
		2479 5 - 7'	5 - 7' - SILTY CLAY (CL-ML): ANGULAR YELLOW - ORANGE SILTY CLAY; ODOR STRONGER; MIXED WITH SANDSTONE GRAVEL.
		1476 7 - 9'	7 -9' - SILTY CLAY (CL-ML): ANGULAR YELLOW - ORANGE SILTY CLAY; LESS GRAVELS.
10	SB-31/MW-10 (9 -11')	373.1 9 - 11'	9 - 11' - SILTY CLAY (CL-ML): ANGULAR YELLOW - ORANGE SILTY CLAY; DRY; LESS ODOR AT 9' BGS.
		124.8 11 - 13'	11 - 14' - SILTY CLAY (CL-ML): ANGULAR YELLOW - ORANGE SILTY CLAY; RED SANDSTONE INCLUSIONS.
		110.4 13 - 15'	14 - 15' - SILTY CLAY (CL-ML): ANGULAR YELLOW - ORANGE SILTY CLAY; MORE MOIST - NEAR SATURATED.
15		53.8 15 - 17'	15 - 19' - SILTY CLAY (CL-ML): ANGULAR YELLOW - ORANGE SILTY CLAY; DRY.
		42.9 17 - 19'	
20		93.4 19 - 21'	19 - 21' - SAND (SW): WHITE AND ORANGE; VERY MOIST; COARSE.
			21' - REFUSAL AT 21' BGS.
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GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 0 - 1'
- BENTONITE 1 - 4'
- PVC RISER DIA 2" 0- 5'
- FILTER SAND 4 - 20'
- WELL SCREEN DIA 2" SLOT 0.010 5 - 20'

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-32

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: N/A

WEATHER: 50'S/CLOUDS/RAIN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/21/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0			0 - 1' - ASPHALT/GRAVEL.	
		0	0.5 - 1' - SILTY CLAY (CL-ML): BLACK/TAN/BROWN; LOW PLASTICITY; DRY.	
		0	1 - 2' - SILTY CLAY (CL-ML): LIGHT GREY/BROWN; MEDIUM PLASTICITY; MEDIUM MOISTURE.	
		0	2 - 4' - SILTY CLAY (CL-ML): GREY/TAN; MOTTLING.	
		0	4 - 9' - SILTY CLAY (CL-ML): MORE ORANGE; LESS MOTTLING; DRIER; LOW PLASTICITY.	
5		0.8 5 - 7'		
		0.7 7 - 9'		
10		0.8 9 - 11'	9 - 11' - SILTY CLAY (CL-ML): MORE ORANGE; LESS MOTTLING; SLIGHTLY MORE MOISTURE FROM 9 TO 10' BGS; DRIER FROM 10 TO 11' BGS.	
	SB-32 (11-13')	1.0 11 - 13'	11 - 13' - SILTY CLAY (CL-ML): ORANGE; GREY SILTY MOIST INCLUSIONS.	
		0.3 13 - 15'	13 - 15' - SILTY CLAY (CL-ML): GREY; HOMOGENOUS; HIGH PLASTICITY; 13 - 14' BGS - HIGH MOISTURE CONTENT - NEAR SATURATION ZONE; 14 - 15' BGS - VERY DRY; MIXED WITH MEDIUM PLASTICITY RED CLAY; MOIST AT 15' BGS.	
15		0.4 15 - 17'	15 - 17' - SILTY CLAY (CL-ML): BROWN; 60% RECOVERY FROM 15 TO 20' BGS.	
		0.5	17 -20' - SILTY CLAY (CL-ML): BROWN; MOIST; MIXED WITH DARK GREY SANDS.	
		17 - 20'		
20			20' - REFUSAL AT 20' BGS - SHALE BEDROCK.	
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MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-33/MW-13

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 18.8' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: 50'S/CLOUDS/RAIN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 2/21/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0.0	0 - 0.5' - FILL: ORGANIC RICH SOIL.
		0.0	0.5 - 2' - CLAY (CL): YELLOW-ORANGE; LOW PLASTICITY; DRY.
		0.0	2 - 3' - CLAY (CL): YELLOW-ORANGE; LOW PLASTICITY; REDDISH INCLUSIONS; MOTTLING.
		0.0	3 - 4' - CLAY (CL): YELLOW-ORANGE; SLIGHTLY HIGHER PLASTICITY; SANDSTONE GRAVEL INCLUSIONS.
5	SB-33/MW-13 (5-7')	448 5 - 7'	4 - 5' - CLAY (CL): PRIMARY COLORATION IS RED; MOTTLING; SLIGHTLY HIGHER PLASTICITY.
	SB-33/MW-13 (7-9')	757 7 - 9'	5 - 7' - CLAY (CL): RED; MORE MOTTLING NEAR 7' BGS.
10	SB-33/MW-13 (9-11')	43.9 9 - 11'	7 - 9' - CLAY (CL): BROWN-TAN IN COLOR; HIGHER PLASTICITY; MOTTLING; ODOR.
		9.7 11 - 13'	9 - 11' - CLAY (CL): YELLOW-ORANGE IN COLOR, WITH RED INCLUSION; LESS ODOR; MEDIUM TO LOW PLASTICITY; LOW MOISTURE CONTENT.
		7.8 13 - 15'	11 - 13' - CLAY (CL): YELLOW-ORANGE IN COLOR; MEDIUM TO LOW PLASTICITY; LOW MOISTURE; SIGNFICANT MOTTLING.
15		7.4 15 - 17'	13 - 15' - CLAY (CL): YELLOW-ORANGE IN COLOR; MEDIUM TO LOW PLASTICITY; STRONG SULFUR ODOR FROM 14 TO 15' BGS.
		4.1 17 - 19'	15 - 19' - CLAY (CL): YELLOW-ORANGE IN COLOR; HIGHER PLASTICITY AT 15' BGS; LOWER PLASTICITY CLOSER TO 17' BGS; HIGH MOISTURE CONTENT FROM 18 TO 19' BGS.
20			19' - REFUSAL AT 19' BGS.
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GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 0 - 1'
- BENTONITE 1 - 4'
- PVC RISER DIA 2" 0 - 5'
- FILTER SAND 4 - 18.8'
- WELL SCREEN DIA 2" SLOT 0.010 5 - 18.8'

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-33R

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 19' BGS.
SATURATED ZONE: 14 - 15' BGS.

WEATHER: SUN/10'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING
DATE: 1/2/2018
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0	0 - 0.25' - FILL: GRASS/ORGANICS.	
		0	0.25 - 7' - SILTY CLAY (CL-ML): YELLOW-ORANGE; DRY TO LOW MOISTURE; NO ODOR.	
		0		
		0		
5		0		
		2.8		
		47.6		
	SB-33R	762.4	7 - 10' - SILTY CLAY (CL-ML): YELLOW-ORANGE; DRY TO MEDIUM MOISTURE; LOW TO MEDIUM PLASTICITY.	
		802		
10		324		
		68.1	10 - 11' - SILTY CLAY (CL-ML): YELLOW-ORANGE; DRY TO MEDIUM MOISTURE; LOW TO MEDIUM PLASTICITY; SLIGHT ODOR FROM 10 TO 11' BGS.	
		32.2	11 - 14' - SILTY CLAY (CL-ML): MOTTLED; MEDIUM TO HIGH MOISTURE CONTENT.	
		10.8		
		5.3	14 - 15' - SILTY CLAY (CL-ML): GREY; SATURATED.	
15		0	15 - 19' - SILTY CLAY (CL-ML): GREY; LIGHT ODOR (SULFUR AND PETROLEUM) AT 19' BGS.	
		0		
		0		
		2.2		
		4.8		
20			19' - REFUSAL AT 19' BGS - BEDROCK.	
			Ben Az	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-34**

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: N/A

WEATHER: 50'S/CLOUDS/RAIN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/21/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0			0 - 0.5 - ASPHALT GRAVEL.	
		4.3	0.5 - 3' - SANDY CLAY (CLS): BLACK/GREY; MEDIUM PLASTICITY.	
		8.5		
		3.9		
		13.9	3 - 4' - SILTY CLAY (CL-ML): YELLOW - ORANGE - GREY; MOTTLED; DRY ORANGE CLAY AT 4' BGS.	
5		27.5	4 - 5' - SILTY CLAY (CL-ML): YELLOW - ORANGE - GREY; LOW PLASTICITY; MOTTLED; DRY.	
	SB-34 (5-7')	246.6 5 - 7'	5 - 7' - CLAY (CL): RED - ORANGE - TAN; MOTTLED; SLIGHT ODOR.	
		224.3 7 - 9'	7 - 9' - CLAY (CL): RED - ORANGE - TAN; STRONG ODOR; LARGE SANDSTONE GRAVEL INCLUSIONS AT 8' BGS.	
10	SB-34 (9-11')	125.1 9 - 11'	9 - 11' - CLAY (CL): RED - ORANGE - TAN; NO GRAVEL.	
		5.6 11 - 13'	11 - 13 ' - CLAY (CL): RED - ORANGE - TAN; ROUNDED RED SANDSTONE GRAVEL MIXED IN.	
		3.1 13 - 15'	13 - 19' - CLAY (CL): GREY; HIGH PLASTICITY FROM 13 TO 17' BGS; EXTREME PLASTICITY FROM 17 TO 19' BGS.	
15		34.6 15 - 17'		
		3.1 17 - 19'		
		19 - 20' 3.0	19 - 20' - CLAY (CL): EXPANDING CLAY; SOIL BORING TIGHT.	
20			20' - REFUSAL AT 20' BGS.	
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Ben Azar

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-35**

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 18' BGS.
SATURATED ZONE: 15 - 18' BGS.

WEATHER: 50'S/CLOUDS/RAIN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/21/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		1.0	0 - 0.5' - FILL: ORGANIC DARK SOIL.	
		1.7	0.5 - 1' - CLAY (CL): YELLOW - TAN; MEDIUM TO HIGH PLASTICITY; MEDIUM MOISTURE.	
		1.0	1 - 2' - CLAY (CL): YELLOW - TAN; MEDIUM TO HIGH PLASTICITY; MEDIUM MOISTURE; MIXED WITH SMALL ANGULAR SANDSTONE GRAVEL.	
		1.5	2 - 5' - CLAY (CL): RED - ORANGE; MEDIUM TO HIGH PLASTICITY; MEDIUM MOISTURE; MOTTLED; NO GRAVEL.	
5		1.2		
		0.6 5 - 7'	5 - 11' - CLAY (CL): RED - ORANGE; MEDIUM TO HIGH PLASTICITY; MEDIUM MOISTURE; MIXED WITH RED ANGULAR SANDSTONE GRAVEL - DRY, LOW PLASTICITY.	
		1.3 7 - 9'		
10		1.6 9 - 11'		
		2.5 11 - 13'	11 - 13' - CLAY (CL): RED - ORANGE; MEDIUM TO HIGH PLASTICITY; MEDIUM MOISTURE; MIXED WITH RED ANGULAR SANDSTONE GRAVEL - DRY, LOW PLASTICITY; LESS MOTTLING.	
	SB-35 (13-15')	8.1 13 - 15'	13 - 18' - SILTY CLAY (CL-ML): GREY - BLACK - BROWN RED; STRONG SULFUR ODOR FROM 13 TO 14' BGS; COLOR TRANSITIONS TO LIGHT GREY SILTY HIGH PLASTICITY CLAY; LESS MOTTLING WITH SAMPLE ZONE.	
15				
			18' - REFUSAL AT 18' BGS.	
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MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-36/MW-11

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 18.8' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: 50'S/CLOUDS/RAIN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 2/21/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG	WELL CONSTRUCTION DETAILS
0	SB-36/MW-11 (1')	57.8	0 - 0.25' - FILL: BLACK ORGANICS.		CONCRETE 0 - 1'
		0.6	0.25 - 1' - CLAY (CL): YELLOW - TAN; MEDIUM PLASTICITY.		
		1.1	1 - 3' - SILTY CLAY (CL-ML): LOW PLASTICITY; DRY.		BENTONITE 1 - 4'
		1.3			
5		0.9	3 - 5' - SILTY CLAY (CL-ML): LOW PLASTICITY; DRY; SOME MOTTLING.		PVC RISER DIA 2" 0 - 5'
		0.7 5 - 7'	5 - 7' - GRAVELLY CLAY (CLG): RED - ORANGE; LOW PLASTICITY; ANGULAR SANDSTONE GRAVEL INCLUSIONS.		
	SB-36/MW-11 (7-9')	3.5 7 - 9'	7 - 9' - GRAVELLY CLAY (CLG): MORE TAN IN COLOR; LOW PLASTICITY; ANGULAR SANDSTONE GRAVEL INCLUSIONS.		FILTER SAND 4 - 18.8
10		1.6 9 - 11'	9 - 13' - GRAVELLY CLAY (CLG): MORE UNIFORMLY TAN TO GREY IN COLOR; RED AND BROWN MOTTLING; ANGULAR SANDSTONE GRAVEL INCLUSIONS.		
		1.9 11 - 13'			WELL SCREEN DIA 2" SLOT 0.010 5 - 18.8'
		1.8 13 - 15'	13 - 15' - SILTY CLAY (CL-ML): UNIFORM GREY IN COLOR; EXTREME PLASTICITY.		
15		2.5 15 - 17'	15 - 17' - SILTY CLAY (CL-ML): UNIFORM GREY IN COLOR; LESS PLASTICITY; HEAVILY MOTTLED.		
		17 - 18' 0.7	17 - 18' - SANDY CLAY (CLS): DARK GREY IN COLOR.		
			18' - REFUSAL AT 18' BGS - WEATHERED SHALE.		
20					
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Benjamin A

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-37**

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20.5' BGS.
SATURATED ZONE: N/A

WEATHER: 50'S/CLOUDS/RAIN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/21/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-37 (1')	73.7	0 - 0.5' - ASPHALT.	
		17.8	0.5 - 1' - SILTY CLAY (CL-ML): GREY SANDS / DARK GREY SILTY CLAY; MEDIUM PLASTICITY; MOIST; ODOR.	
		12.2	1 - 2' - SILTY CLAY (CL-ML): DARK GREY SILTY CLAY; NO SANDS; MOTTLED; MEDIUM PLASTICITY; MOIST; ODOR.	
		12.6	2 - 3' - SILTY CLAY (CL-ML): YELLOW - ORANGE SILTY CLAY; NO SANDS; MOTTLED.	
5	SB-37 (5')	12.4	3 - 5' - SILTY CLAY (CL-ML): YELLOW - ORANGE SILTY CLAY; NOT MOTTLED; DRIER.	
		7.9 5 - 7'	5 - 7' - SILTY CLAY (CL-ML): UNIFORMLY TAN; LIGHT MOTTLING; LOW MOISTURE AND LOW PLASTICITY FROM 6 TO 7' BGS.	
		5.9 7 - 9'	7 - 9' - SILTY CLAY (CL-ML): UNIFORMLY TAN; LIGHT MOTTLING; ANGULAR SANDSTONE GRAVEL.	
10		1.7 9 - 11'	9 - 11' - SILTY CLAY (CL-ML): UNIFORMLY TAN; SLIGHTLY HIGHER MOISTURE; DRIER AT 11' BGS.	
		1.1 11 - 13'	11 - 15' - SILTY CLAY (CL-ML): UNIFORMLY TAN; DRY; MIXED WITH SMALL RED SANDSTONE GRAVEL.	
		0.9 13 - 15'		
15		1.1 15 - 17'	15 - 19' - SILTY CLAY (CL-ML): UNIFORMLY TAN; HIGHER PLASTICITY; MOTTLING.	
		0.3 17 - 19'		
		19 - 20' 0.1	19 - 20' - SAND (SW): GREY SAND; MEDIUM GRAINED; MOIST.	
20			20 - 20.5' - SHALE: GREY WEATHERED SHALE BEDROCK.	
			20.5' - REFUSAL AT 20.5' BGS.	
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Ben Azar

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-38

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 22' BGS.
SATURATED ZONE: N/A

WEATHER: 60'S/SUN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/22/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		58.4	0 - 0.5' - ASPHALT.	
		73.3	0.5 - 1' - SANDY CLAY (CLS): DARK GREY; DRY; NO PLASTICITY; LOW TO NO MOISTURE; ODOR.	
	SB-38 (3')	430.8	1 - 2' - SANDY CLAY (CLS): LIGHT GREY; MORE MOIST; HIGHER PLASTICITY THAN ABOVE.	
		103.8	2 - 3' - SILTY CLAY (CL-ML): TAN; MOTTLED; ODOR PERSISTS.	
5		50.9	3 - 5' - SILTY CLAY (CL-ML): ORANGE - TAN; DRIER; LESS MOTTLED.	
		12.6 5 - 7'	5 - 7' - CLAY (CL): REDDISH-TAN; MOTTLED; LOW MOISTURE; MEDIUM PLASTICITY.	
	SB-38 (7-9')	192.2 7 - 9'	7 - 9' - CLAY (CL): REDDISH-TAN; MOTTLED; LOW MOISTURE; MEDIUM PLASTICITY; STRONG ODOR.	
10	SB-38 (9-11')	4.3 9 -11'	9 -11' - CLAY (CL): REDDISH-TAN; MOTTLED; LOW MOISTURE; MEDIUM PLASTICITY; LESS ODOR.	
		2.9 11 - 13'	11 - 13' - CLAY (CL): REDDISH-TAN; LESS MOTTLING; MEDIUM PLASTICITY; VERY DRY.	
		1.3 13 - 15'	13 - 15' - CLAY (CL): REDDISH-TAN; LESS MOTTLING; MEDIUM PLASTICITY; VERY DRY; RED ANGULAR SANDSTONE GRAVELS NEAR 15' BGS.	
15		6.5 15 - 17'	15 - 17' - CLAY (CL): REDDISH-TAN; NO MOTTLING; MEDIUM PLASTICITY; NO GRAVELS.	
		4.1 17 - 19'	17 - 19' - CLAY (CL): REDDISH-TAN; MOTTLING FROM 18 TO 19' BGS; MEDIUM PLASTICITY.	
20		3.7 19 - 21'	19 - 21' - SANDY CLAY (CLS): WHITE AND ORANGE; HEAVY MOTTLING FROM 19 TO 20' BGS; MIXED WITH SUBANGULAR SANDSTONE GRAVEL.	
			21 - 22' - SHALE: BEDROCK.	
			22' - REFUSAL AT 22' BGS.	
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MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-39

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 23' BGS.
SATURATED ZONE: N/A

WEATHER: 60'S/SUN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/22/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0	SB-39 (2')	47.8	0 - 0.25' - ASPHALT.	
			0.25 - 1' - SAND (SW): STAINED BLACK; MEDIUM GRAINED; DRY.	
			1 - 2' - SANDY CLAY (CLS): LIGHT GREY; MOTTLED; MEDIUM MOISTURE.	
		7.9	2 - 3' - SILTY CLAY (CL-ML): YELLOW-ORANGE; MEDIUM MOISTURE; MEDIUM PLASTICITY.	
		5.0	3 - 5' - SILTY CLAY (CL-ML): YELLOW-ORANGE; LOW PLASTICITY; DRY.	
5		5.4		
		14.6 5 - 7'	5 - 9' - SILTY CLAY (CL-ML): RED; LOW PLASTICITY; MIXED WITH RED SUBANGULAR SANDSTONE GRAVEL.	
		8.3 7 - 9'		
10		7.7 9 - 11'	9 - 11' - SILTY CLAY (CL-ML): RED; MOTTLING NEAR 10' BGS; SANDSTONE COBBLES NEAR 11' BGS.	
		0.6 11 - 13'	11 - 13' - SILTY CLAY (CL-ML): RED; LESS MOTTLING.	
		0.7 13 - 15'	13 - 15' - SILTY CLAY (CL-ML): UNIFORM RED / YELLOW-ORANGE NEAR 15' BGS; LOW PLASTICITY.	
15		5.4 15 - 17'	15 - 19' - SILTY CLAY (CL-ML): YELLOW-ORANGE AND GREY; MOTTLING; LOW TO MEDIUM PLASTICITY; LOW MOISTURE CONTENT.	
		3.4 17 - 19'		
20		2.8 19 - 21'	19 - 21' - SILTY CLAY (CL-ML): YELLOW-ORANGE AND GREY; LESS PLASTICITY; MORE MOISTURE CONTENT.	
		1.9 21 - 23'	21 - 23' - SILTY CLAY (CL-ML): YELLOW-ORANGE AND GREY; NO PLASTICITY; VERY DRY.	
			23' - REFUSAL AT 23' BGS / WEATHERED SHALE.	
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Ben Azar

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-40

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: N/A

WEATHER: 60'S/SUN
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING
DATE: 2/22/2017
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0			0 - 0.25' - ASPHALT.	
	SB-40 (2')	98.3	0.25 - 1' - SILTY CLAY (CL-ML): LIGHT GREY; MEDIUM PLASTICITY; MEDIUM MOISTURE.	
		123.8	1 - 2' - SILTY CLAY (CL-ML): LIGHT GREY; MEDIUM PLASTICITY; MEDIUM MOISTURE; MOTTLED NEAR 2' BGS.	
		15.6	2 - 3'- SILTY CLAY (CL-ML): PRIMARILY TAN; MEDIUM PLASTICITY; MEDIUM MOISTURE.	
		8.5	3 - 4' - SILTY CLAY (CL-ML): PRIMARILY TAN; MEDIUM PLASTICITY; DRIER.	
5		8.9	4 - 5' - SILTY CLAY (CL-ML): PRIMARILY TAN; MEDIUM PLASTICITY; MIXED WITH ANGULAR GRAVEL.	
	SB-40 (5-7')	31.2 5 - 7'		
		1.5 7 - 9'	5 - 11' - SILTY CLAY (CL-ML): PRIMARILY TAN; MEDIUM PLASTICITY; NO GRAVEL; MOTTLED.	
10		1.0 9 - 11'		
		0.1 11 - 13'	11 - 13' - SILTY CLAY (CL-ML): PRIMARLY TAN; MEDIUM PLASTICITY; NO MOTTLING.	
		0.0 13 - 15'	13 - 15' - SILTY CLAY (CL-ML): PRIMARLY TAN; MIXED WITH RED SANDSTONE ANGULAR GRAVEL; LOW PLASTICITY; LOW MOISTURE.	
15		14.4 15 - 17'	15 - 17' - CLAY (CL): YELLOW-ORANGE AND RED; NO PLASTICITY; DRY.	
		0.2 17 - 19'	17 -20' - CLAY (CL): YELLOW-ORANGE AND RED; MOTTLED NEAR 19' BGS; NO PLASTICITY; DRY.	
		19 - 20' 0.9		
20			20' - REFUSAL AT 20' BGS - WEATHERED SHALE.	
25				
30				
35				

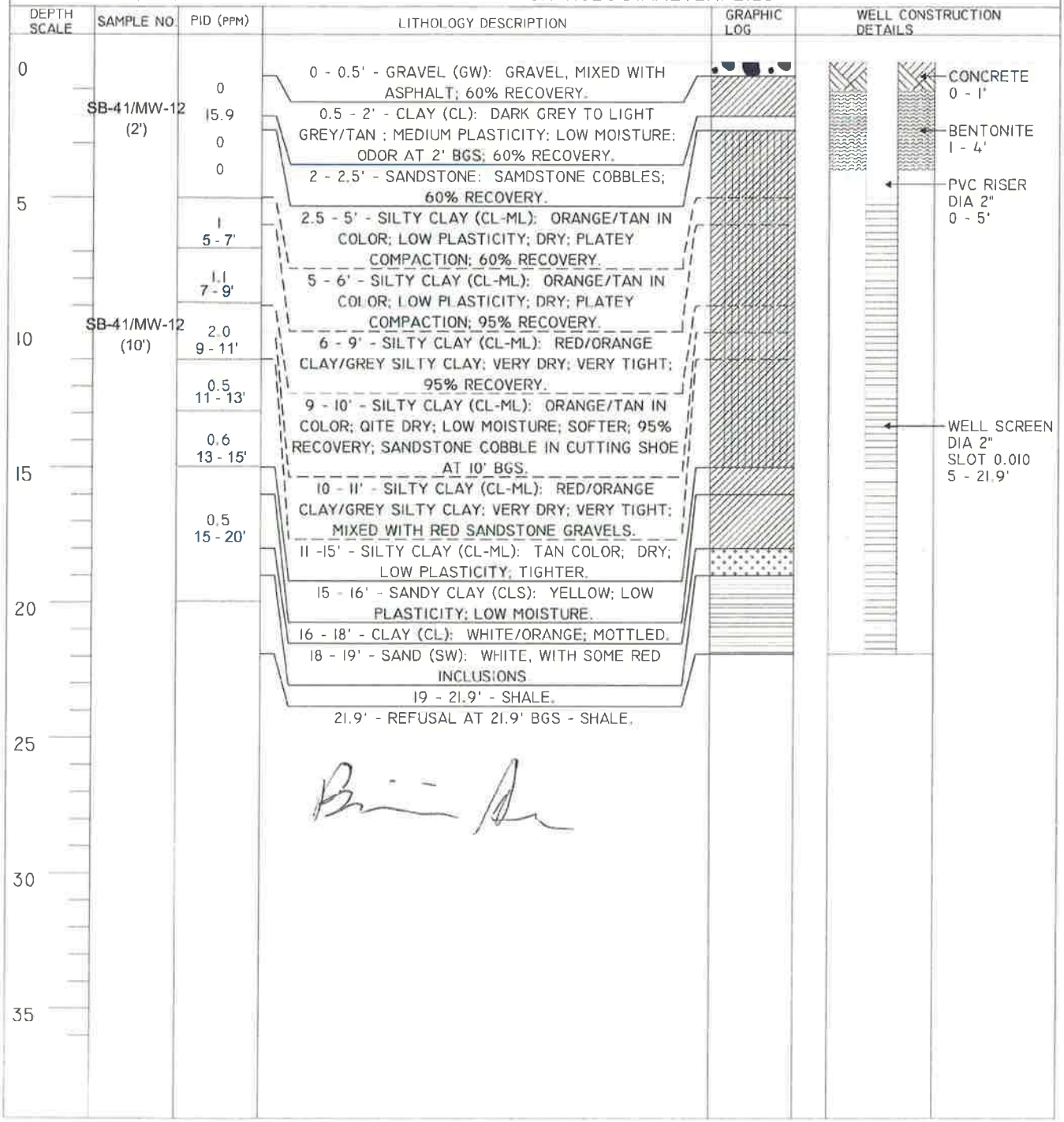
Benjamin A

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-41/MW-12

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 21.9' BGS.
SATURATED ZONE:
TOC ELEVATION:

WEATHER: 40'S/CLOUDY
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH/HSA
OPERATOR: DAMION CANNISTRACI
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 2/20/2017
BOREHOLE DIAMETER: 2.25"



MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-42

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20' BGS.
SATURATED ZONE: N/A

WEATHER: SUN/10'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING
DATE: 1/2/2018
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0		0	0 - 1' - ASPHALT AND SUB-BASE.	
		0	1 - 3' - SILTY CLAY (CL-ML): DARK GREY; LOW PLASTICITY; DRY.	
		0		
		0	3 - 5' - SILTY CLAY (CL-ML): TAN TO YELLOW; MOTTLED; MEDIUM MOISTURE; HIGH PLASTICITY.	
5		0		
		0	5 - 7' - TAN - YELLOW; MOTTLED; LOW MOISTURE; LOW PLASTICITY; 90% RECOVERY FROM 5 TO 10' BGS.	
		0		
		0	7 - 10' - SILTY CLAY (CL-ML): YELLOW - ORANGE; HIGH MOISTURE; HIGH PLASTICITY.	
		0		
10		0		
		0	10 - 12' - SILTY CLAY (CL-ML): TAN - ORANGE; FLAKEY; NO PLASTICITY; NO MOISTURE - DRY; 90% RECOVERY FROM 10 TO 15' BGS.	
		0		
		0	12 - 15' - SILTY CLAY (CL-ML): YELLOW - ORANGE; MEDIUM MOISTURE.	
		1.2		
15		0		
		0	15 - 19.5' - SILTY CLAY (CL-ML): YELLOW - ORANGE; MEDIUM MOISTURE; 80% RECOVERY FROM 15 TO 20' BGS.	
		0		
	SB-42	0		
		2.3		
20		0	19.5 - 20' - SHALE: SHALE BEDROCK.	
			20' - REFUSAL AT 20' BGS - SHALE BEDROCK.	
25				
30				
35				

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: SB-43

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20.5' BGS.
SATURATED ZONE: 19' BGS.

WEATHER: SUN/10'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING
DATE: 1/2/2018
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0			0 - 1' - ASPHALT/SUB-BASE.	
		0	1 - 2' - SILTY CLAY (CL-ML): YELLOW - ORANGE; MEDIUM MOISTURE; MEDIUM PLASTICITY.	
		0	2 - 5' - SILTY CLAY (CL-ML): YELLOW - ORANGE; LOW MOISTURE; LOW PLASTICITY.	
		0		
		0		
5		0	5 - 7' - SILTY CLAY (CL-ML): YELLOW - ORANGE; LOW MOISTURE; LOW PLASTICITY; 90% RECOVERY FROM 5 TO 10' BGS.	
		0		
		0	7 - 10' - SILTY CLAY (CL-ML): YELLOW - ORANGE; HIGH PLASTICITY; MEDIUM MOISTURE CONTENT AT 10' BGS.	
		0		
		0		
10		0	10 - 12' - SILTY CLAY (CL-ML): YELLOW - ORANGE; HIGH PLASTICITY; MEDIUM MOISTURE CONTACT; 95% RECOVERY FROM 10 TO 15' BGS.	
		0		
		0	12 - 14' - SANDY CLAY (CLS): RED - ORANGE; FINE; LIGHTLY MOTTLED.	
		0		
		0		
		0	14 - 15' - CLAY (CH): TAN; HIGH PLASTICITY; HIGH MOISTURE.	
15		0	15 - 16' - SLUFF; 85% RECOVERY FROM 15 TO 20' BGS.	
	SB-43	0	16 - 17' - CLAY (CH): TAN; HIGH PLASTICTY; HIGH MOISTURE BLACK SULFUR ODOR.	
		0	17 - 18' - SANDY CLAY (CLS): GREY; HIGH PLASTICITY.	
		0	18 - 20' - SAND (SW): WELL ROUNDED SAND; SATURATED; NO PLASTICITY; MIXED WITH SANDSTONE GRAVEL; NO ODORS.	
		0		
20		0	20 - 20.5' - SHALE BEDROCK.	
			20.5' - REFUSAL AT 20.5' BGS - SHALE BEDROCK.	
25				
30				
35				

MOUNTAIN RESEARCH, LLC

MOUNTAIN RESEARCH, LLC
SOIL BORING LOG

BORING NO.: **SB-44**

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: TERMINATED - 14' BGS.
SATURATED ZONE: N/A

WEATHER: 20'S/PARTLY CLOUDY
LOGGED BY: MIKE CROWE
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING
DATE: 1/17/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG
0			0 - 0.25' - TOPSOIL/GRASS.	
			0.25 - 1.25' - CLAY (CL): GREY TO YELOW/BROWN; TRACE SILT; MOIST.	
		0.2 (0-2')	1.25 - 4' - SILTY CLAY (CL-ML): YELLOW/BROW; MOTTLING FROM 2.75 TO 4' BGS; TRACE SILTSTONE FRAGMENTS; ANGULAR; SLIGHTLY MOIST.	
		0.1 (2-4')	4 - 8' - SILTY/GRAVELLY CLAY (CL-ML): YELLOW/BROWN TO DARK YELLOW/BROWN; SILTY AND GRAVELLY CLAY - DARK YELLOW/BROWN SILTSTONE FRAGMENTS, ANGULAR; SOME MOTTLING THROUGHOUT; 4' RECOVERY FROM 4 TO 8' BGS.	
5		0.3 (4-6')		
		0.4 (6-8')		
			8 - 12' - SILTY/GRAVELLY CLAY (CL-ML): YELLOW/BROWN TO DARK YELLOW/BROWN; SILTY AND GRAVELLY - DARK YELLOW/BROWN SILTSTONE FRAGMENTS, ANGULAR; SOME MOTTLING THROUGHOUT; SLIGHTLY MOIST; 4' RECOVERY FROM 8 TO 12' BGS.	
10	SB-44	1.3 (8-10')		
	SB-44	4.4 (10-12')		
			12 - 13' - DARK BROWN/RED/BLACK ORGANIC SILTS; TRACE PLANT MATTER; SLIGHTLY MOIST; 2' RECOVERY FROM 12 TO 14' BGS.	
	SB-44	5.7 (12-14')	13 - 14' - CLAYEY SAND (SC): DARK GREY; TRACE ORGANIC MATTER; ORGANIC ODOR.	
15			14' - TERMINATED AT 14' BGS.	
20				
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MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-45/MW-14

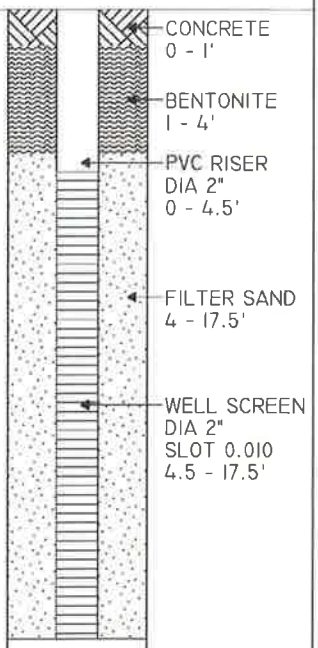
PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 18' BGS.
SATURATED ZONE: 13' BGS.
TOC ELEVATION:

WEATHER: TEEN'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 1/3/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0	0 - 2' - FILL: BLACK ORGANIC SOIL; HIGH MOISTURE CONTENT; PERCHED; SATURATED AT 1.5' BGS; 100% RECOVERY FROM 0 TO 5' BGS.
		0	
		0	2 - 5' - CLAY (CH): YELLOW - ORANGE; MOTTLED; DRY; HIGH PLASTICITY.
		0	
5		0	5 - 10' - CLAY (CH): YELLOW - ORANGE; HIGH MOISTURE CONTENT; MIXED WITH ANGULAR SANDSTONE AND SHALE GRAVEL FROM 6 TO 7' BGS; VERY HIGH PLASTICITY TO 10' BGS.
		0	
		0	
		0	
		0	
10		0	10 - 13' - CLAY (CH): YELLOW - ORANGE; HIGH MOISTURE CONTENT; HIGH PLASTICITY.
		0	
		0	
	SB-45/MW-14	0	13 - 13.5' - CLAY (CL): YELLOW - ORANGE; SATURATED.
		0	
15		0	13.5 - 15' - CLAY (CL): YELLOW - GREY; MOTTLED; DRY.
		0	15 - 16' - CLAY (CL): WET.
		0	16 - 17.5 - SAND (SW): SATURATED.
		0	17.5 - 18' - BEDROCK SHALE.
			18' - REFUSAL AT 18' BGS - BEDROCK SHALE.
20			
25			
30			
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS



MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-46/MW-15

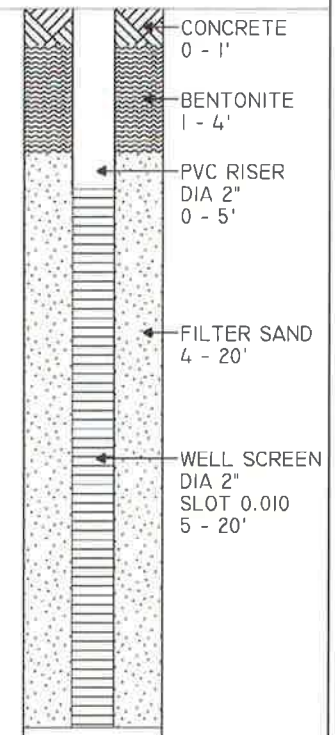
PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 20.5' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: OVERCAST/TEEN'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 1/4/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0	0 - 0.1' - ASPHALT: DEGRADED.
		0	0.1 - 0.5' - FILL: ORGANIC SOIL.
		0	0.5 - 1' - SILTY CLAY (CL-ML): TAN; DRY; LOW TO NO PLASTICITY.
		0	1 - 4' - SILTY CLAY (CL-ML): YELLOW - ORANGE; MEDIUM MOISTURE; LOW TO MEDIUM PLASTICITY.
5		0	4 - 5' - SILTY CLAY (CL-ML): ORANGE; DRY; MIXED WITH ANGULAR, FINE SILTSTONE GRAVEL.
		0	5 - 8' - CLAY (CL): ORANGE - RED - YELLOW; LIGHTLY MOTTLED; MEDIUM PLASTICITY; LOW MOISTURE; 100% RECOVERY FROM 5 TO 10' BGS.
		0	8 - 8.5' - SANDSTONE: SANDSTONE COBBLES.
10		0	8.5 - 10' - CLAY (CL): YELLOW - ORANGE; LOW MOISTURE; LOW PLASTICITY; MOTTLED.
		0	10 - 15' - CLAY (CL): YELLOW - ORANGE; LOW MOISTURE; LOW PLASTICITY.
		0	
		0	
15		0	15 - 16' - CLAY (CL): YELLOW - ORANGE; LOW MOISTURE; LOW PLASTICITY; 100 RECOVERY FROM 15 TO 20' BGS.
	SB-46/MW-15	0	
		0	16 - 18' - SANDY CLAY (CLS): GREY - YELLOW; FINE; DRY; HEAVILY MOTTLED.
		0	18 - 20' - SILTY CLAY (CL-ML): YELLOW - ORANGE; HIGH MOISTURE CONENT; LOW TO MEDIUM PLASTICITY.
20		0	20 - 20.5' - SHALE BEDROCK.
			20.5' - REFUSAL AT 20.5' BGS.
25			
30			
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS



MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-47/PZ-I

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL-7.5'/TERMINATED-13' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: OVERCAST/TEEN'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/PW
DATE: 1/4/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0	0 - 1' - FILL: DARK BLACK ORGANIC SOIL.
		0	1 - 3' - CLAY (CH): YELLOW/ORANGE; HIGH PLASTICITY; MEDIUM TO HIGH MOISTURE CONTENT.
		0	
		0	3 - 5' - BROWN/GREY I COLOR; MEDIUM MOISTURE; NO PLASTICITY; VERY LIGHT MOTTLING.
5		0	
		0	5 - 7.5' - GRAVELLY CLAY (CLG): BROWN/GREY; MEDIUM MOISTURE; NO PLASTICITY; MIXED WITH SHALE GRAVEL; 80% RECOVERY FROM 5 TO 10' BGS; REFUSAL AT 7.5' BGS.
	SB-47/PZ-I	0	
		0	
		0	7.5 - 13' - WEATHERED SHALE.
10		0	
15			13' - TERMINATED AT 13' BGS.
20			
25			
30			
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS

- CONCRETE 0 - 1'
- BENTONITE 1 - 2.5'
- PVC RISER DIA 2" 0 - 3'
- FILTER SAND 2.5 - 8'
- WELL SCREEN DIA 2" SLOT 0.010 3 - 8'

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-48/PZ-2BR

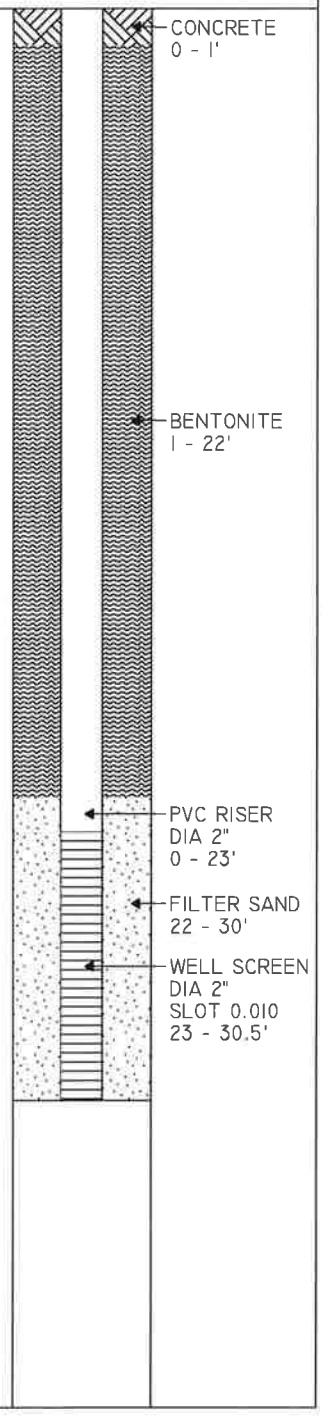
PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: TERMINATED AT 30.5' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: RAIN/50'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/PW
DATE: 1/9/18
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0	SB-48/ PZ-2BR	0	0 - 0.25 - FILL: GRASS/ORGANIC SOIL.
		0	0.25 - 1' - SILTY CLAY (CL-ML): TAN TO GREY; MEDIUM PLASTICITY; COARSE.
		0	1 - 2' - SILTY CLAY (CL-ML): ORANGE/YELLOW; MEDIUM PLASTICITY; MOTTLED.
		0	2 - 4' - SANDY CLAY (CLS): BROWN/ORANGE; MIXED WITH ANGULAR TO SUB-ANGULAR GRAVEL; LOW MOISTURE TO DRY.
5		0	4 - 4.5' - SANDY CLAY (CLS): BROWN TO ORANGE; MEDIUM GRAINED; MIXED WITH ANGULAR TO SUB-ANGULAR GRAVEL; MEDIUM MOISTURE.
		0	4.5 - 5' - SANDY CLAY (CLS): BROWN TO ORANGE; MEDIUM GRAINED; MIXED WITH ANGULAR GRAVEL; MEDIUM TO HIGH MOISTURE.
			5 - 6' - SHALE: GREY; WEATHERED.
10			6 - 18' - SHALE: BLACK; WEATHERED; FAIRLY SOFT; WATER AT 11' BGS; AUGERED TO 18' BGS.
15			
20			18 - 25' - SHALE: VERY HARD BEDROCK SHALE; COMPETENT ROCK; WATER AT 18.5' BGS; VISIBLE SHEEN ON WATER.
25			25 - 30.5' - SHALE: BLACK; HARD.
30			30.5' - TERMINATED AT 30.5' BGS.
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS



MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-49/MW-18

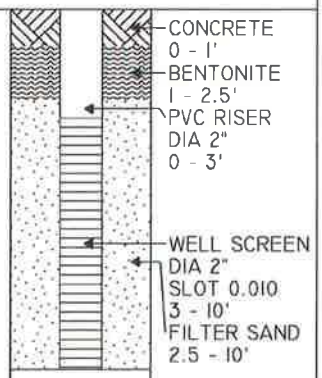
PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 10' BGS.
SATURATED ZONE: 10' BGS.
TOC ELEVATION:

WEATHER: RAIN/50'S
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 1/12/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0	0 - 0.25' - FILL: ORGANIC SOIL.
		0	0.25 - 1.5' - CLAY (CL-CH): YELLOW - ORANGE; MEDIUM TO HIGH PLASTICITY; HIGH MOISTURE.
		0	1.5 - 3.5' - CLAY (CL-CH): YELLOW - ORANGE; HIGH MOISTURE; MEDIUM TO HIGH PLASTICITY; MOTTLED.
		0	
5		0	3.5 - 4' - GRAVELLY CLAY (CLG): ORANGE - YELLOW; LOW MOISTURE; LOW PLASTICITY; MIXED WITH ANGULAR TO SUBANGULAR GRAVEL.
		0	4 - 6' - GRAVELLY CLAY (CLG): ORANGE - YELLOW; LOW TO MEDIUM MOISTURE; LOW TO MEDIUM PLASTICITY; MOTTLED CLAY - MIXED WITH ANGULAR TO SUBANGULAR GRAVEL.
		0	
10	SB-49/MW-18	0	6 - 8' - GRAVELLY CLAY (CLG): ORANGE - YELLOW; HIGH MOISTURE; MEDIUM PLASTICITY; MOTTLED CLAY, MIXED WITH ANGULAR TO SUBANGULAR GRAVEL; 70% RECOERY FROM 6 TO 10' BGS.
			8 - 10' - GRAVELLY CLAY (CLG): ORANGE - YELLOW; LOW PLASTICITY; LOW MOISTURE; MOTTLED CLAY, MIXED WITH ANGULAR TO SUBANGULAR GRAVEL; TRANSITIONS TO WHITE DRY SILTY CLAY, MIXED WITH ANGULAR TO SUBANGULAR GRAVEL; TRANSITIONS TO GREY SATURATED SHALE.
15			
20			10' - REFUSAL AT 10' BGS - GREY SATURATED SHALE.
25			
30			
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS



MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-50/MW-17

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 9.5' BGS.
SATURATED ZONE: N/A
TOC ELEVATION:

WEATHER: SNOW
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 1/15/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION	GRAPHIC LOG	WELL CONSTRUCTION DETAILS
0		0	0 - 0.25' - FILL: GRASS/ORGANICS - SATURATED VIA SURFACE WATER.		CONCRETE 0 - 1'
		0	0.25 - 2' - SILTY CLAY (CL-ML): YELLOW - ORANGE; MEDIUM TO HIGH MOISTURE; MEDIUM PLASTICITY.		BENTONITE 1 - 2.5'
		0			PVC RISER DIA 2" 0 - 3'
		0	2 - 4' - SILTY CLAY (CL-ML): YELLOW - ORANGE; NO PLASTICITY; LOW MOISTURE.		
5		0			FILTER SAND 2.5 - 10'
		0	4 - 8' - SILTY CLAY (CL-ML): YELLOW - ORANGE; MOTTLED FROM 5 - 8' BGS; HIGHER PLASTICITY AT 8' BGS.		
		0			WELL SCREEN DIA 2" SLOT 0.010 3 - 10'
	SB-50/MW-17	0	8 - 9.5' - SILTY CLAY (CL-ML): YELLOW - ORANGE; HIGH PLASTICITY; FINE SANDY CLAY.		
10		0	9.5' - REFUSAL AT 9.5' BGS.		
15					
20					
25					
30					
35					

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: SB-51/MW-16

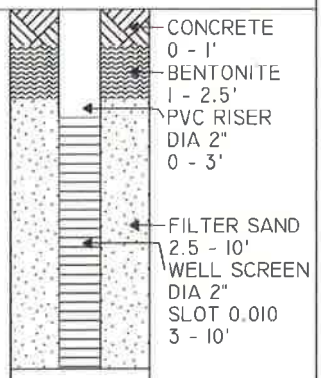
PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL AT 10' BGS.
SATURATED ZONE: 8 - 10' BGS.
TOC ELEVATION:

WEATHER: SNOW
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 1/16/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0	0 - 0.5' - FILL: ORGANICS.
		0	0.5 - 1.5' - SILTY CLAY (CL-ML): PERCHED SATURATION.
		0	1.5 - 4' - SILTY TO FINE SANDY CLAY; MEDIUM MOISTURE; LOW PLASTICITY.
		0	
5		0	4 - 8' - CLAY (CH): YELLOW - ORANGE; MOTTLED; MEDIUM MOISTURE; VERY HIGH PLASTICITY AT 8' BGS; TRANSITION TO MOTTLED SANDY CLAY - NO PLASTICITY.
		0	
	SB-51/MW-16	0	
		0	
		0	8 - 9' - SANDY CLAY (CLS): SATURATED.
		0	9' - REFUSAL AT 9' BGS - SHALE BEDROCK.
10		0	
15			
20			
25			
30			
35			

GRAPHIC LOG

WELL CONSTRUCTION DETAILS



MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

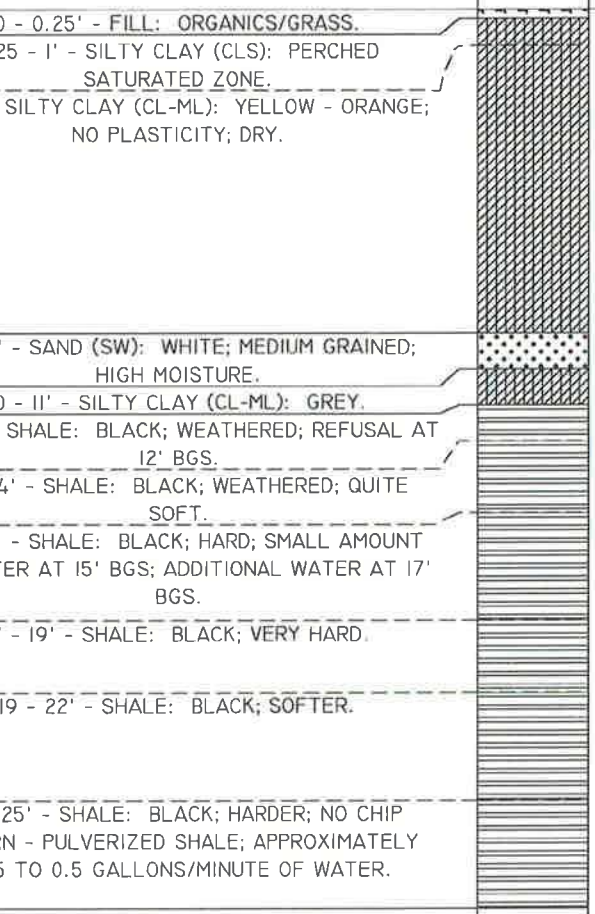
WELL NO.: SB-52/MW-19BR

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL-12'/TERMINATED-25' BGS.
SATURATED ZONE: 14'/17'/20' BGS.
TOC ELEVATION:

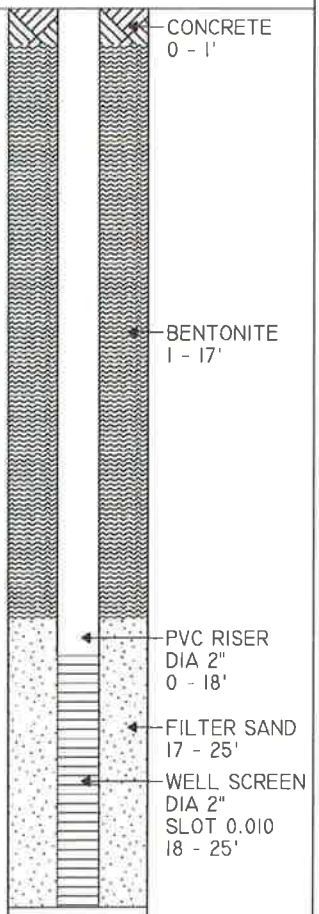
WEATHER: SNOW
LOGGED BY: BEN AZAR
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: SOIL BORING/MW
DATE: 1/16-17/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		0	0 - 0.25' - FILL: ORGANICS/GRASS.
		0	0.25 - 1' - SILTY CLAY (CLS): PERCHED SATURATED ZONE.
		0	1 - 9' - SILTY CLAY (CL-ML): YELLOW - ORANGE; NO PLASTICITY; DRY.
		0	
5		0	
		0	
		0	
	SB-52/MW-19BR	0	
		0	9 - 10' - SAND (SW): WHITE; MEDIUM GRAINED; HIGH MOISTURE.
10		0	10 - 11' - SILTY CLAY (CL-ML): GREY.
		0	11 - 12' - SHALE: BLACK; WEATHERED; REFUSAL AT 12' BGS.
			12 - 14' - SHALE: BLACK; WEATHERED; QUITE SOFT.
15			14 - 17' - SHALE: BLACK; HARD; SMALL AMOUNT OF WATER AT 15' BGS; ADDITIONAL WATER AT 17' BGS.
			17 - 19' - SHALE: BLACK; VERY HARD.
			19 - 22' - SHALE: BLACK; SOFTER.
20			
			22 - 25' - SHALE: BLACK; HARDER; NO CHIP RETURN - PULVERIZED SHALE; APPROXIMATELY 0.25 TO 0.5 GALLONS/MINUTE OF WATER.
25			25' - TERMINATED AT 25' BGS.
30			
35			

GRAPHIC LOG



WELL CONSTRUCTION DETAILS



MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: MW-20BR

PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: REFUSAL - 18'/TERMINATED - 29.5' BGS.
SATURATED ZONE: 25' BGS.
TOC ELEVATION:

WEATHER: 20'S/SUNNY
LOGGED BY: ADAM KOVAC
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: MONITORING WELL
DATE: 1/18/2018
BOREHOLE DIAMETER: 4.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0			0 - 0.75' - TOPSOIL: TOPSOIL, MIXED WITH GRASS AND ROOTS; 3.25' RECOVERY FROM 0 TO 4' BGS.
		0.3 (0-2')	0.75 - 2' - SILTY CLAY (CL-ML): YELLOW/BROWN; MOIST.
		0.4 (2-4')	2 - 4' - GRAVELLY CLAY (CLG): YELLOW/BROWN; SILTY AND GRAVELLY (YELLOW/BROWN ANUGLAR SULSTONE FRAGMENTS); LIGHT GREY MOTTLING; SLIGHTLY MOIST.
5	MW-20BR		
	MW-20BR	792.2 (4-6')	4 - 8' - GRAVELLY CLAY (CLG): YELLOW/BROWN; SILTY AND GRAVELLY (YELLOW/BROWN ANUGLAR SULSTONE FRAGMENTS); LIGHT GREY MOTTLING; SLIGHTLY MOIST; 4' RECOVERY FROM 4 TO 8' BGS; MODERATE HYDROCARBON ODOR.
	MW-20BR	775.8 (6-8')	
10		30.9 (8-10')	8 - 10' - GRAVELLY CLAY (CLG): YELLOW/BROWN; SILTY AND GRAVELLY (YELLOW/BROWN ANUGLAR SULSTONE FRAGMENTS); LIGHT GREY MOTTLING; SLIGHTLY MOIST.
		9.6 (10-12')	10 - 12' - CLAY (CL): YELLOW/BROWN TO LIGHT GREY; TIGHT; PLASTIC' SLIGHTLY MOIST.
		8.2 (12-14')	12 - 18' - CLAY (CL): BROWN TO DARK GREY; STIFF; PLASTIC; SLIGHTLY MOIST; AUGERED TO REFUSAL AT 18' BGS.
15			
			18 - 23' - SHALE: BLACK; FAIRLY SOFT.
20			
			23 - 26' - SHALE: GREY/BROWN; HARDER ROCK; LOST DUST AT 24.5' BGS.; SATURATED AT 25' BGS; FRACTURE AT 25.5' BGS.
25			26 - 29.5' BGS - SHALE: HARD BEDROCK.
			29.5' - TERMINATED AT 29.5' BGS.
30			
35			

Adam Kovac

3/16/18

MOUNTAIN RESEARCH, LLC
MONITORING WELL LOG

WELL NO.: PZ-3BR

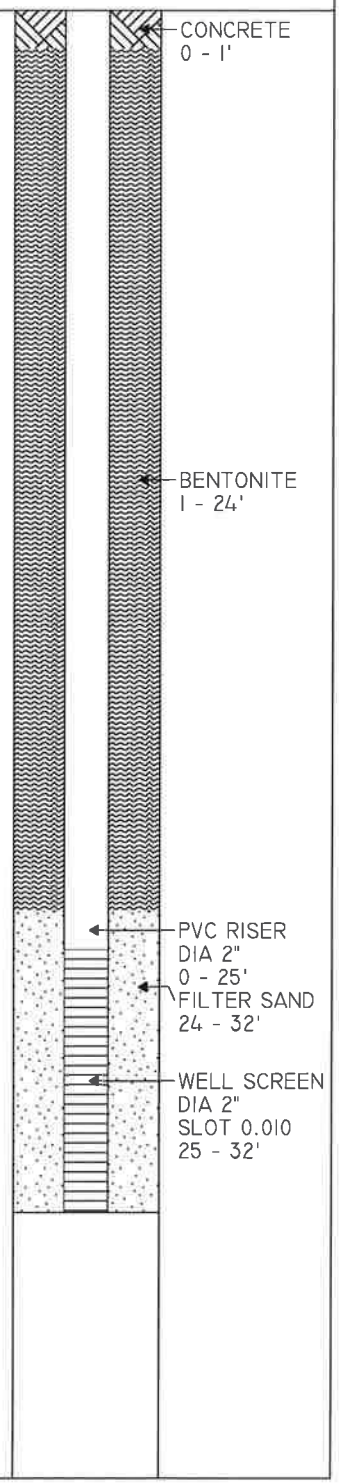
PROJECT NO.: 4559.15.01
PROJECT NAME: BORING/WELL INSTALL
CLIENT: POINT STORE
LOCATION: MIFFLIN COUNTY, PA
DEPTH: TERMINATED AT 32' BGS.
SATURATED ZONE: 9 - 10.5' / 24' BGS.
TOC ELEVATION:

WEATHER: CLEAR/30'S
LOGGED BY: ADAM KOVAC
DRILLING METHOD: DIRECT PUSH
OPERATOR: DREW SNYDER
BOREHOLE COMPLETION: PIEZOMETER WELL
DATE: 1/19/2018
BOREHOLE DIAMETER: 2.25"

DEPTH SCALE	SAMPLE NO.	PID (PPM)	LITHOLOGY DESCRIPTION
0		21	0 - 0.5' - ASPHALT: MIXED WITH SUB-BASE.
		43	0.5 - 2.5' - GRAVEL (GW): LIMESTONE GRAVEL.
	PZ-3BR	177	2.5 - 9' - SILTY CLAY (CL-ML): BROWN/GREY/ORANGE; HIGHLY MOTTLED.
5		56	
		62	
		75	
		18	
	PZ-3BR	112	
		67	9 - 10.5' - SAND (SW): SATURATED; HEAVY ODORS; STAINING.
10		92	10.5 - 12' - SHALE: BROWN/GREY; MOTTLED; DRY.
		61	12 - 23' - CLAY (CL): BROWN/ORANGE; FINE; MIXED WITH DRILL CUTTINGS; REFUSAL AT 22' BGS - BLACK SHALE.
15			
20			
			23 - 24' - SHALE: BLACK/GREY; COMPETENT BEDROCK.
25			24 - 26' - FRACTURE ZONE - SATURATED AT 24' BGS.
			26 - 32' - SHALE: BLACK; COMPETENT ROCK
30			
			32' - TERMINATED AT 32' BGS.
35			

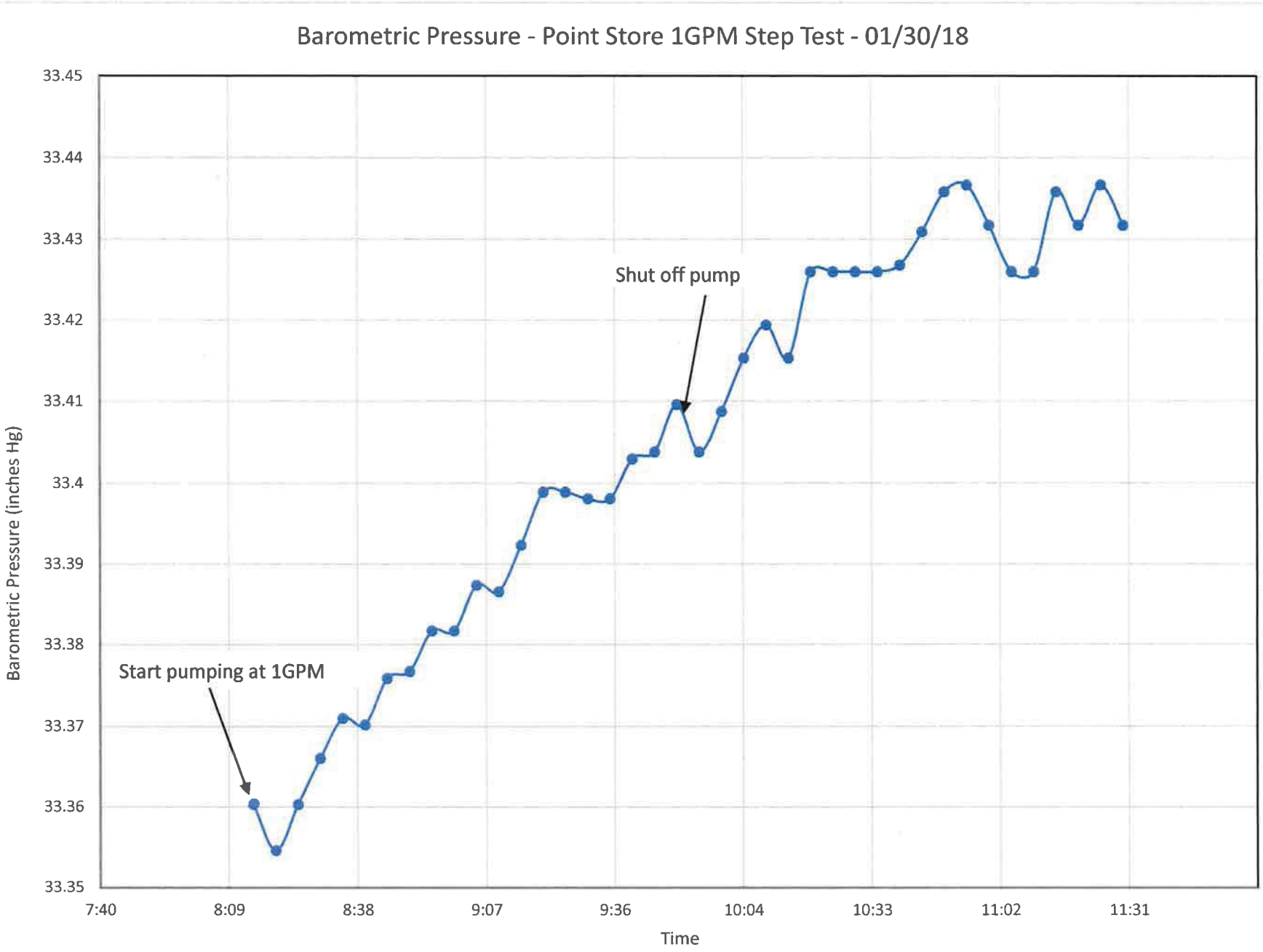
Adam Kovac
3/16/18

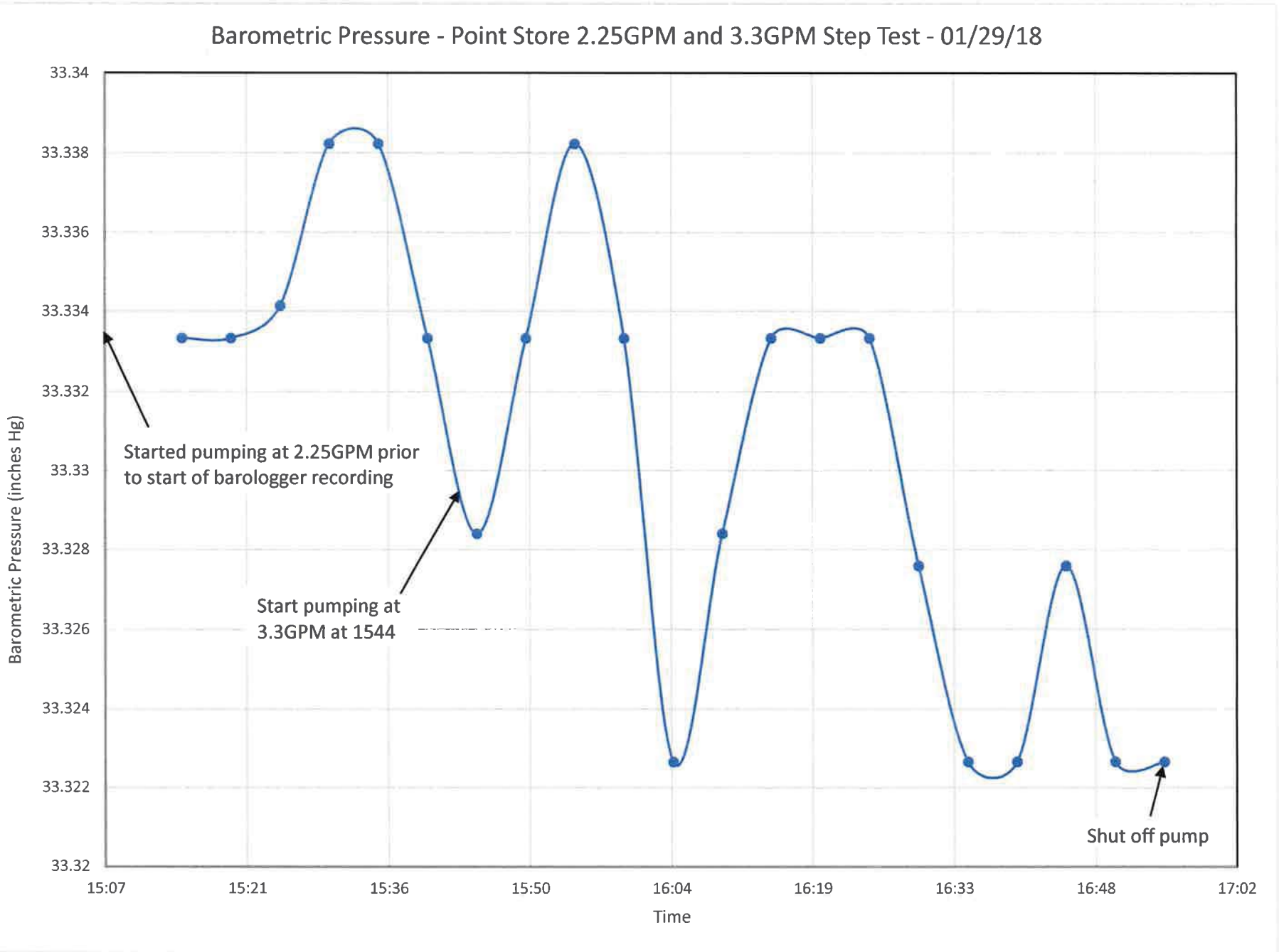
WELL CONSTRUCTION DETAILS

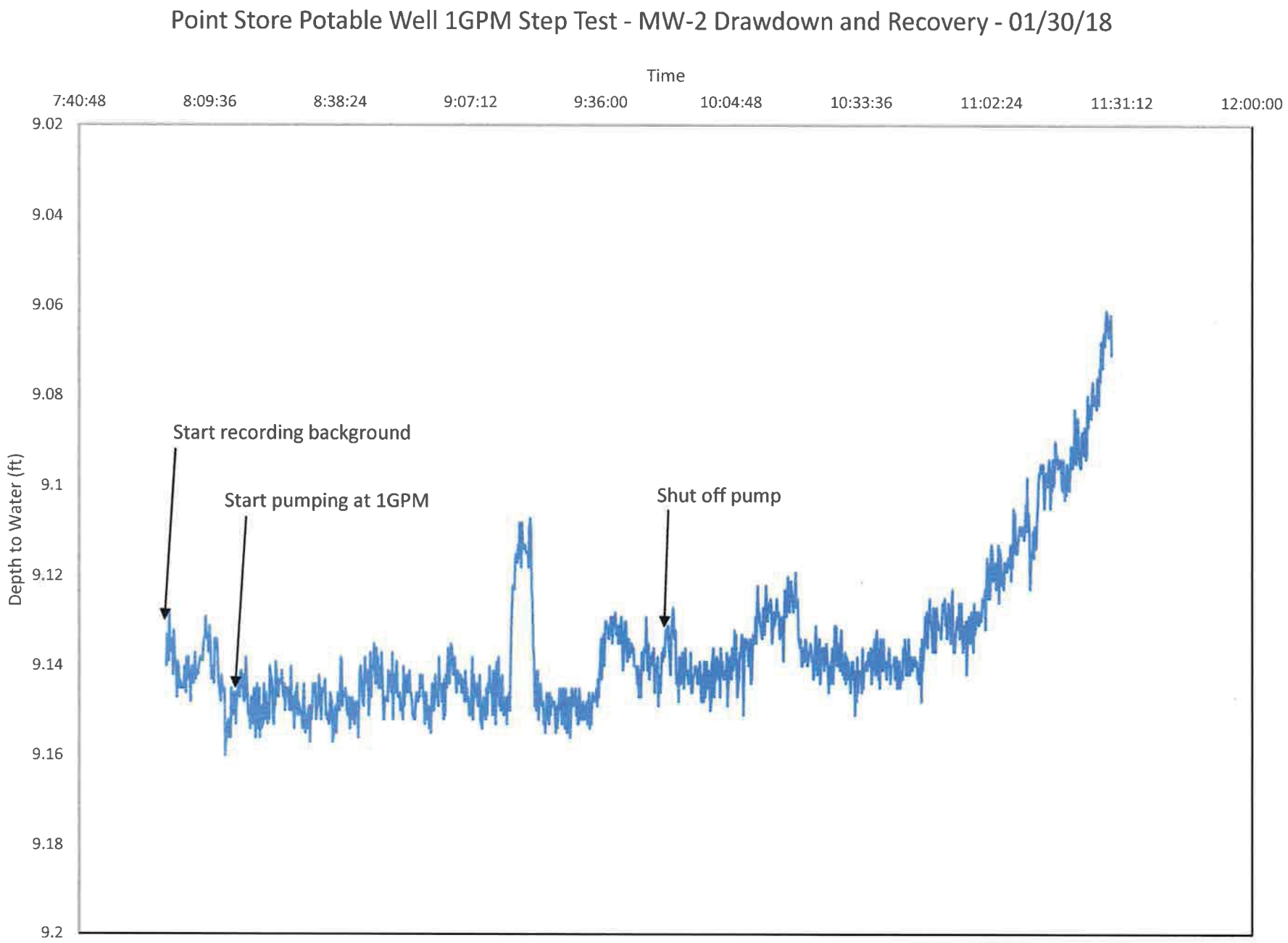


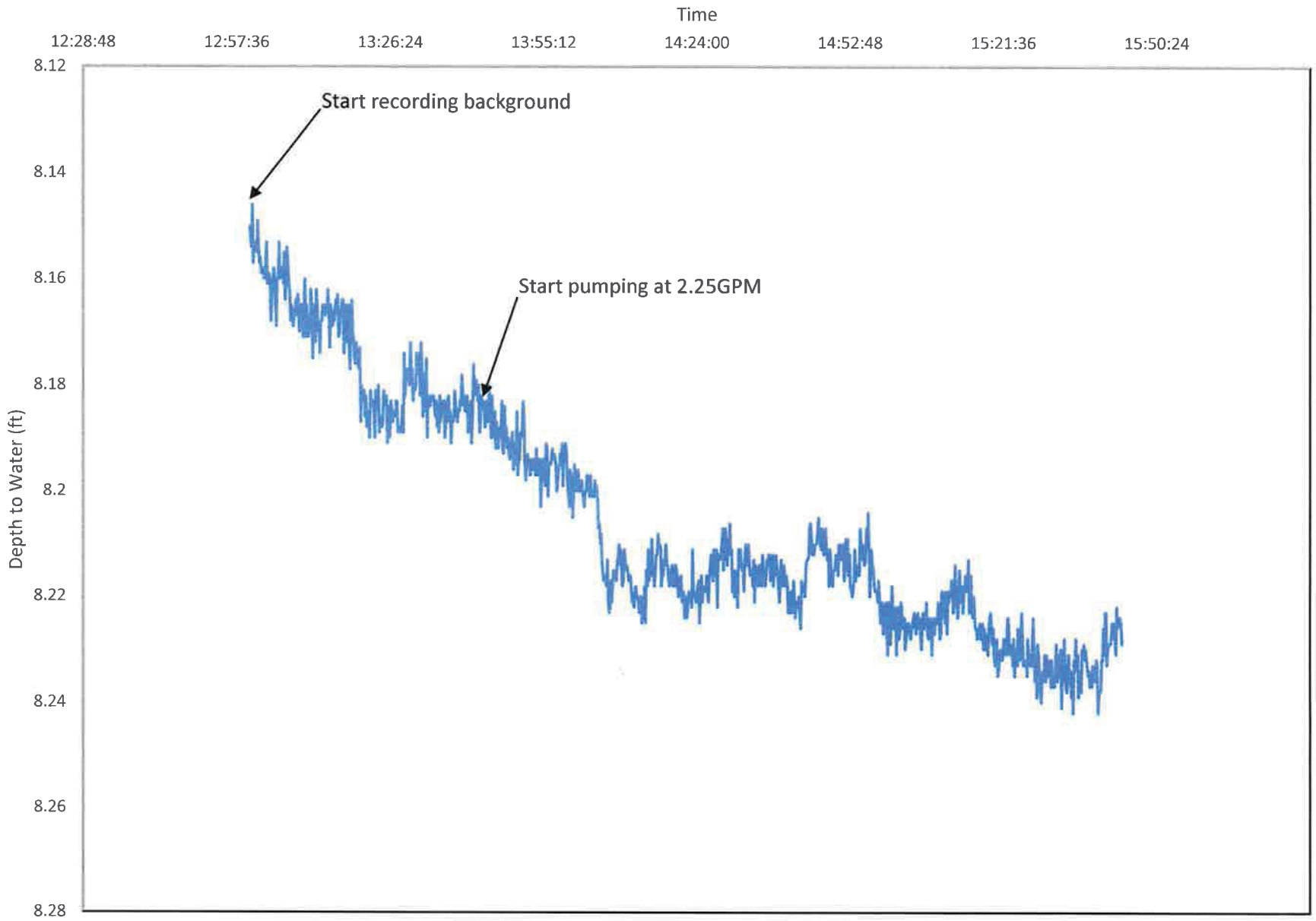
APPENDIX E

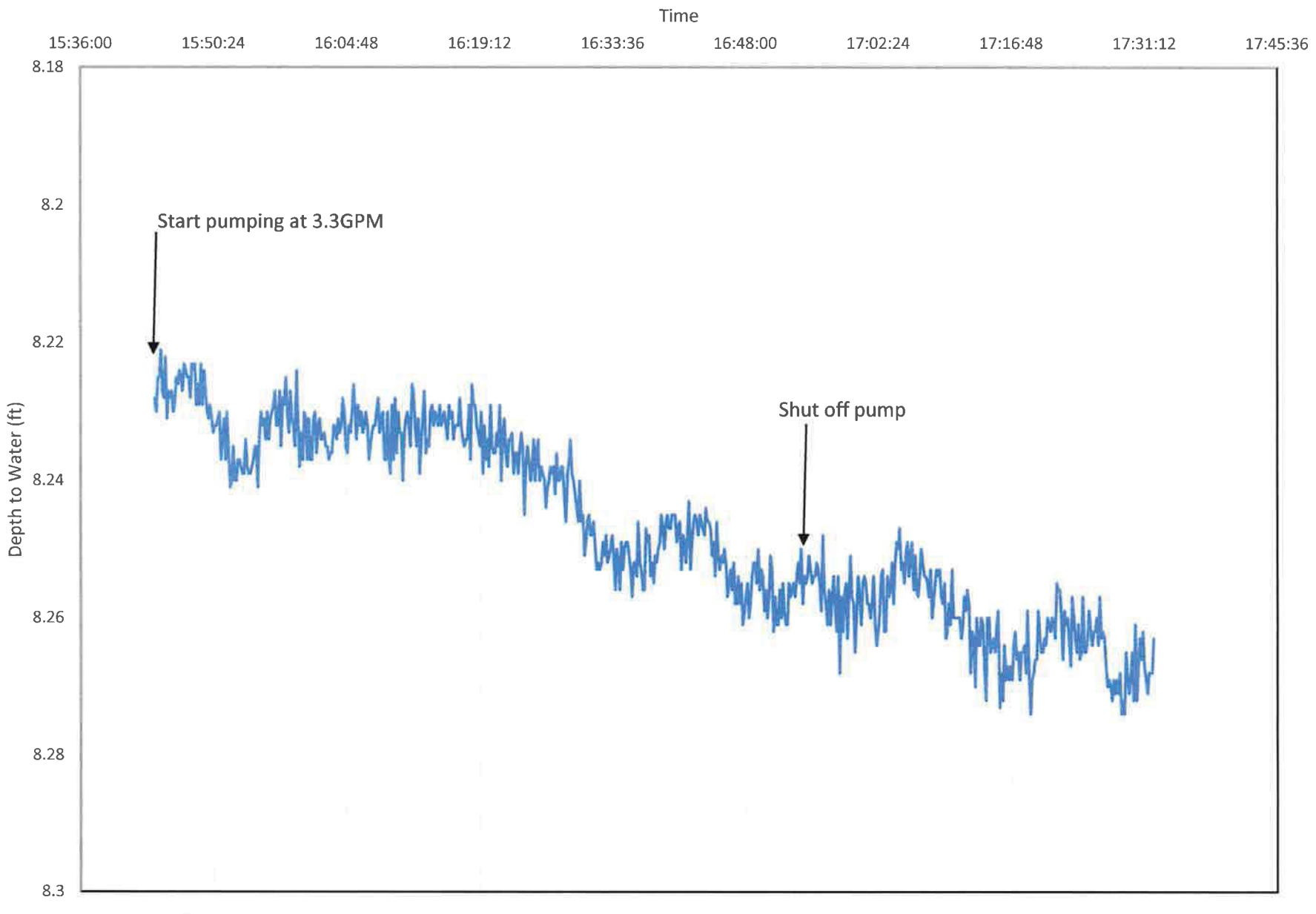
STEP TESTING BAROMETRIC AND DRAWDOWN CHARTS


Barometric Pressure - Point Store 1GPM Step Test - 01/30/18
Barometric Pressure (inches Hg)
33.45
33.44
33.43
33.42
33.41
33.4
33.39
33.38
33.37
33.36
33.35
Shut off pump
Start pumping at 1GPM
7:40
8:09
8:38
9:07
9:36
10:04
10:33
11:02
11:31
Time

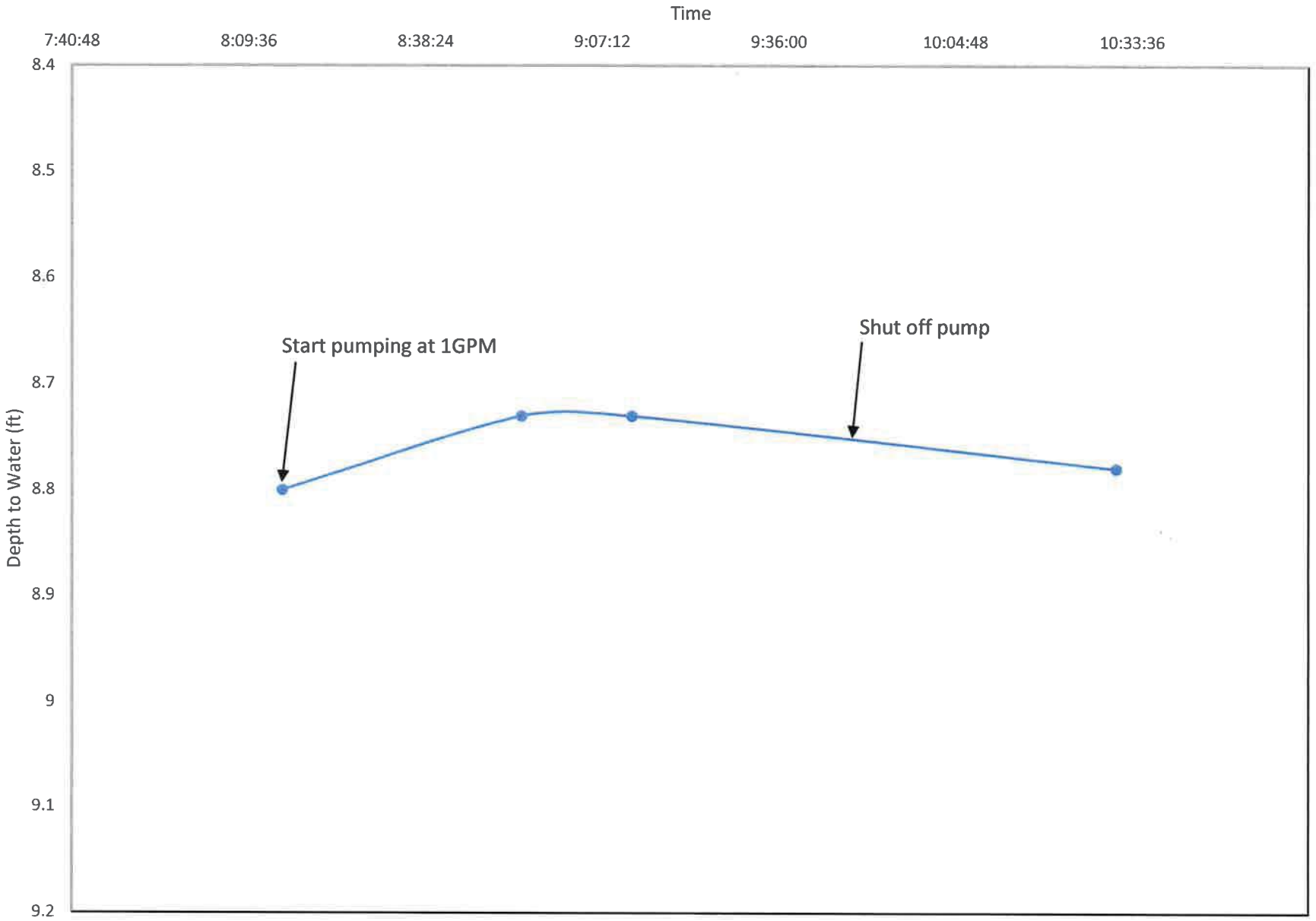

Barometric Pressure - Point Store 2.25GPM and 3.3GPM Step Test - 01/29/18
Barometric Pressure (inches Hg)
33.34
33.338
33.336
33.334
33.332
33.33
33.328
33.326
33.324
33.322
33.32
15:07
15:21
15:36
15:50
16:04
16:19
16:33
16:48
17:02
Time
Started pumping at 2.25GPM prior to start of barologger recording
Start pumping at 3.3GPM at 1544
Shut off pump


Point Store Potable Well 1GPM Step Test - MW-2 Drawdown and Recovery - 01/30/18
Time
7:40:48
8:09:36
8:38:24
9:07:12
9:36:00
10:04:48
10:33:36
11:02:24
11:31:12
12:00:00
Depth to Water (ft)
9.02
9.04
9.06
9.08
9.1
9.12
9.14
9.16
9.18
9.2
Start recording background
Start pumping at 1GPM
Shut off pump

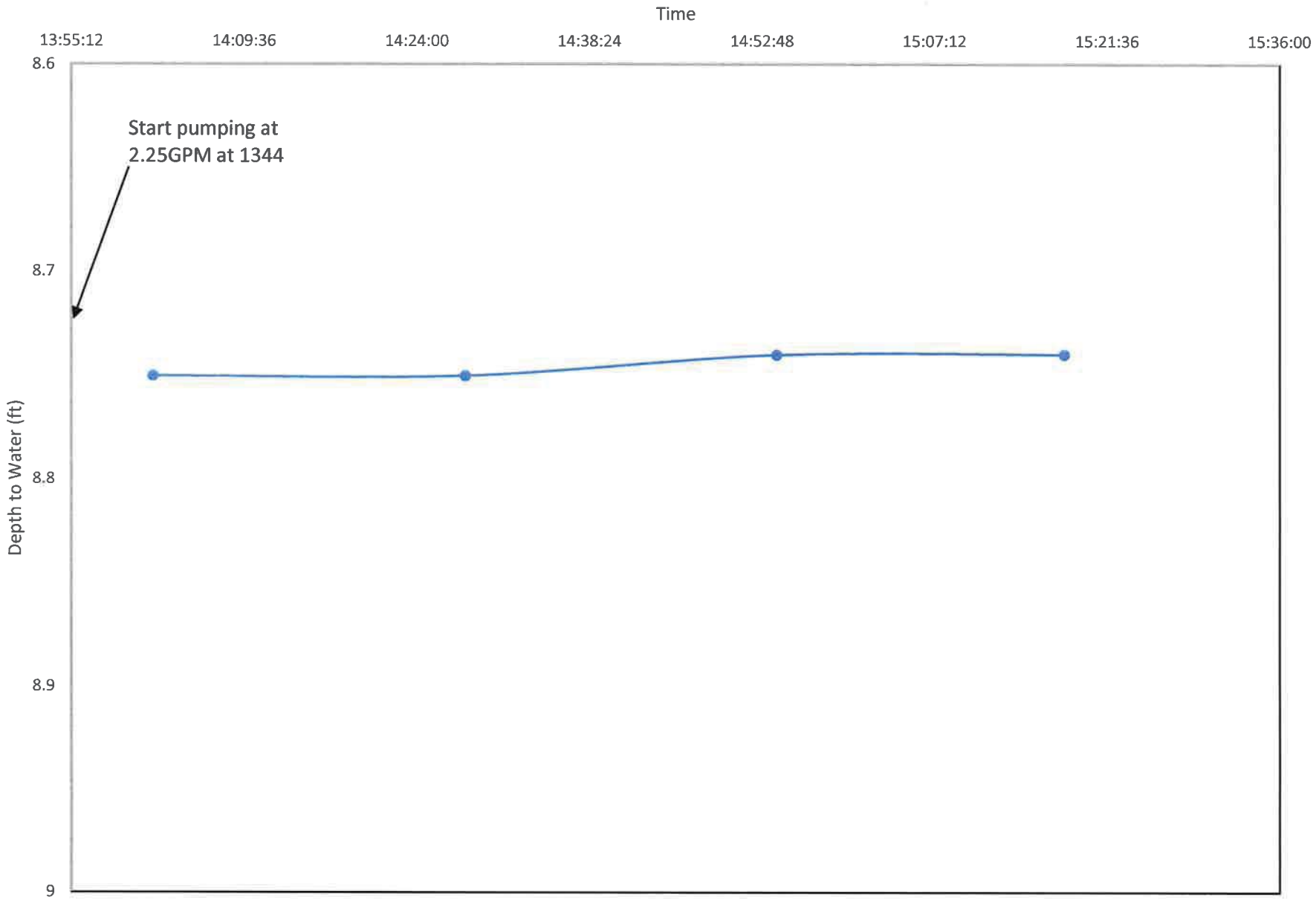

Point Store Potable Well 2.25GPM Step Test - MW-2 Drawdown - 01/29/18
Time
12:28:48
12:57:36
13:26:24
13:55:12
14:24:00
14:52:48
15:21:36
15:50:24
Depth to Water (ft)
8.12
8.14
8.16
8.18
8.2
8.22
8.24
8.26
8.28
Start recording background
Start pumping at 2.25GPM


Point Store Potable Well 3.3GPM Step Test - MW-2 Drawdown and Recovery - 01/29/18
Time
15:36:00
15:50:24
16:04:48
16:19:12
16:33:36
16:48:00
17:02:24
17:16:48
17:31:12
17:45:36
Depth to Water (ft)
8.18
8.2
8.22
8.24
8.26
8.28
8.3
Start pumping at 3.3GPM
Shut off pump

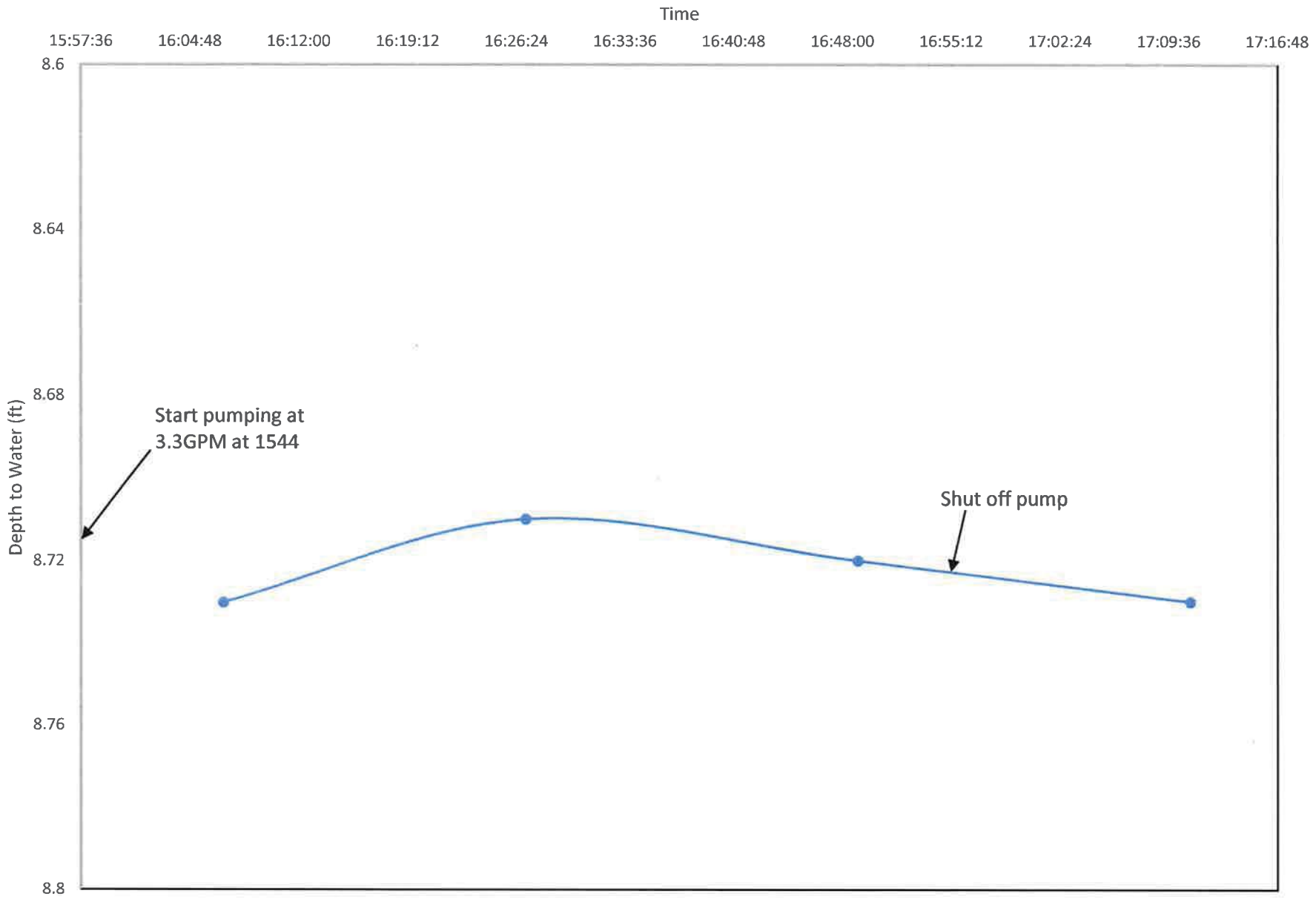
Point Store Potable Well 1GPM Step Test - MW-4 Drawdown and Recovery - 01/30/18



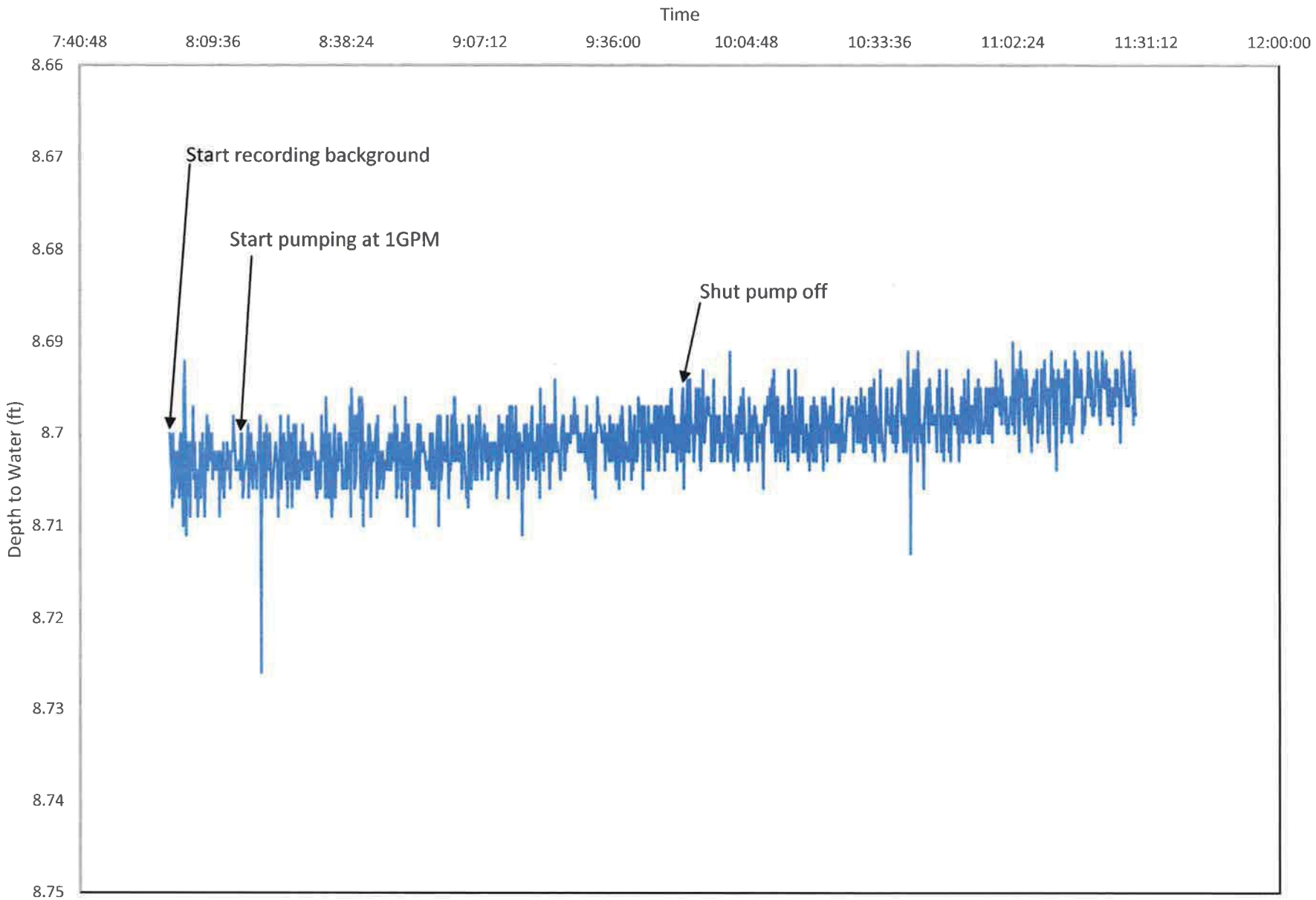
Point Store Potable Well 2.25GPM Step Test - MW-4 Drawdown - 01/29/18

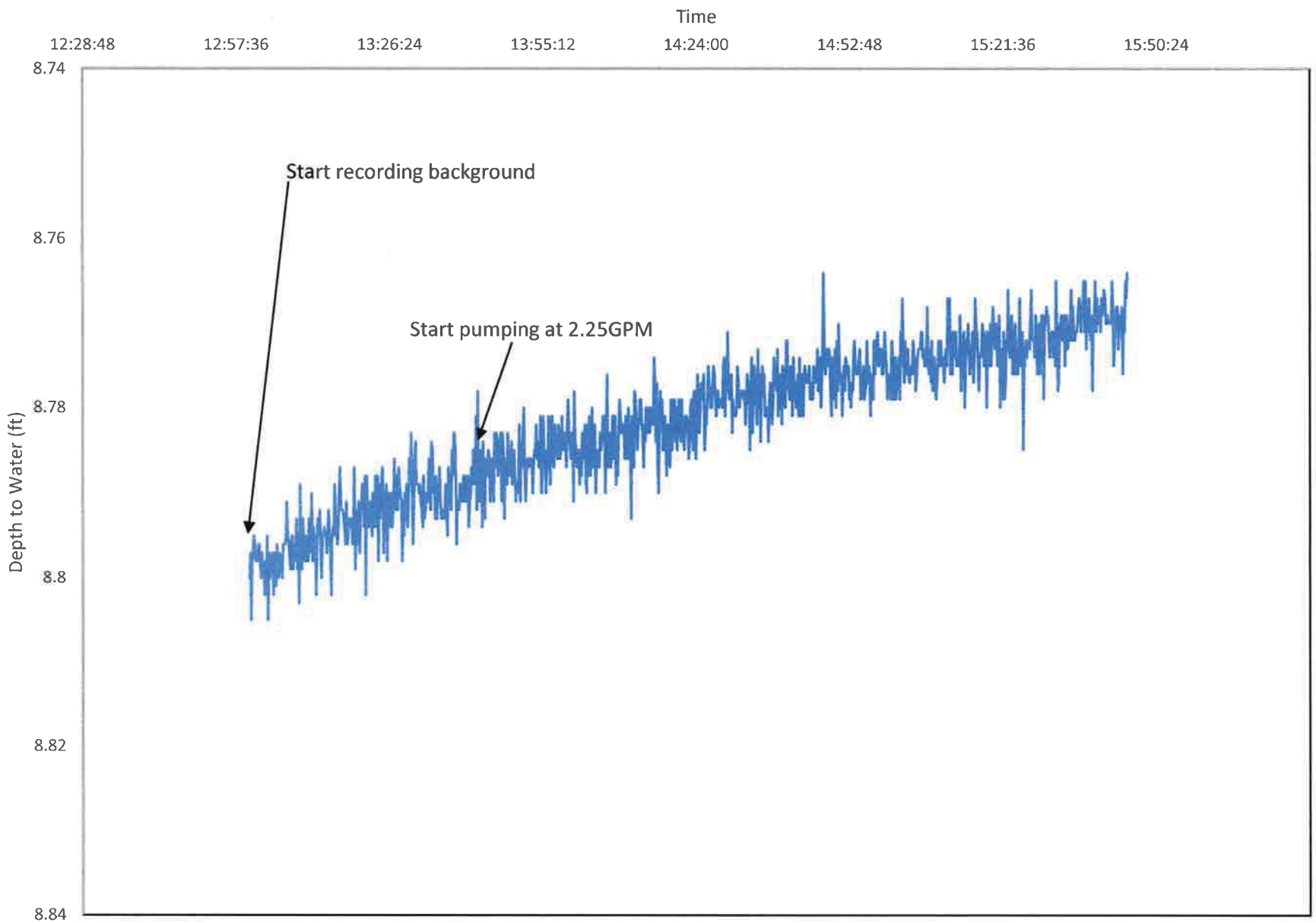


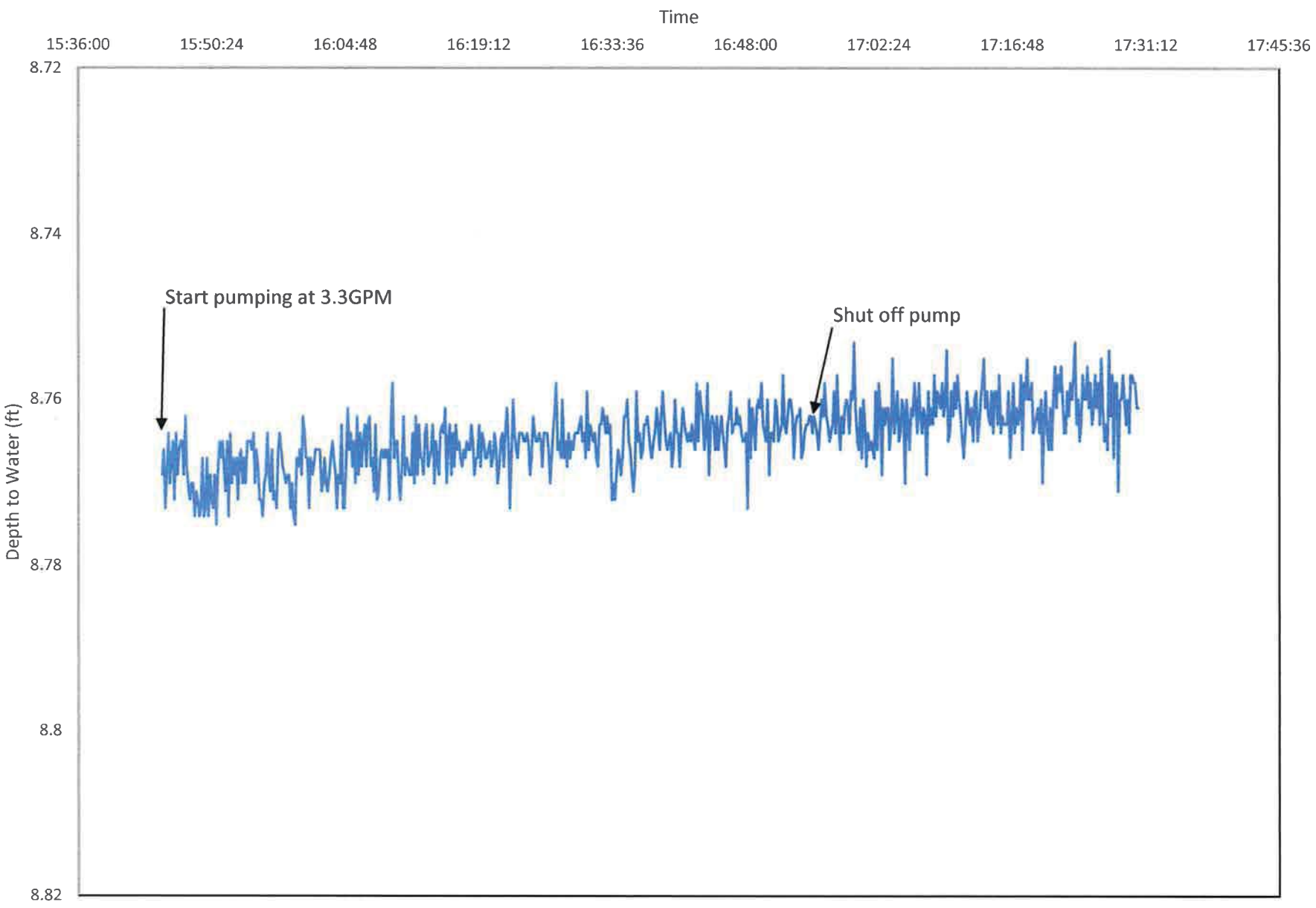
Point Store Potable Well 3.3GPM Step Test - MW-4 Drawdown and Recovery - 01/29/18



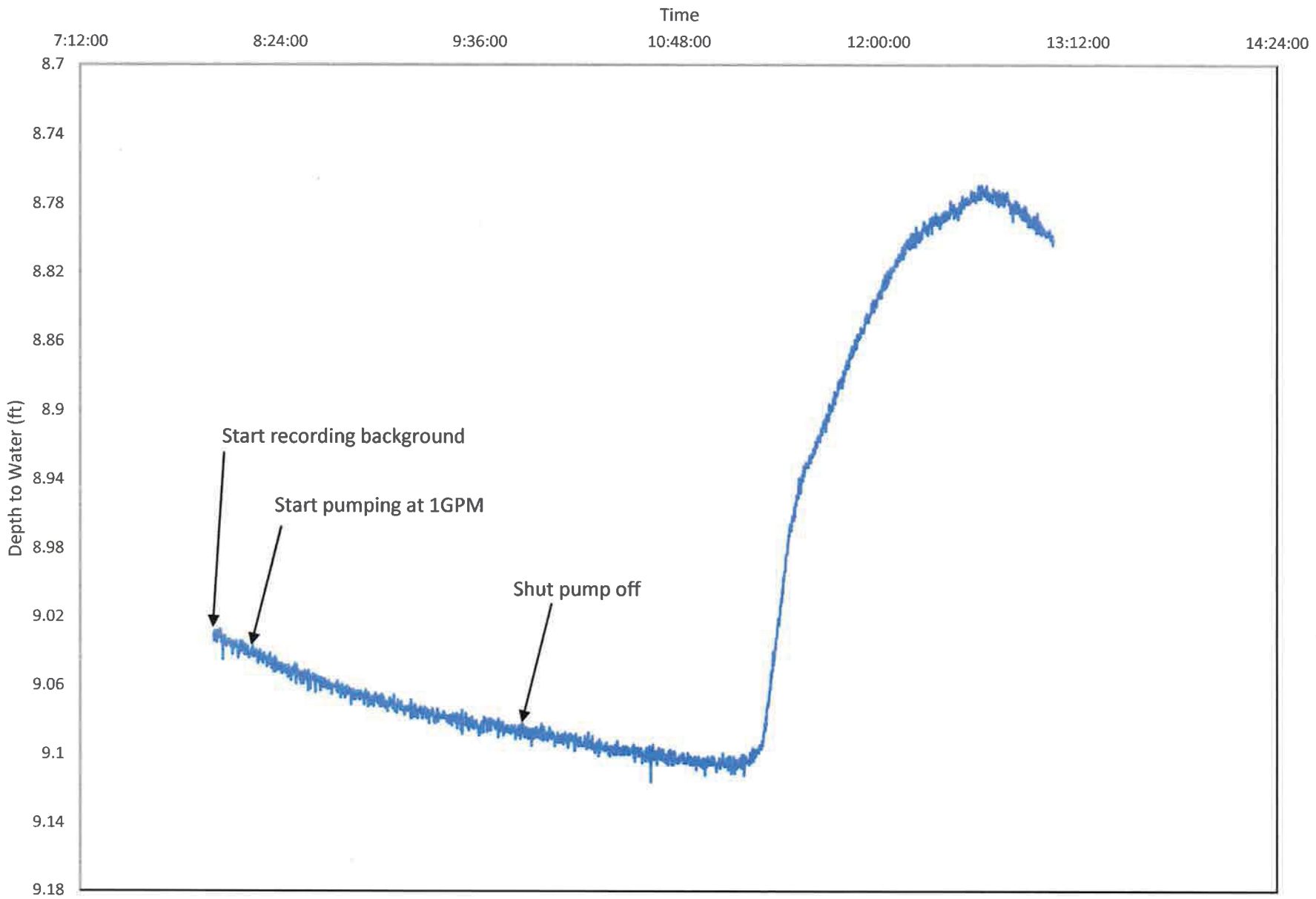
Point Store Potable Well 1GPM Step Test - MW-7 Drawdown and Recovery - 01/30/18

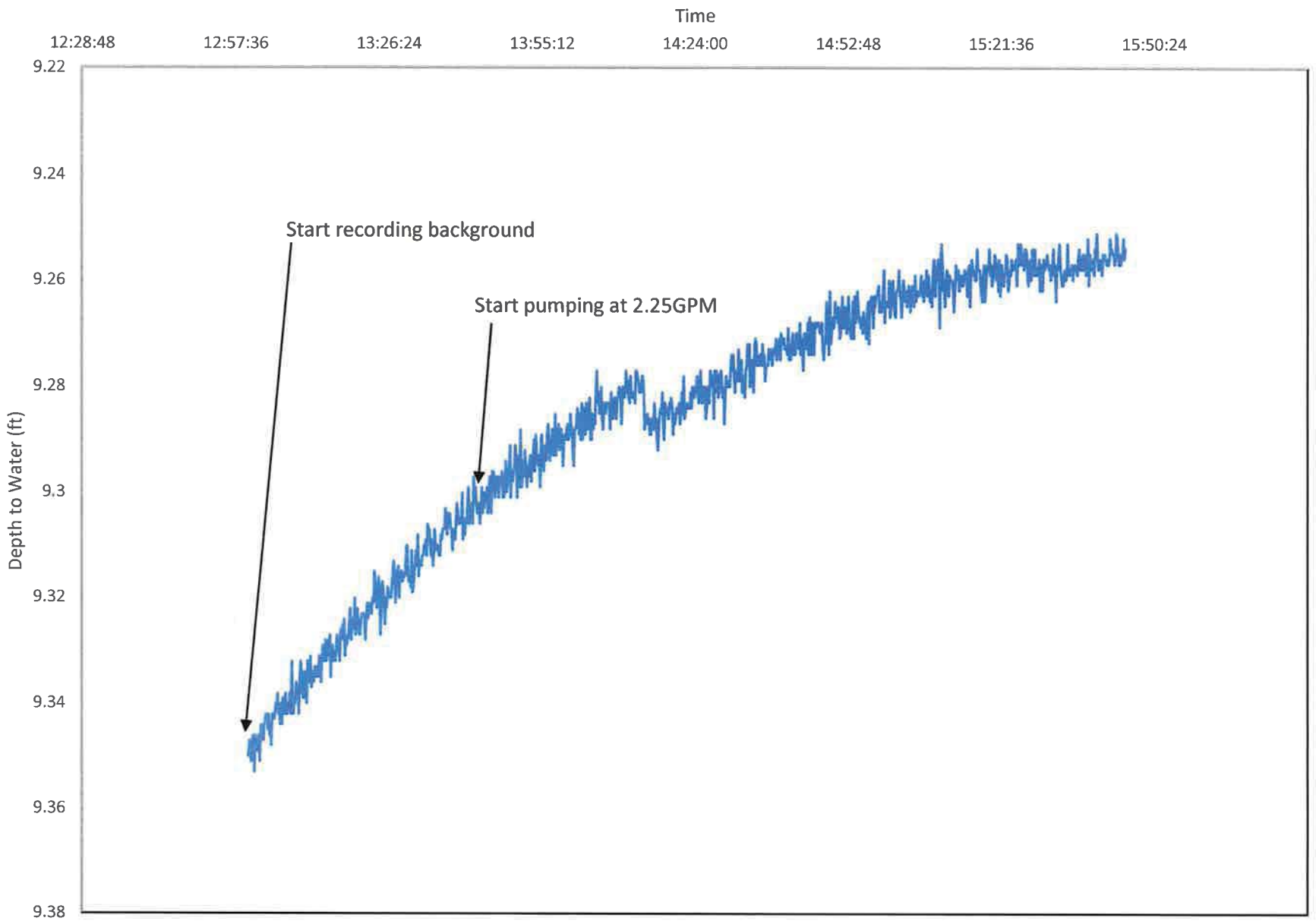


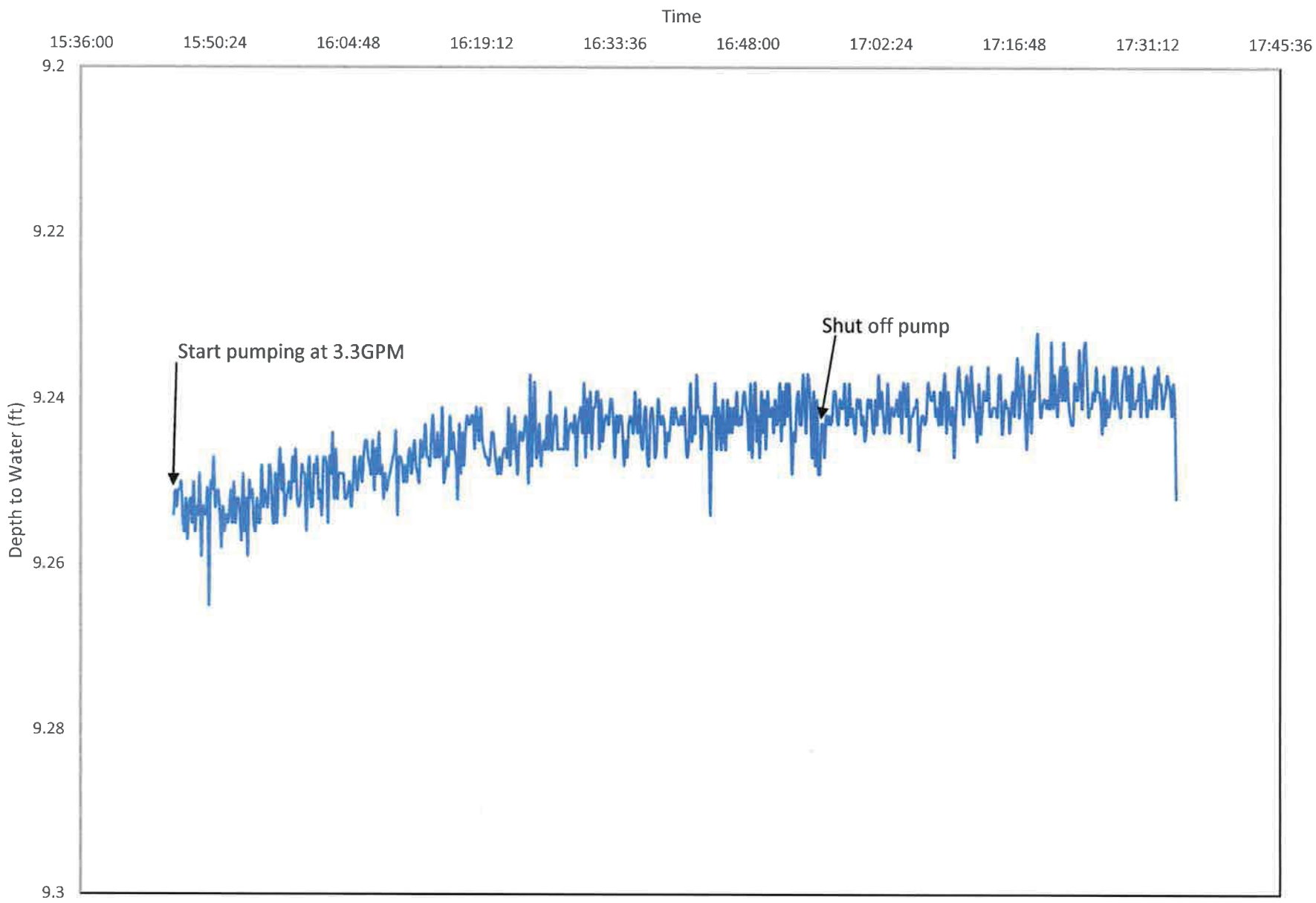

Point Store Potable Well 2.25GPM Step Test - MW-7 Drawdown - 01/30/18
Time
12:28:48
12:57:36
13:26:24
13:55:12
14:24:00
14:52:48
15:21:36
15:50:24
Depth to Water (ft)
8.74
8.76
8.78
8.8
8.82
8.84
Start recording background
Start pumping at 2.25GPM

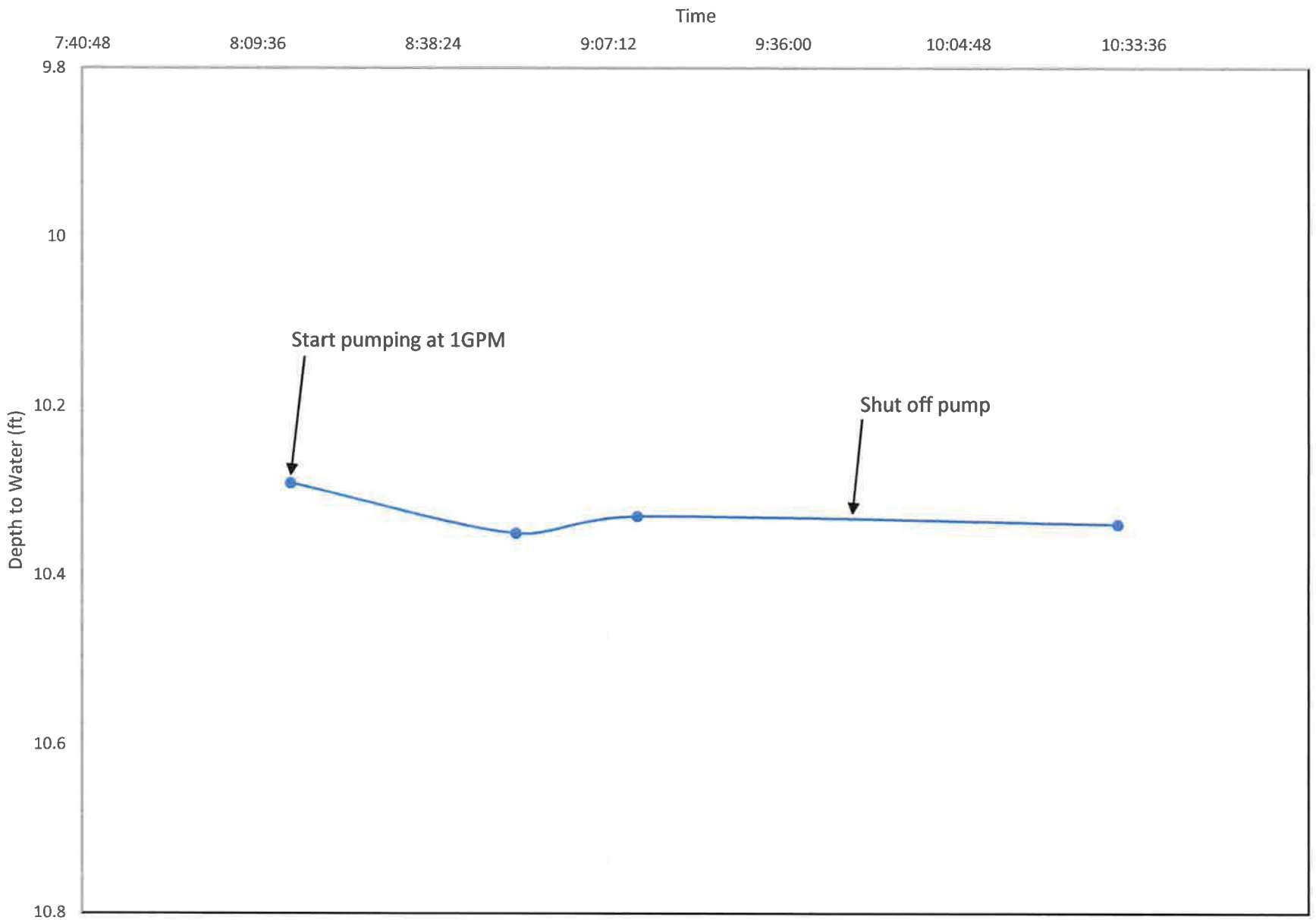

Point Store Potable Well 3.3GPM Step Test - MW-7 Drawdown and Recovery - 01/30/18
Time
15:36:00
15:50:24
16:04:48
16:19:12
16:33:36
16:48:00
17:02:24
17:16:48
17:31:12
17:45:36
Depth to Water (ft)
8.72
8.74
8.76
8.78
8.8
8.82
Start pumping at 3.3GPM
Shut off pump

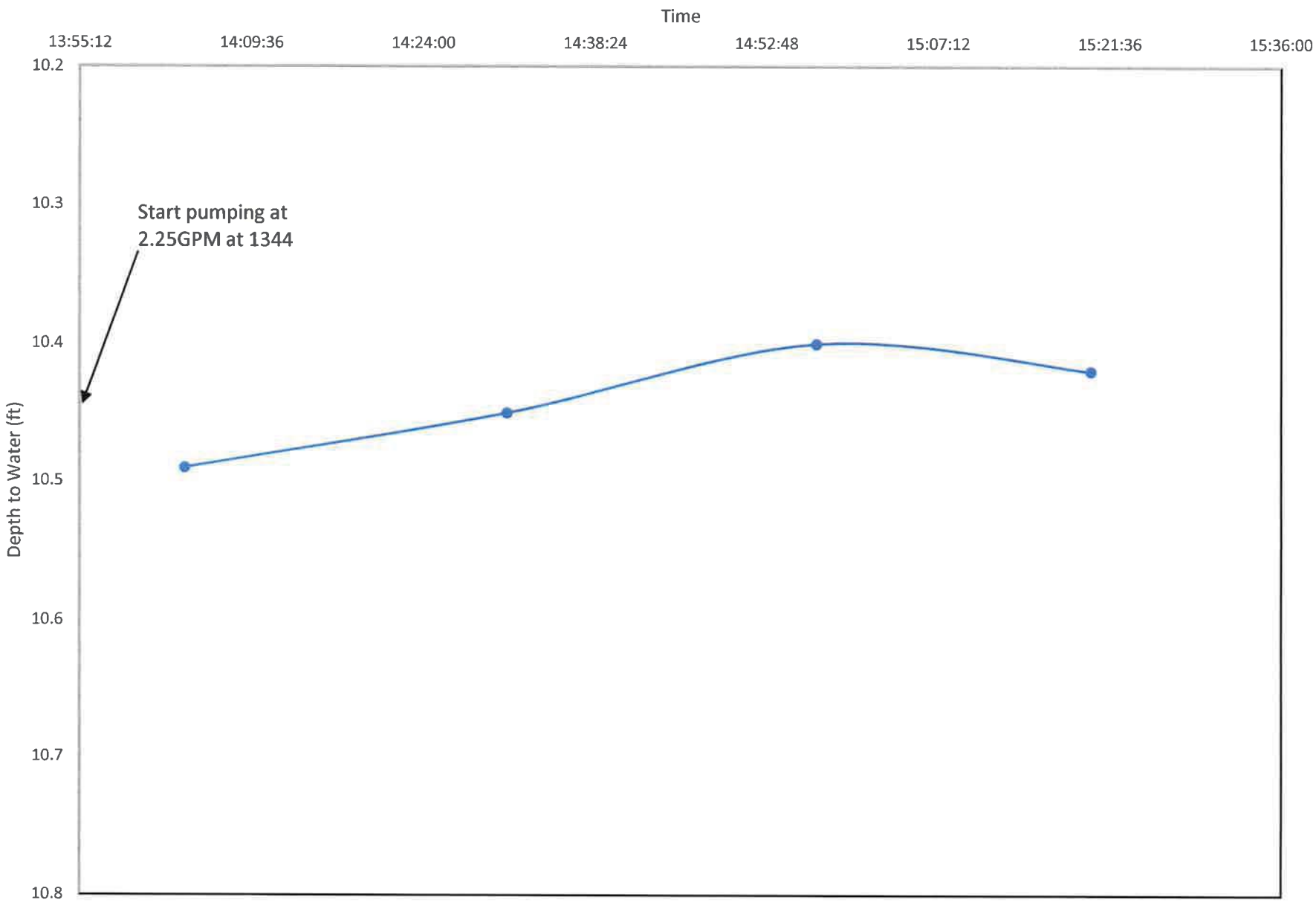
Point Store Potable Well 1GPM Step Test - MW-8 Drawdown and Recovery - 01/30/18



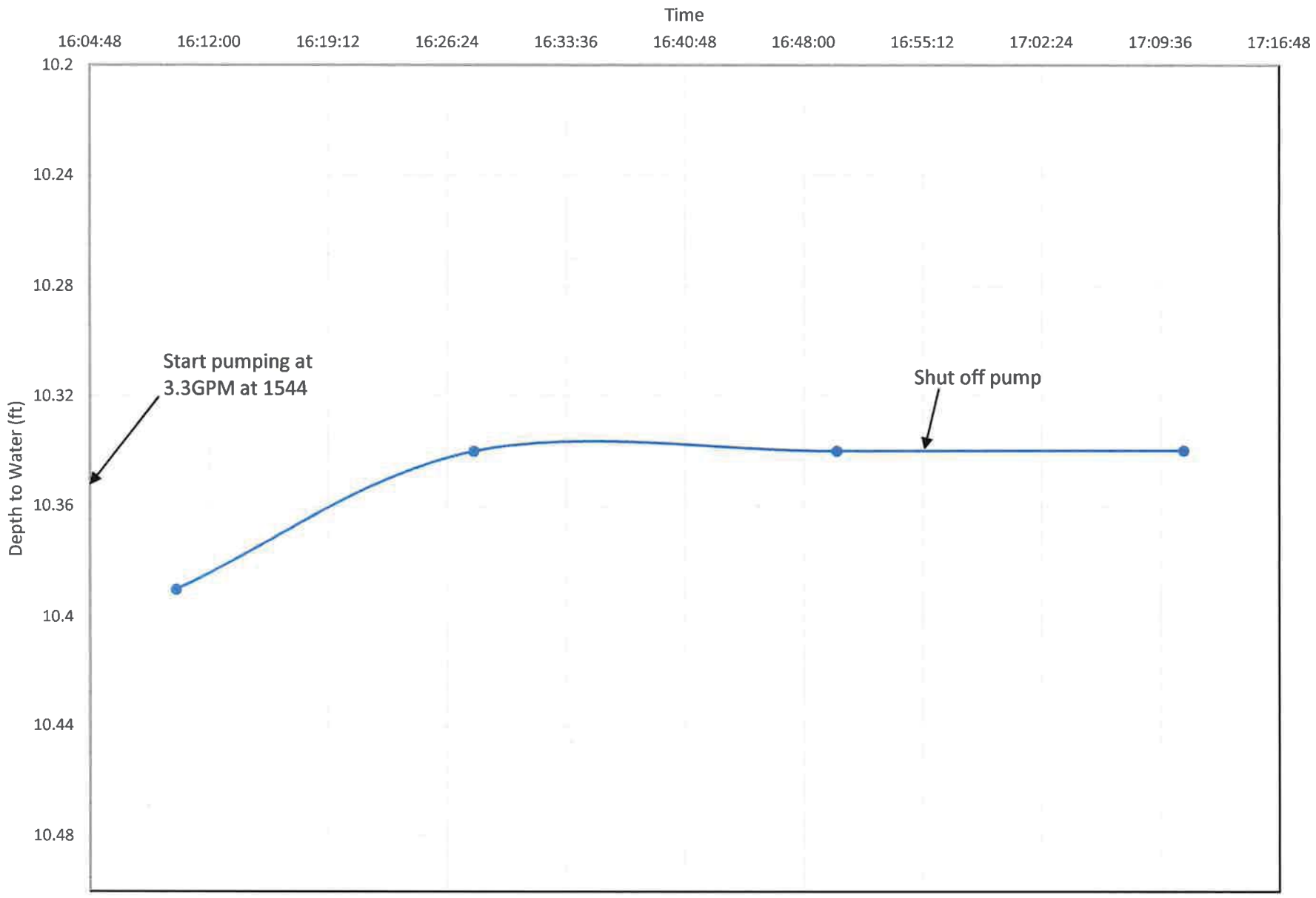

Point Store Potable Well 2.25GPM Step Test - MW-8 Drawdown - 01/29/18
Time
12:28:48
12:57:36
13:26:24
13:55:12
14:24:00
14:52:48
15:21:36
15:50:24
Depth to Water (ft)
9.22
9.24
9.26
9.28
9.3
9.32
9.34
9.36
9.38
Start recording background
Start pumping at 2.25GPM

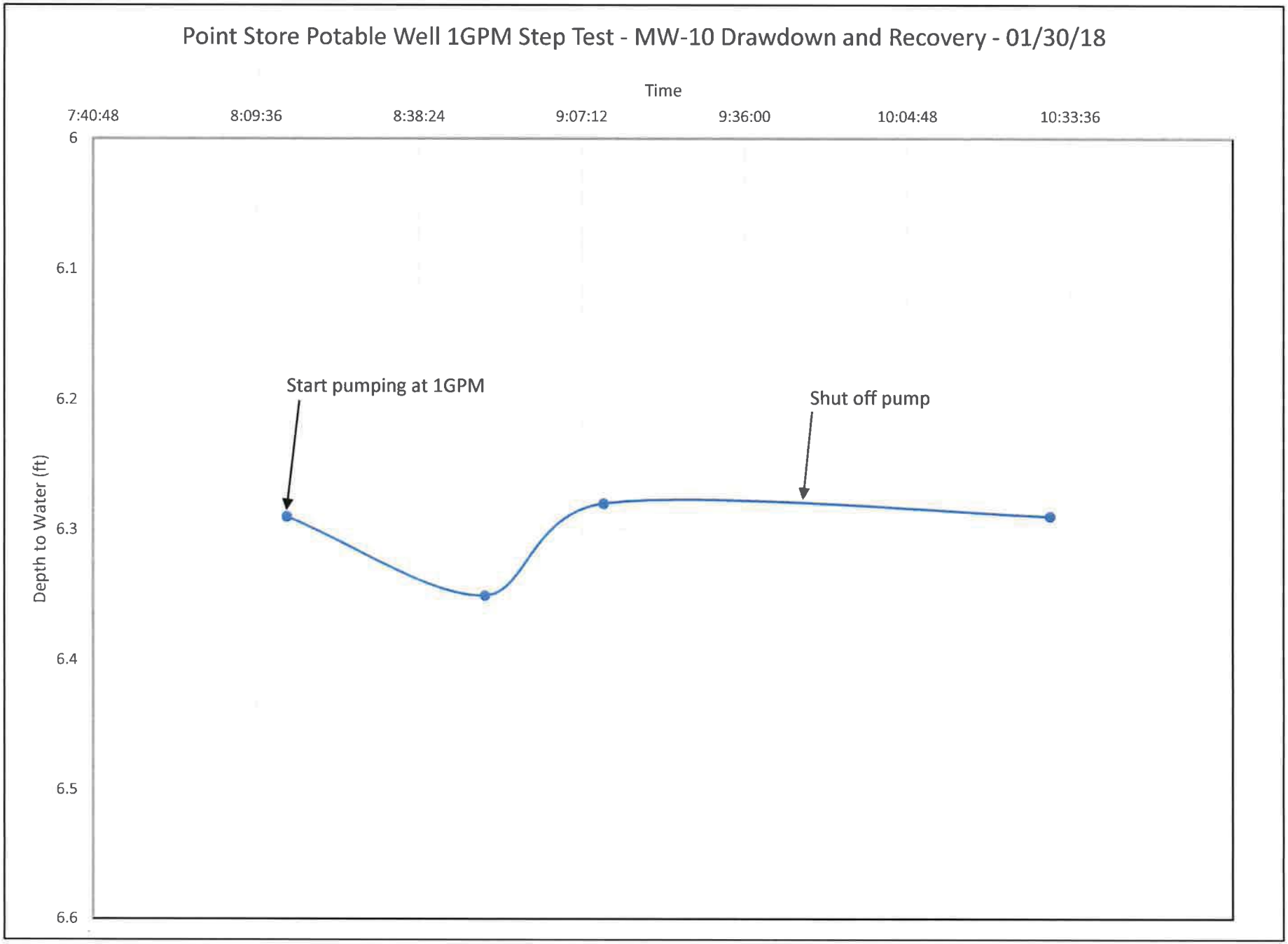

Point Store Potable Well 3.3GPM Step Test - MW-8 Drawdown and Recovery - 01/29/18
Time
15:36:00
15:50:24
16:04:48
16:19:12
16:33:36
16:48:00
17:02:24
17:16:48
17:31:12
17:45:36
Depth to Water (ft)
9.2
9.22
9.24
9.26
9.28
9.3
Start pumping at 3.3GPM
Shut off pump

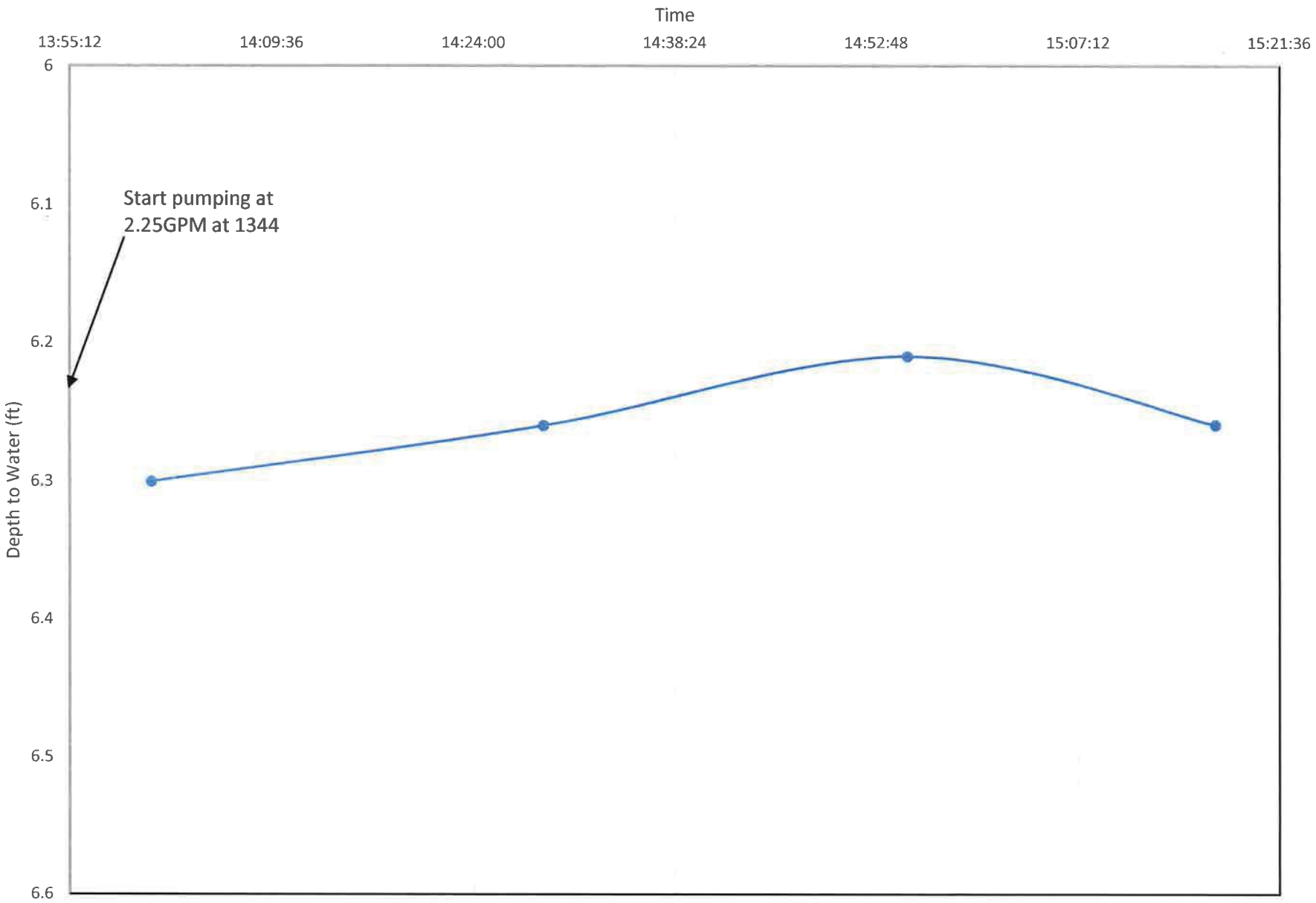

Point Store Potable Well 1GPM Step Test - MW-9 Drawdown and Recovery - 01/30/18
Time
7:40:48
8:09:36
8:38:24
9:07:12
9:36:00
10:04:48
10:33:36
Depth to Water (ft)
9.8
10
10.2
10.4
10.6
10.8
Start pumping at 1GPM
Shut off pump

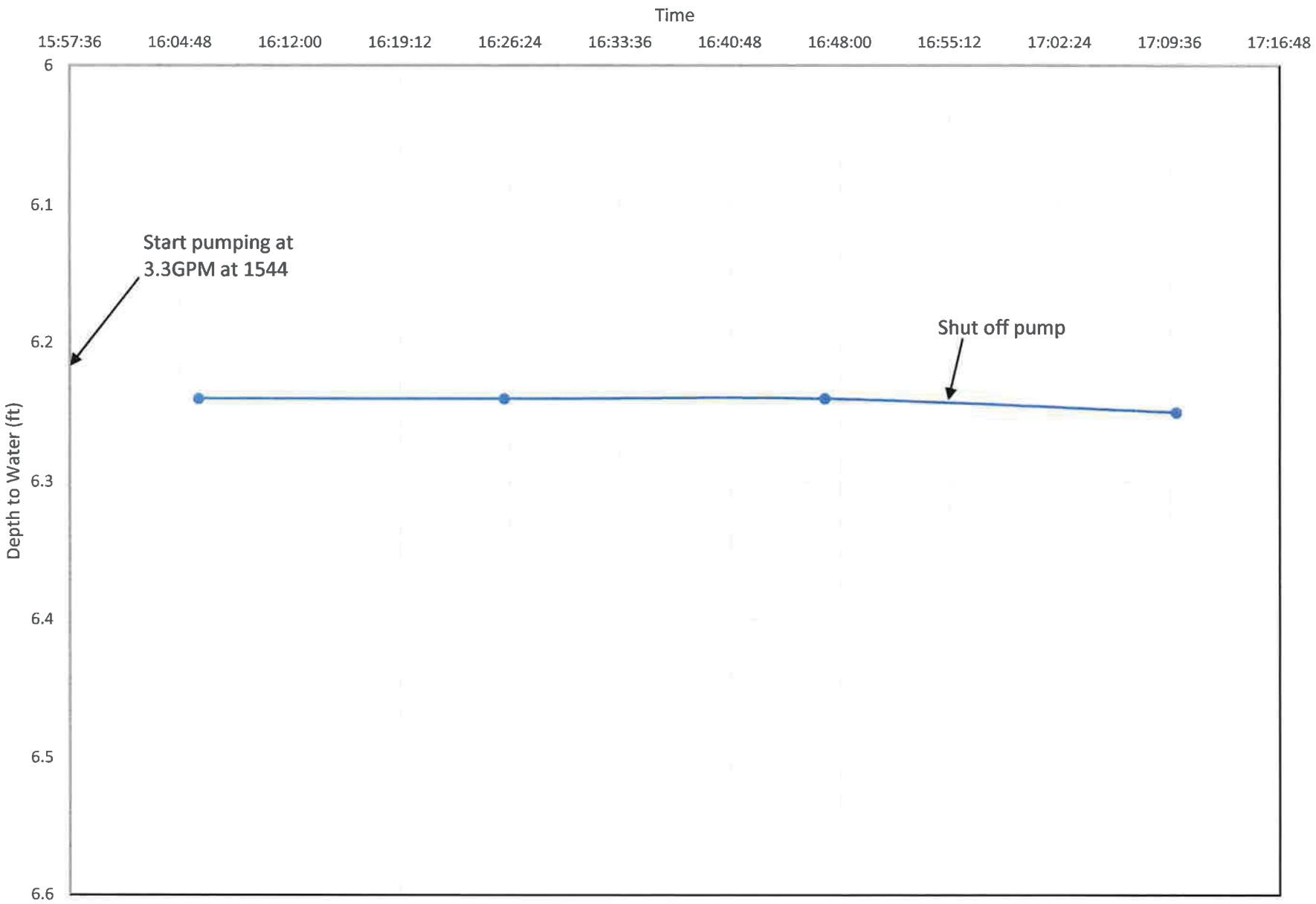

Point Store Potable Well 2.25GPM Step Test - MW-9 Drawdown - 01/29/18
Time
13:55:12
14:09:36
14:24:00
14:38:24
14:52:48
15:07:12
15:21:36
15:36:00
Depth to Water (ft)
10.2
10.3
10.4
10.5
10.6
10.7
10.8
Start pumping at
2.25GPM at 1344

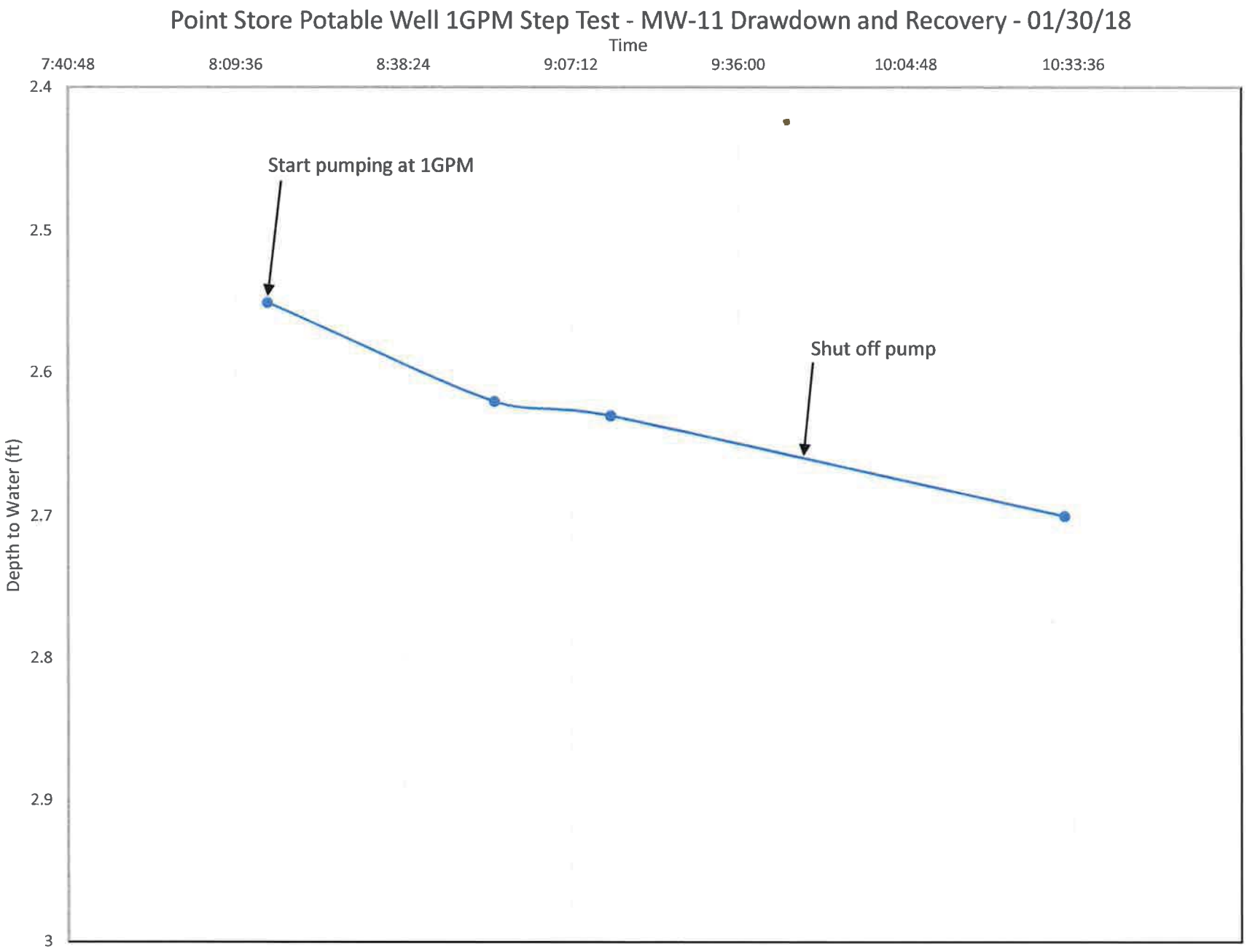
Point Store Potable Well 3.3GPM Step Test - MW-9 Drawdown and Recovery - 01/29/18

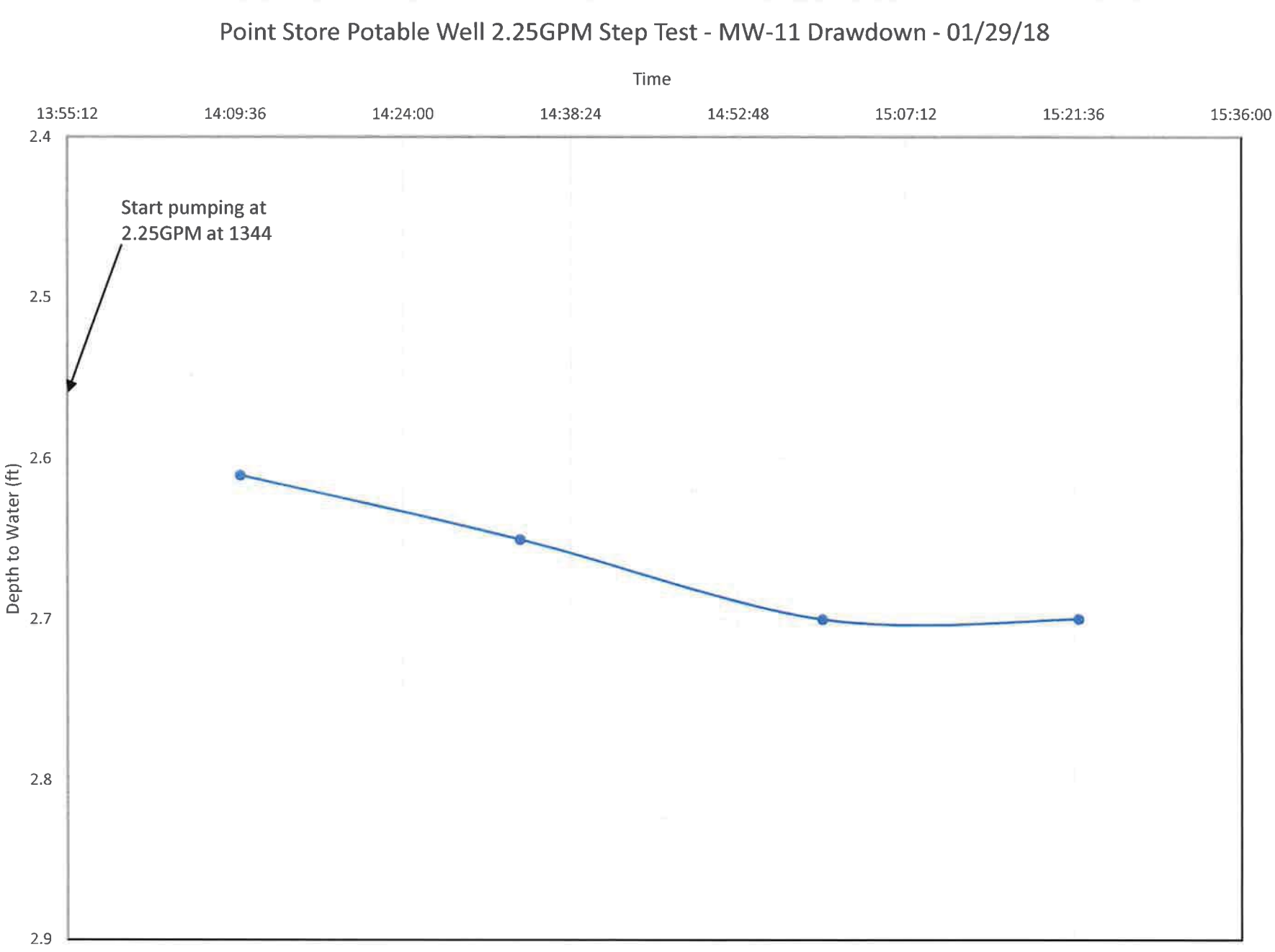


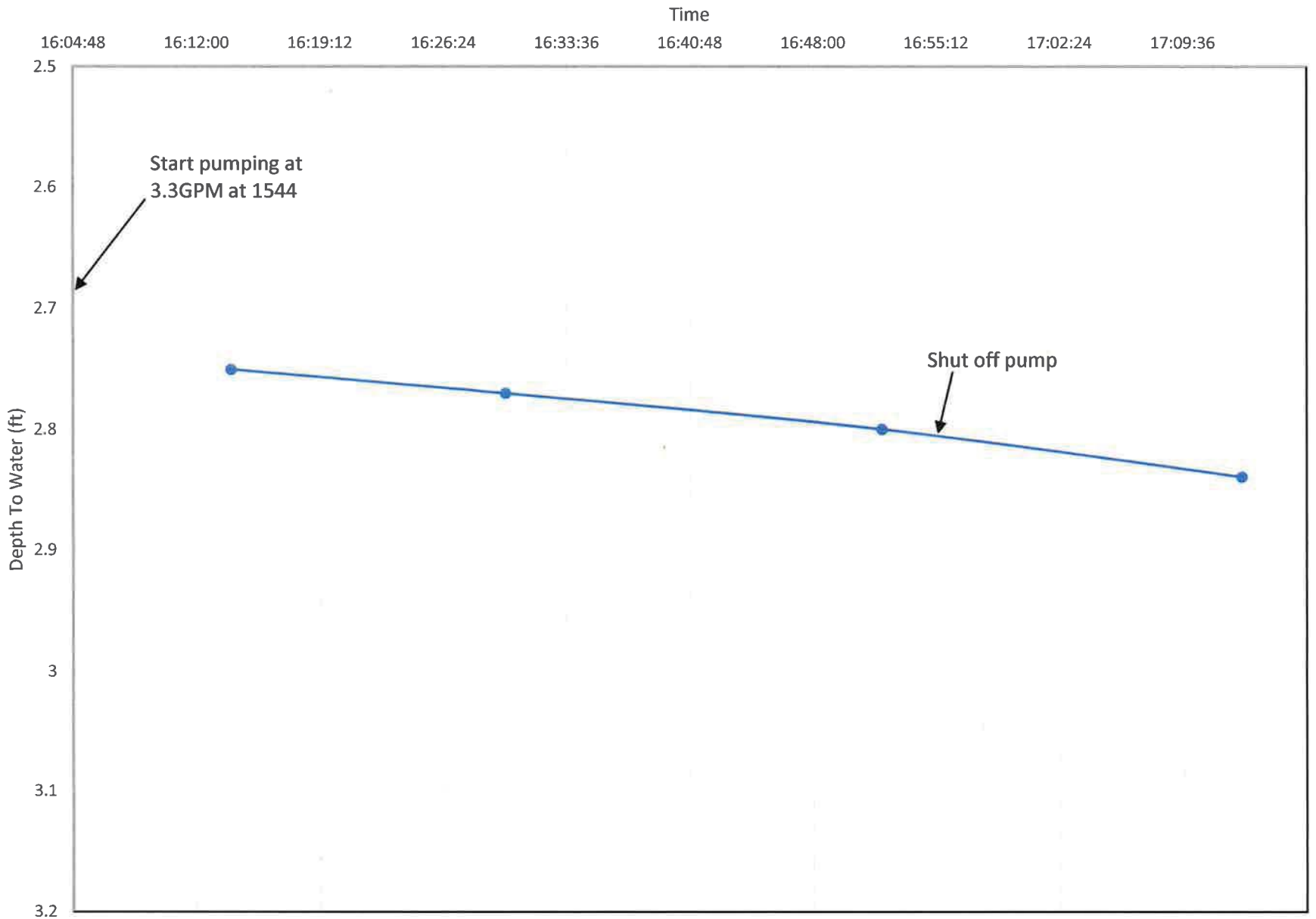

Point Store Potable Well 1GPM Step Test - MW-10 Drawdown and Recovery - 01/30/18
Time
7:40:48
8:09:36
8:38:24
9:07:12
9:36:00
10:04:48
10:33:36
Depth to Water (ft)
6
6.1
6.2
6.3
6.4
6.5
6.6
Start pumping at 1GPM
Shut off pump


Point Store Potable Well 2.25GPM Step Test - MW-10 Drawdown - 01/29/18
Time
13:55:12
14:09:36
14:24:00
14:38:24
14:52:48
15:07:12
15:21:36
Depth to Water (ft)
6
6.1
6.2
6.3
6.4
6.5
6.6
Start pumping at
2.25GPM at 1344

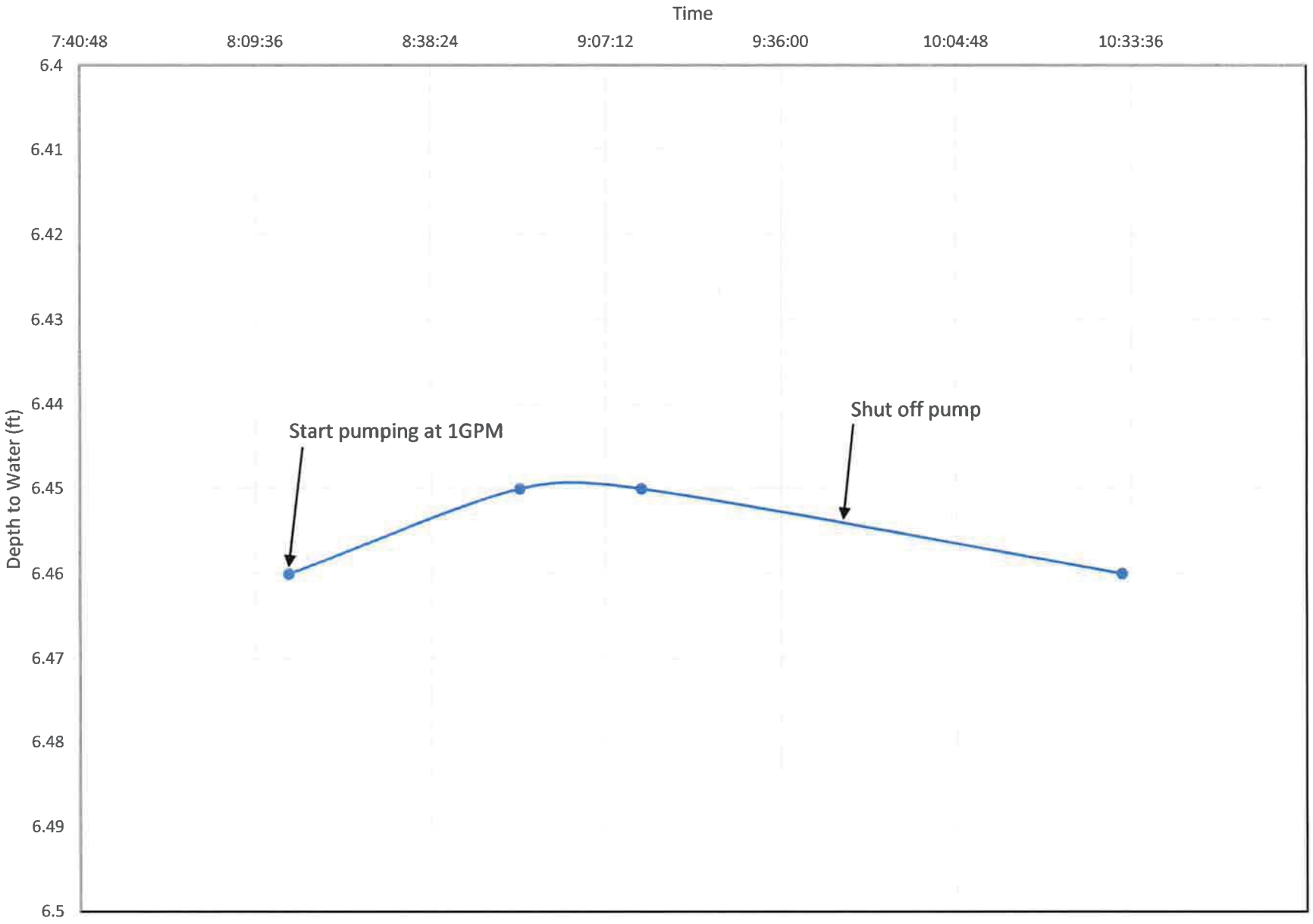

Point Store Potable Well 3.3GPM Step Test - MW-10 Drawdown and Recovery - 01/29/18
Time
15:57:36
16:04:48
16:12:00
16:19:12
16:26:24
16:33:36
16:40:48
16:48:00
16:55:12
17:02:24
17:09:36
17:16:48
Depth to Water (ft)
6
6.1
6.2
6.3
6.4
6.5
6.6
Start pumping at
3.3GPM at 1544
Shut off pump

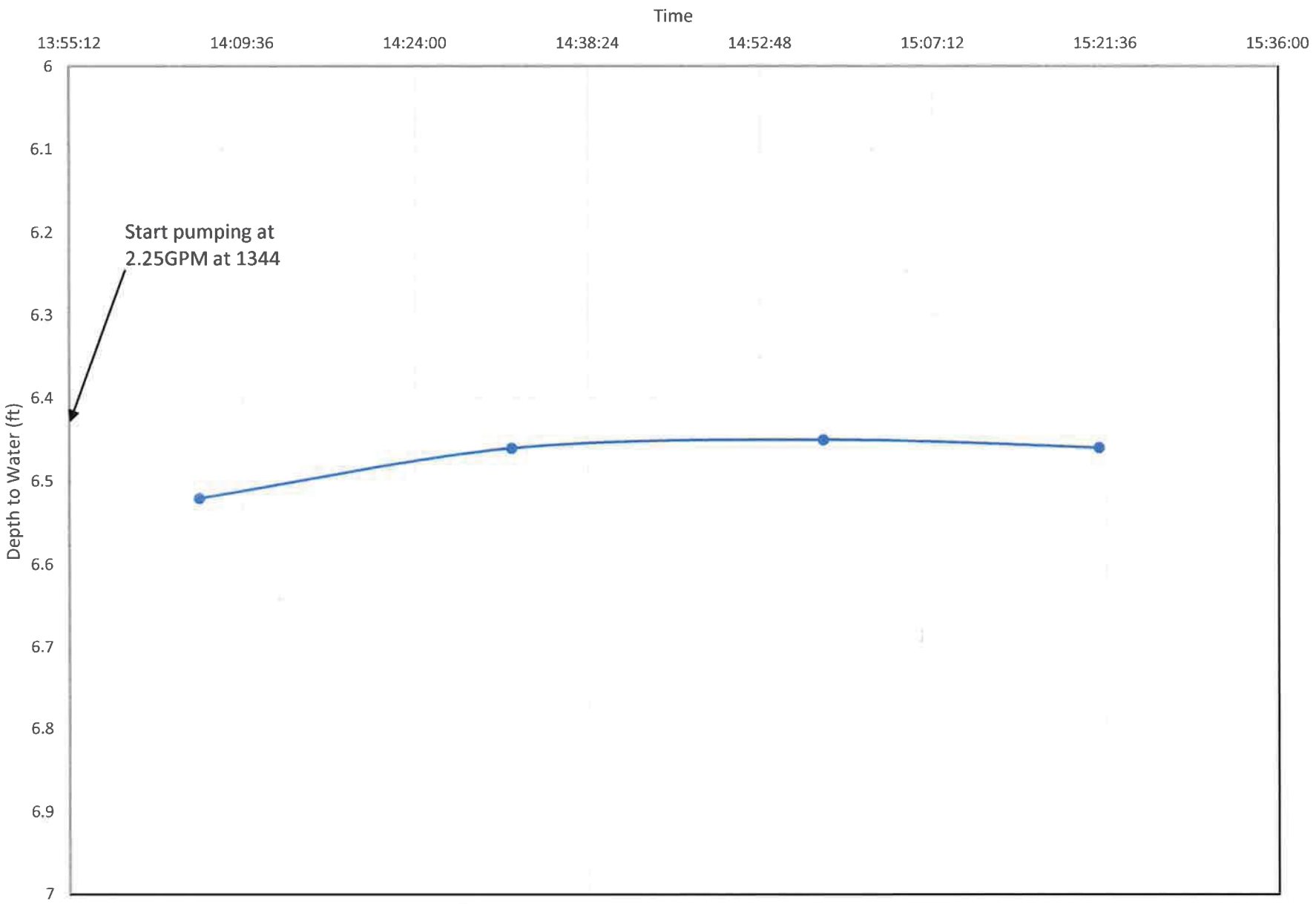

Point Store Potable Well 1GPM Step Test - MW-11 Drawdown and Recovery - 01/30/18
Time
7:40:48
8:09:36
8:38:24
9:07:12
9:36:00
10:04:48
10:33:36
Depth to Water (ft)
2.4
2.5
2.6
2.7
2.8
2.9
3
Start pumping at 1GPM
Shut off pump


Point Store Potable Well 2.25GPM Step Test - MW-11 Drawdown - 01/29/18
Time
13:55:12
14:09:36
14:24:00
14:38:24
14:52:48
15:07:12
15:21:36
15:36:00
Depth to Water (ft)
2.4
2.5
2.6
2.7
2.8
2.9
Start pumping at
2.25GPM at 1344

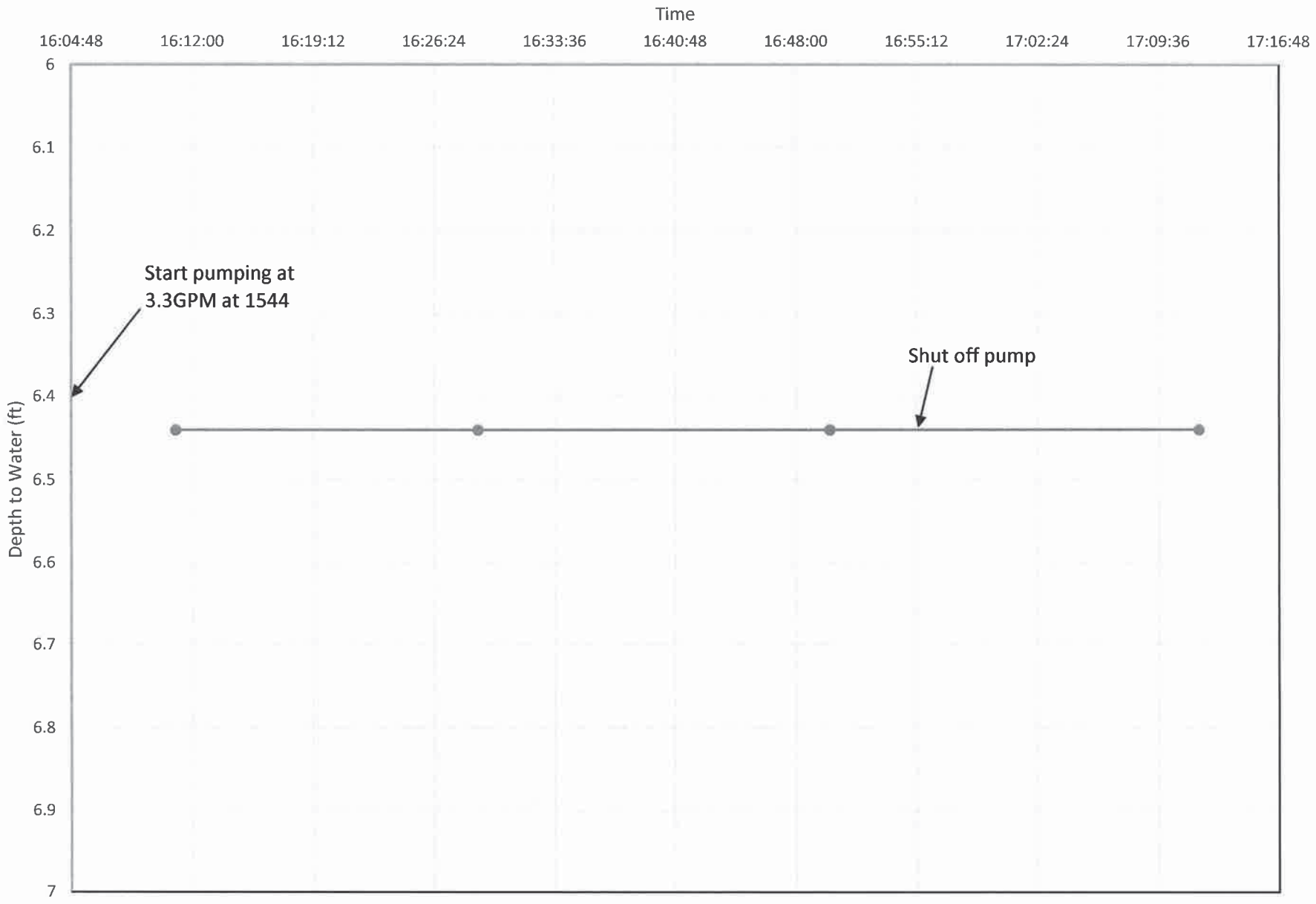

Point Store Potable Well 3.3GPM Step Test - MW-11 Drawdown and Recovery - 01/29/18
Time
16:04:48
16:12:00
16:19:12
16:26:24
16:33:36
16:40:48
16:48:00
16:55:12
17:02:24
17:09:36
Depth To Water (ft)
2.5
2.6
2.7
2.8
2.9
3
3.1
3.2
Start pumping at
3.3GPM at 1544
Shut off pump

Point Store Potable Well 1GPM Step Test - MW-12 Drawdown and Recovery - 01/30/18

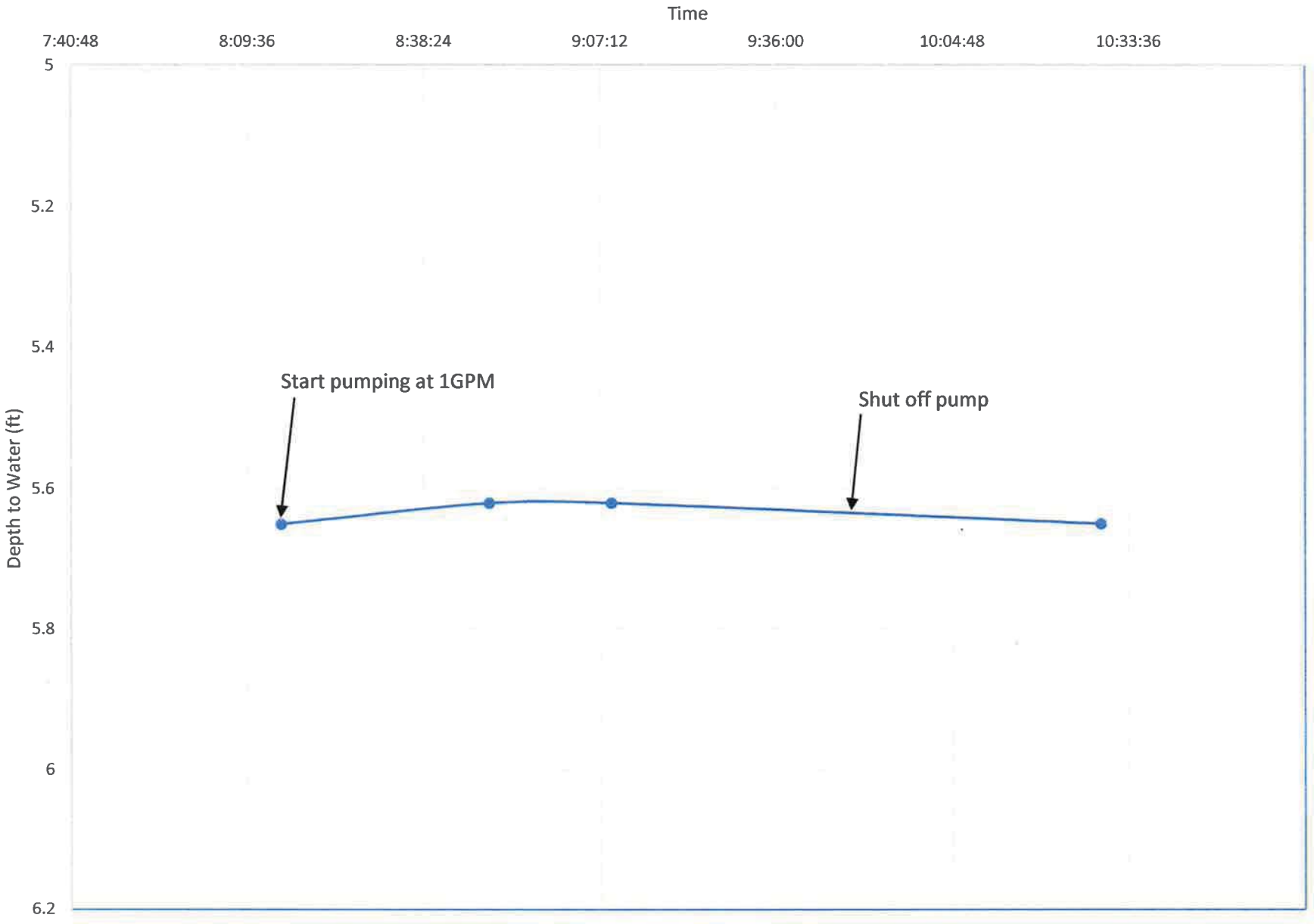


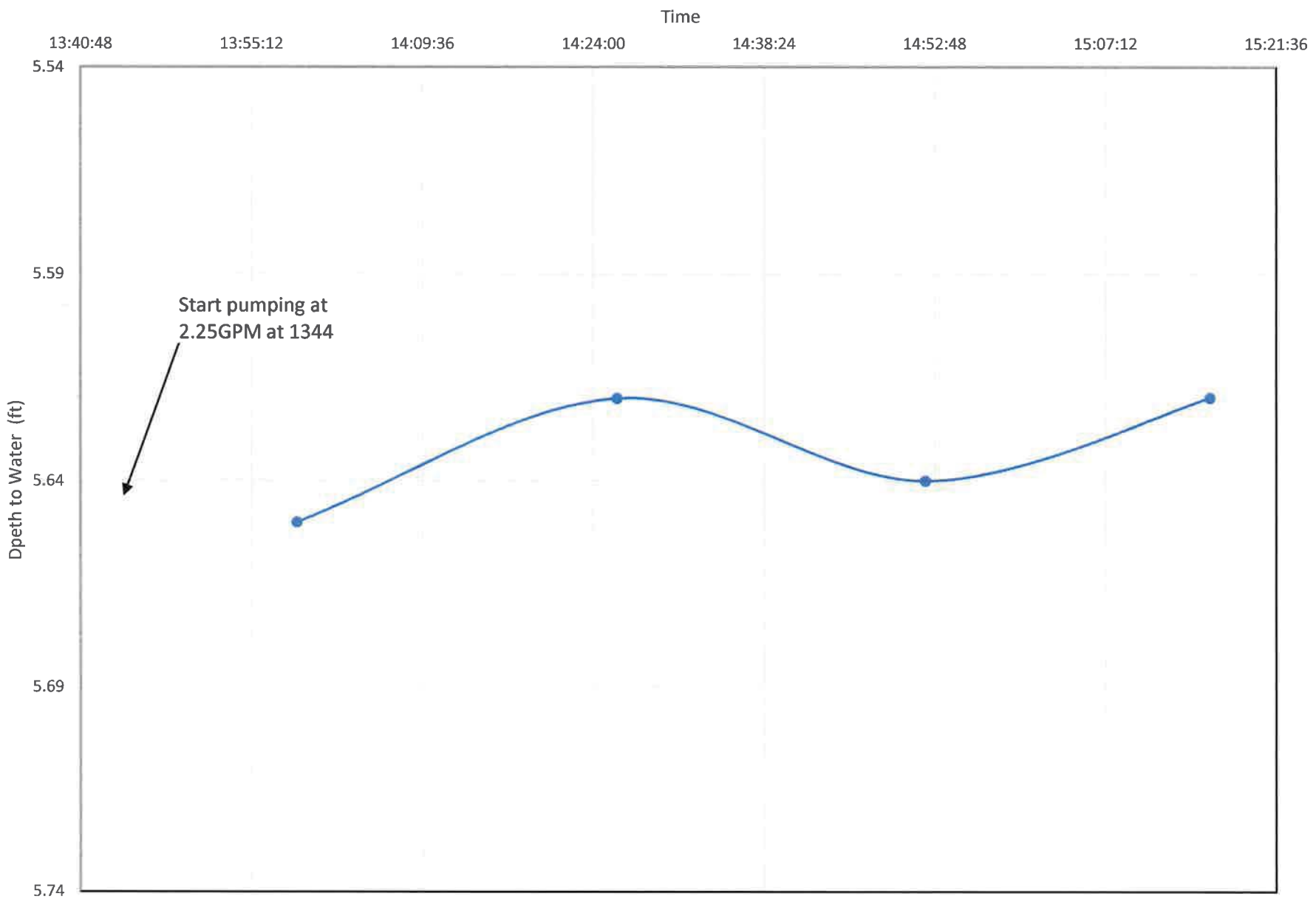

Point Store Potable Well 2.25GPM Step Test - MW-12 Drawdown - 01/29/18
Time
13:55:12
14:09:36
14:24:00
14:38:24
14:52:48
15:07:12
15:21:36
15:36:00
Depth to Water (ft)
6
6.1
6.2
6.3
6.4
6.5
6.6
6.7
6.8
6.9
7
Start pumping at
2.25GPM at 1344

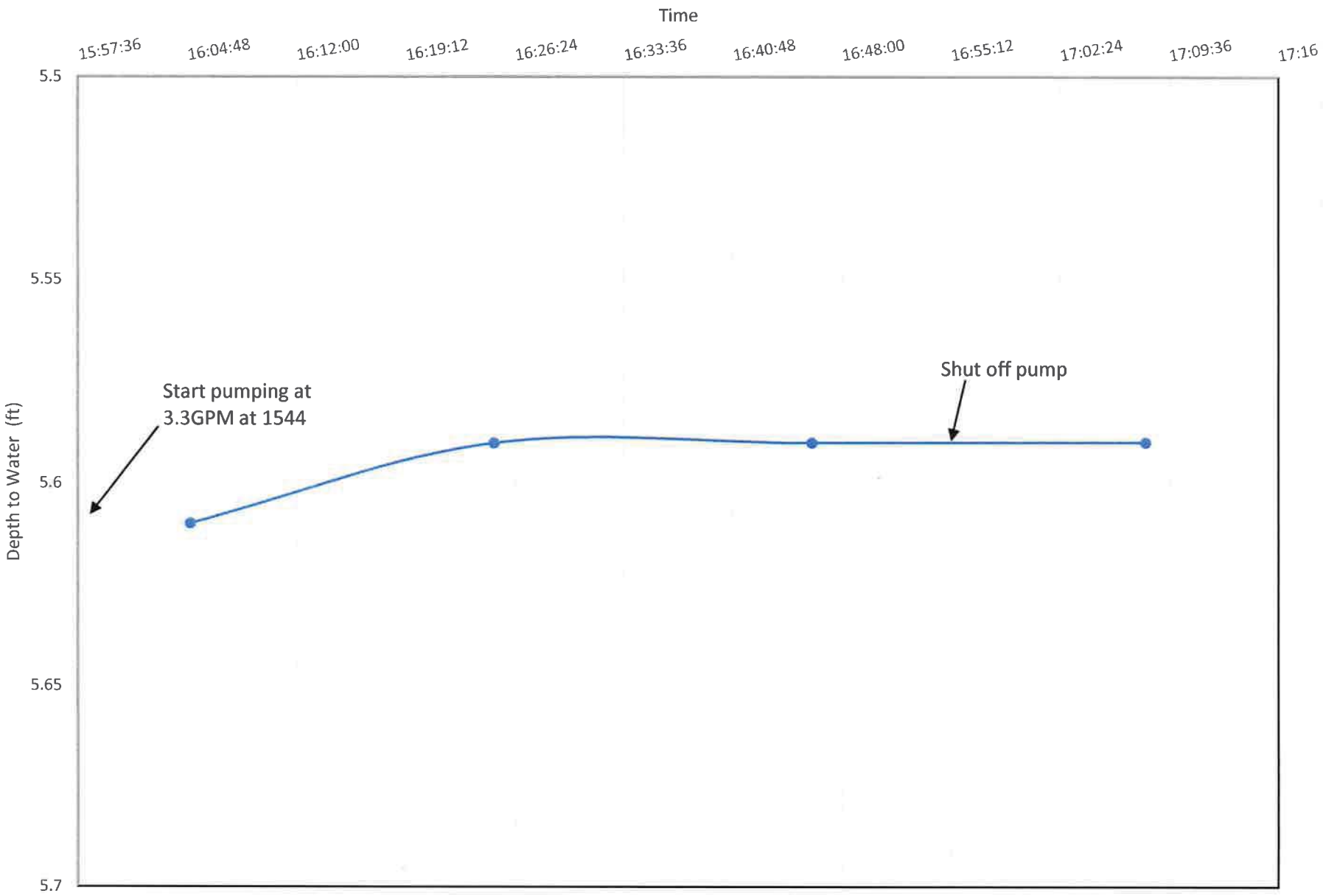
Point Store Potable Well 3.3GPM Step Test - MW-12 Drawdown and Recovery - 01/29/18



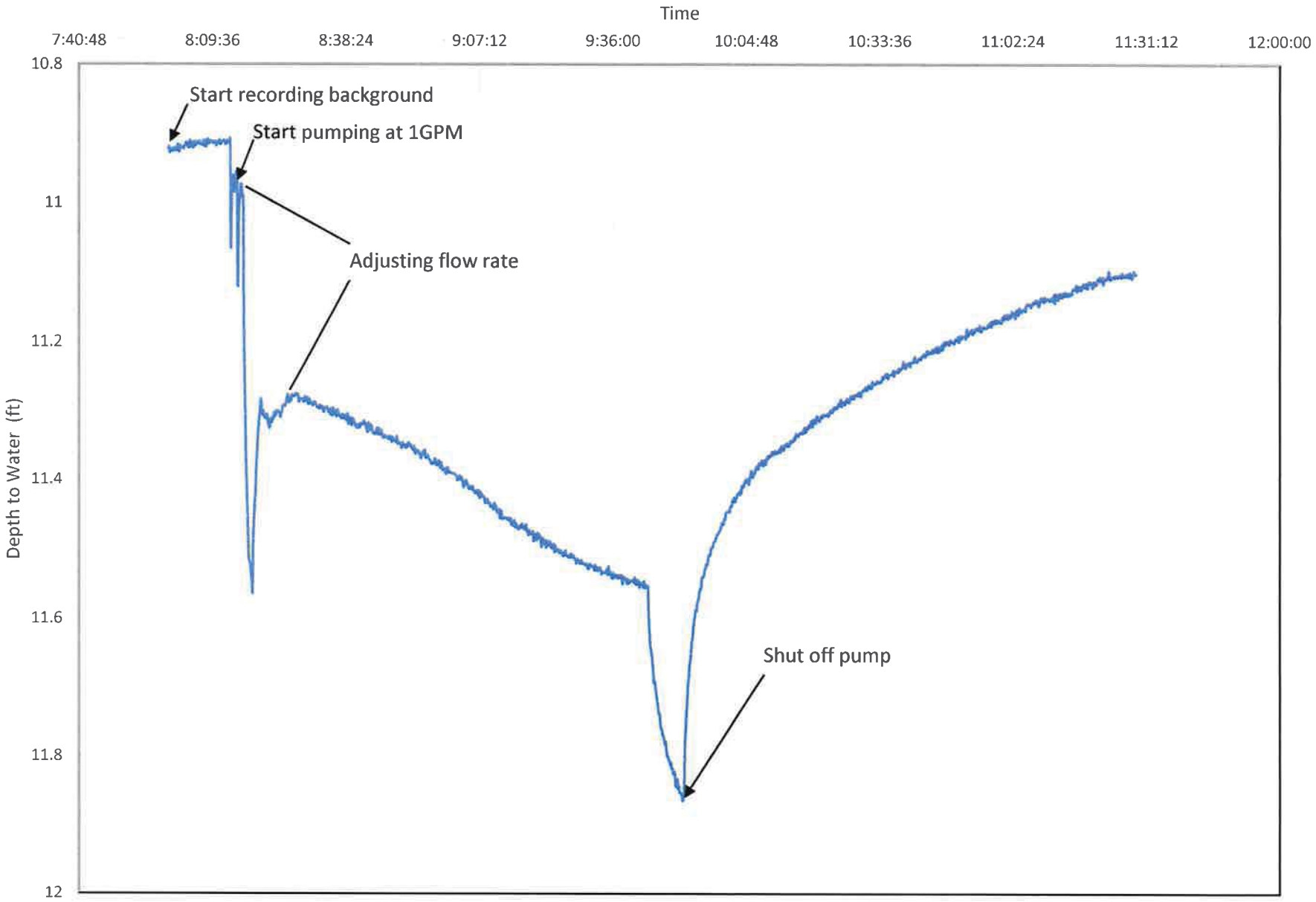
Point Store Potable Well 1GPM Step Test - MW-14 Drawdown and Recovery - 01/30/18

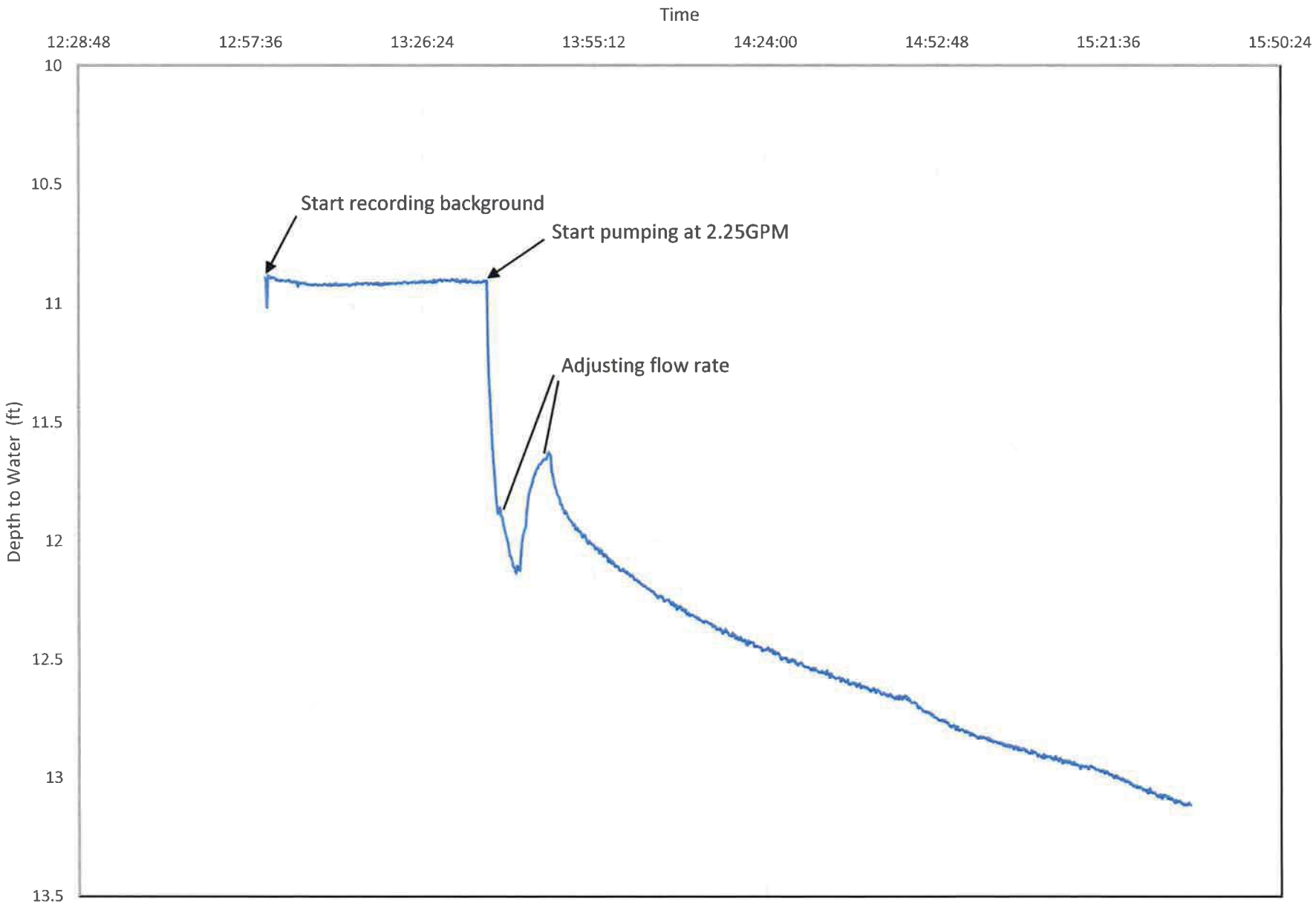


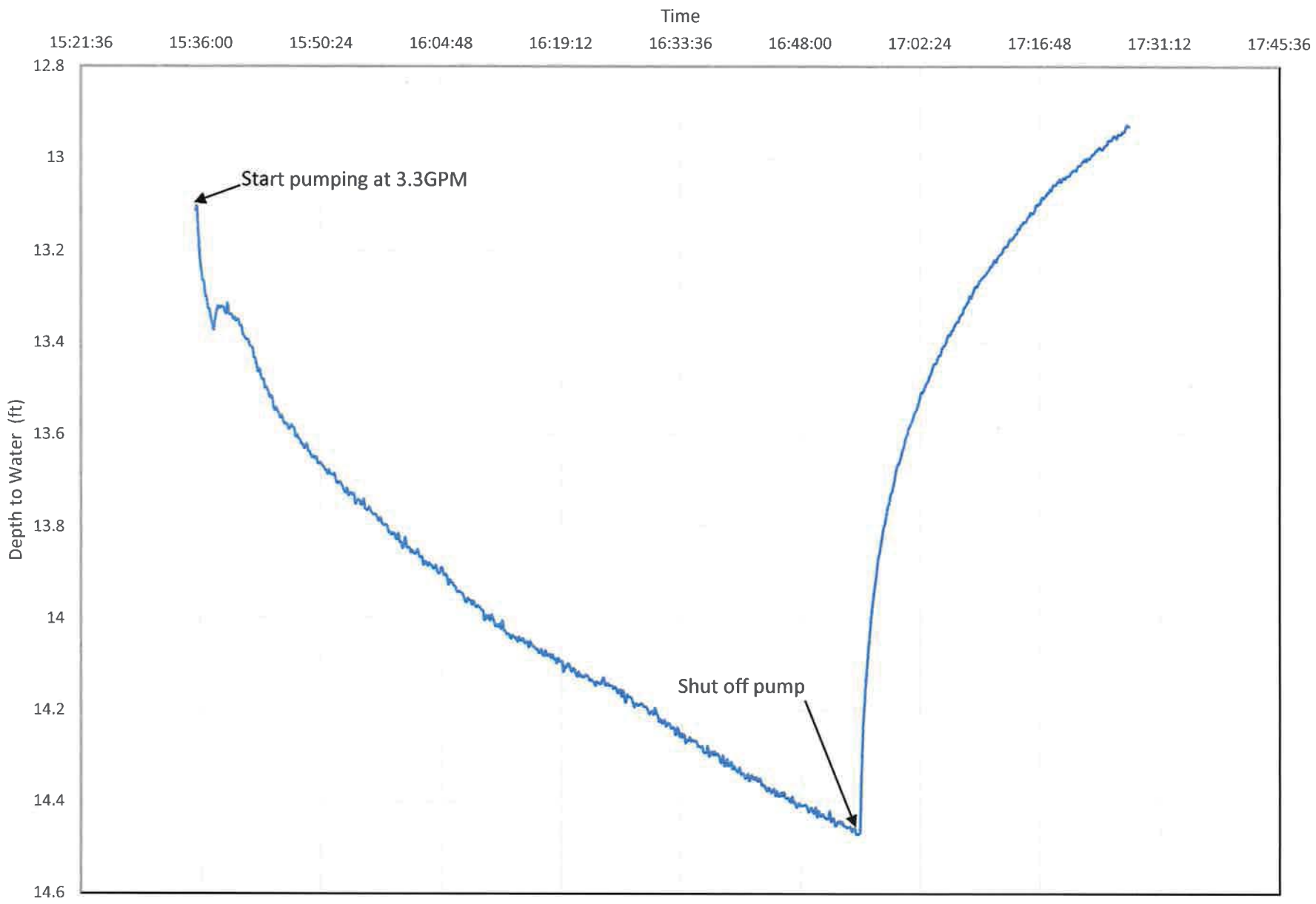

Point Store Potable Well 2.25 GPM Step Test - MW-14 Drawdown - 01/29/18
Time
13:40:48
13:55:12
14:09:36
14:24:00
14:38:24
14:52:48
15:07:12
15:21:36
5.54
5.59
5.64
5.69
5.74
Dpeth to Water (ft)
Start pumping at
2.25GPM at 1344


Point Store Potable Well 3.3GPM Step Test - MW-14 Drawdown and Recovery - 01/29/18
Time
15:57:36
16:04:48
16:12:00
16:19:12
16:26:24
16:33:36
16:40:48
16:48:00
16:55:12
17:02:24
17:09:36
17:16
Depth to Water (ft)
5.5
5.55
5.6
5.65
5.7
Start pumping at
3.3GPM at 1544
Shut off pump

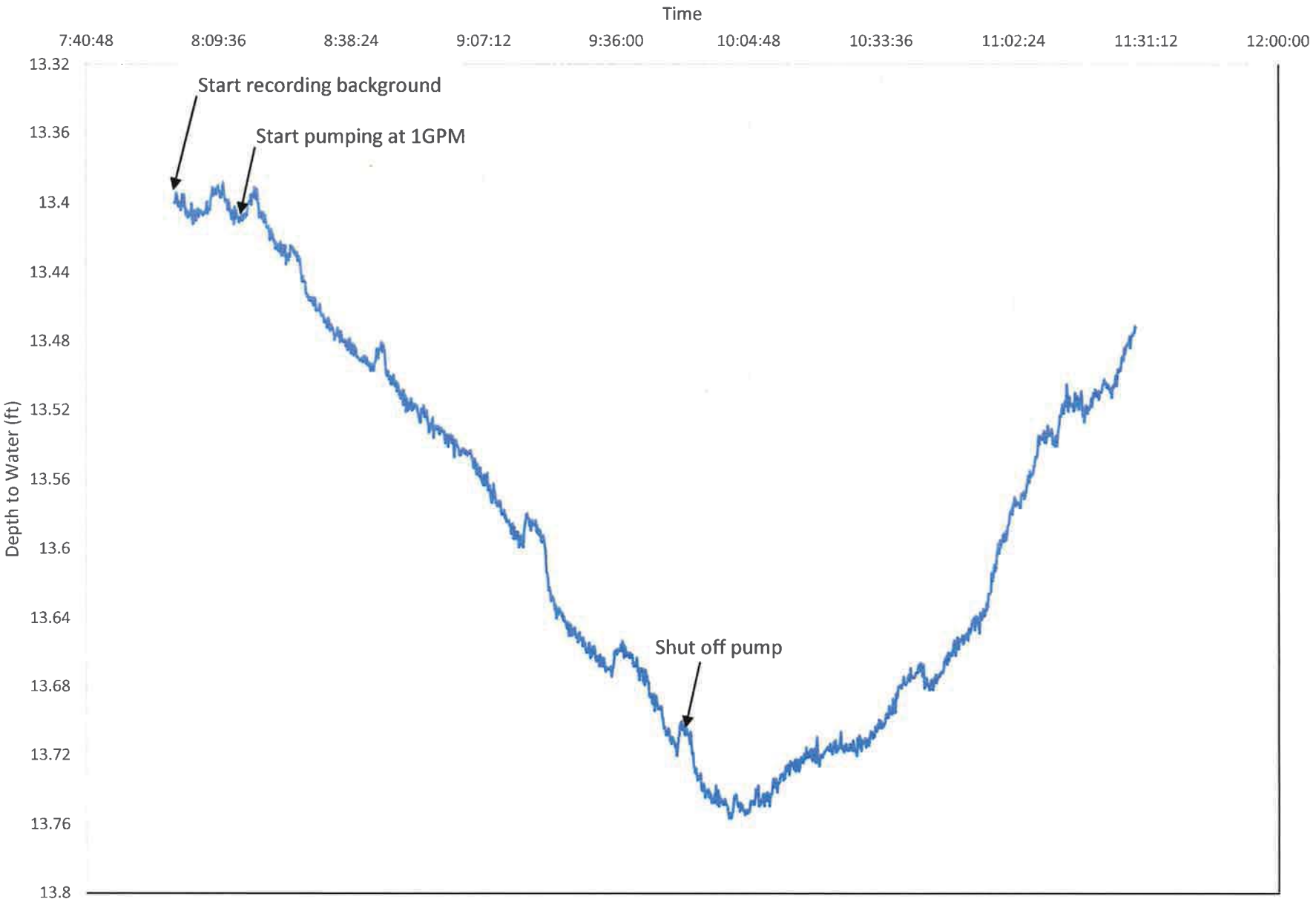
Point Store Potable Well 1GPM Step Test - Potable Well Drawdown and Recovery - 01/30/18

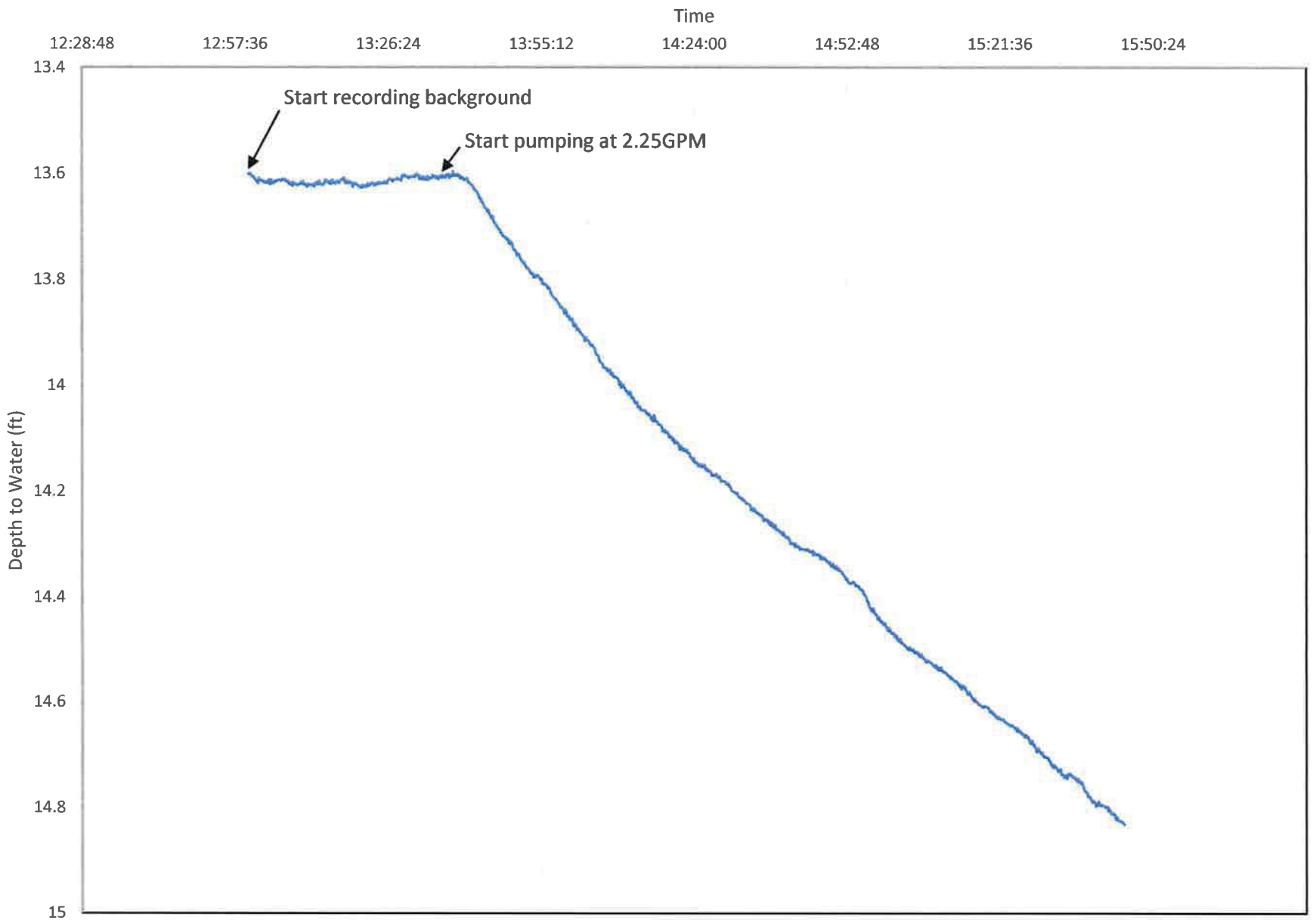


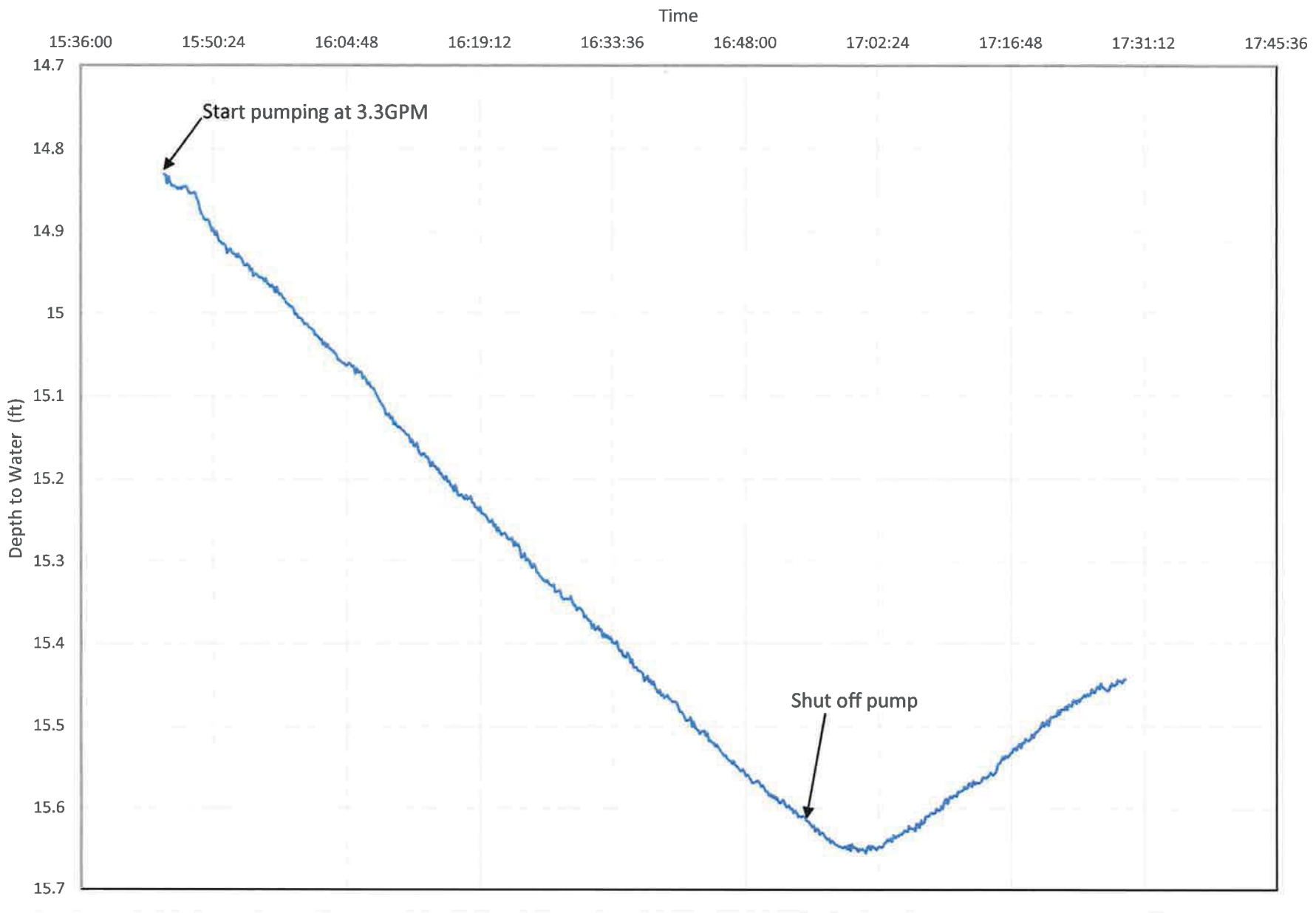

Point Store Potable Well 2.25GPM Step Test - Potable Well Drawdown - 01/29/18
Time
12:28:48
12:57:36
13:26:24
13:55:12
14:24:00
14:52:48
15:21:36
15:50:24
Depth to Water (ft)
10
10.5
11
11.5
12
12.5
13
13.5
Start recording background
Start pumping at 2.25GPM
Adjusting flow rate

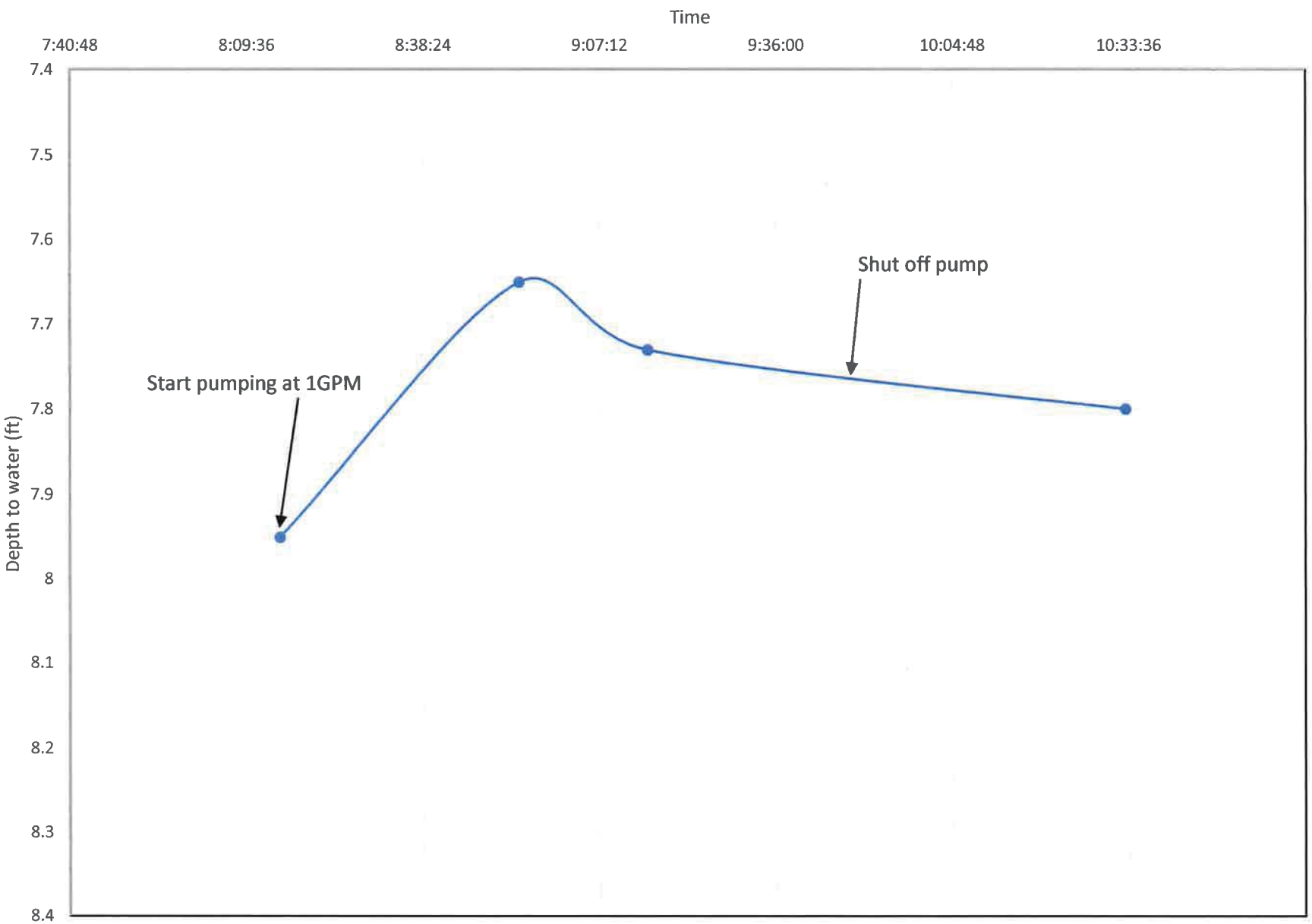

Point Store Potable Well 3.3GPM Step Test - Potable Well Drawdown and Recovery - 01/29/18
Time
15:21:36
15:36:00
15:50:24
16:04:48
16:19:12
16:33:36
16:48:00
17:02:24
17:16:48
17:31:12
17:45:36
Depth to Water (ft)
12.8
13
13.2
13.4
13.6
13.8
14
14.2
14.4
14.6
Start pumping at 3.3GPM
Shut off pump

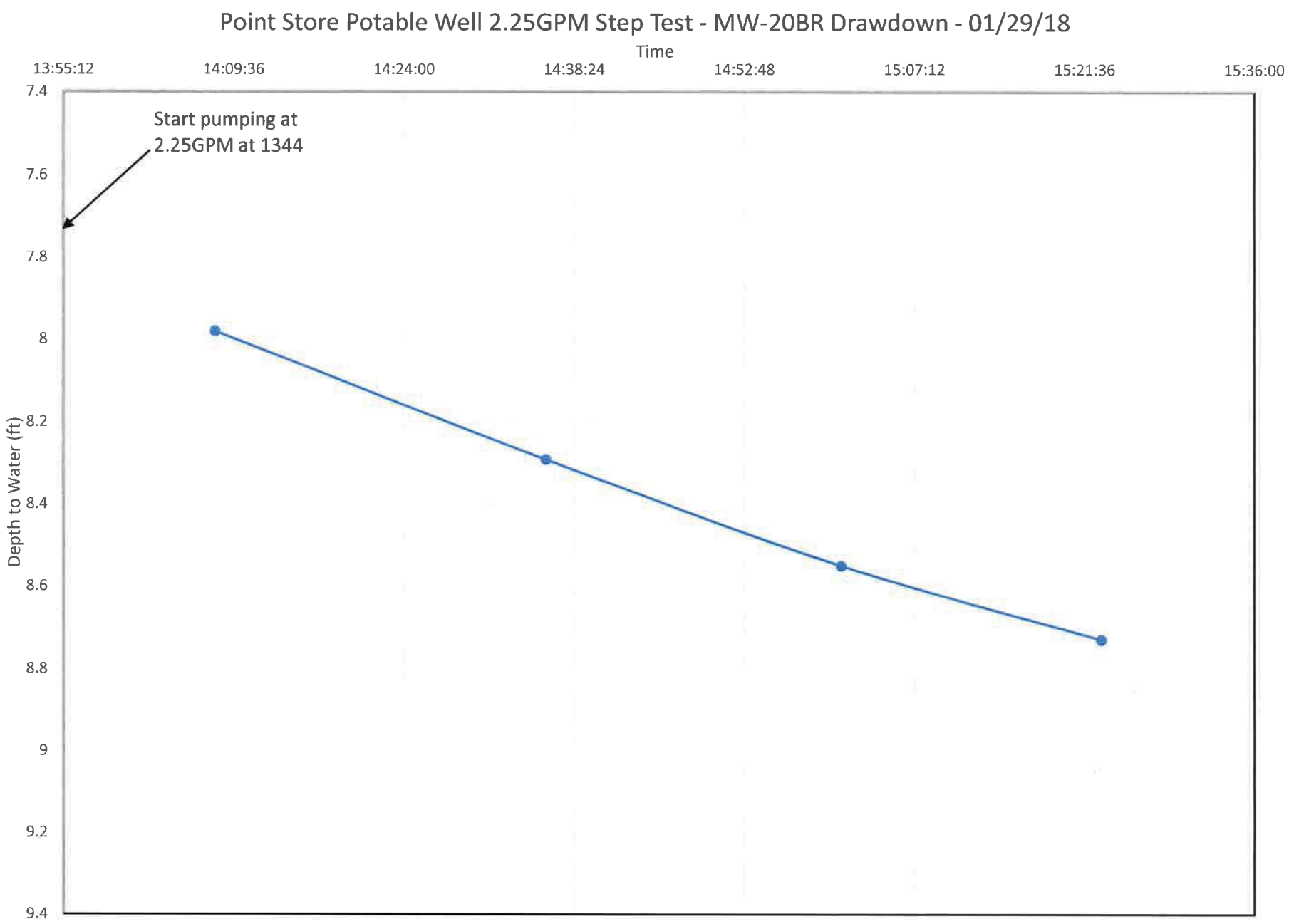
Point Store Potable Well 1GPM Step Test - PZ-3BR Drawdown and Recovery - 01/30/18

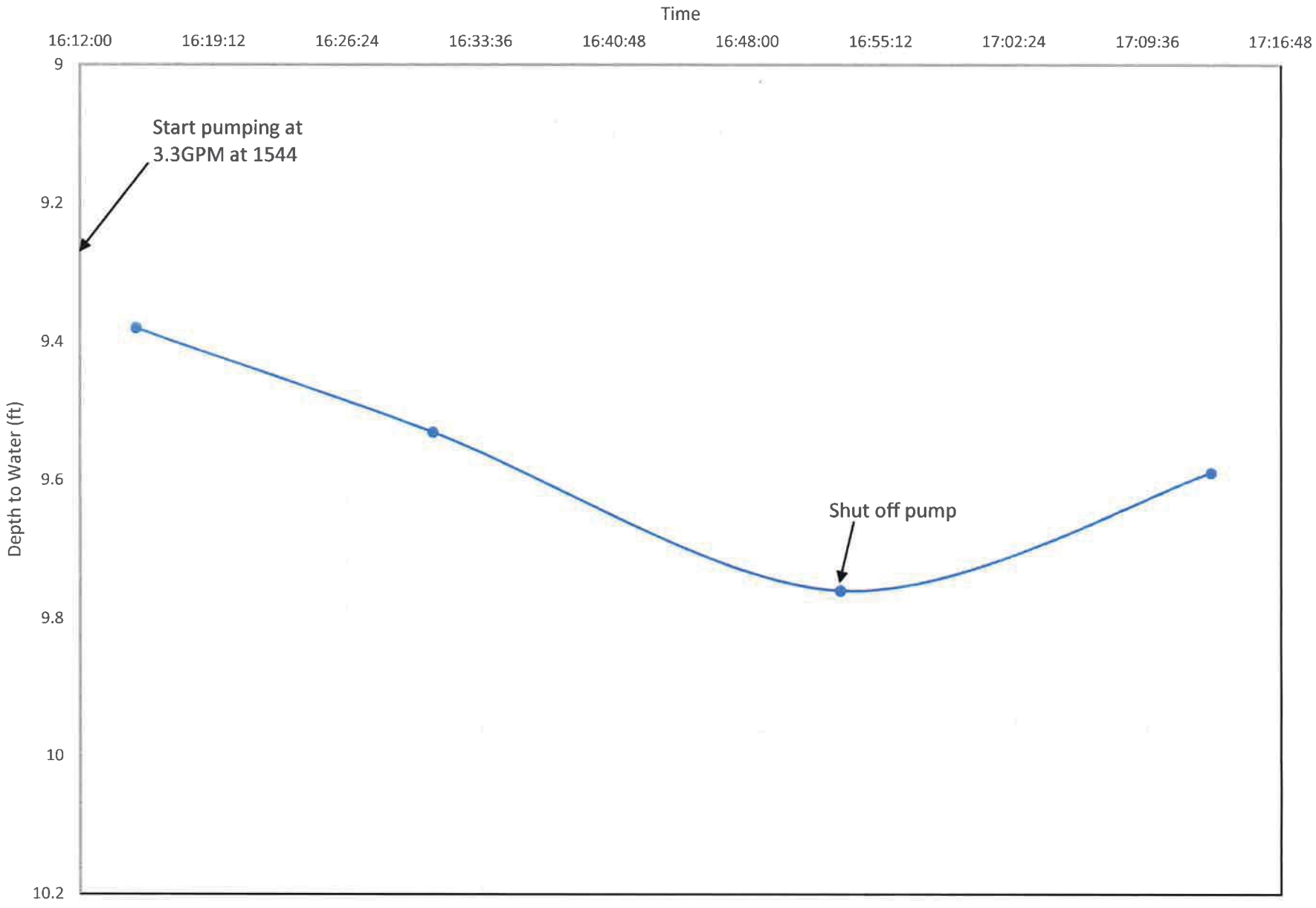


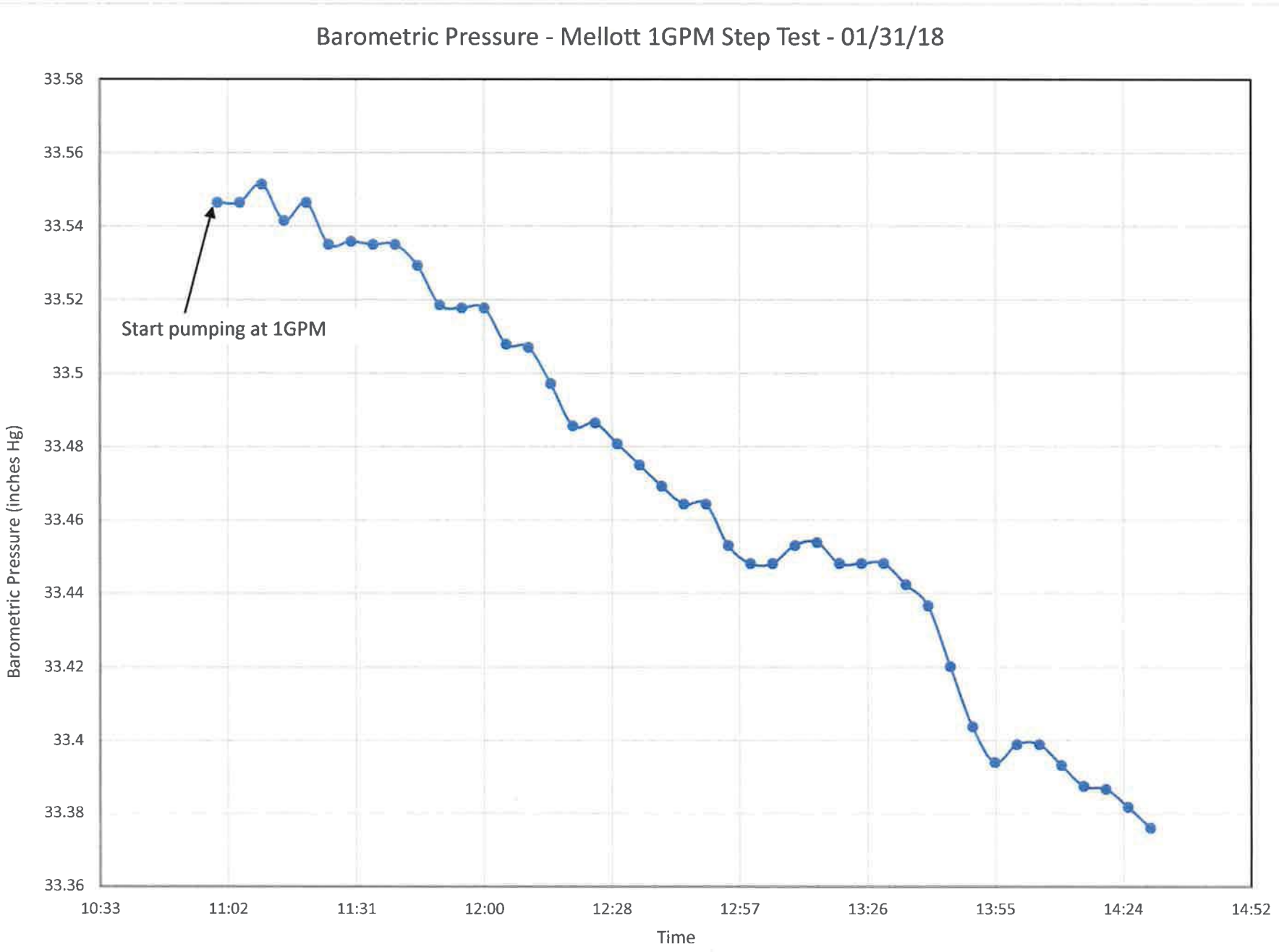

Point Store Potable Well 2.25GPM Step Test - PZ-3BR Drawdown - 01/29/18
Time
12:28:48
12:57:36
13:26:24
13:55:12
14:24:00
14:52:48
15:21:36
15:50:24
Depth to Water (ft)
13.4
13.6
13.8
14
14.2
14.4
14.6
14.8
15
Start recording background
Start pumping at 2.25GPM

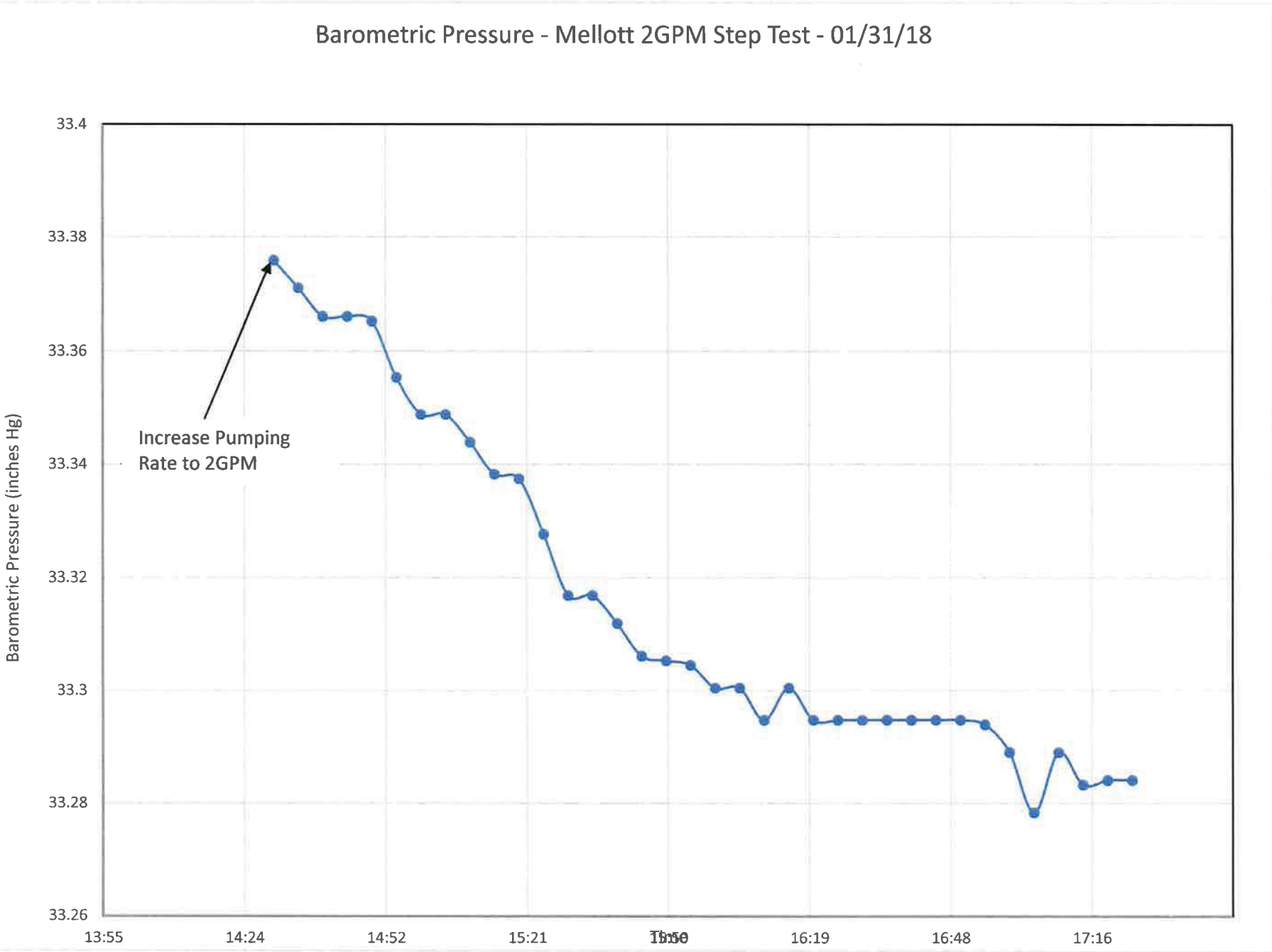

Point Store Potable Well 3.3GPM Step Test - PZ-3BR Drawdown and Recovery - 01/29/18
Time
15:36:00
15:50:24
16:04:48
16:19:12
16:33:36
16:48:00
17:02:24
17:16:48
17:31:12
17:45:36
Depth to Water (ft)
14.7
14.8
14.9
15
15.1
15.2
15.3
15.4
15.5
15.6
15.7
Start pumping at 3.3GPM
Shut off pump

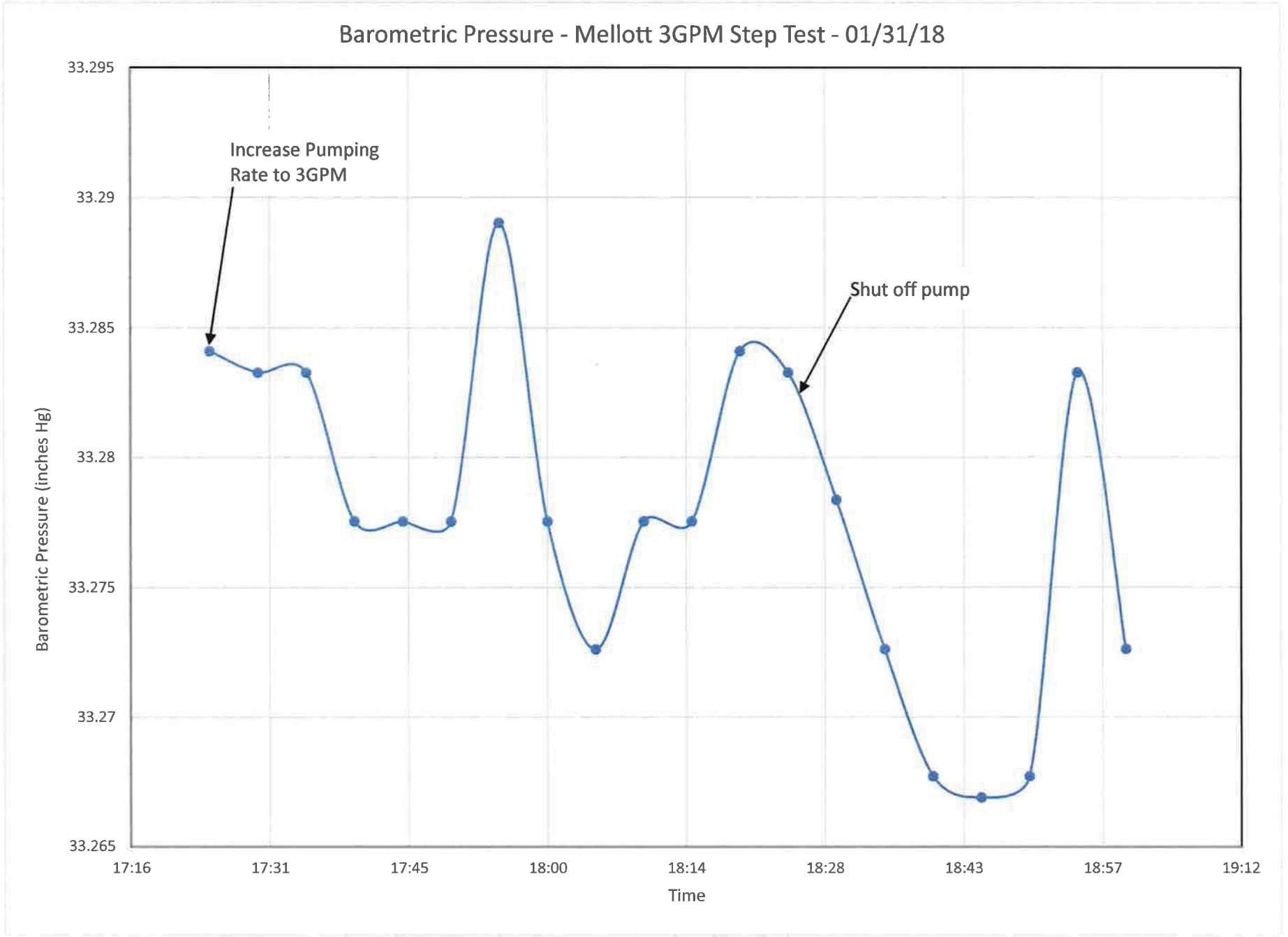

Point Store Potable Well 1GPM Step Test - MW-20BR Drawdown and Recovery - 01/30/18
Time
7:40:48
8:09:36
8:38:24
9:07:12
9:36:00
10:04:48
10:33:36
Depth to water (ft)
7.4
7.5
7.6
7.7
7.8
7.9
8
8.1
8.2
8.3
8.4
Start pumping at 1GPM
Shut off pump

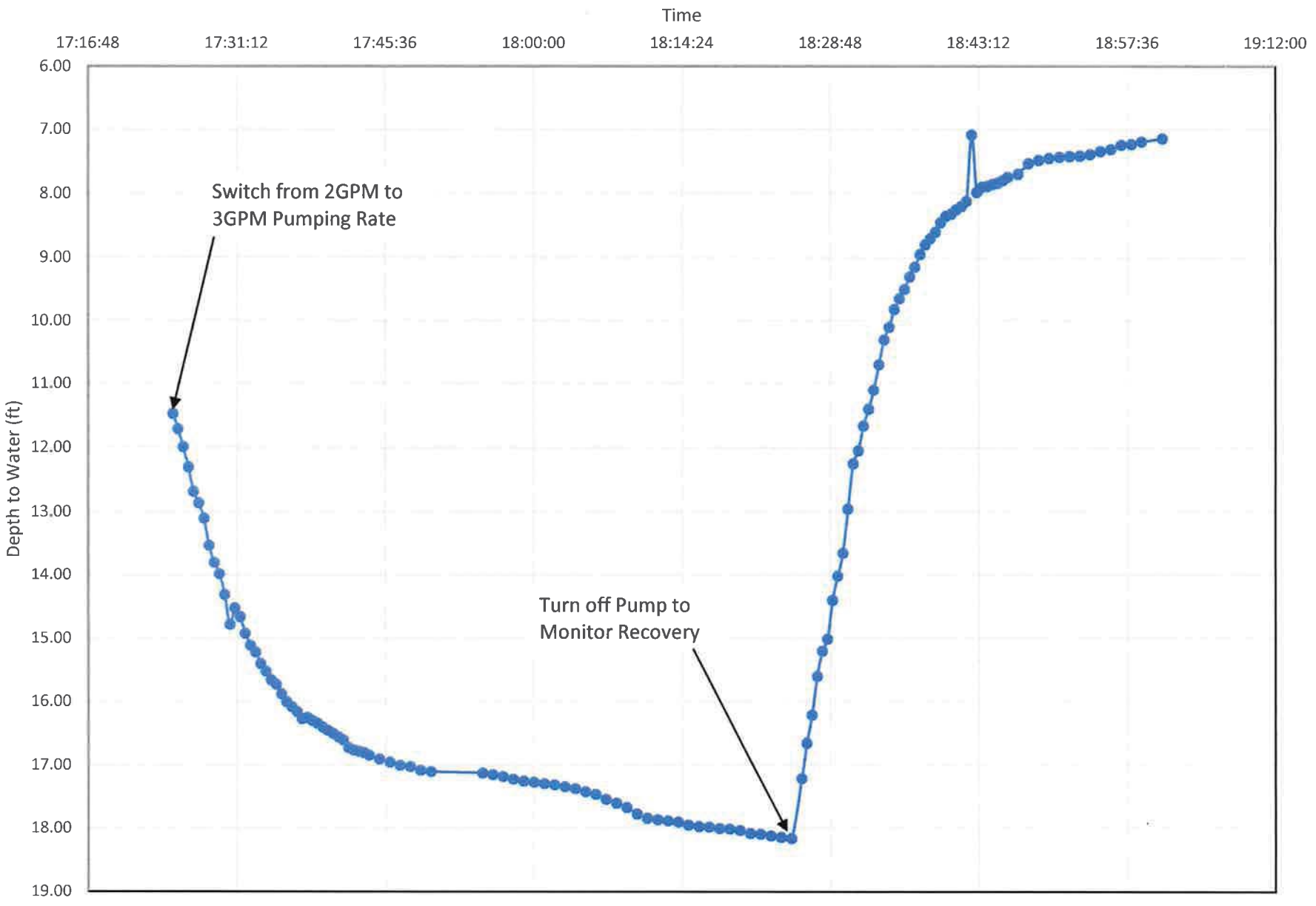

Point Store Potable Well 2.25GPM Step Test - MW-20BR Drawdown - 01/29/18
Time
13:55:12
14:09:36
14:24:00
14:38:24
14:52:48
15:07:12
15:21:36
15:36:00
Start pumping at
2.25GPM at 1344
Depth to Water (ft)
7.4
7.6
7.8
8
8.2
8.4
8.6
8.8
9
9.2
9.4

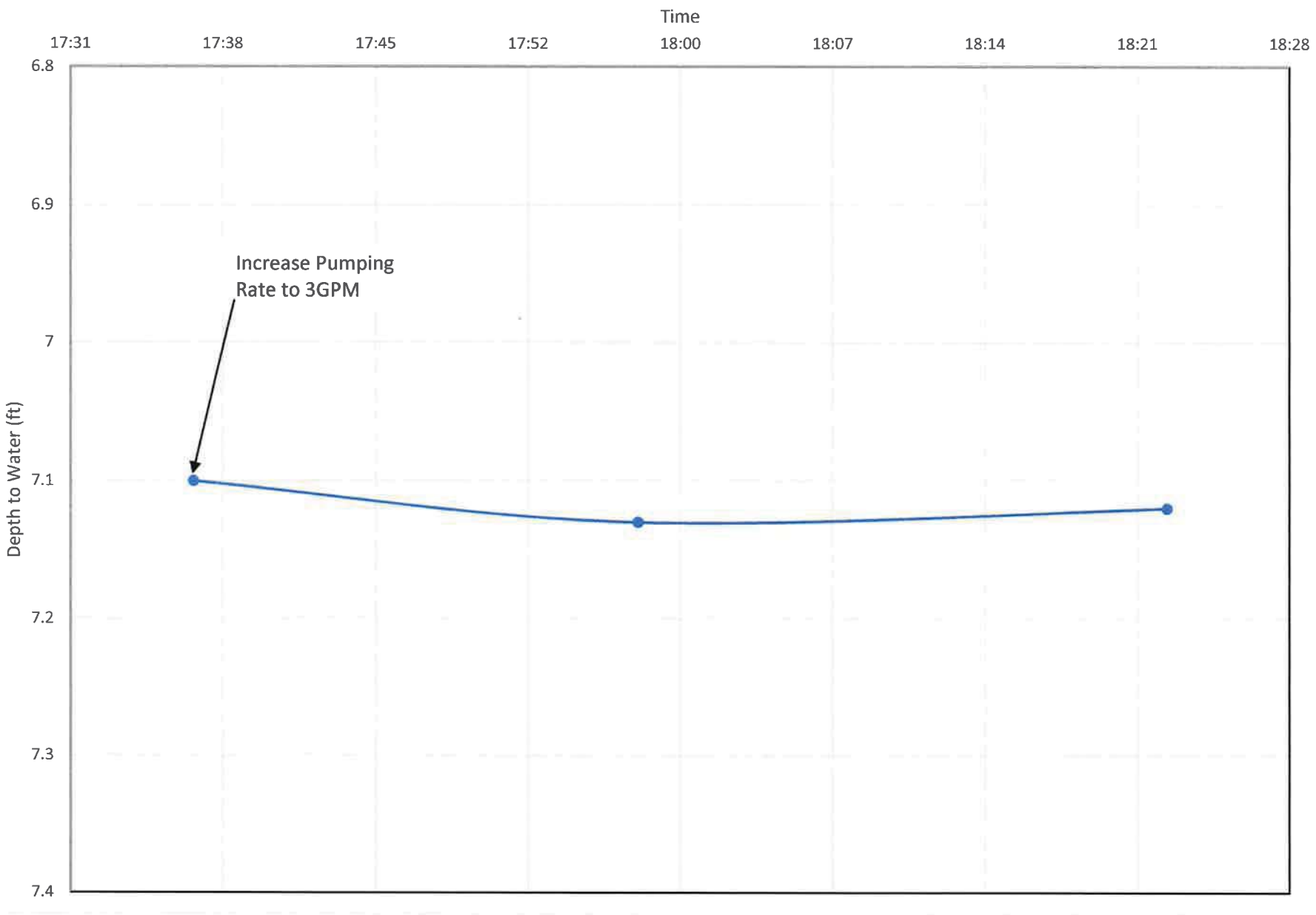

Point Store Potable Well 3.3GPM Step Test - MW-20BR Drawdown and Recovery - 01/29/18
Time
16:12:00
16:19:12
16:26:24
16:33:36
16:40:48
16:48:00
16:55:12
17:02:24
17:09:36
17:16:48
Depth to Water (ft)
9
9.2
9.4
9.6
9.8
10
10.2
Start pumping at
3.3GPM at 1544
Shut off pump

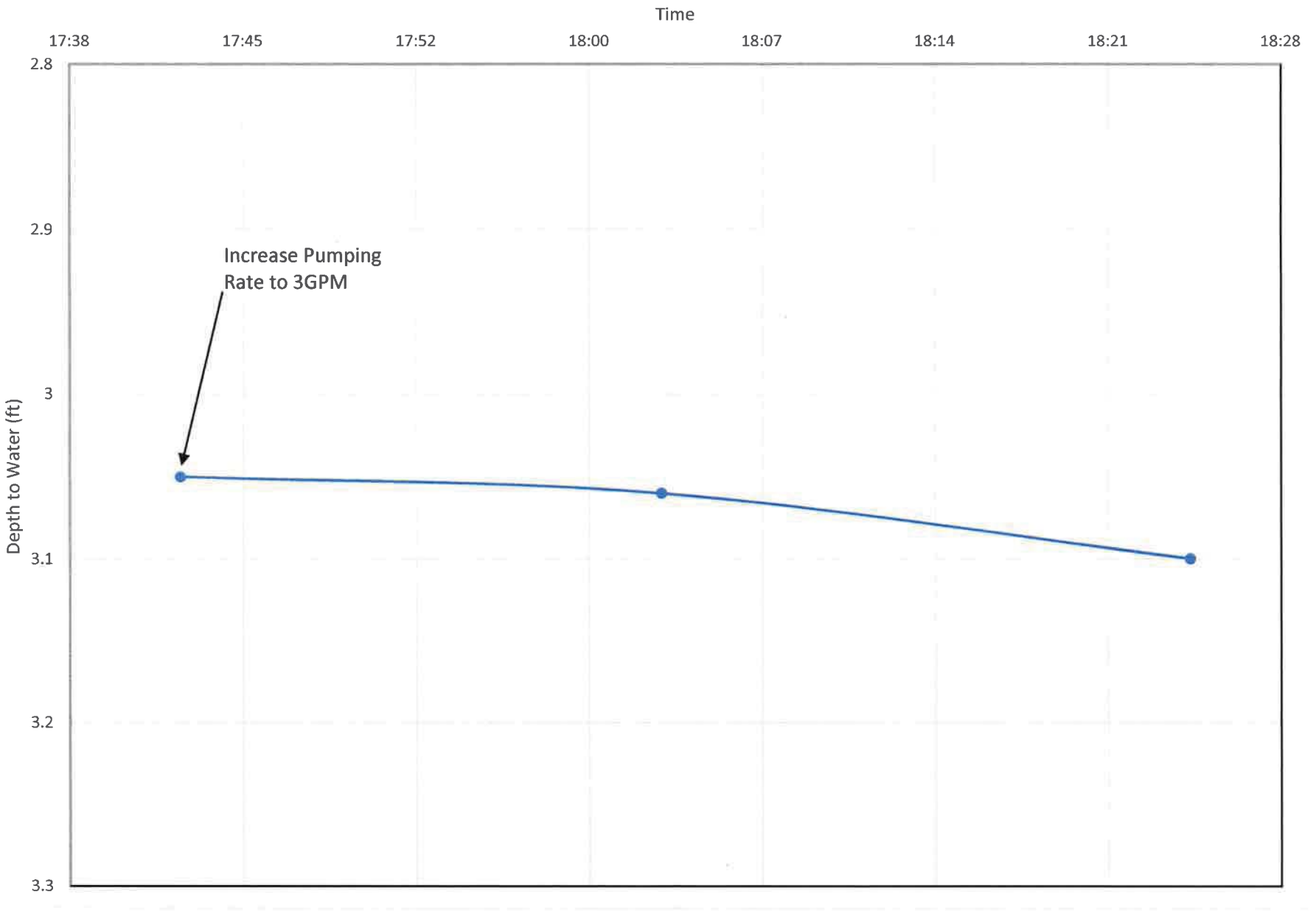

Barometric Pressure - Mellott 1GPM Step Test - 01/31/18
Barometric Pressure (inches Hg)
33.58
33.56
33.54
33.52
33.5
33.48
33.46
33.44
33.42
33.4
33.38
33.36
Start pumping at 1GPM
10:33
11:02
11:31
12:00
12:28
12:57
13:26
13:55
14:24
14:52
Time

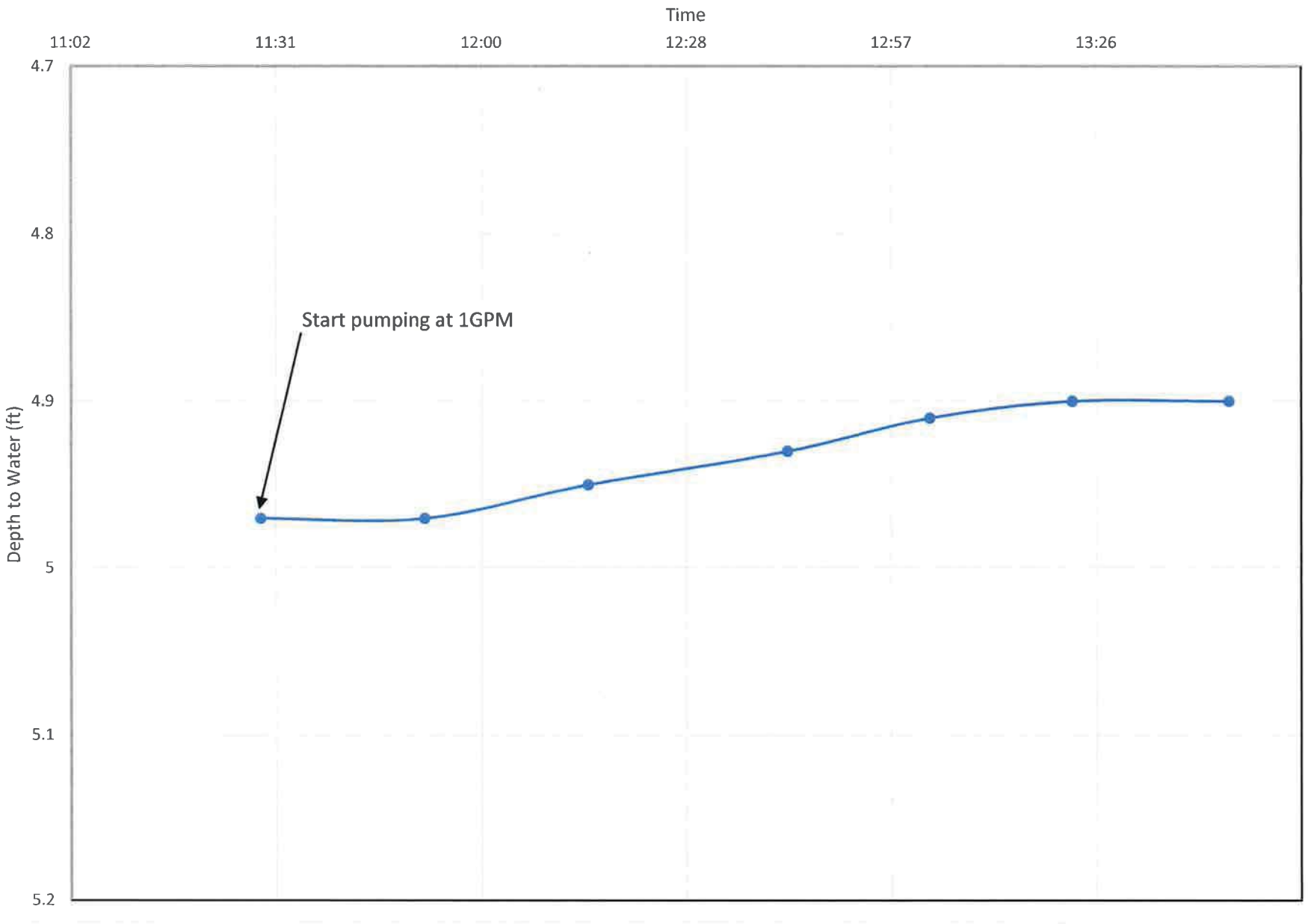

Barometric Pressure - Mellott 2GPM Step Test - 01/31/18
Barometric Pressure (inches Hg)
33.4
33.38
33.36
33.34
33.32
33.3
33.28
33.26
Increase Pumping Rate to 2GPM
13:55
14:24
14:52
15:21
16:19
16:48
17:16

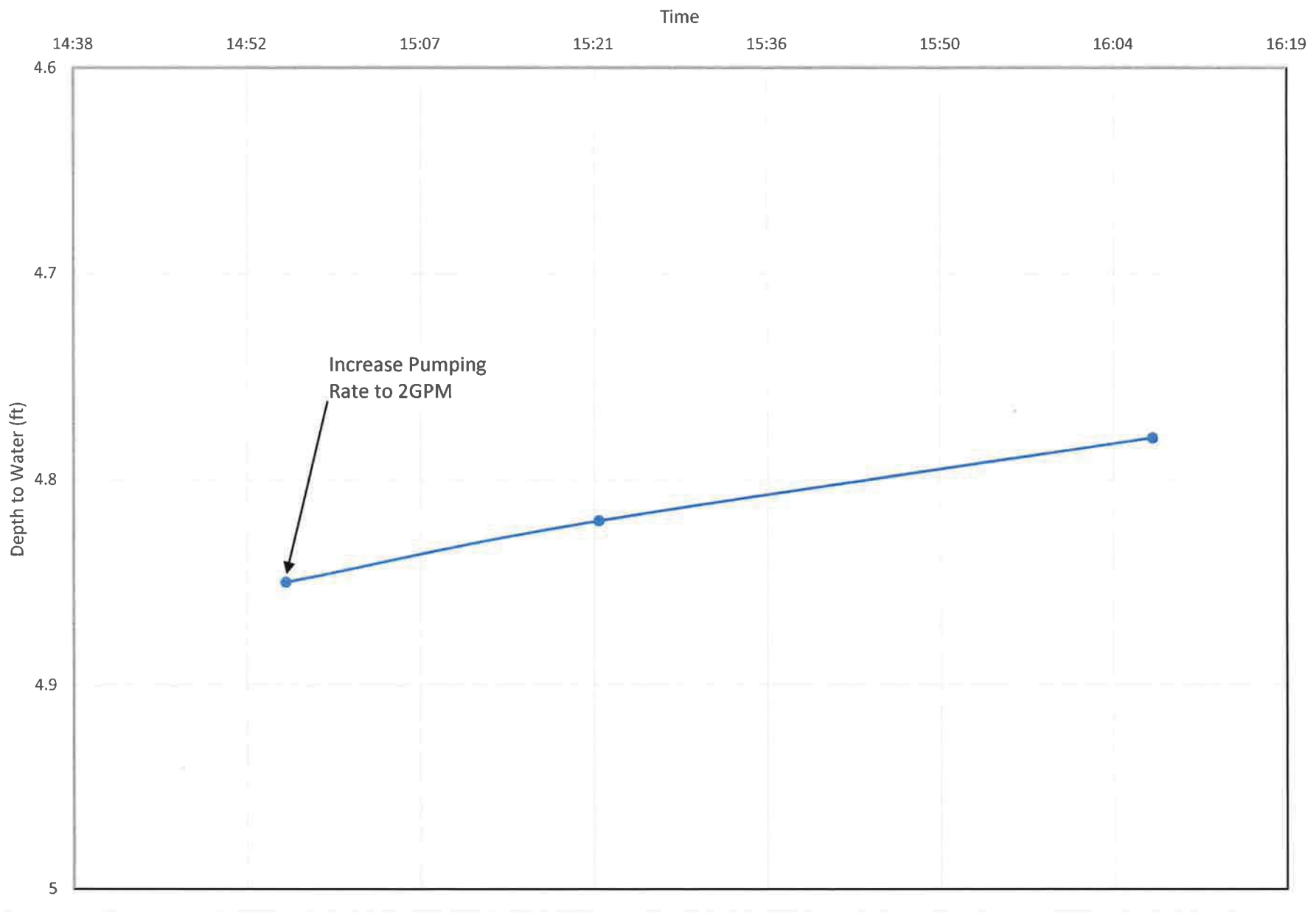

Barometric Pressure - Mellott 3GPM Step Test - 01/31/18
Increase Pumping Rate to 3GPM
Shut off pump
Barometric Pressure (inches Hg)
33.295
33.29
33.285
33.28
33.275
33.27
33.265
17:16
17:31
17:45
18:00
18:14
18:28
18:43
18:57
19:12
Time

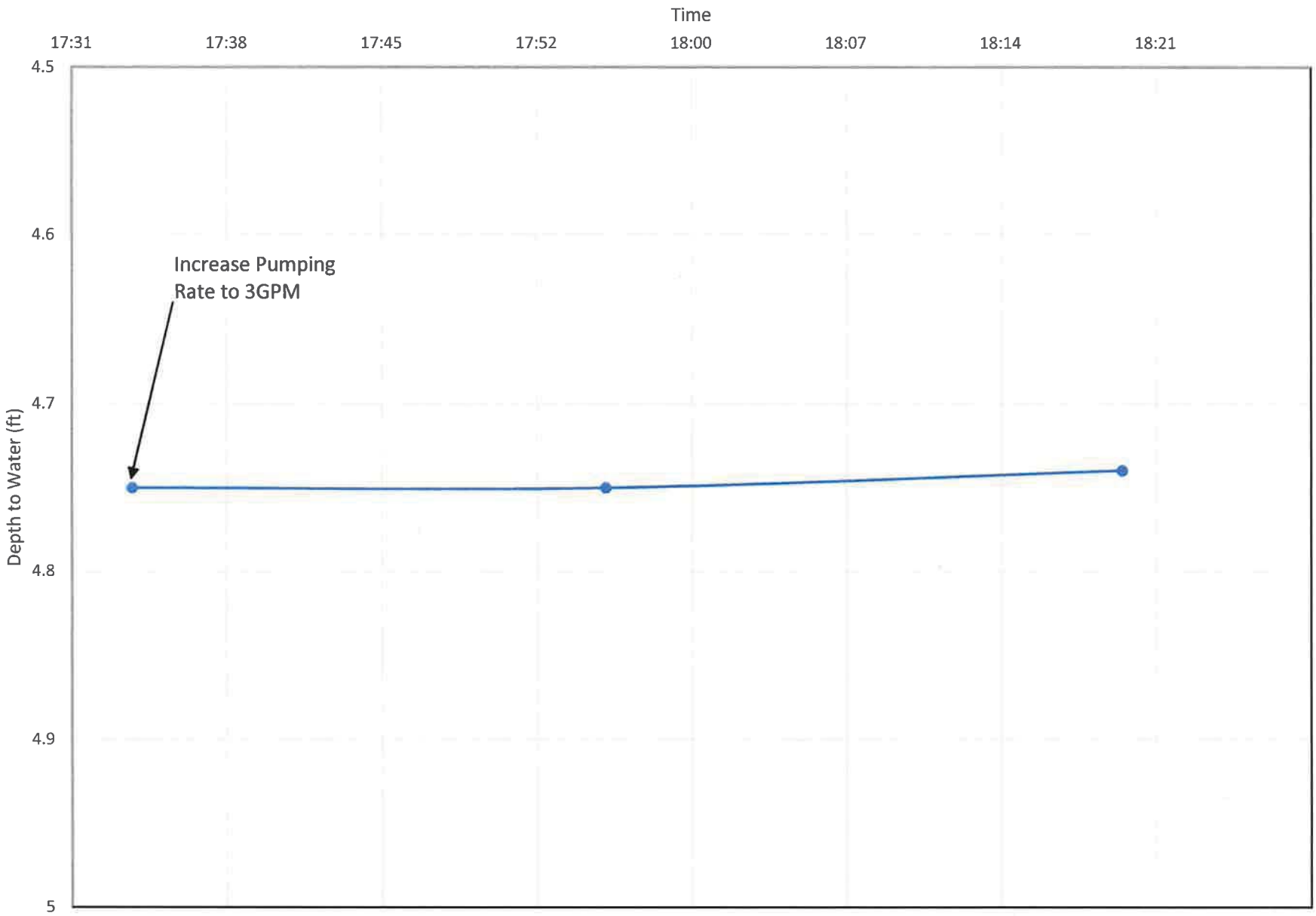

Mellott Potable Well 3GPM Step Test - Mellott Well Drawdown - 01/31/18
Time
17:16:48
17:31:12
17:45:36
18:00:00
18:14:24
18:28:48
18:43:12
18:57:36
19:12:00
Depth to Water (ft)
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
Switch from 2GPM to
3GPM Pumping Rate
Turn off Pump to
Monitor Recovery

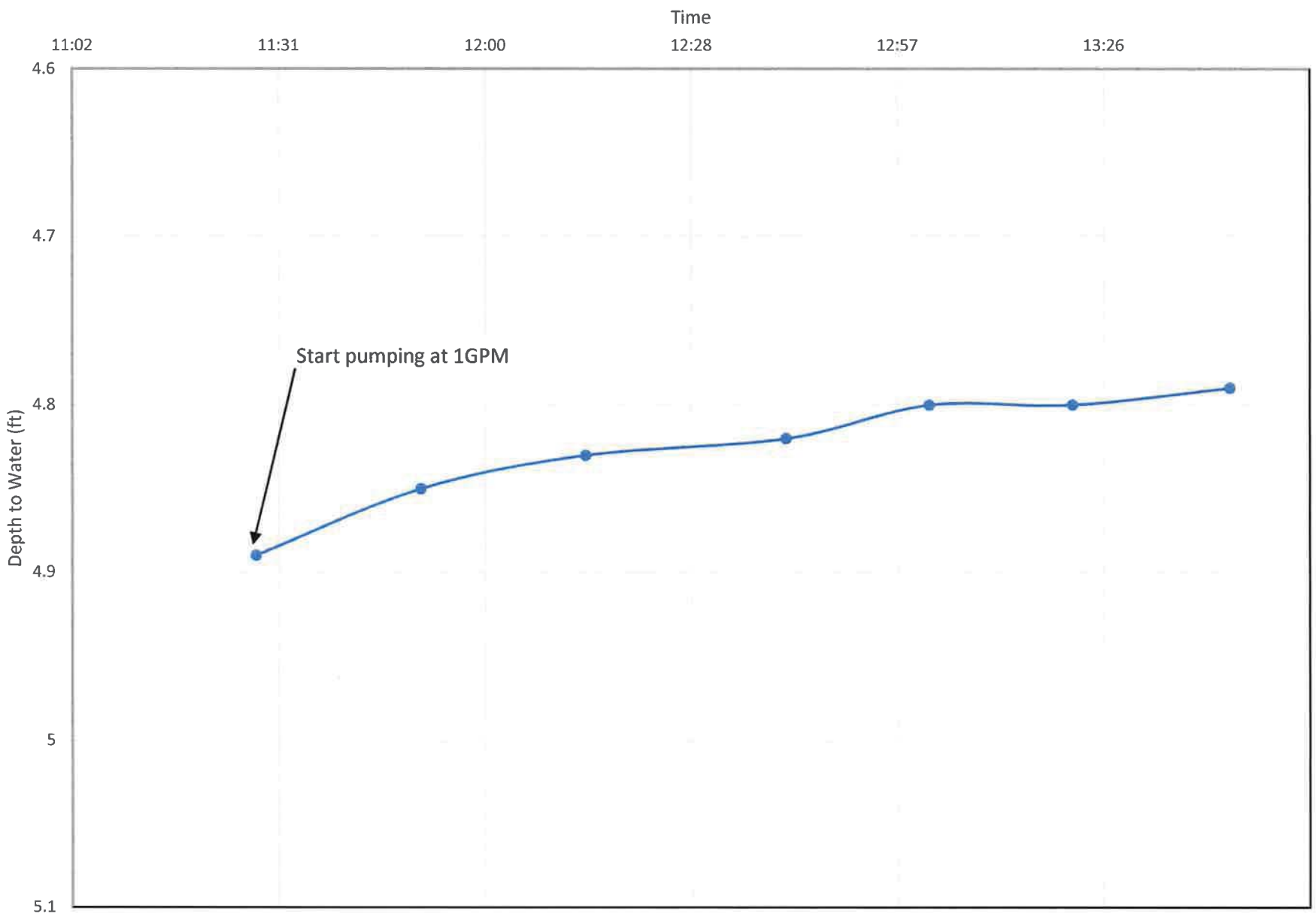

Mellott Potable Well 3GPM Step Test - MW-19BR Drawdown - 01/31/18
Time
17:31
17:38
17:45
17:52
18:00
18:07
18:14
18:21
18:28
6.8
6.9
7
7.1
7.2
7.3
7.4
Depth to Water (ft)
Increase Pumping Rate to 3GPM

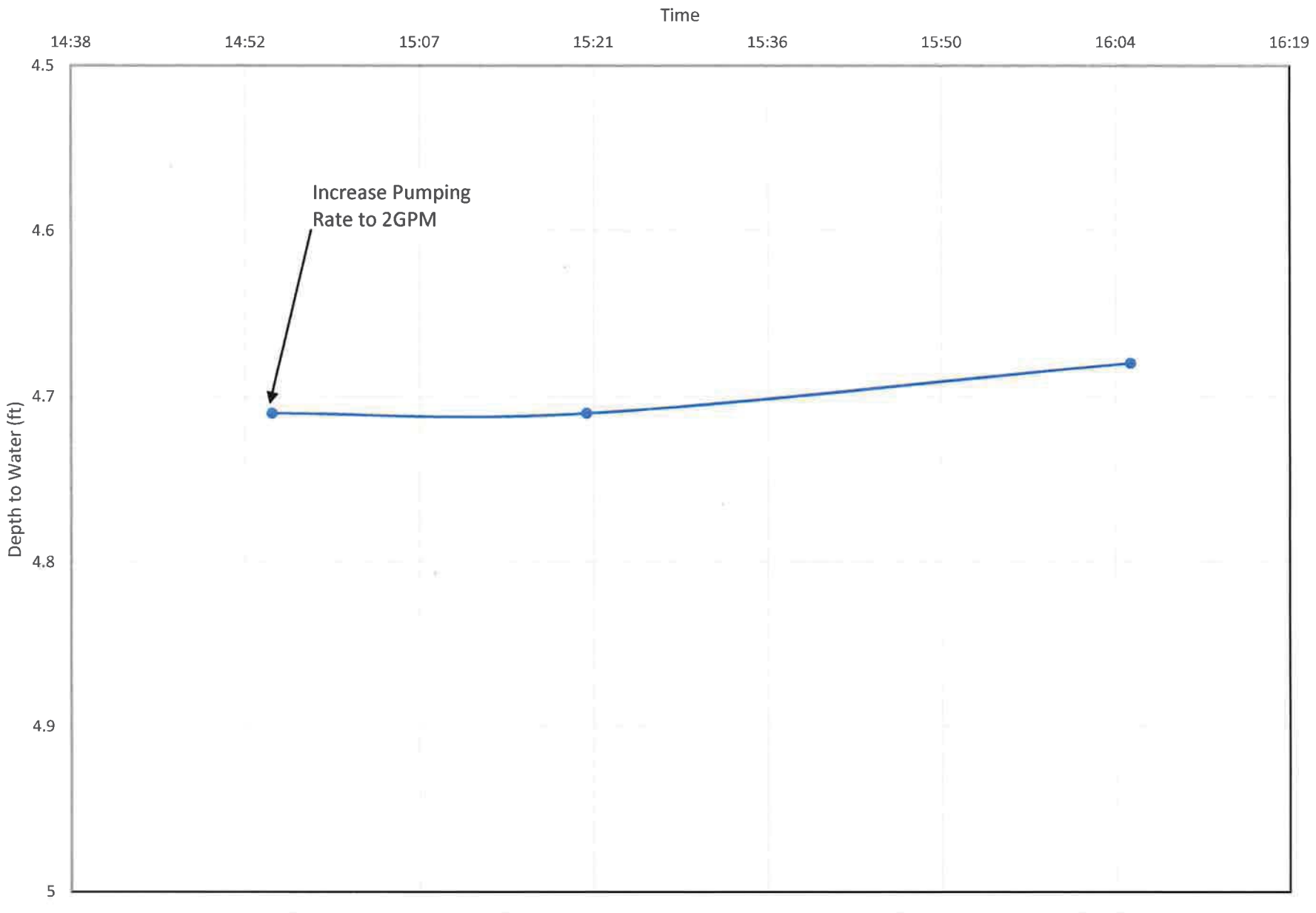

Mellott Potable Well 3GPM Step Testing - PZ-2BR Drawdown - 01/31/18
Time
17:38
17:45
17:52
18:00
18:07
18:14
18:21
18:28
Depth to Water (ft)
2.8
2.9
3
3.1
3.2
3.3
Increase Pumping Rate to 3GPM

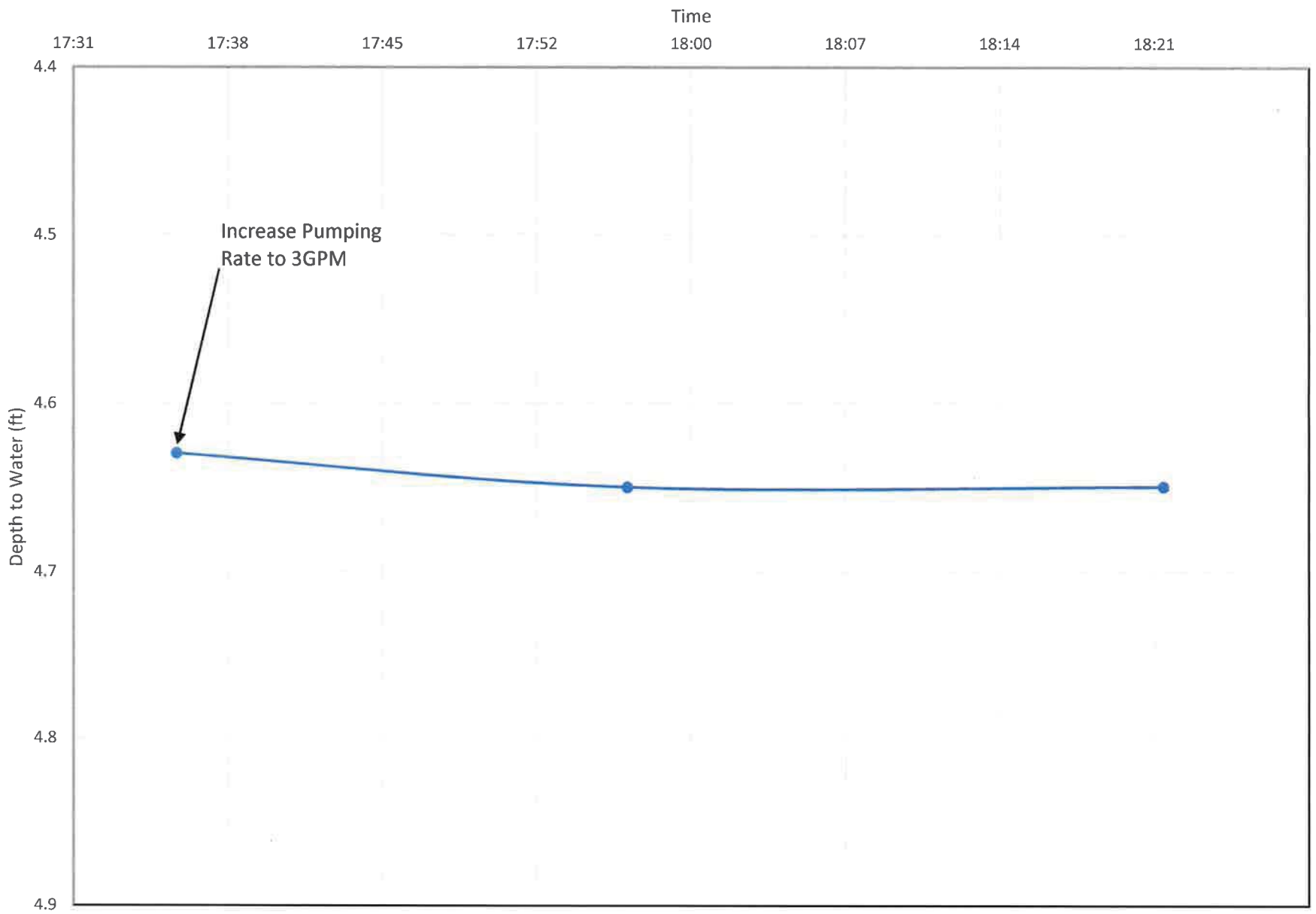

Mellott Potable Well 1GPM Step Test - MW-16 Drawdown - 01/31/18
Time
11:02
11:31
12:00
12:28
12:57
13:26
Depth to Water (ft)
4.7
4.8
4.9
5
5.1
5.2
Start pumping at 1GPM

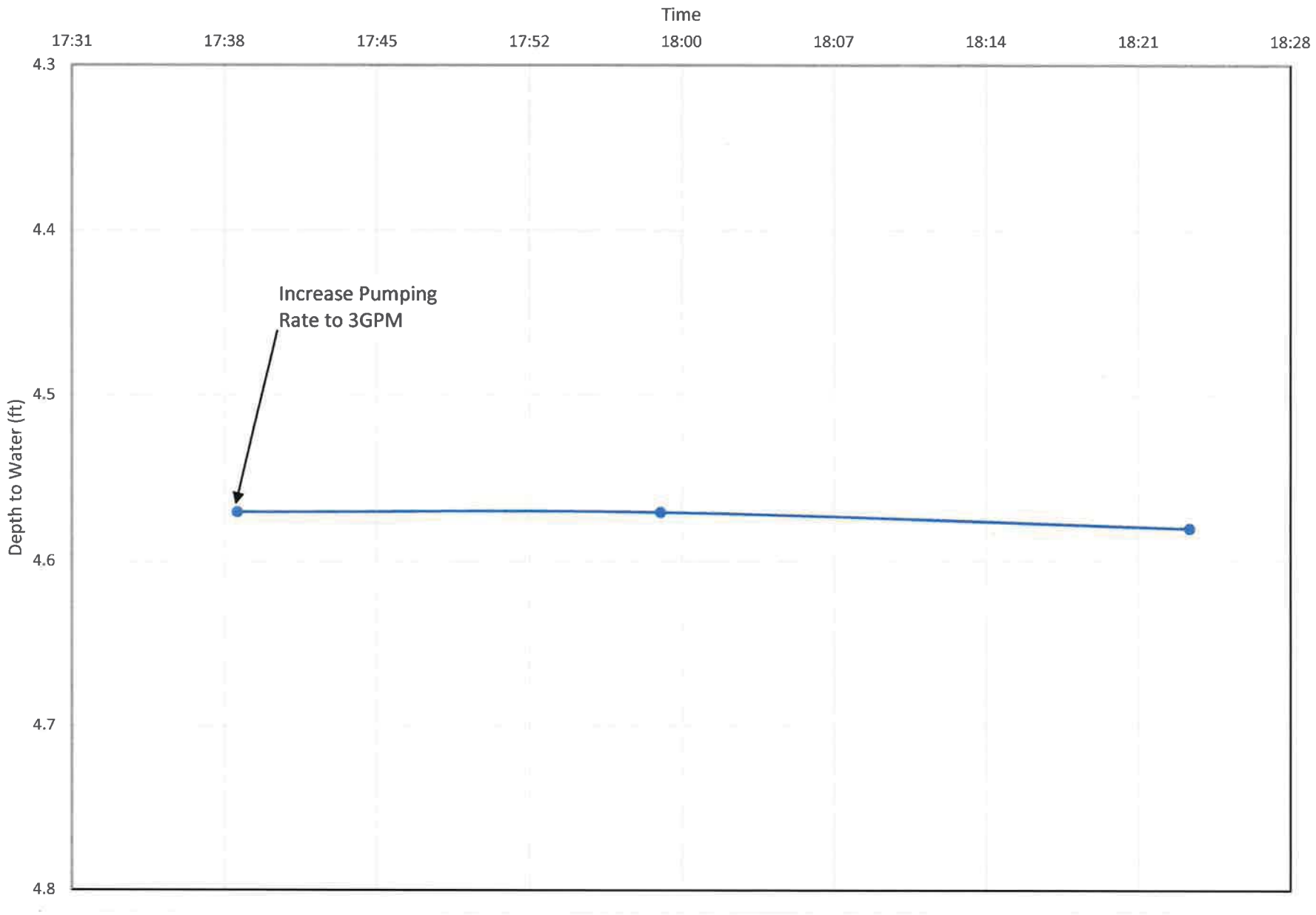

Mellott Potable Well 2GPM Step Test - MW-16 Drawdown - 01/31/18
Time
14:38
14:52
15:07
15:21
15:36
15:50
16:04
16:19
Depth to Water (ft)
4.6
4.7
4.8
4.9
5
Increase Pumping Rate to 2GPM

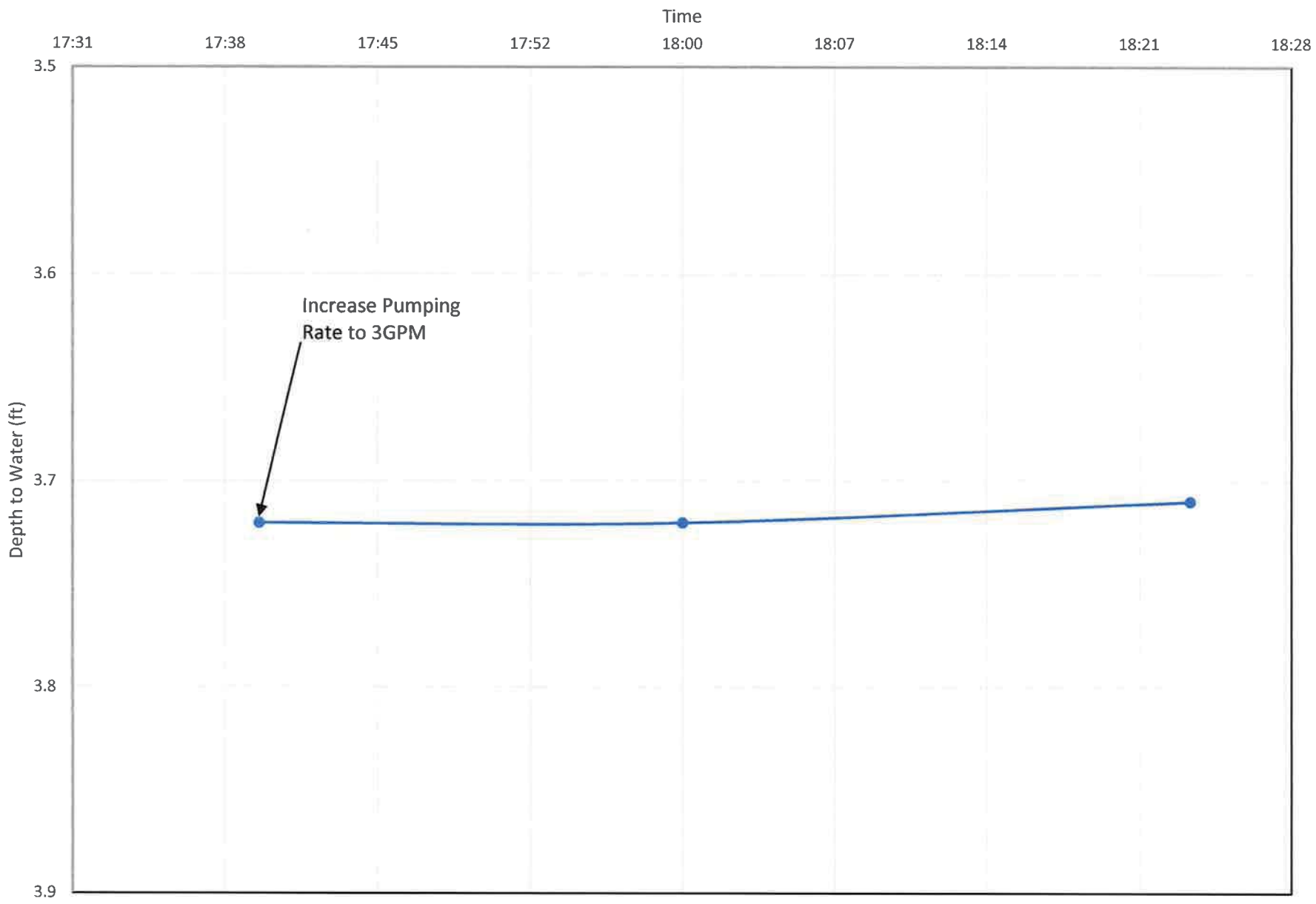

Mellott Potable Well 3GPM Step Test - MW-16 Drawdown - 01/31/18
Time
17:31
17:38
17:45
17:52
18:00
18:07
18:14
18:21
4.5
4.6
4.7
4.8
4.9
5
Depth to Water (ft)
Increase Pumping Rate to 3GPM


Mellott Potable Well 1GPM Step Test - MW-17 Drawdown - 01/31/18
Time
11:02
11:31
12:00
12:28
12:57
13:26
Depth to Water (ft)
4.6
4.7
4.8
4.9
5
5.1
Start pumping at 1GPM


Mellott Potable Well 2GPM Step Testing - MW-17 Drawdown - 01/31/18
Time
14:38
14:52
15:07
15:21
15:36
15:50
16:04
16:19
4.5
4.6
4.7
4.8
4.9
5
Depth to Water (ft)
Increase Pumping Rate to 2GPM

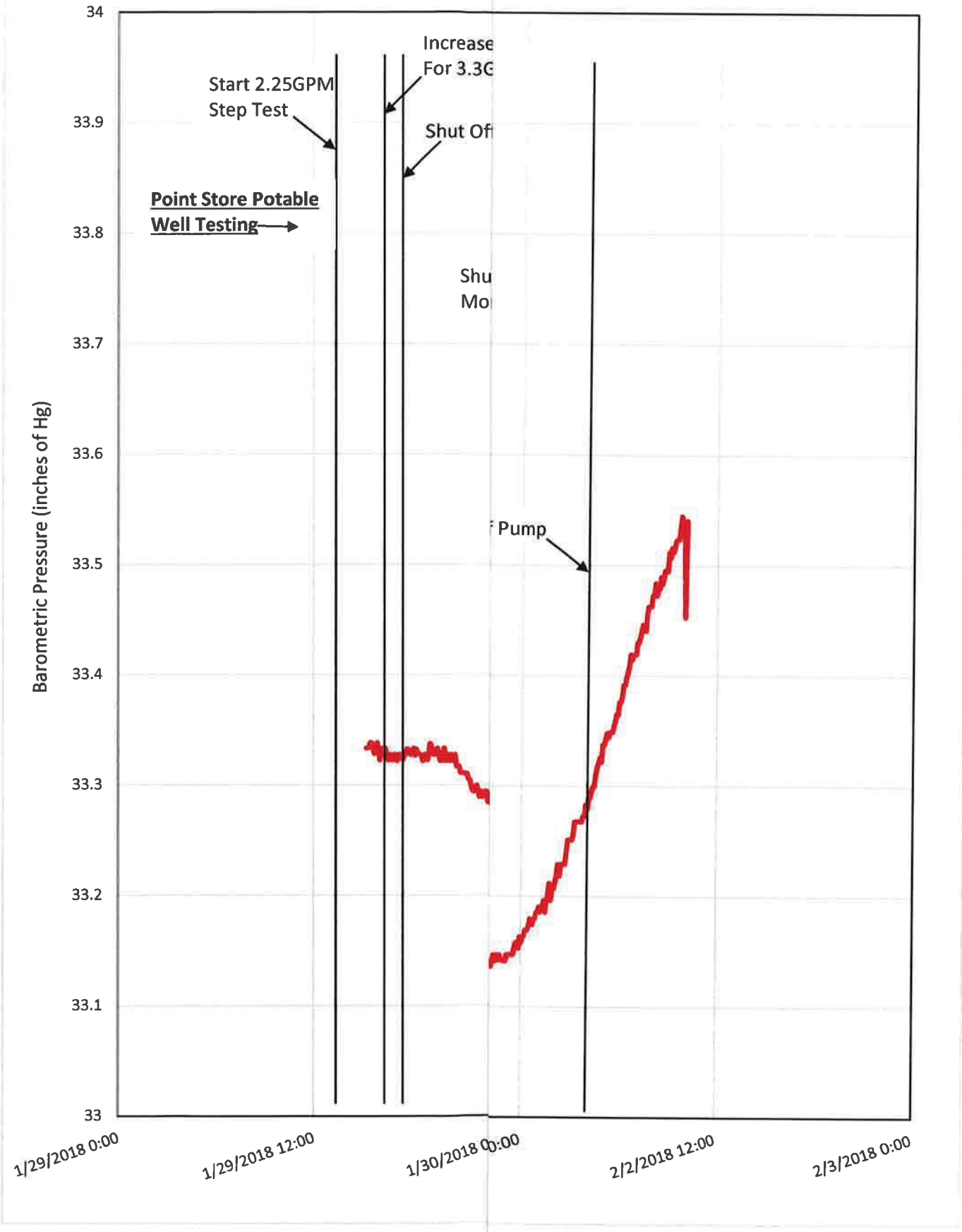

Mellott Potable Well 3GPM Step Testing - MW-17 Drawdown - 01/31/18
Time
17:31
17:38
17:45
17:52
18:00
18:07
18:14
18:21
Depth to Water (ft)
4.4
4.5
4.6
4.7
4.8
4.9
Increase Pumping Rate to 3GPM

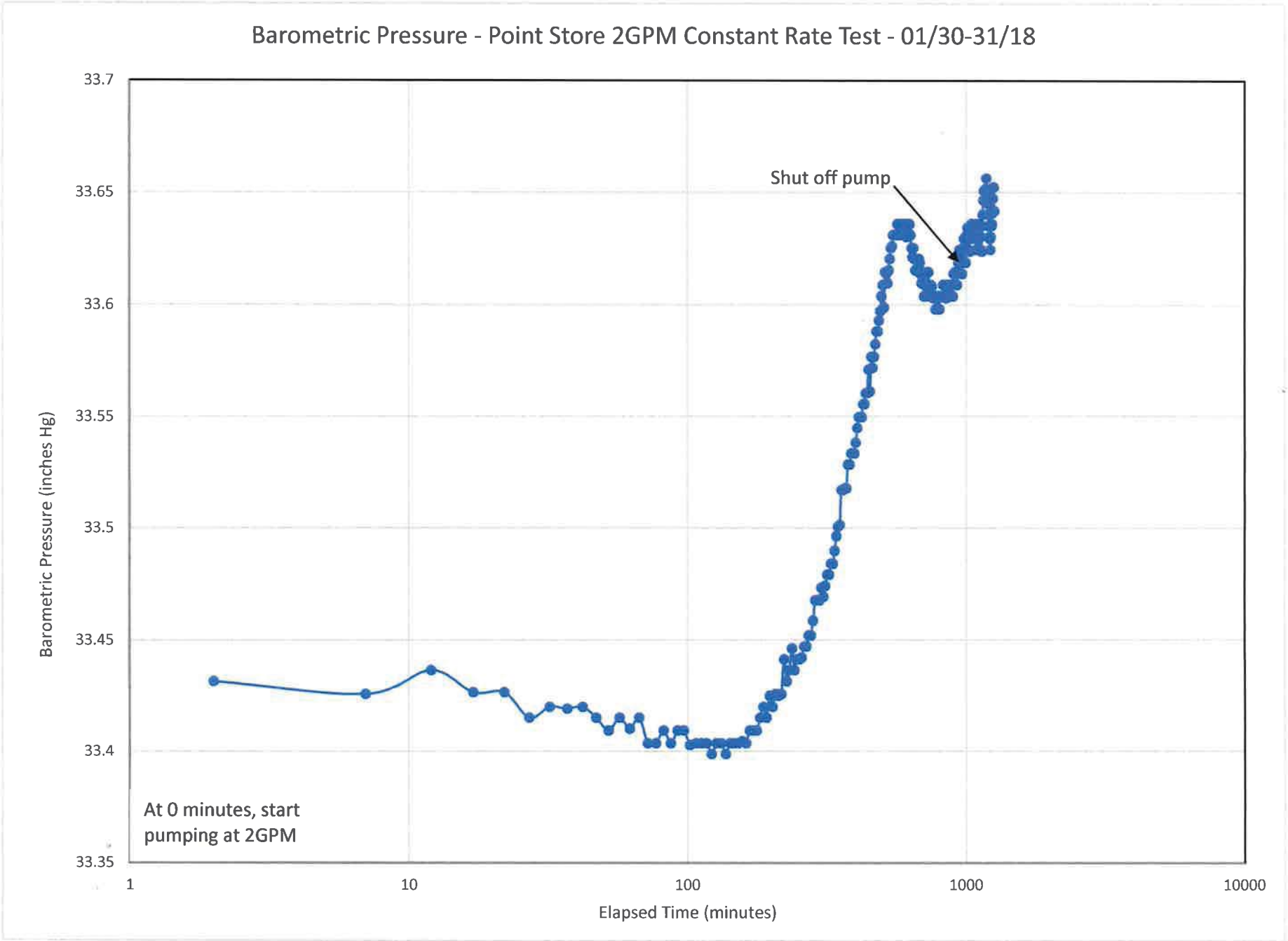

Mellott Potable Well 3GPM Step Testing - MW-18 Drawdown - 01/31/18
Time
17:31
17:38
17:45
17:52
18:00
18:07
18:14
18:21
18:28
Depth to Water (ft)
4.3
4.4
4.5
4.6
4.7
4.8
Increase Pumping Rate to 3GPM


Mellott Potable Well 3GPM Step Testing - PZ-1 Drawdown - 01/31/18
Time
17:31
17:38
17:45
17:52
18:00
18:07
18:14
18:21
18:28
3.5
3.6
3.7
3.8
3.9
Depth to Water (ft)
Increase Pumping Rate to 3GPM

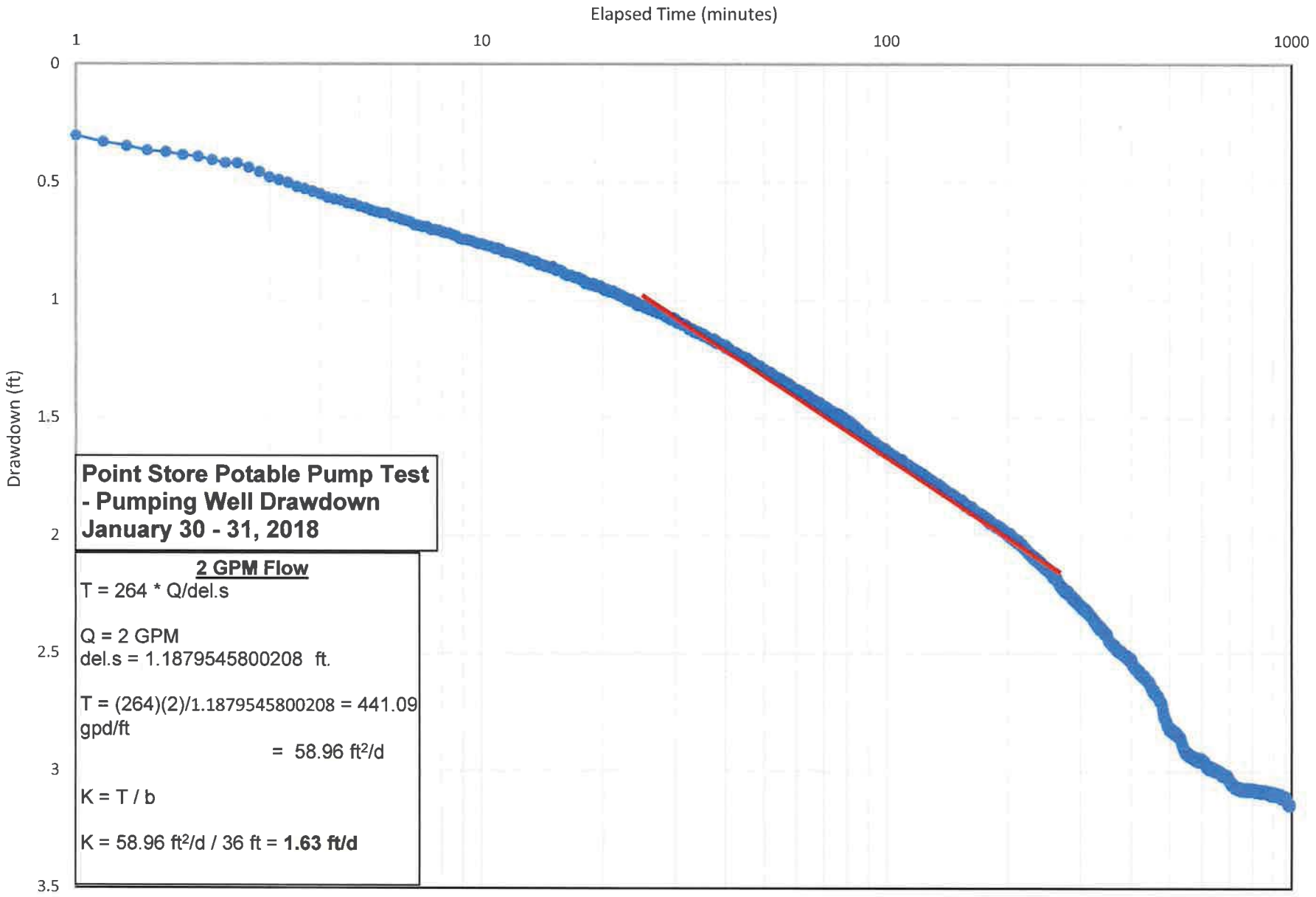
APPENDIX F

CONSTANT RATE TESTING BAROMETRIC AND DRAWDOWN CHARTS

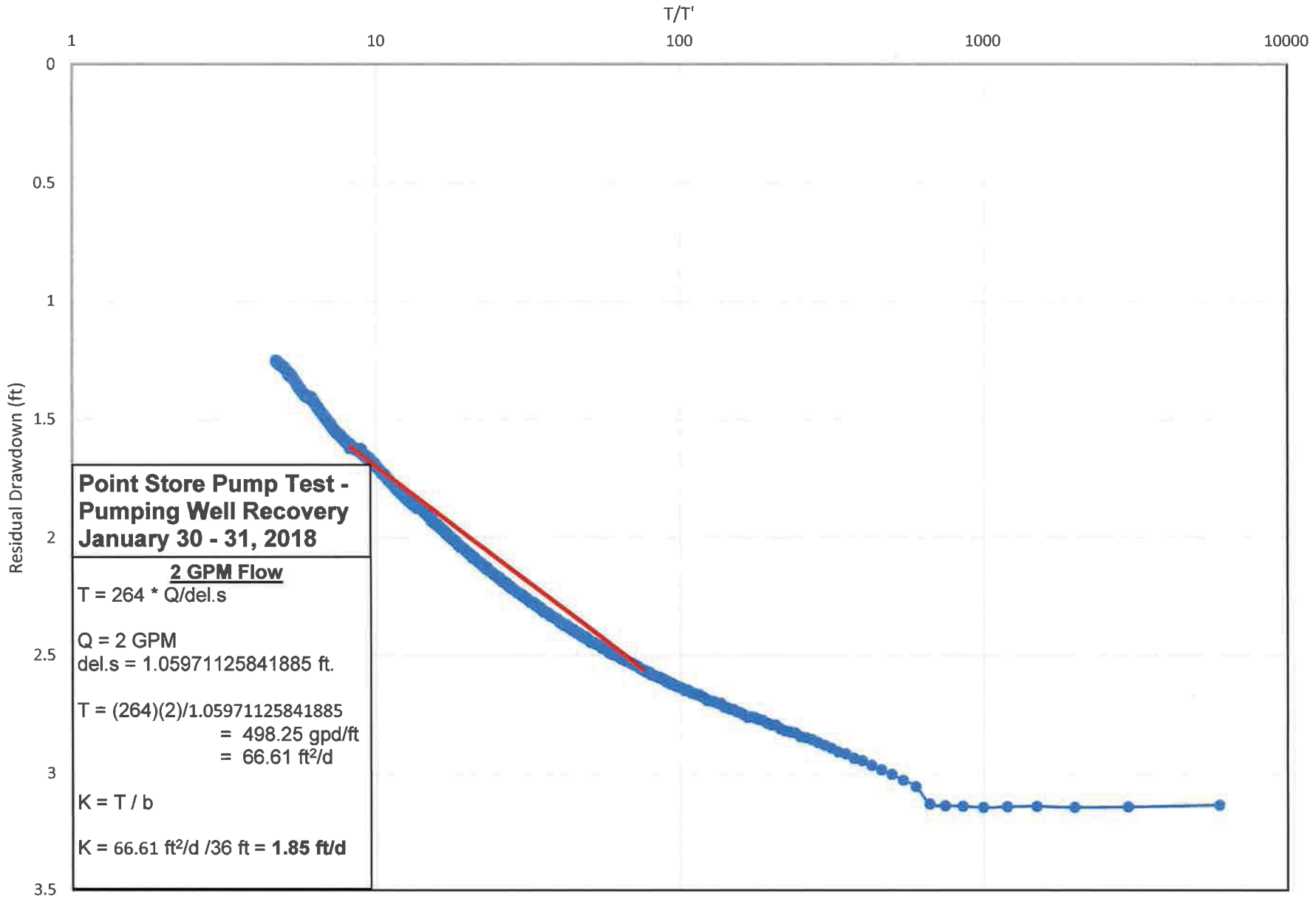

34
33.9
33.8
33.7
33.6
33.5
33.4
33.3
33.2
33.1
33
Barometric Pressure (inches of Hg)
Start 2.25GPM
Step Test
Increase
For 3.3G
Shut Off
Point Store Potable
Well Testing
Shu
Mo
Pump
1/29/2018 0:00
1/29/2018 12:00
1/30/2018 0:00
2/2/2018 12:00
2/3/2018 0:00


Barometric Pressure - Point Store 2GPM Constant Rate Test - 01/30-31/18
33.7
33.65
33.6
33.55
33.5
33.45
33.4
33.35
Barometric Pressure (inches Hg)
Shut off pump
At 0 minutes, start pumping at 2GPM
1
10
100
1000
10000
Elapsed Time (minutes)

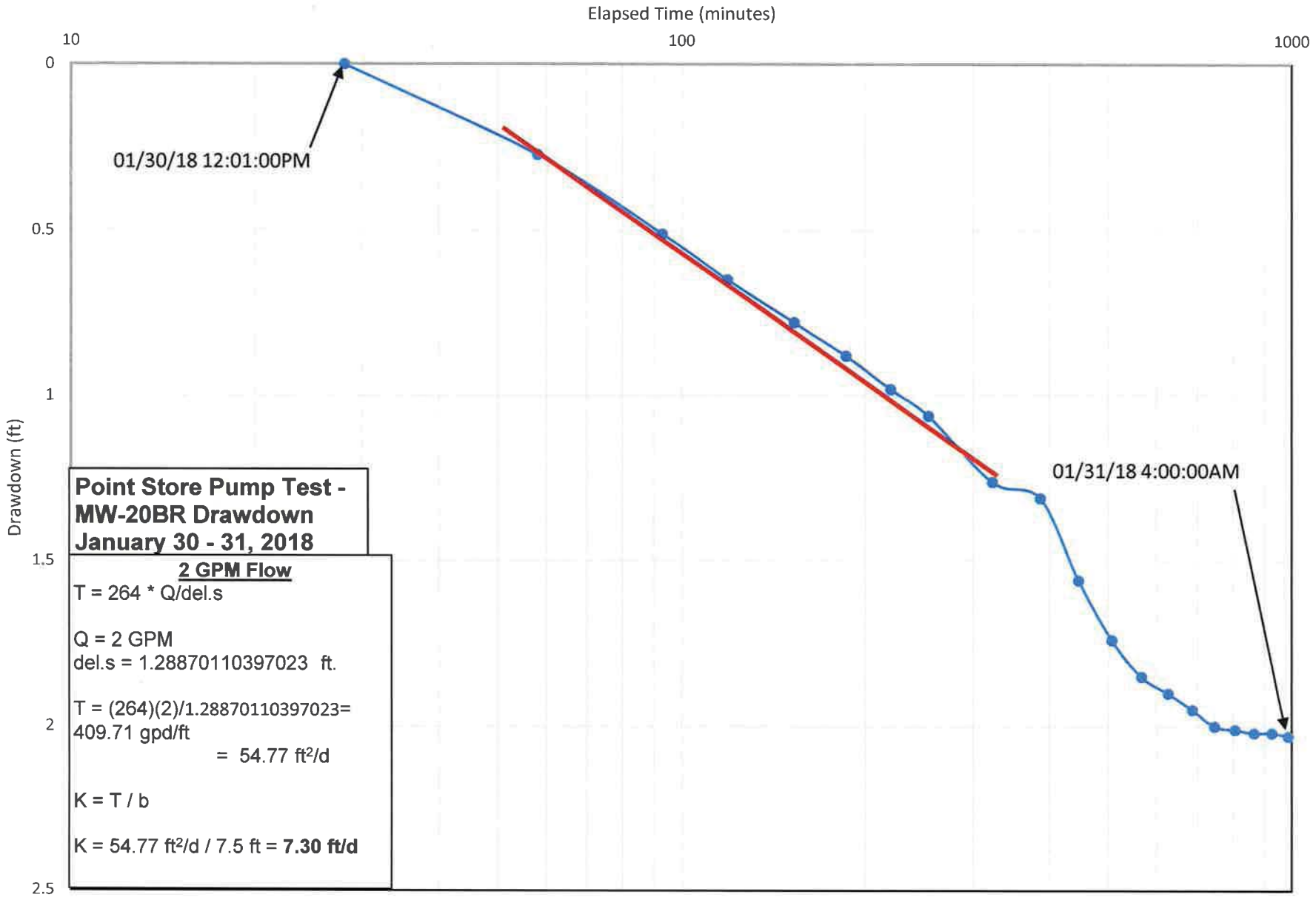
Point Store Potable Well 2GPM Constant Rate Test - Potable Well Drawdown - 01/30-31/18



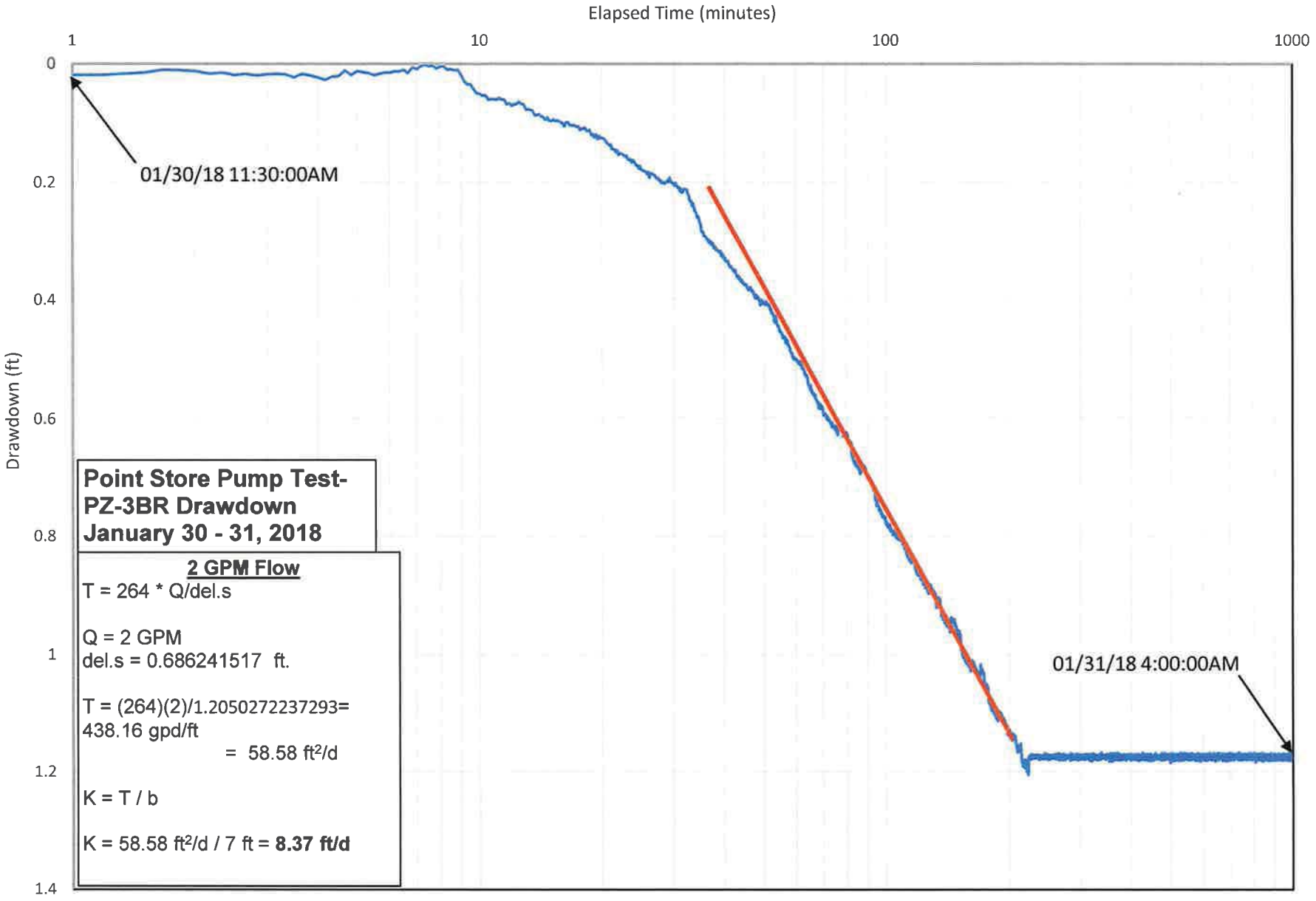
Point Store Potable Well Constant Rate Test - Potable Well Recovery - 01/31/18

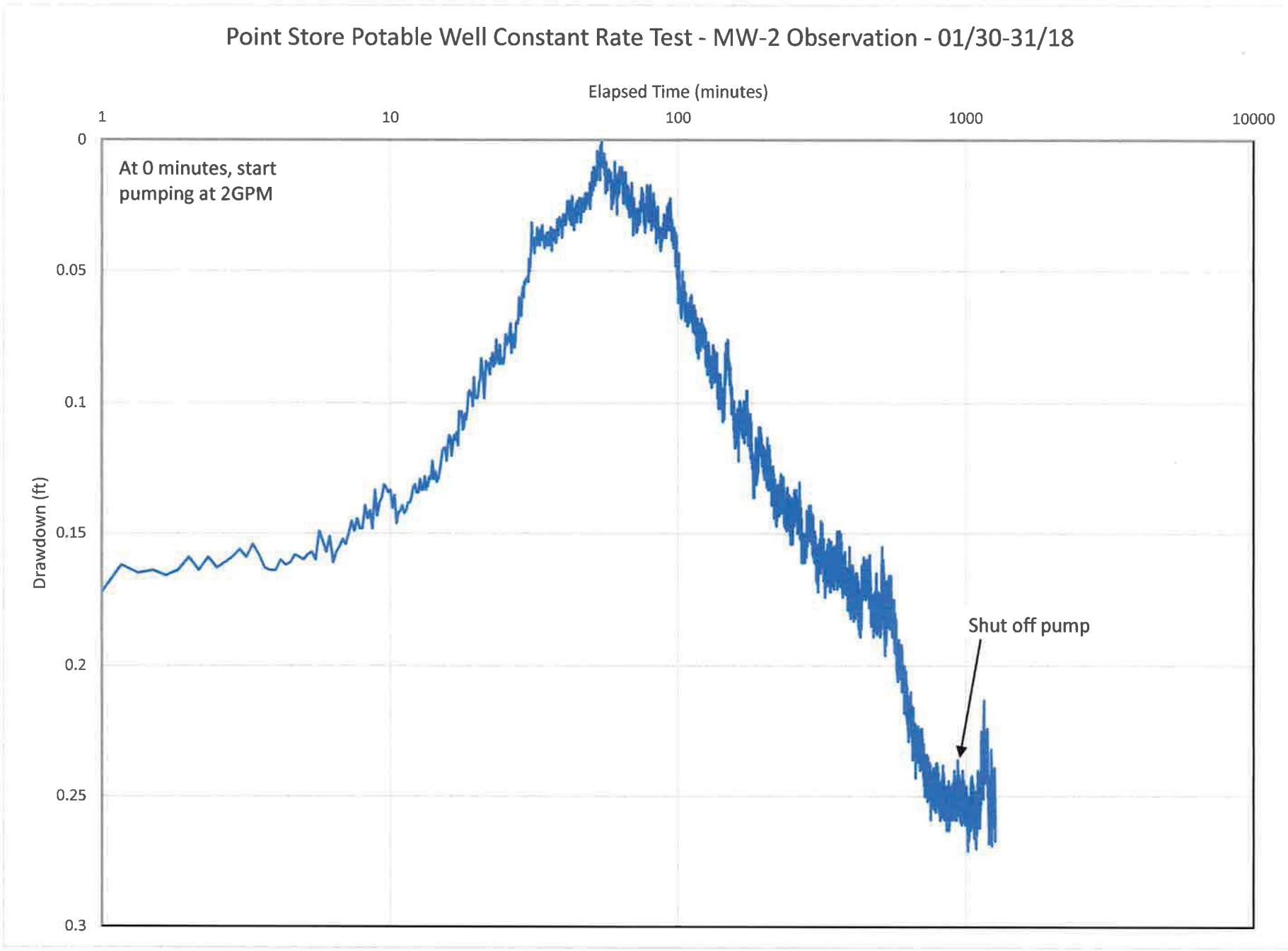


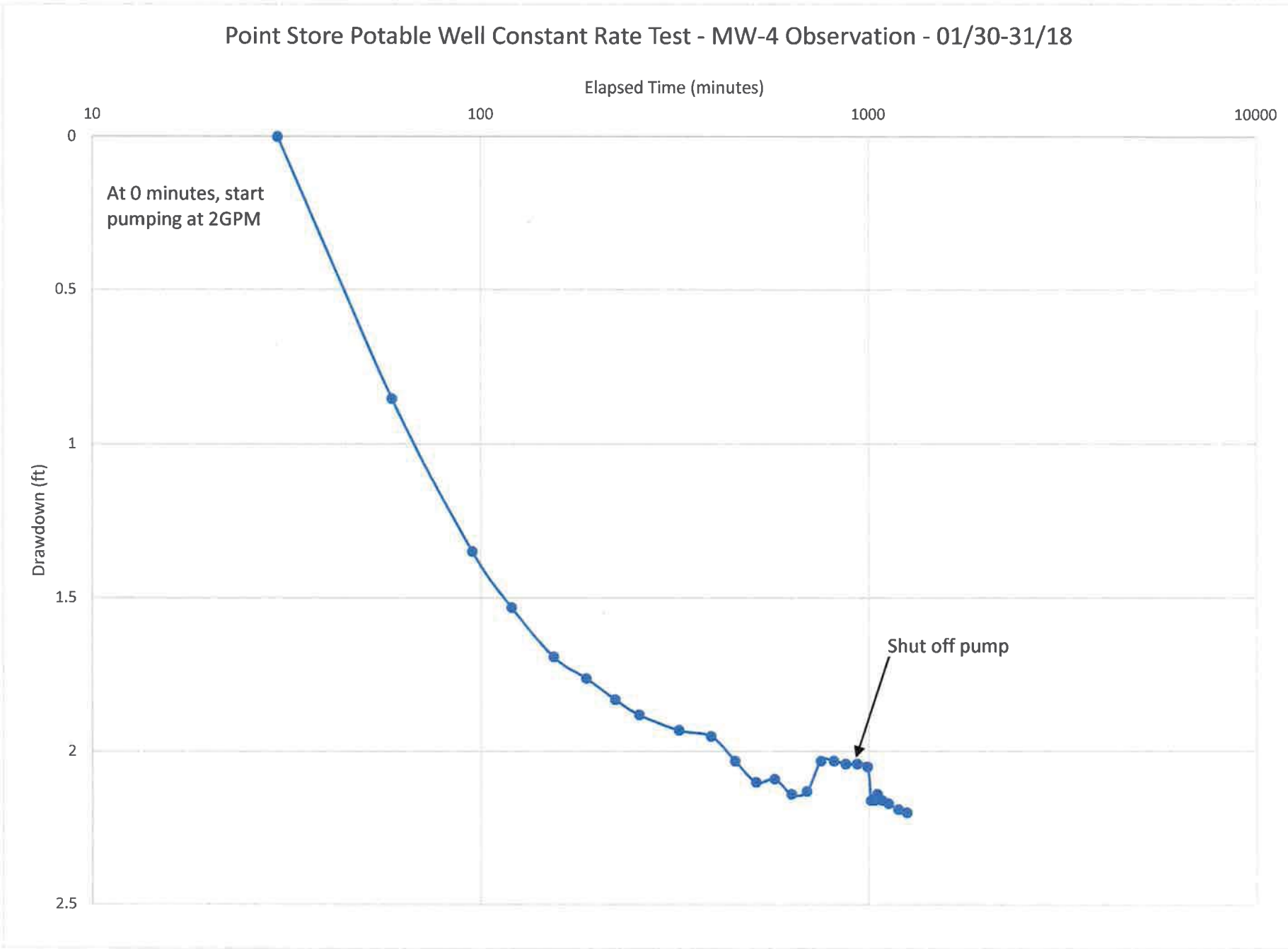
Point Store Potable Well 2GPM Constant Rate Test - MW-20BR Drawdown - 01/30-31/18

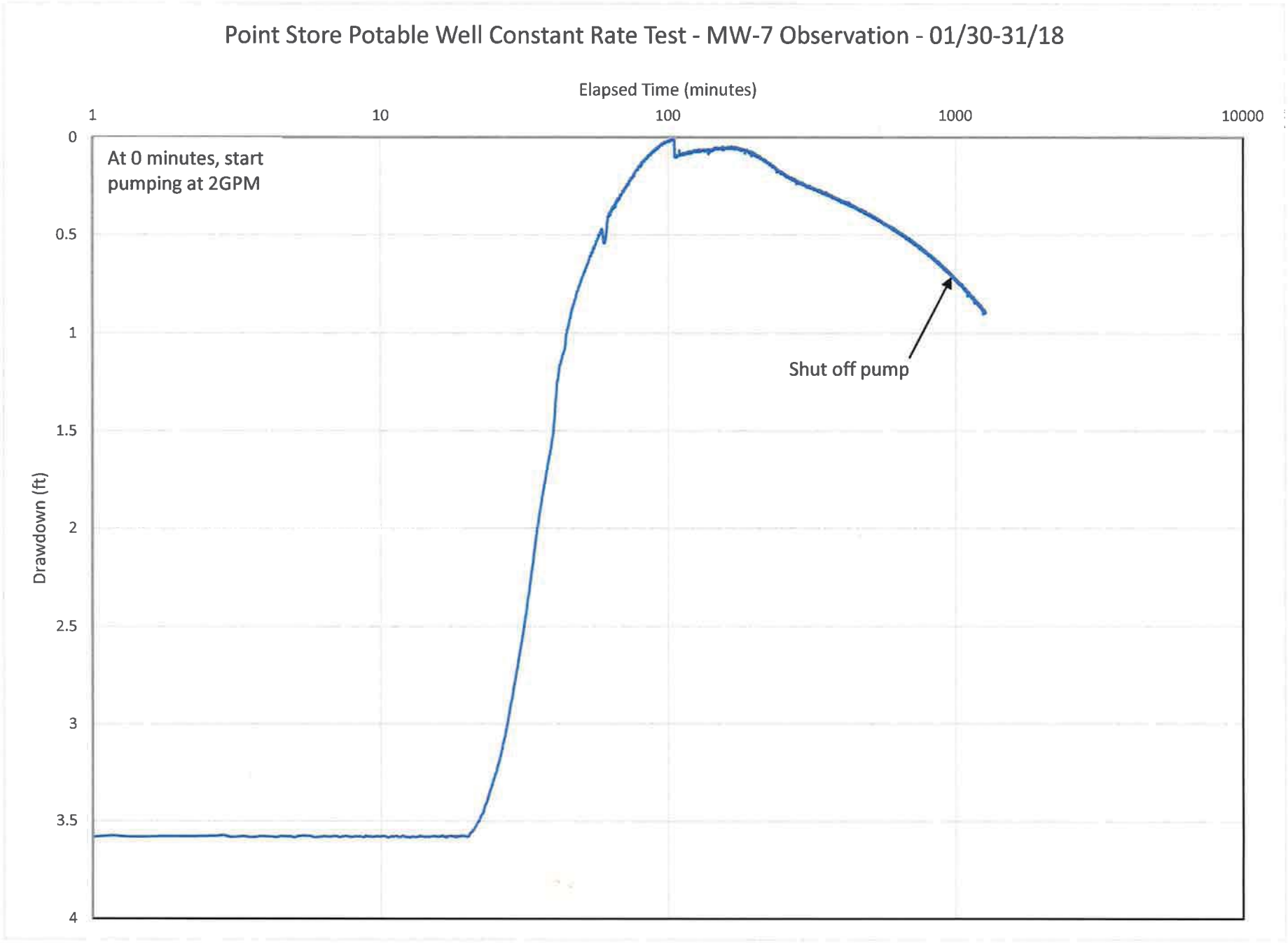


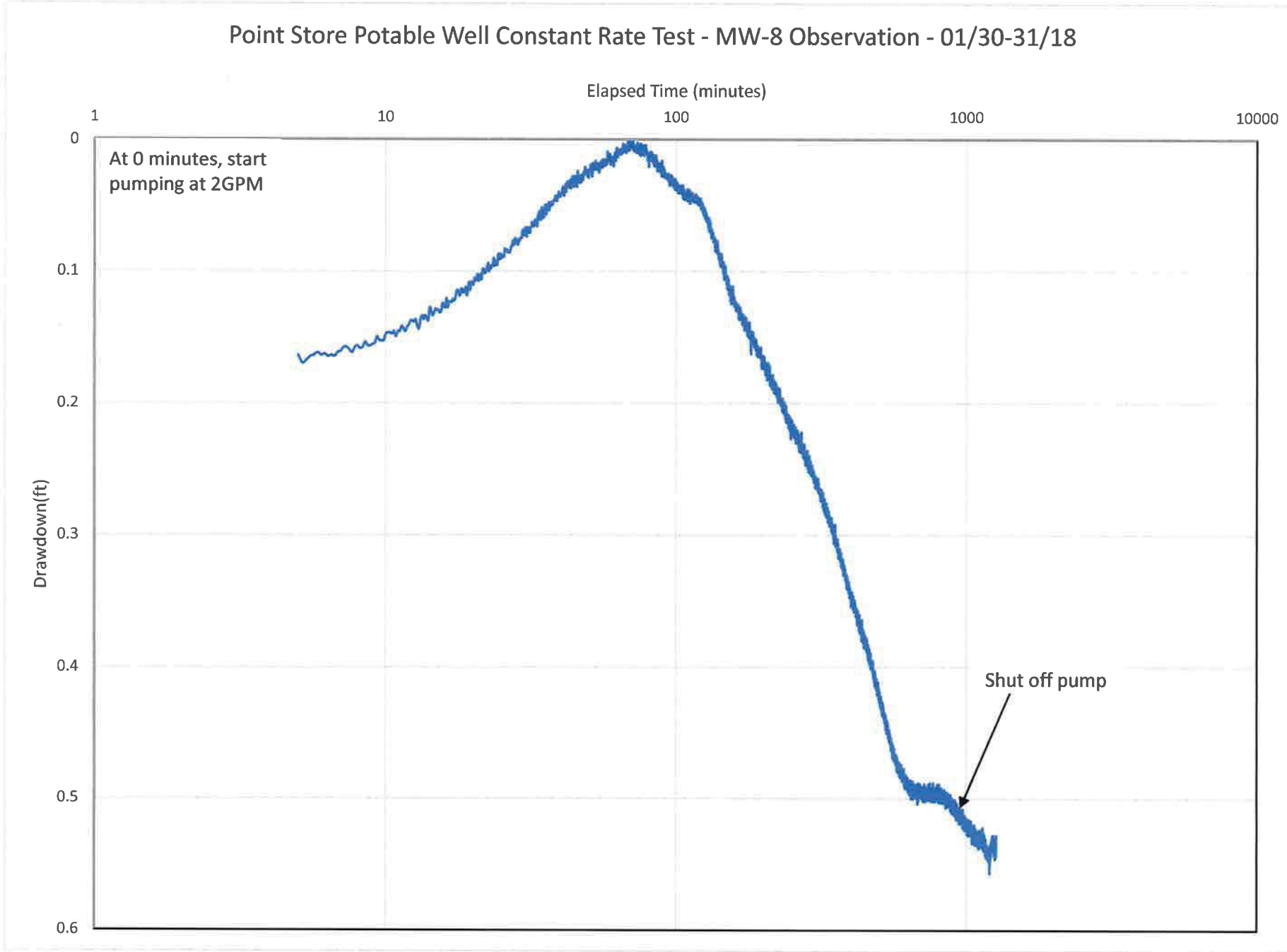
Point Store Potable Well 2GPM Constant Rate Test - PZ-3BR Drawdown - 01/30-31/18

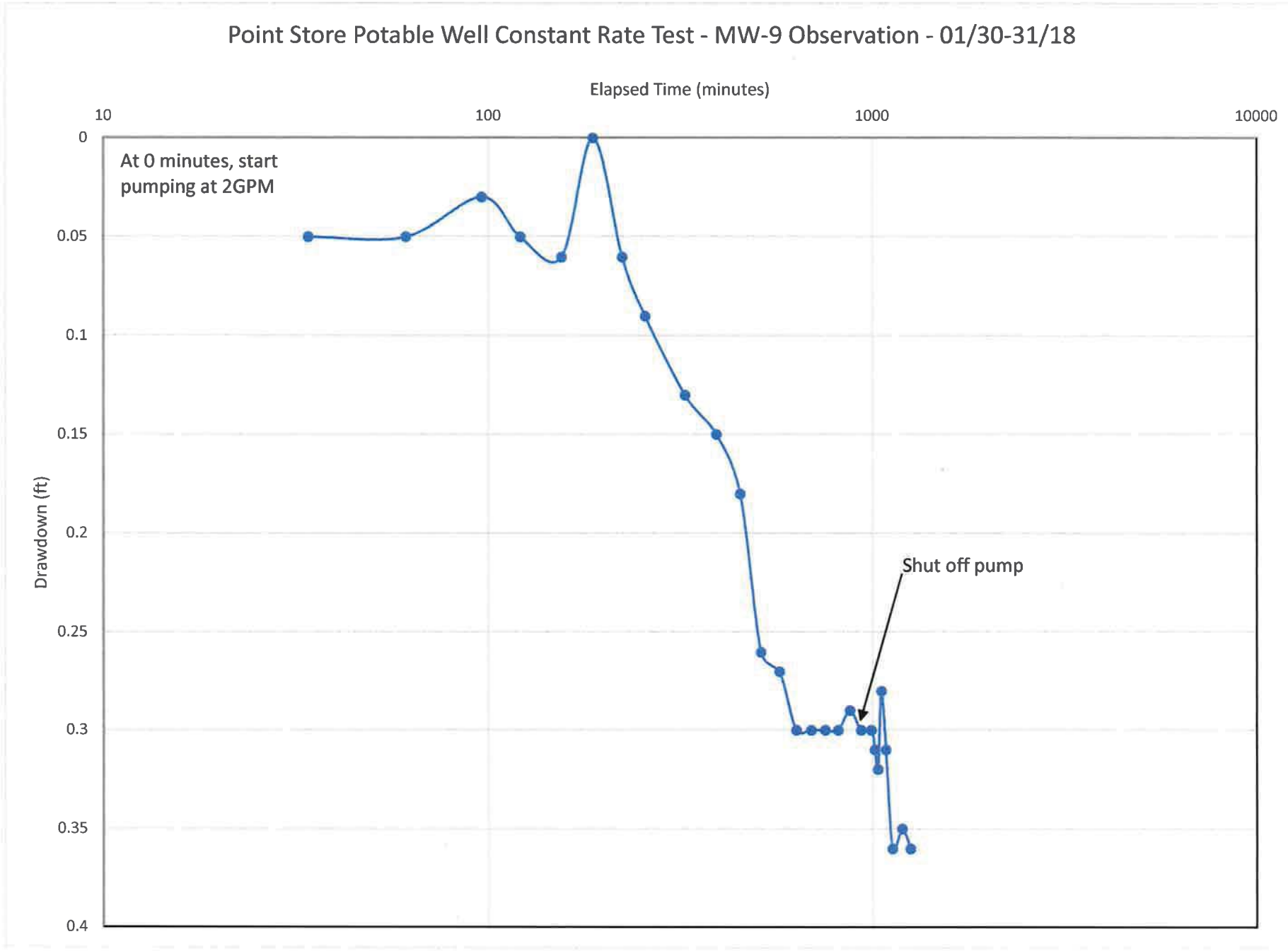


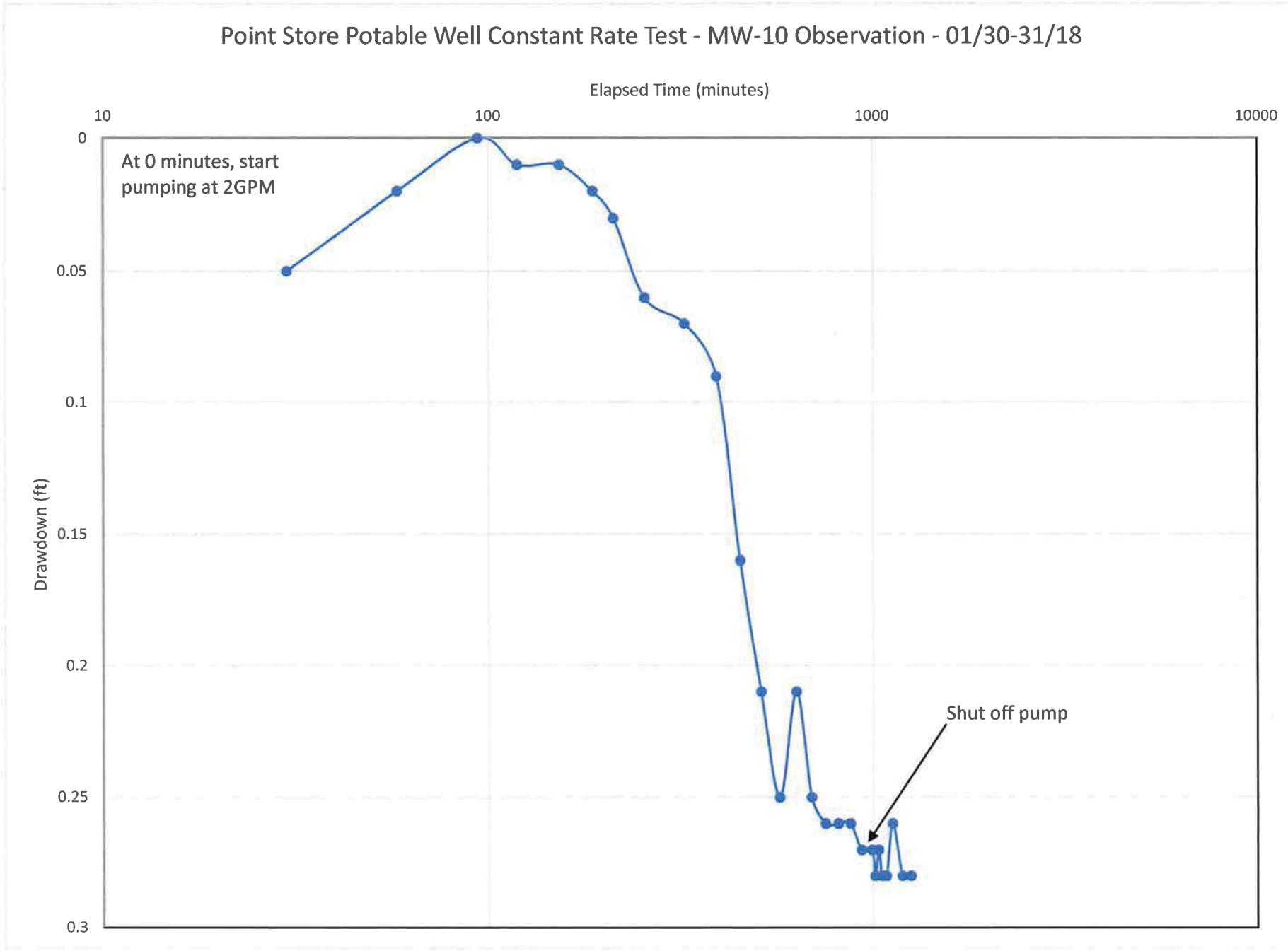

Point Store Potable Well Constant Rate Test - MW-2 Observation - 01/30-31/18
Elapsed Time (minutes)
1
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
At 0 minutes, start pumping at 2GPM
Shut off pump

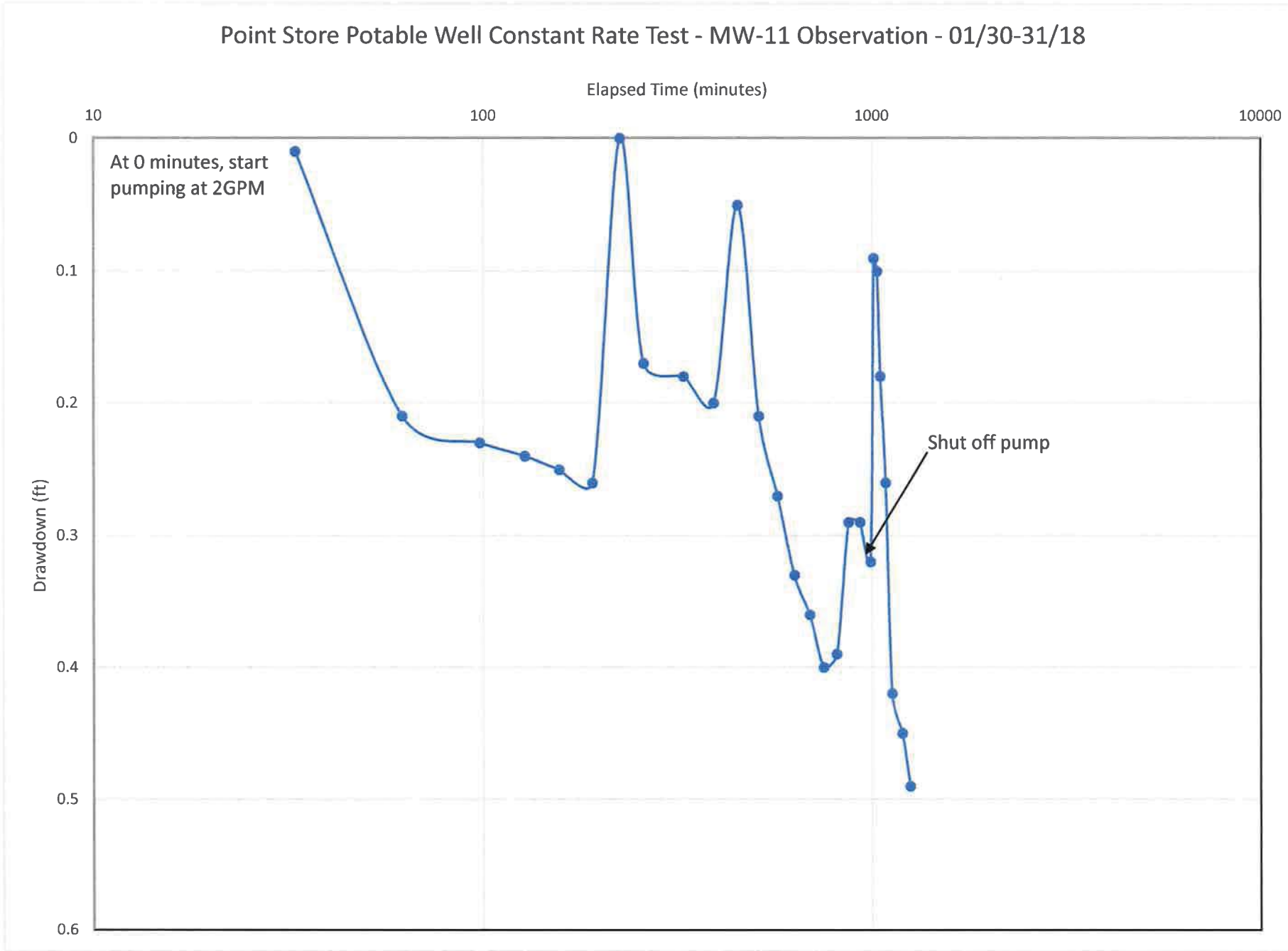

Point Store Potable Well Constant Rate Test - MW-4 Observation - 01/30-31/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.5
1
1.5
2
2.5
At 0 minutes, start pumping at 2GPM
Shut off pump

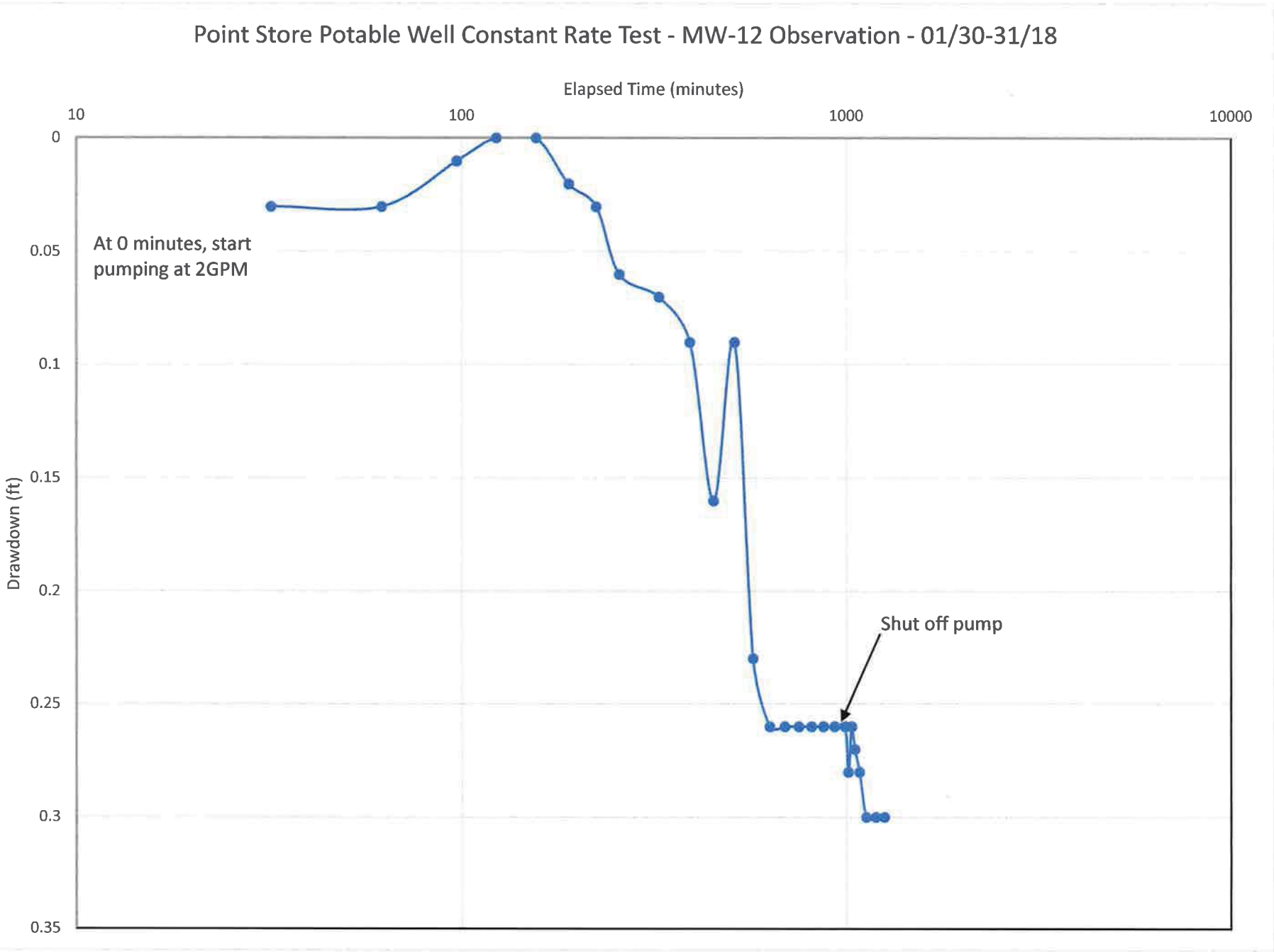

Point Store Potable Well Constant Rate Test - MW-7 Observation - 01/30-31/18
Elapsed Time (minutes)
1
10
100
1000
10000
0
0.5
1
1.5
2
2.5
3
3.5
4
Drawdown (ft)
At 0 minutes, start pumping at 2GPM
Shut off pump

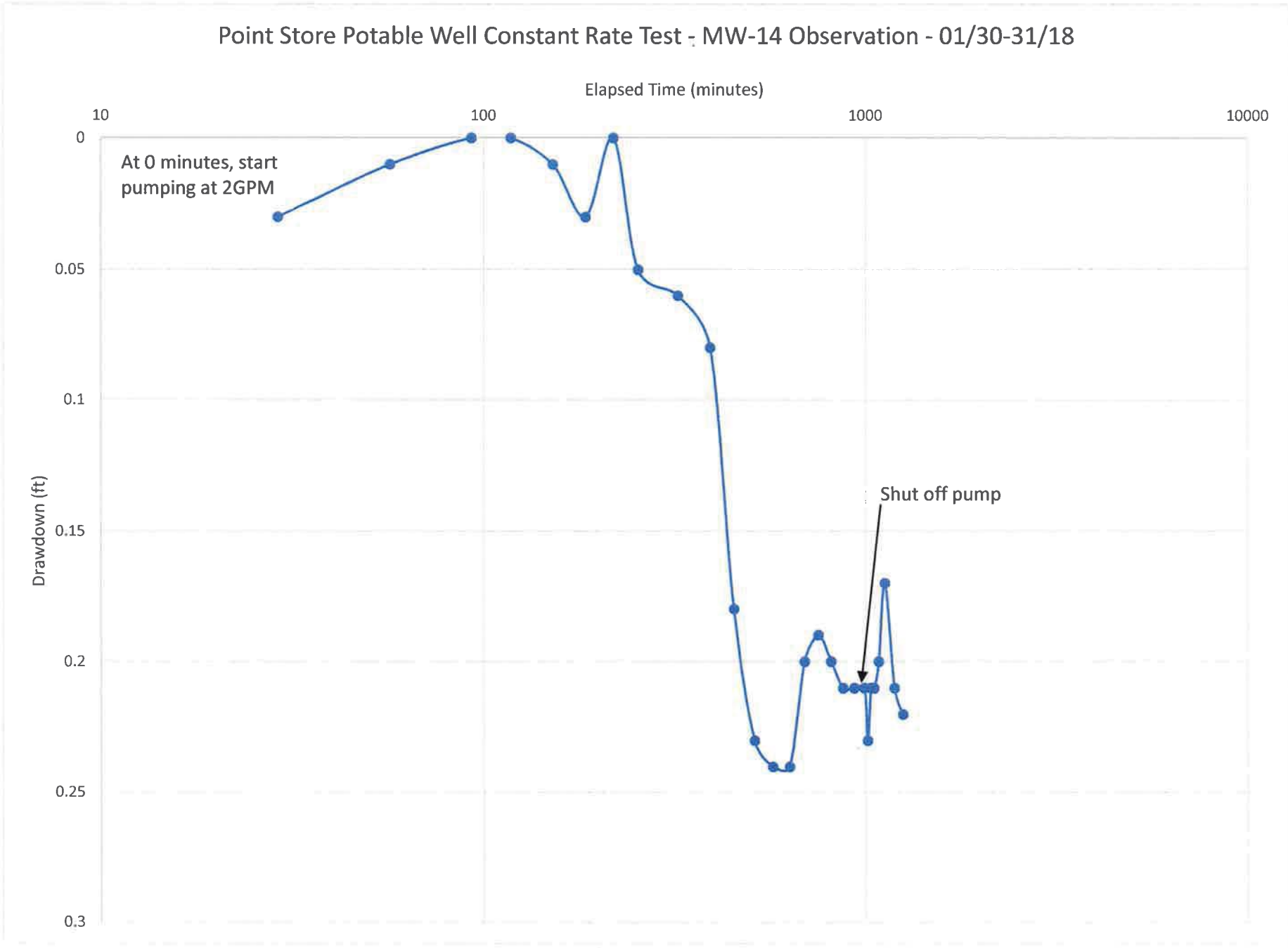

Point Store Potable Well Constant Rate Test - MW-8 Observation - 01/30-31/18
Elapsed Time (minutes)
1
10
100
1000
10000
0
0.1
0.2
0.3
0.4
0.5
0.6
Drawdown(ft)
At 0 minutes, start pumping at 2GPM
Shut off pump

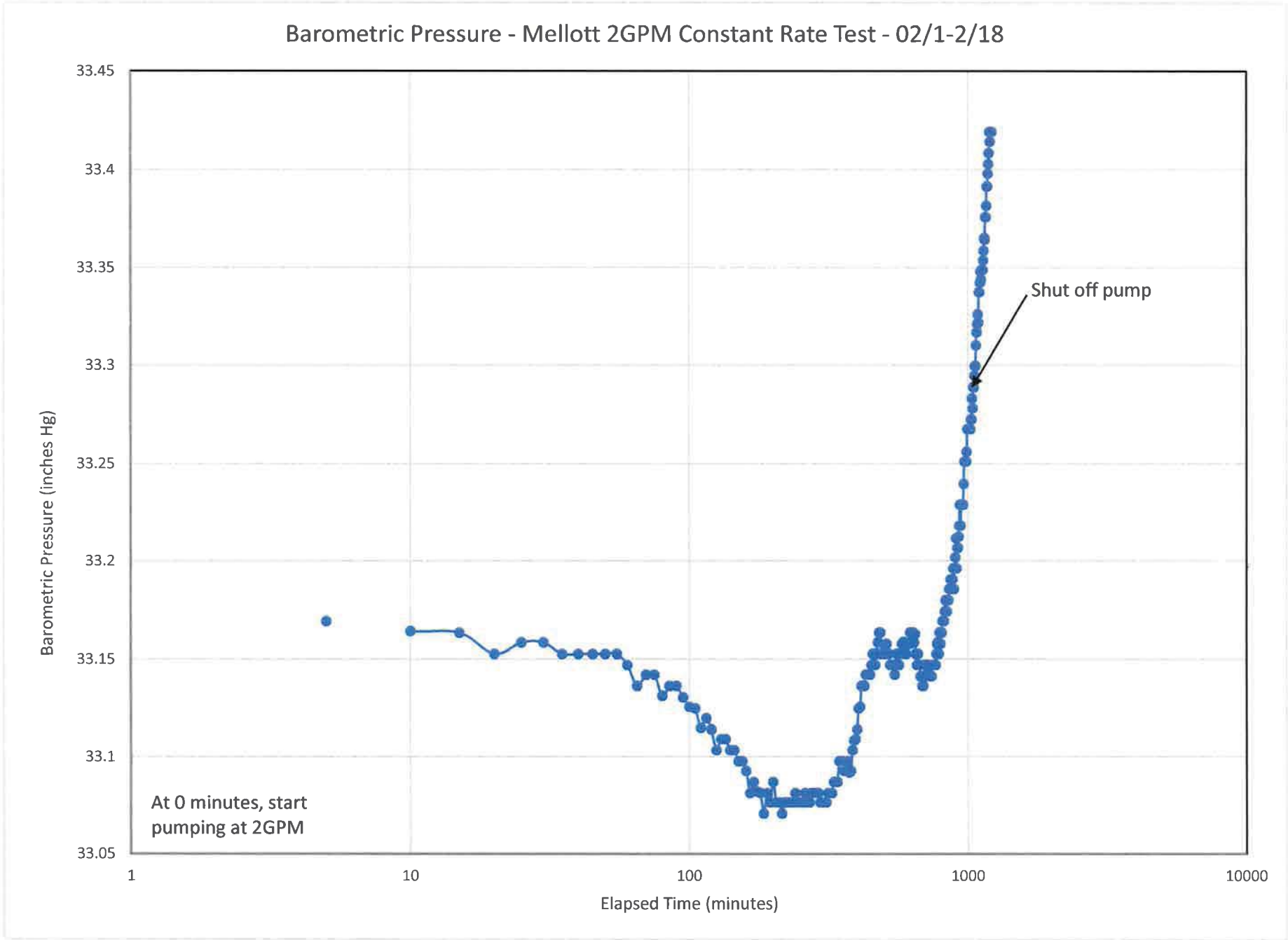

Point Store Potable Well Constant Rate Test - MW-9 Observation - 01/30-31/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
At 0 minutes, start pumping at 2GPM
Shut off pump

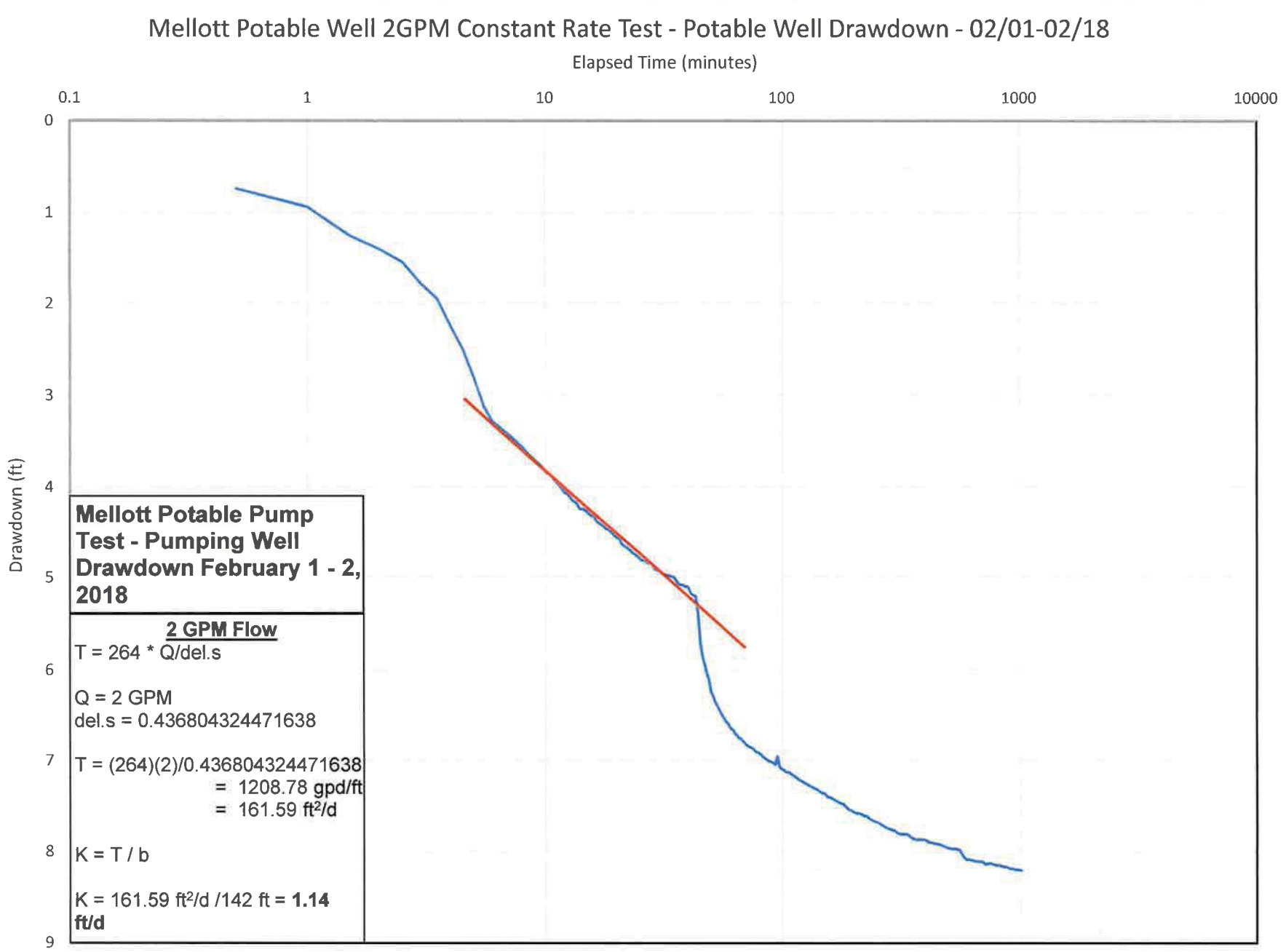

Point Store Potable Well Constant Rate Test - MW-10 Observation - 01/30-31/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
At 0 minutes, start pumping at 2GPM
Shut off pump

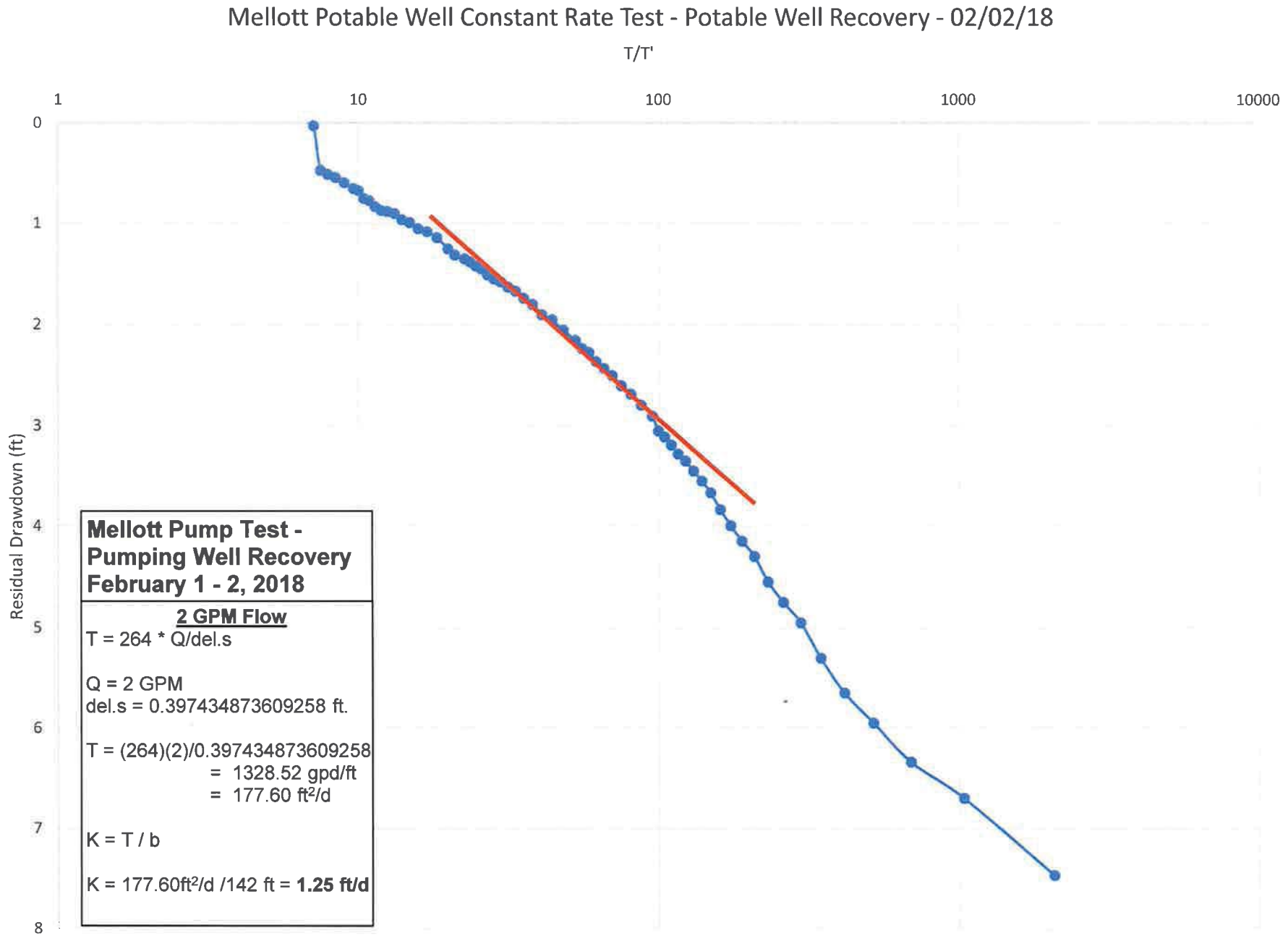

Point Store Potable Well Constant Rate Test - MW-11 Observation - 01/30-31/18
Elapsed Time (minutes)
10
100
1000
10000
0
0.1
0.2
0.3
0.4
0.5
0.6
Drawdown (ft)
At 0 minutes, start pumping at 2GPM
Shut off pump

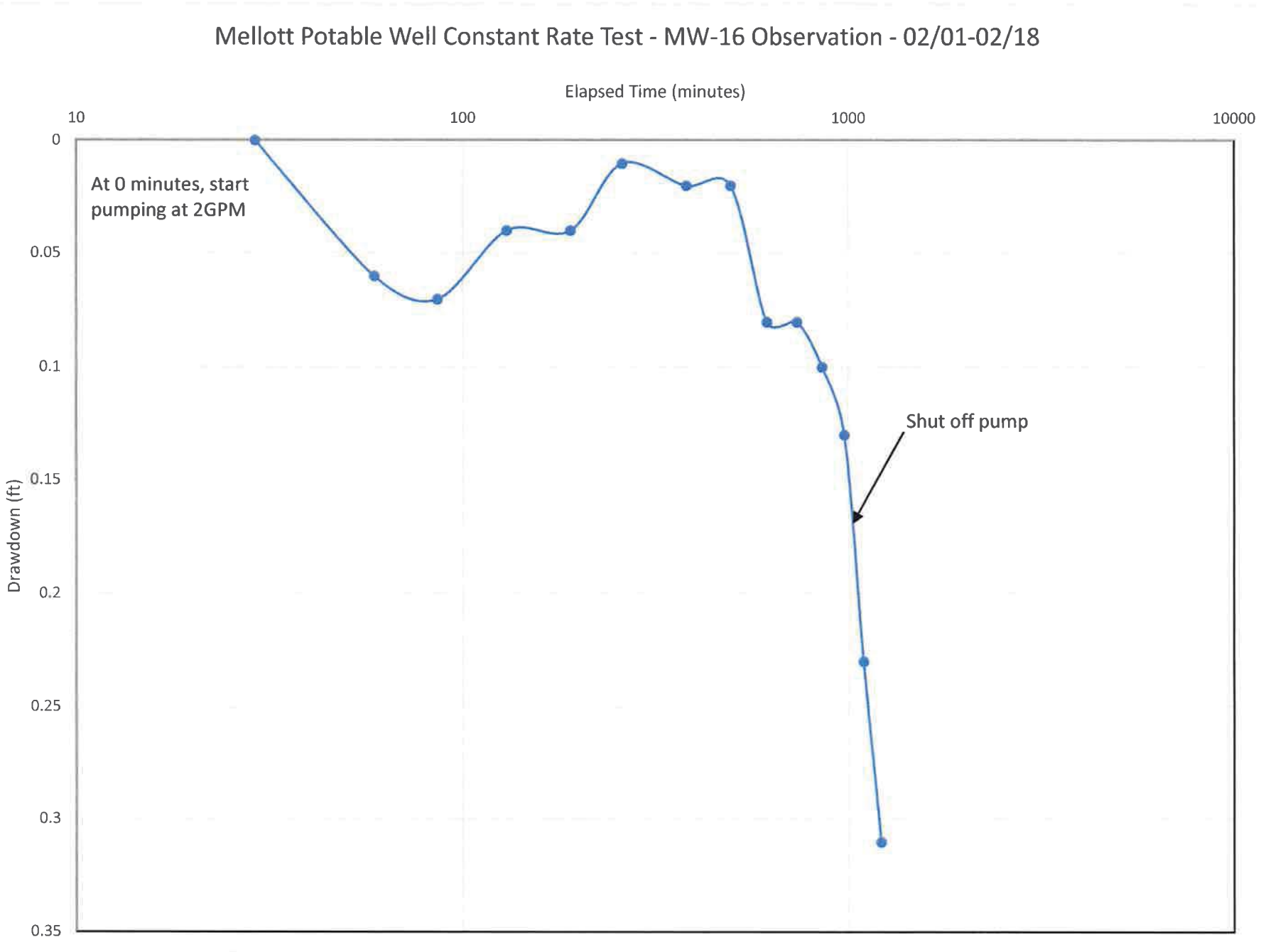

Point Store Potable Well Constant Rate Test - MW-12 Observation - 01/30-31/18
Elapsed Time (minutes)
10
100
1000
10000
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
Drawdown (ft)
At 0 minutes, start pumping at 2GPM
Shut off pump

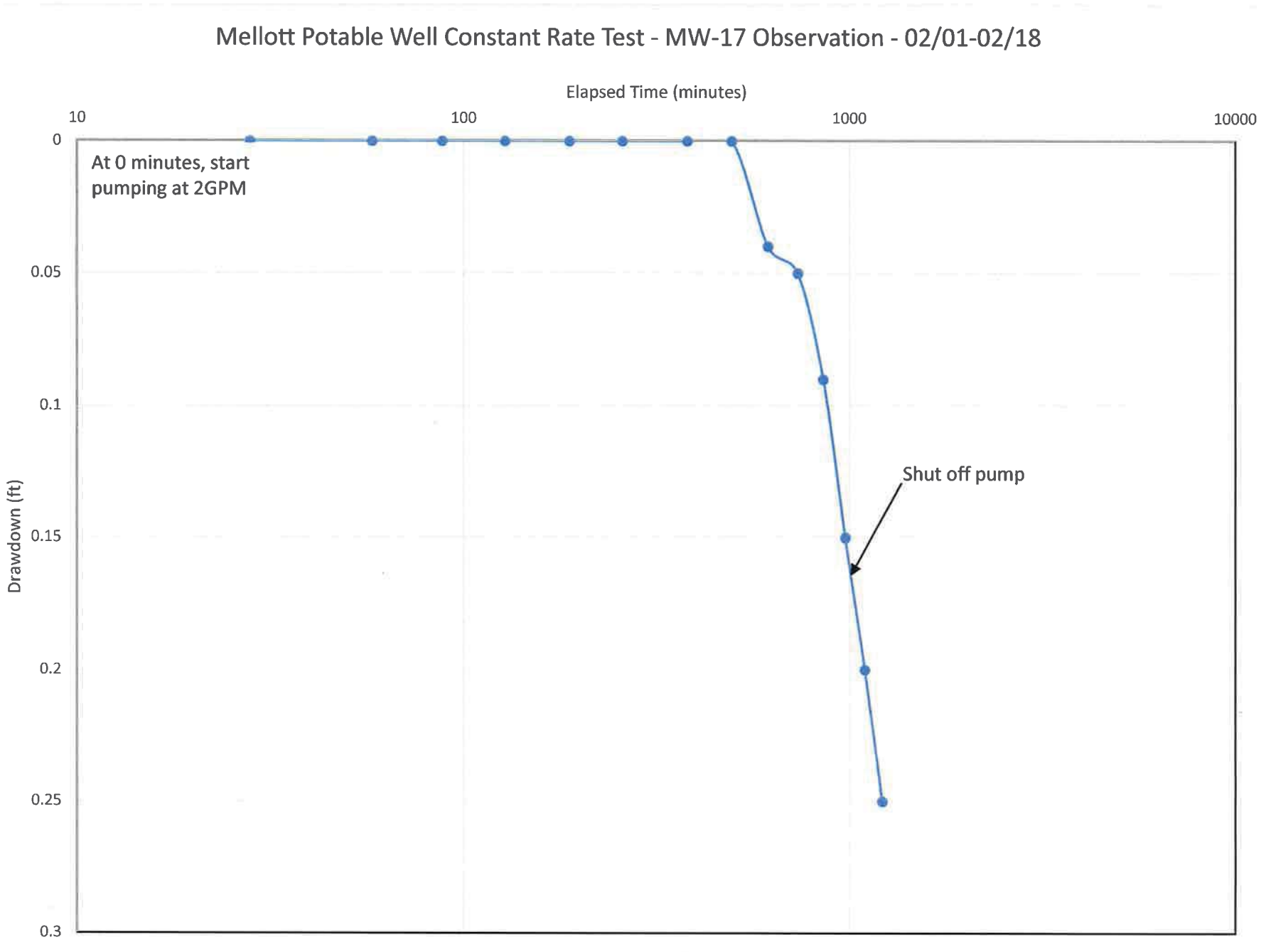

Point Store Potable Well Constant Rate Test - MW-14 Observation - 01/30-31/18
Elapsed Time (minutes)
10
100
1000
10000
0
0.05
0.1
0.15
0.2
0.25
0.3
Drawdown (ft)
At 0 minutes, start pumping at 2GPM
Shut off pump

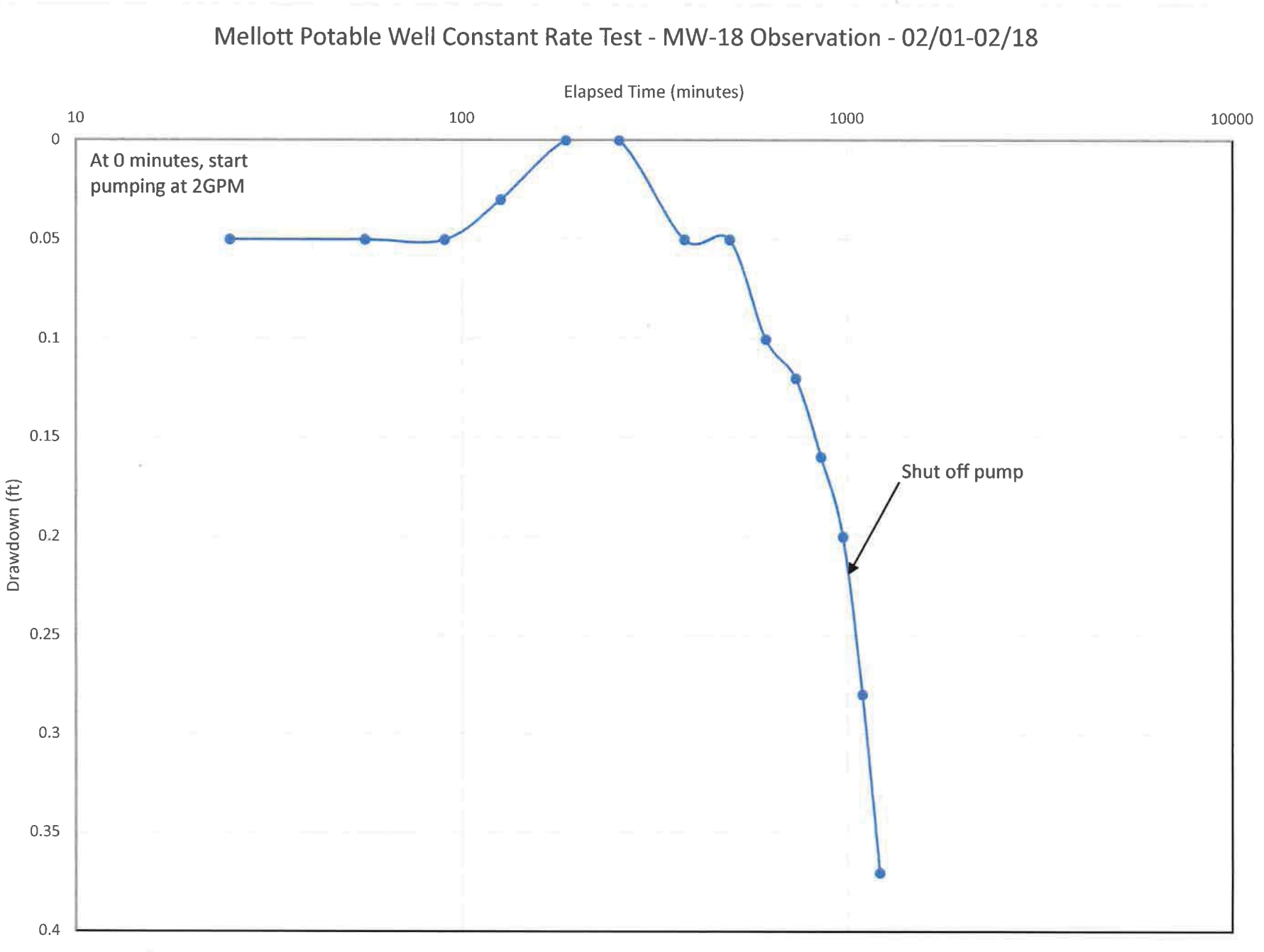

Barometric Pressure - Mellott 2GPM Constant Rate Test - 02/1-2/18
33.45
33.4
33.35
33.3
33.25
33.2
33.15
33.1
33.05
Barometric Pressure (inches Hg)
Shut off pump
At 0 minutes, start pumping at 2GPM
1
10
100
1000
10000
Elapsed Time (minutes)

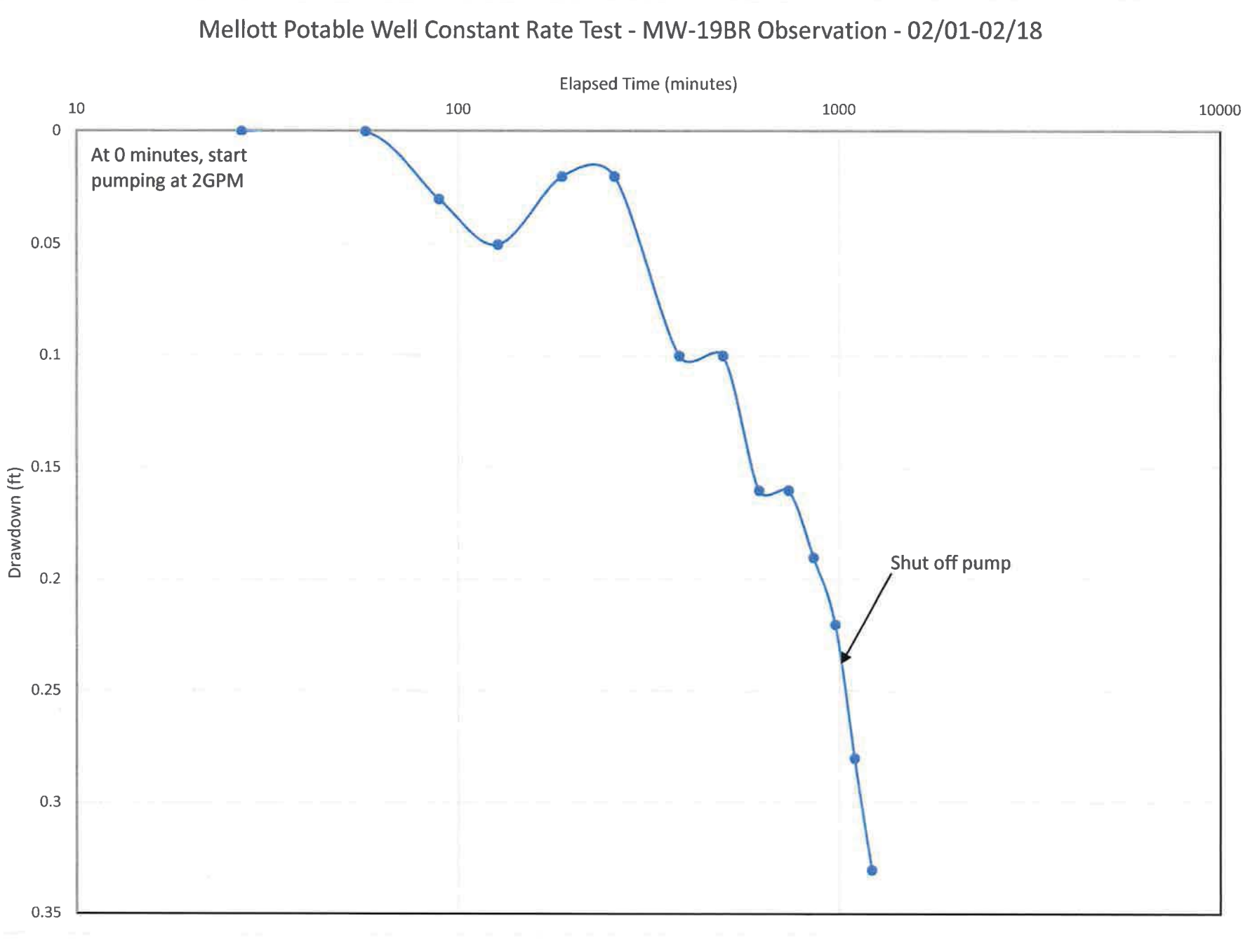

Mellott Potable Well 2GPM Constant Rate Test - Potable Well Drawdown - 02/01-02/18
Elapsed Time (minutes)
0.1
1
10
100
1000
10000
Drawdown (ft)
0
1
2
3
4
5
6
7
8
9
Mellott Potable Pump Test - Pumping Well Drawdown February 1 - 2, 2018
2 GPM Flow
T = 264 * Q/del.s
Q = 2 GPM
del.s = 0.436804324471638
T = (264)(2)/0.436804324471638
= 1208.78 gpd/ft
= 161.59 ft²/d
K = T / b
K = 161.59 ft²/d /142 ft = 1.14 ft/d

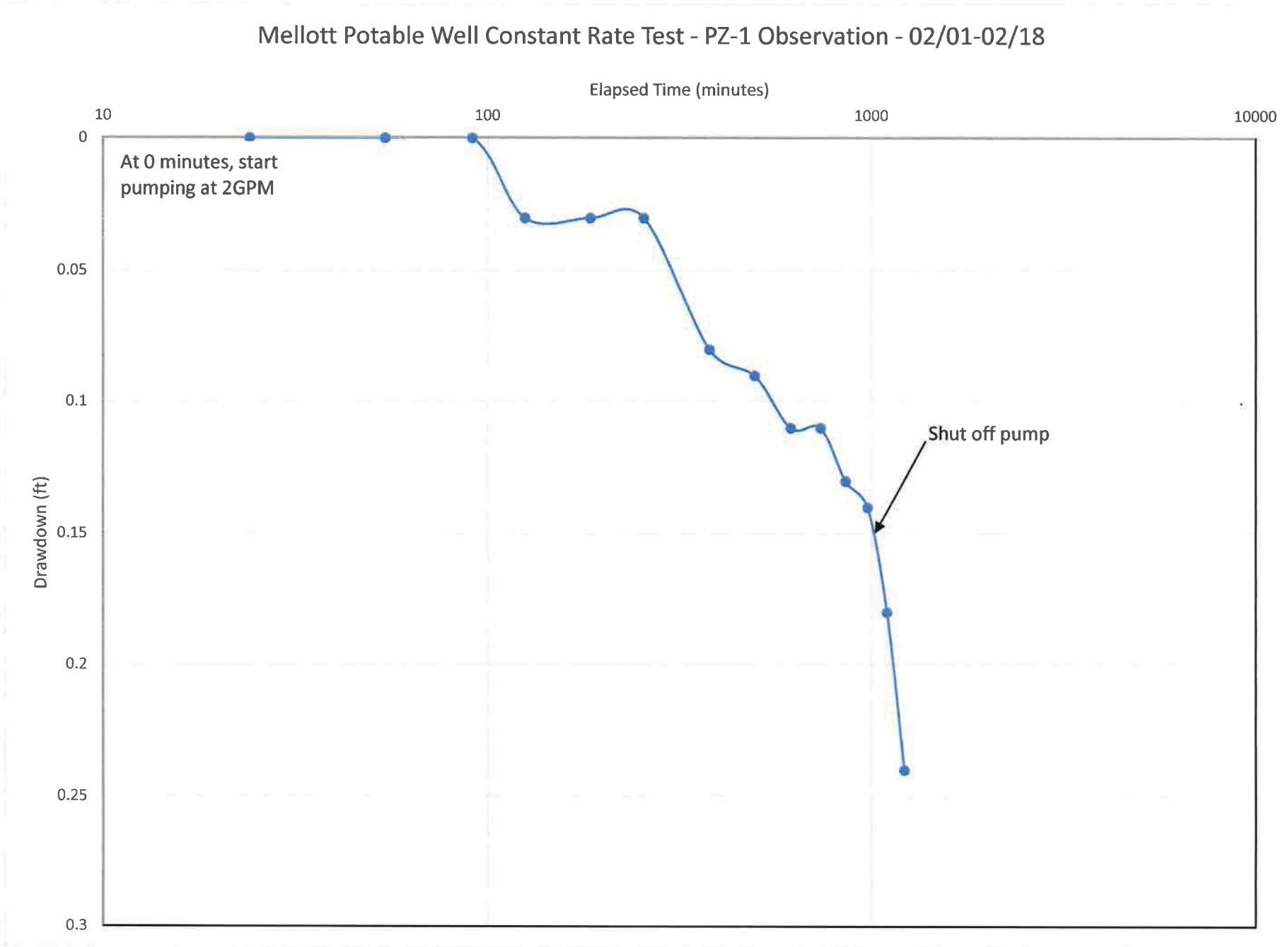

Mellott Potable Well Constant Rate Test - Potable Well Recovery - 02/02/18
T/T'
1
10
100
1000
10000
0
1
2
3
4
5
6
7
8
Residual Drawdown (ft)
Mellott Pump Test - Pumping Well Recovery February 1 - 2, 2018
2 GPM Flow
T = 264 * Q/del.s
Q = 2 GPM
del.s = 0.397434873609258 ft.
T = (264)(2)/0.397434873609258
= 1328.52 gpd/ft
= 177.60 ft²/d
K = T / b
K = 177.60ft²/d /142 ft = 1.25 ft/d

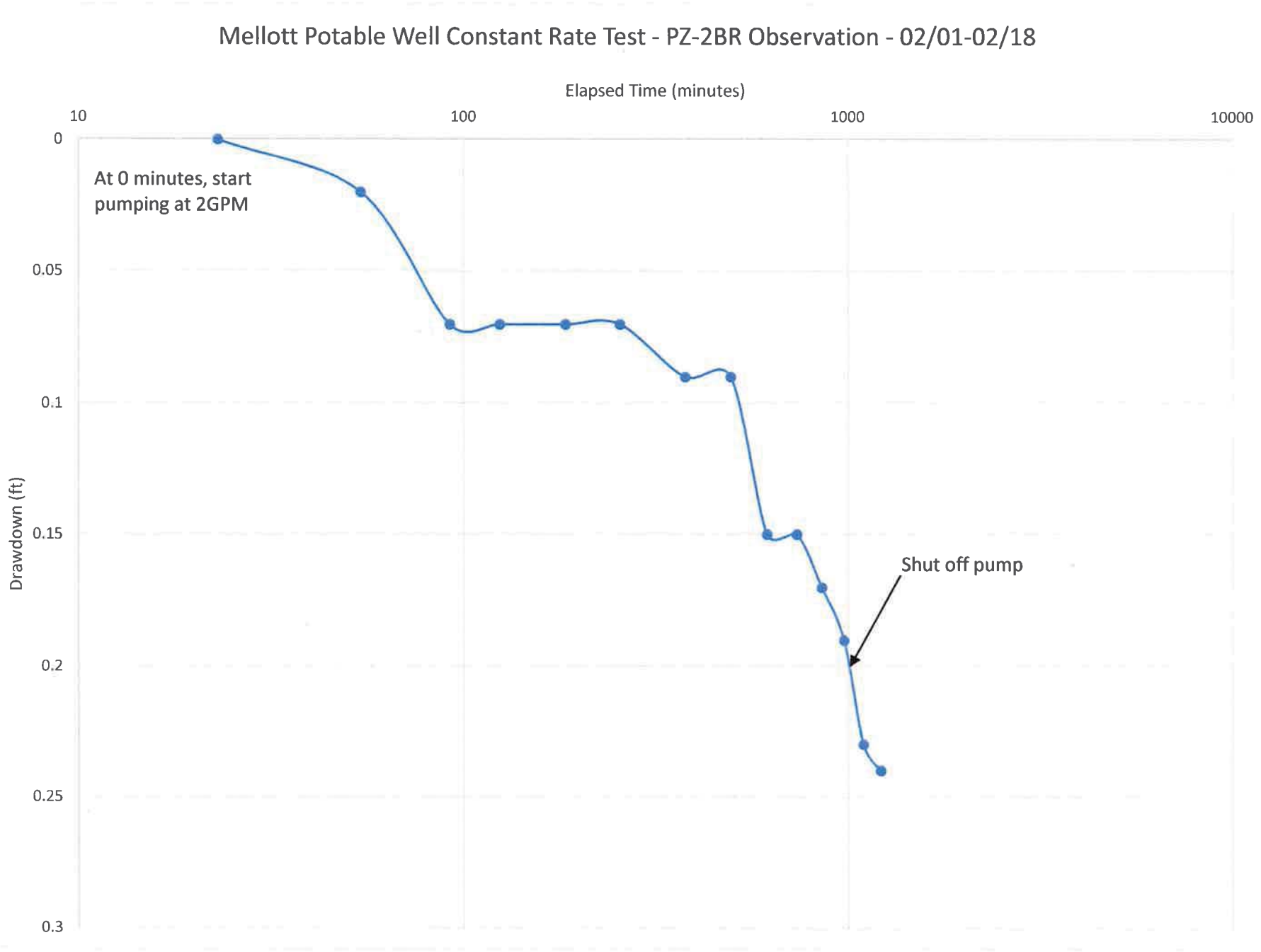

Mellott Potable Well Constant Rate Test - MW-16 Observation - 02/01-02/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
At 0 minutes, start pumping at 2GPM
Shut off pump


Mellott Potable Well Constant Rate Test - MW-17 Observation - 02/01-02/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
At 0 minutes, start pumping at 2GPM
Shut off pump


Mellott Potable Well Constant Rate Test - MW-18 Observation - 02/01-02/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
At 0 minutes, start pumping at 2GPM
Shut off pump


Mellott Potable Well Constant Rate Test - MW-19BR Observation - 02/01-02/18
Elapsed Time (minutes)
10
100
1000
10000
Drawdown (ft)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
At 0 minutes, start pumping at 2GPM
Shut off pump


Mellott Potable Well Constant Rate Test - PZ-1 Observation - 02/01-02/18
Elapsed Time (minutes)
10
100
1000
10000
0
0.05
0.1
0.15
0.2
0.25
0.3
Drawdown (ft)
At 0 minutes, start pumping at 2GPM
Shut off pump


Mellott Potable Well Constant Rate Test - PZ-2BR Observation - 02/01-02/18
Elapsed Time (minutes)
10
100
1000
10000
0
0.05
0.1
0.15
0.2
0.25
0.3
Drawdown (ft)
At 0 minutes, start pumping at 2GPM
Shut off pump

APPENDIX G

WASTE DISPOSAL CERTIFICATES

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
N/A	1	410-494-7587	P015T1285/6

GENERATOR

5. Generator's Name and Mailing Address
Point Store
1301 Avondale Rd
New Windsor, MD 21776
Generator's Phone: 410-857-9670

Generator's Site Address (if different than mailing address)
5867 Highway 522 North
McClure, PA 17841 US

6. Transporter 1 Company Name: AEG Environmental Products & Services, Inc.
U.S. EPA ID Number: MDR000502450

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Water Depot, Inc
1301 Avondale Rd
New Windsor, MD 21776
Facility's Phone: 410-857-9670
U.S. EPA ID Number: N/A

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non-Hazardous, Non-Regulated Material (water)	3	DM	150	G
2.	Non-Hazardous, Non-Regulated Material (soil)	~~2~~ 1	DM	~~150~~ 600	P
3.					
4.					

13. Special Handling Instructions and Additional Information

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: James Korman As Agent
Signature:
Month: 12 Day: 8 Year: 2016

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Will Cucina
Signature:
Month: 12 Day: 8 Year: 16

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Eom Amt
Signature:
Month: 12 Day: 8 Year: 16

169-BLC-O 5 11977 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

Please print or type
Form designed for use on elite (12-pitch) typewriter.

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
N/A		410-634-7587	P01ST010617

GENERATOR

5. Generator's Name and Mailing Address

Point Store
1301 Avondale Rd
New Windsor, MD 21776

Generator's Phone: 410-857-9670-3021

Generator's Site Address (if different than mailing address)

5867 Highway 522 North
McClure, PA 17841 US

6. Transporter 1 Company Name — U.S. EPA ID Number

AEG Environmental Products & Services, Inc — MDR000502450

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address — U.S. EPA ID Number

Water Depot, Inc
1301 Avondale Rd
New Windsor, MD 21776

N/A

Facility's Phone: 410-857-9670

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non-Hazardous, Non-Regulated Material (Contaminated Soil)	20	DM	10000	P
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: James Korman (as agent) — Signature — Month: 1 — Day: 6 — Year: 2017

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Ed Miles — Signature — Month: 1 — Day: 6 — Year: 2017

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Stephen Crotty — Signature — Month: 1 — Day: 10 — Year: 17

DESIGNATED FACILITY TO GENERATOR

GC Labels • Printed in the USA
1-800-997-6966

Reorder Part# MANIFEST-C6NHWC
913-897-6966

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
PA			51617-1

GENERATOR

5. Generator's Name and Mailing Address
Point Stop Requested by Mountain Research
c/o Mountain Research
834 25th Street, Altoona PA 16601
Generator's Phone:

Generator's Site Address (if different than mailing address)
Point Stop
1947 Highway 322 W
Milroy PA

6. Transporter 1 Company Name: Emerald Environmental Services, Inc — U.S. EPA ID Number: OHR 000 152 330

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Emerald Environmental Services Inc
1621 St Clair Ave
East Chicago 46312
Facility's Phone: 330-677-6911 — U.S. EPA ID Number: IND

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT Regulated Material (Soil Stabilizer)	13	DM	8,500	P	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
Soil Received @ EES for consolidation and bulk transport and disposal at CWLF — EES Job # 13-021-51617-1

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Steve J. Cigany - Agent — Signature: [signature] — Month: 5 — Day: 16 — Year: 17

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Steve J. Cigany — Signature: [signature] — Month: 5 — Day: 16 — Year: 17

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month — Day — Year

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
NA	1	330-677-0785	21518-1

GENERATOR

5. Generator's Name and Mailing Address

Point Store
c/o Mountain Research (Joel Banaszak)
825 25th Street, Altoona, PA 16601
Generator's Phone: 814-949-2034

Generator's Site Address (if different than mailing address)

Point Store
5867 Highway 522 North
McClure, PA 17841

6. Transporter 1 Company Name: Emerald Environmental Services, Inc — U.S. EPA ID Number: OHR 000102053

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Emerald Environmental Services, Inc.
1621 St Clair Ave
Kent, Ohio 44240
Facility's Phone: 330-677-0785 — U.S. EPA ID Number: N/A

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt/Vol.	
1.	Non DOT Regulated, Nonhazardous Material (Petroleum Impacted Soil)	17	DM	6,500	P	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

91.) Received @ EES for consolidation into bulk container and disposal at E.S.I.

EES Job #
PO#

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Steve J. Cigany - Agent — Signature — Month 2 Day 15 Year 18

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Steve J. Cigany — Signature — Month 2 Day 15 Year 18

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

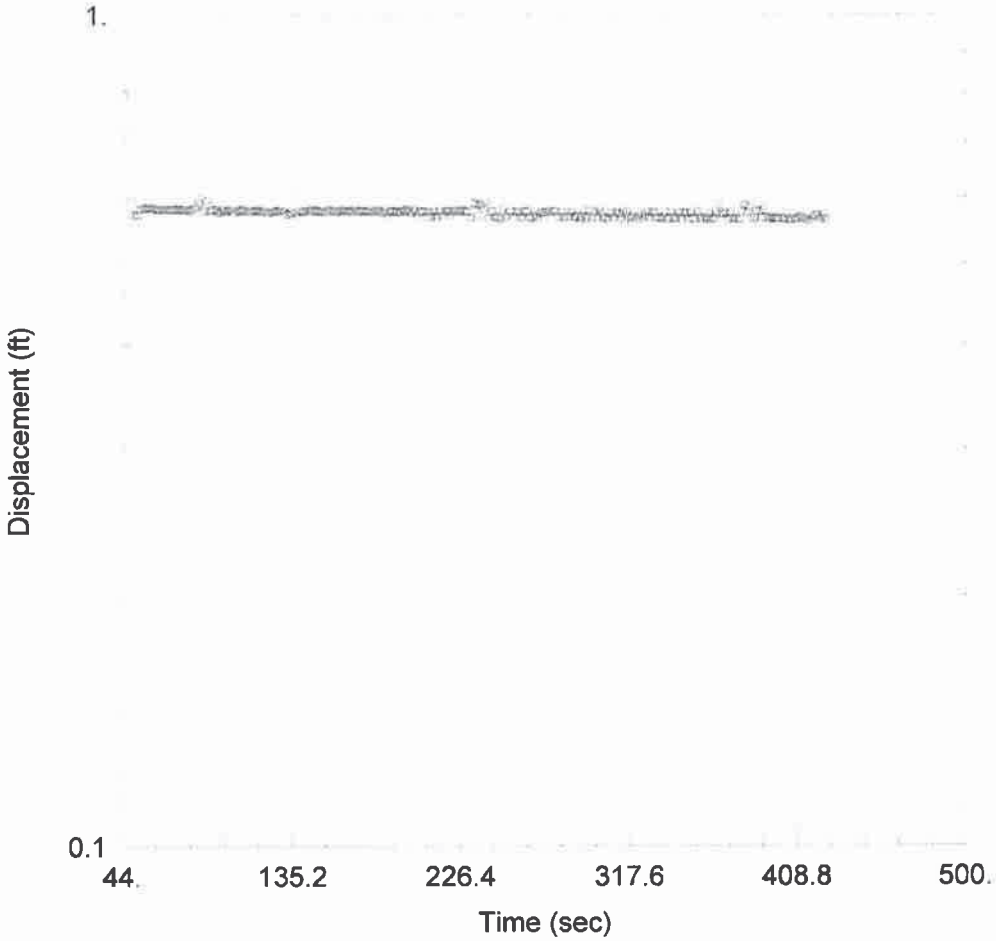
Printed/Typed Name — Signature — Month Day Year

169-BLC-O 5 11977 (Rev. 9/09)

DESIGNATED FACILITY'S COPY

APPENDIX H

SLUG TEST DOCUMENTATION



MW_3_FH

Data Set: H:\...\MW_3_FH.aqt
Date: 06/06/17 Time: 10:05:33

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW_3
Test Date: 11/23/16

AQUIFER DATA

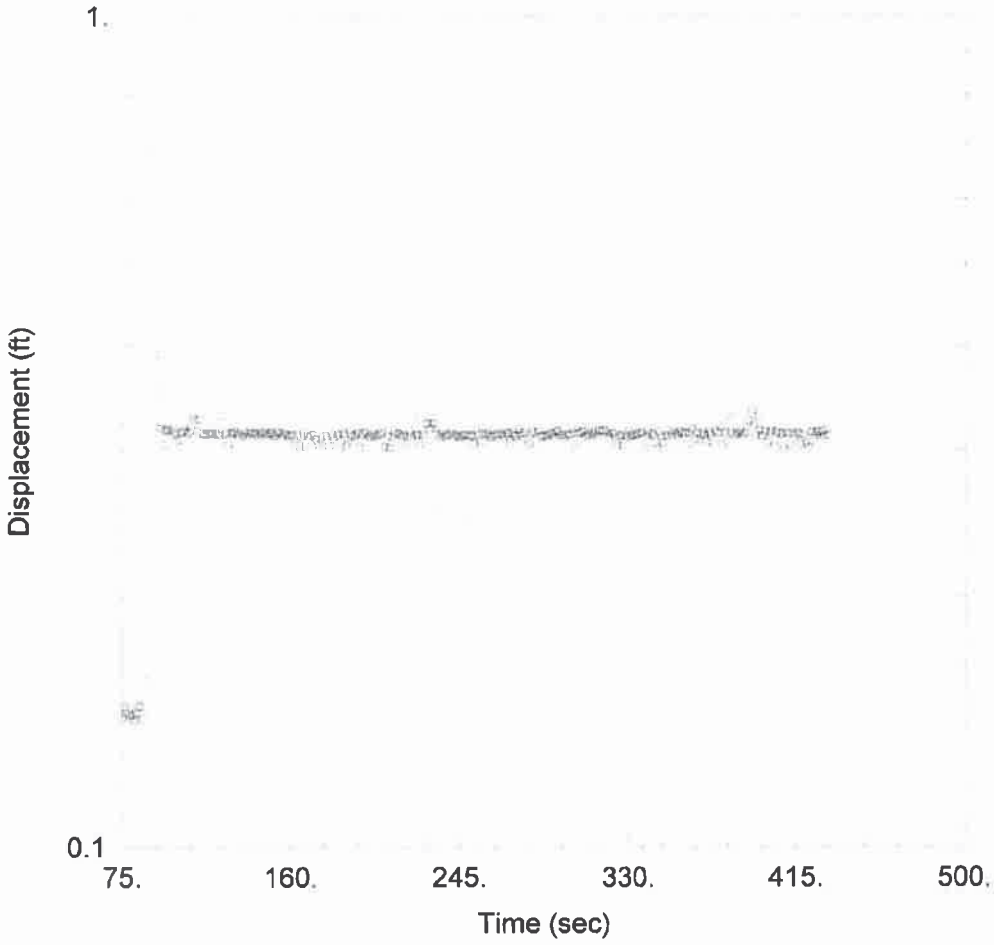
Saturated Thickness: 11.91 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 0.4039 ft
Total Well Penetration Depth: 6.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.91 ft
Screen Length: 15.5 ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.04155 ft/day
y0 = 0.5916 ft



MW_3_FH2

Data Set: H:\...\MW_3_FH2.aqt
Date: 06/06/17 Time: 10:05:46

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-3
Test Date: 11/23/16

AQUIFER DATA

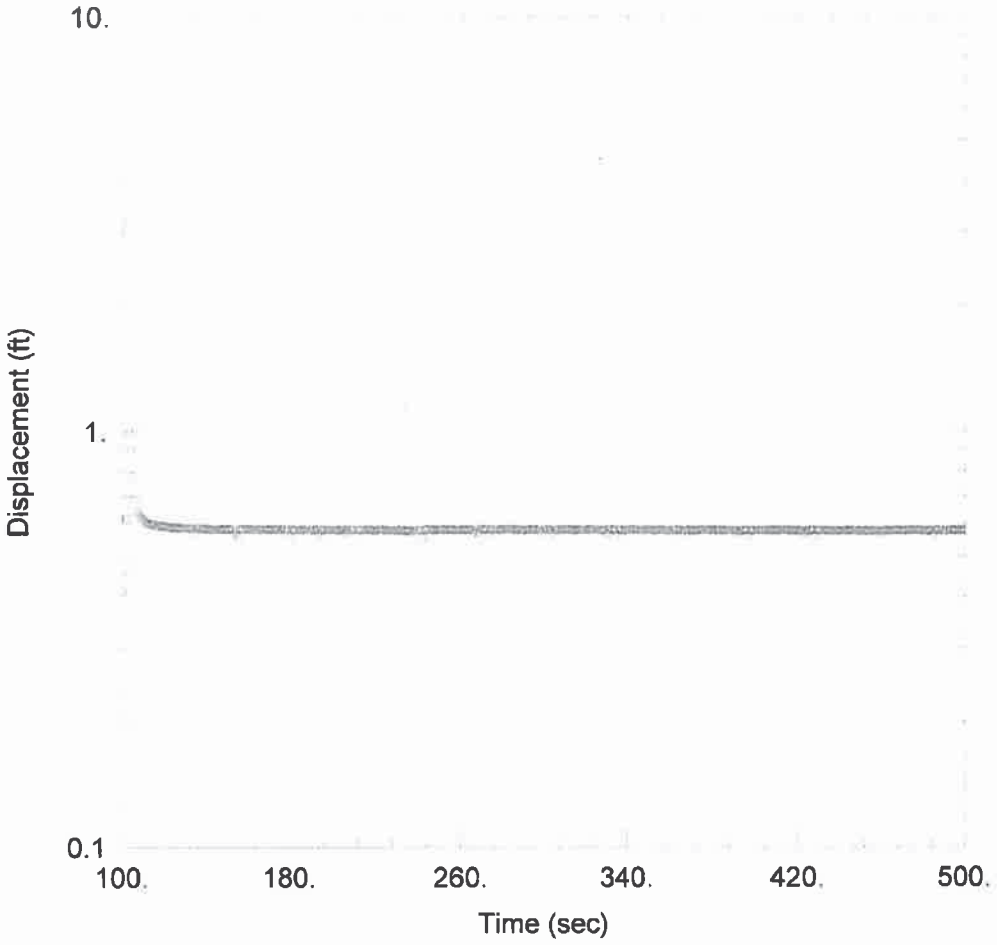
Saturated Thickness: 11.93 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 0.5634 ft
Total Well Penetration Depth: 6.93 ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.93 ft
Screen Length: 15.5 ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.381 ft/day
y0 = 0.3757 ft



MW_3_RH

Data Set: H:\...\MW_3_RH.aqt
Date: 06/06/17 Time: 10:05:58

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-3
Test Date: 11/23/16

AQUIFER DATA

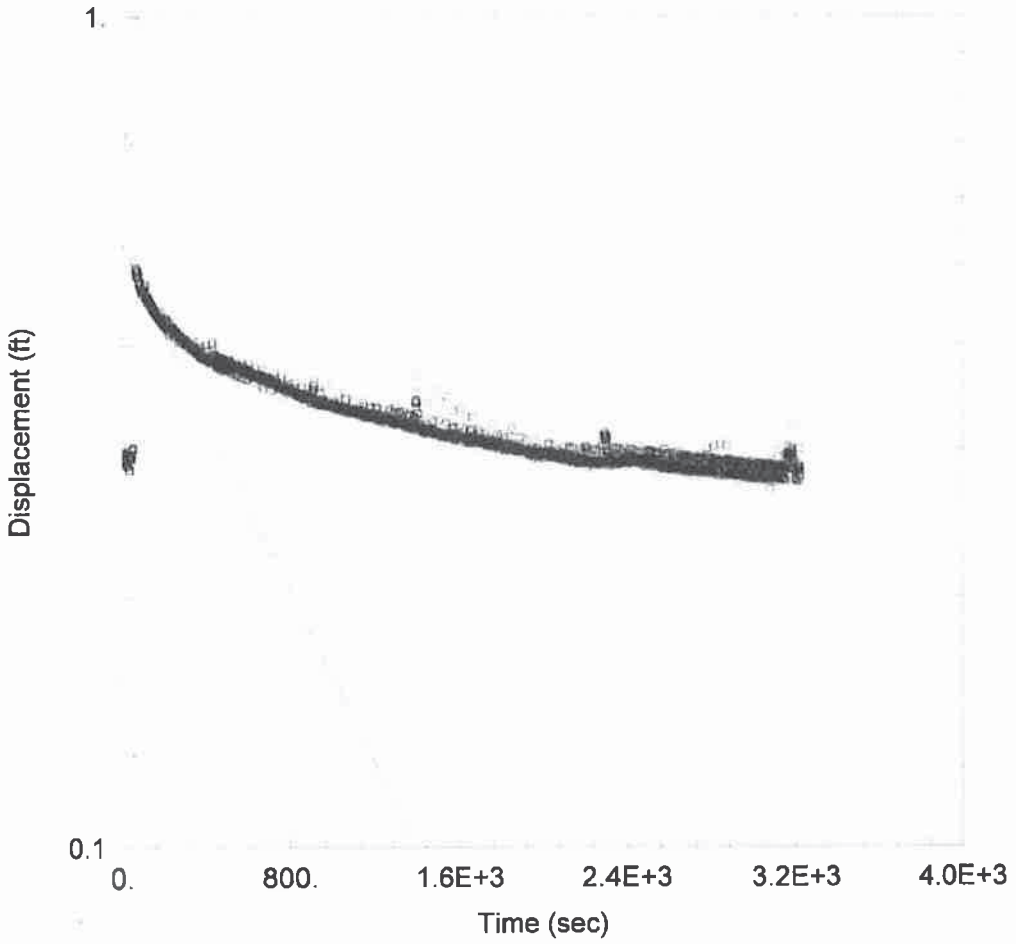
Saturated Thickness: 12.08 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 0.618 ft
Total Well Penetration Depth: 7.08 ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.08 ft
Screen Length: 15.5 ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.926 ft/day
y0 = 1.54 ft



MW_4_FH

Data Set: H:\...\MW_4_FH.aqt
Date: 06/06/17 Time: 10:06:08

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-4
Test Date: 11/23/16

AQUIFER DATA

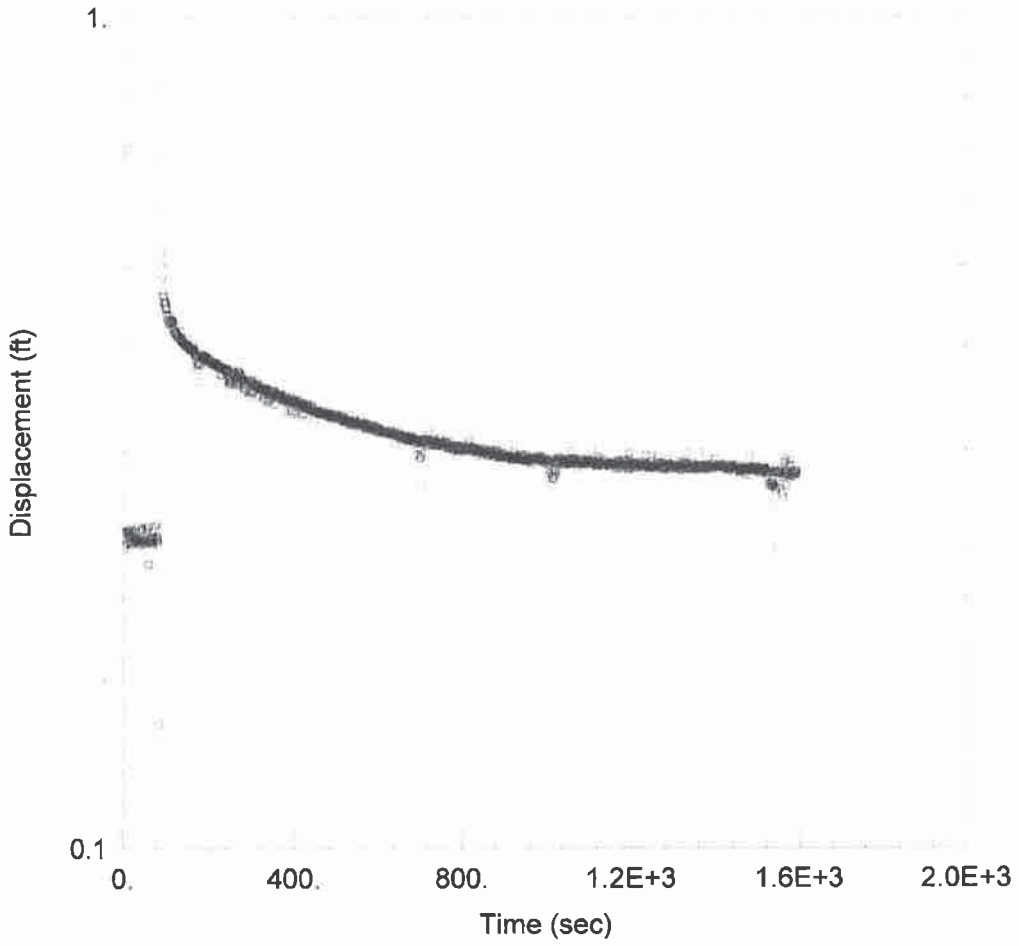
Saturated Thickness: 10.74 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4)

Initial Displacement: 0.7196 ft
Total Well Penetration Depth: 5.74 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.74 ft
Screen Length: 13. ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3093 ft/day
y0 = 0.5308 ft



MW_4_RH

Data Set: H:\...\MW_4_RH.aqt
Date: 06/06/17 Time: 10:06:18

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-4
Test Date: 11/23/16

AQUIFER DATA

Saturated Thickness: 10.75 ft Anisotropy Ratio (Kz/Kr): 1.

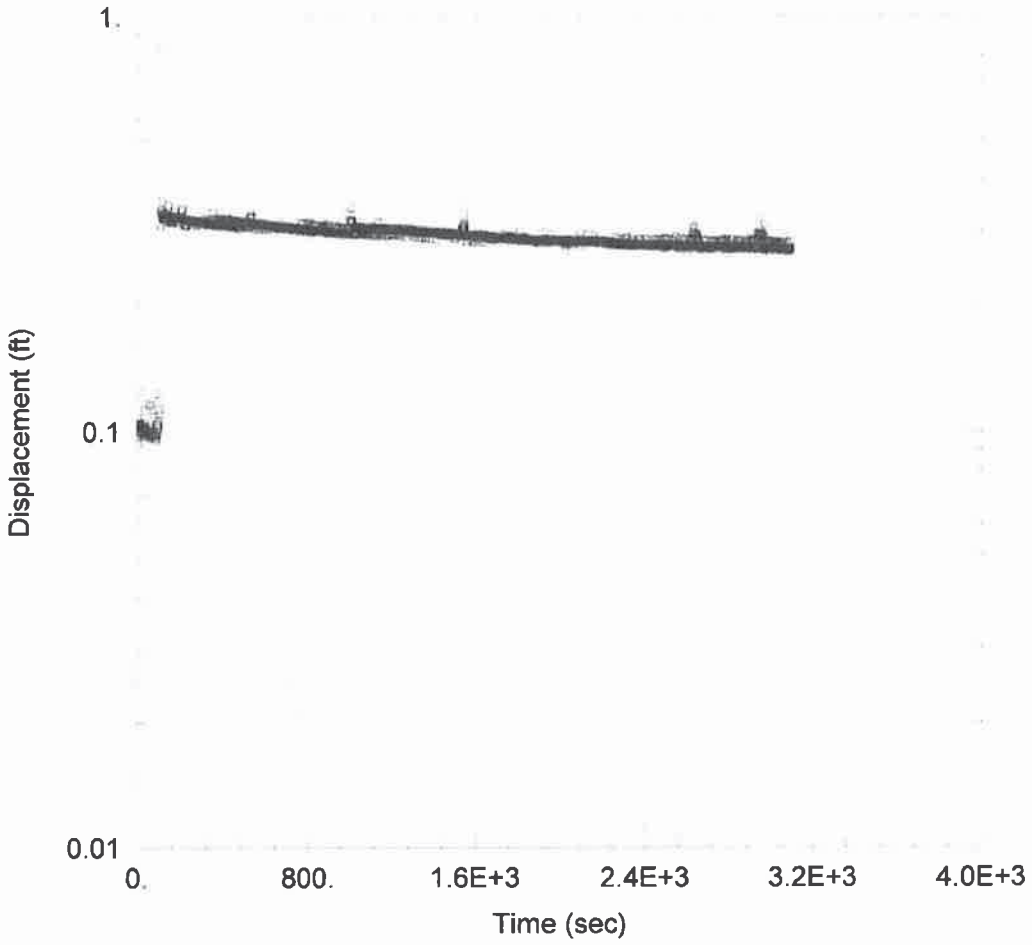
WELL DATA (MW-4)

Initial Displacement: 0.6831 ft
Total Well Penetration Depth: 5.75 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.75 ft
Screen Length: 13. ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.3448 ft/day
y0 = 0.495 ft



MW_6_FH

Data Set: H:\...\MW_6_FH.aqt
Date: 06/06/17 Time: 10:06:33

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-6
Test Date: 11/23/16

AQUIFER DATA

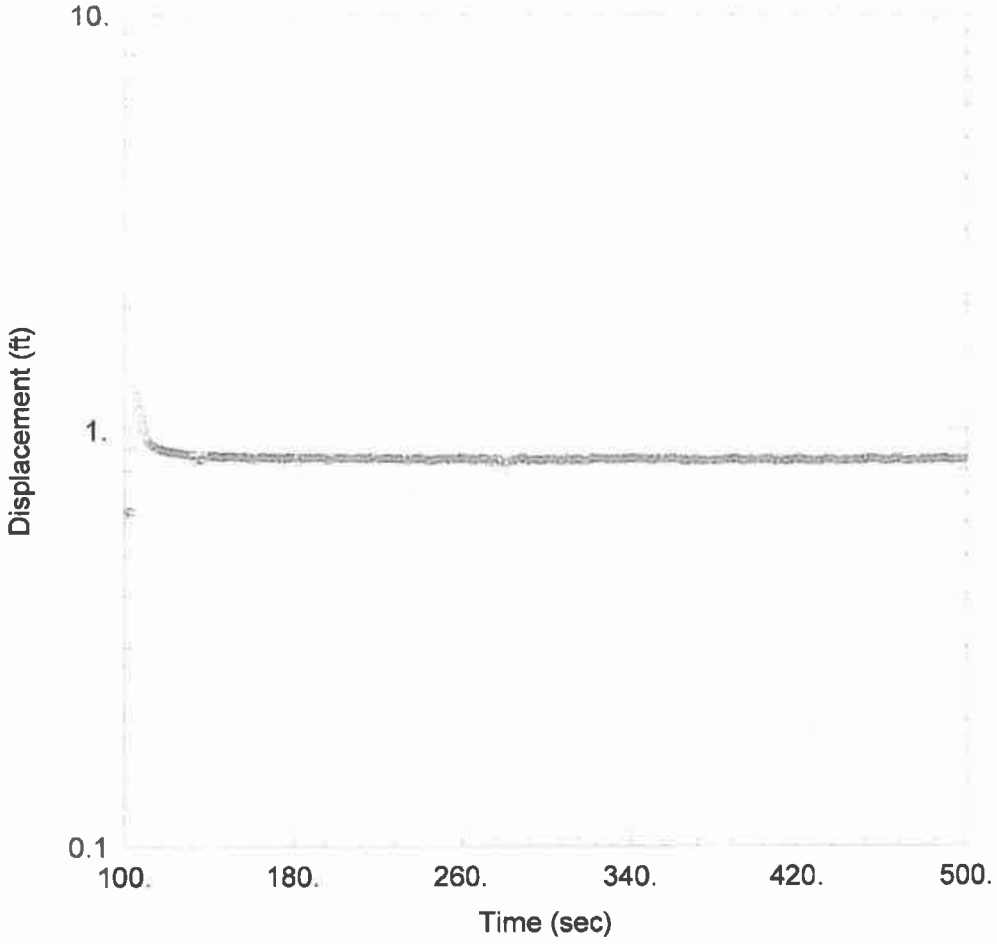
Saturated Thickness: 14.19 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6)

Initial Displacement: 0.7571 ft
Total Well Penetration Depth: 9.19 ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.19 ft
Screen Length: 14. ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.21 ft/day
y0 = 0.5772 ft



MW_6_RH

Data Set: H:\...\MW_6_RH.aqt
Date: 06/06/17 Time: 10:06:44

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-6
Test Date: 10/23/16

AQUIFER DATA

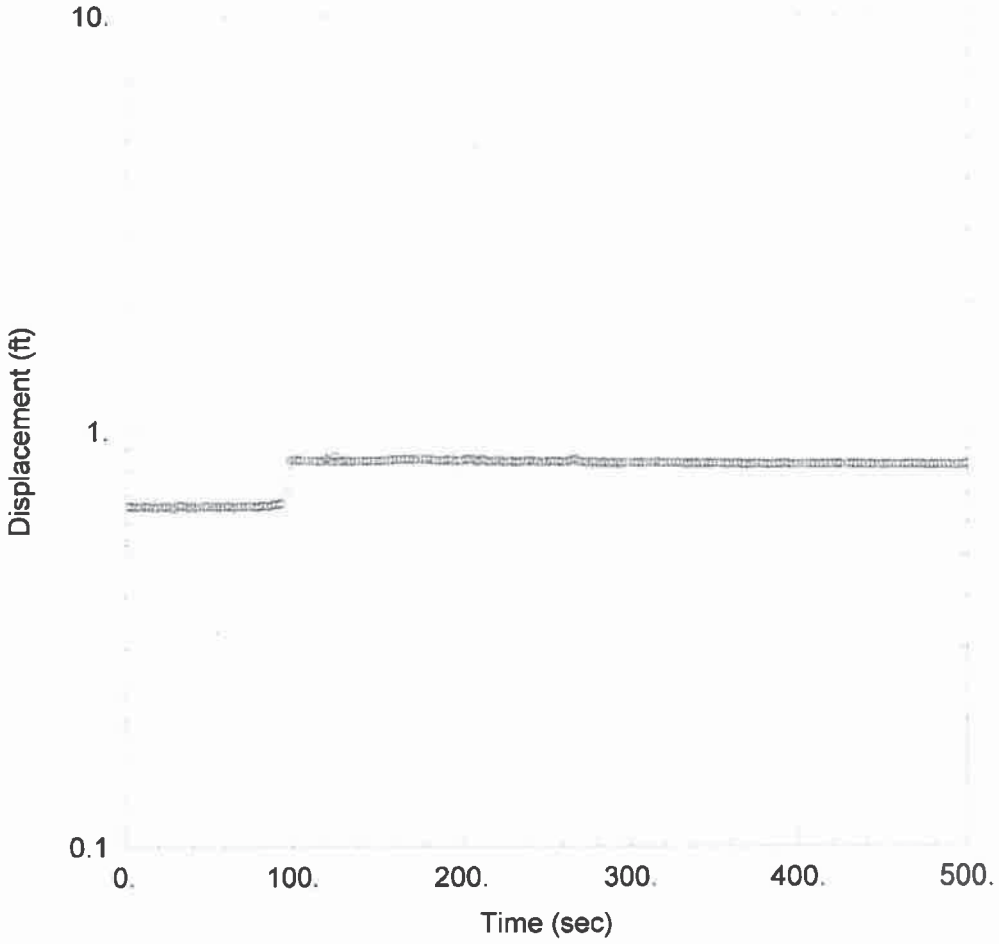
Saturated Thickness: 14.35 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6)

Initial Displacement: 0.6379 ft
Total Well Penetration Depth: 9.35 ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.35 ft
Screen Length: 14. ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.617 ft/day
y0 = 1.199 ft



MW_7_FH

Data Set: H:\...\MW_7_FH.aqt
Date: 06/06/17 Time: 10:06:55

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-7
Test Date: 11/23/16

AQUIFER DATA

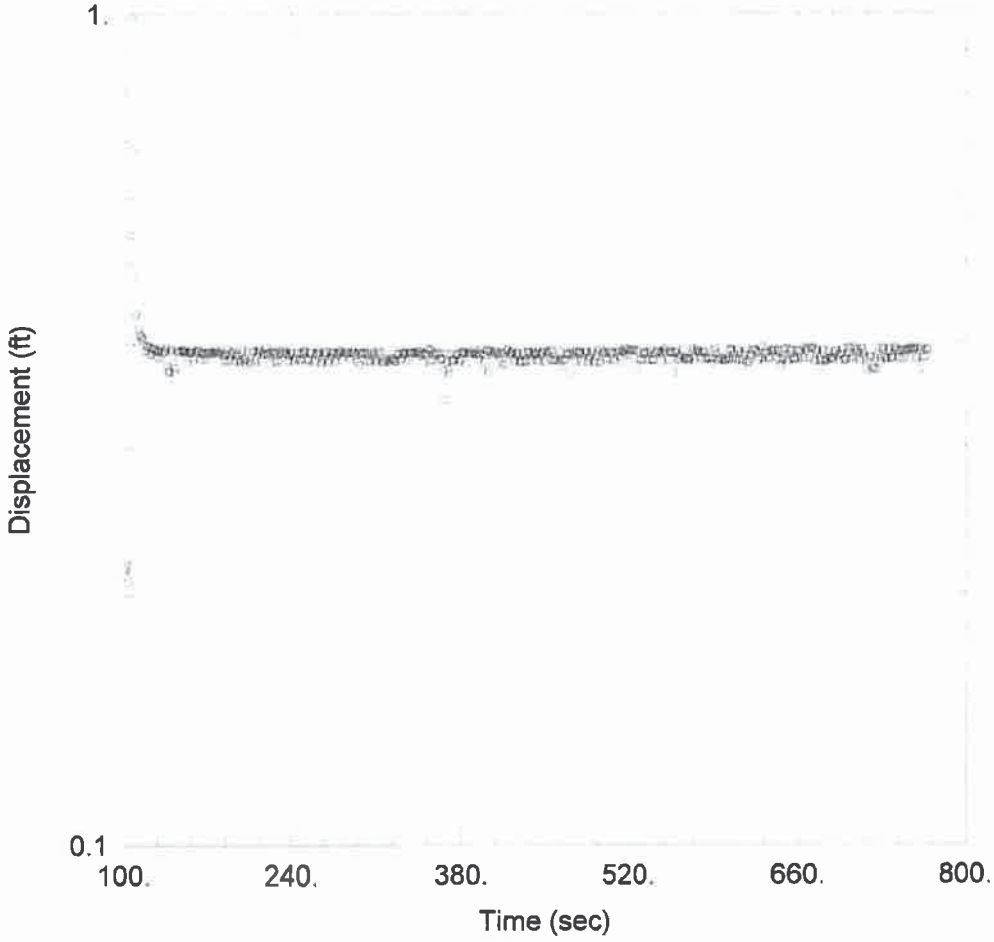
Saturated Thickness: 12.45 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-7)

Initial Displacement: 0.5403 ft
Total Well Penetration Depth: 7.45 ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.45 ft
Screen Length: 14. ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
K = 0.1583 ft/day
Solution Method: Bouwer-Rice
y0 = 0.911 ft



MW_7_RH

Data Set: H:\...\MW_7_RH.aqt
Date: 06/06/17 Time: 10:07:06

PROJECT INFORMATION

Company: Mountain Research
Client: Point Store
Project: 4597.15.01
Location: McClure, PA
Test Well: MW-7
Test Date: 11/23/16

AQUIFER DATA

Saturated Thickness: 12.57 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-7)

Initial Displacement: 0.8083 ft
Total Well Penetration Depth: 7.57 ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.57 ft
Screen Length: 14. ft
Wellbore Radius: 0.3438 ft
Gravel Pack Porosity: 0.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.236 ft/day
y0 = 0.704 ft

APPENDIX I

LABORATORY DATA SHEETS – SOIL

MOUNTAIN RESEARCH, LLC

Corporate Office and Laboratory
825 25th Street
Altoona, PA 16601
814.949.2034 Phone
800.837.4674 Toll Free
814.949.9591 Fax

DuBois Office and Laboratory
110 McCracken Run Road
DuBois, PA 15801
814.371.6030 Phone
814.375.0823 Fax

Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

22 January 2018

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

Lab ID #: 8010179

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 01/05/18 11:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan Davidson-Rager

Megan Davidson-Rager
Project Manager

Authorized Reviewer

MOUNTAIN RESEARCH, LLC

Corporate Office and Laboratory
825 25th Street
Altoona, PA 16601
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814.371.6030 Phone
814.375.0823 Fax

Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
SB-43 16-17'	8010179-01	Solid	Grab	01/02/18 14:00	01/05/18 11:00
SB-42 18-19'	8010179-02	Solid	Grab	01/02/18 15:15	01/05/18 11:00
SB-33R 7-9'	8010179-03	Solid	Grab	01/02/18 15:45	01/05/18 11:00
Duplicate	8010179-04	Solid	Grab	01/02/18 00:00	01/05/18 11:00
SB-45/MW-14 12-13"	8010179-05	Solid	Grab	01/03/18 12:00	01/05/18 11:00
SB-46/MW-15 17"	8010179-06	Solid	Grab	01/04/18 09:15	01/05/18 11:00
SB-47 7"	8010179-07	Solid	Grab	01/04/18 16:00	01/05/18 11:00
Trip Blank	8010179-08	Aqueous	Grab	01/02/18 07:00	01/05/18 11:00

Mountain Research, LLC

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

MOUNTAIN RESEARCH, LLC

Corporate Office and Laboratory
825 25th Street
Altoona, PA 16601
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Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-43 16-17'

8010179-01 (Solid) Sampled: 01/02/18 14:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**59.5**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
MTBE	**21.1**	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Toluene	**9.62**	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<3.36	3.36	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<6.72	6.72	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<10.1	10.1	µg/Kg dry	01/09/18 16:51	01/09/18 16:51	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*102 %*	*80-120*	*01/09/18 16:51*	*01/09/18 16:51*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*100 %*	*80-120*	*01/09/18 16:51*	*01/09/18 16:51*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*109 %*	*80-120*	*01/09/18 16:51*	*01/09/18 16:51*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.0 %*	*80-120*	*01/09/18 16:51*	*01/09/18 16:51*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

MOUNTAIN RESEARCH, LLC

Corporate Office and Laboratory
825 25th Street
Altoona, PA 16601
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Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-42 18-19'

8010179-02 (Solid) Sampled: 01/02/18 15:15

Mountain Research, LLC

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
General Chemistry										
Total Solids	**84.3**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										Q1
1,2,4-Trimethylbenzene	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Toluene	**6.37**	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.37	2.37	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.74	4.74	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<7.12	7.12	µg/Kg dry	01/10/18 16:25	01/10/18 16:25	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*100 %*	*80-120*	*01/10/18 16:25*	*01/10/18 16:25*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*104 %*	*80-120*	*01/10/18 16:25*	*01/10/18 16:25*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*112 %*	*80-120*	*01/10/18 16:25*	*01/10/18 16:25*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.6 %*	*80-120*	*01/10/18 16:25*	*01/10/18 16:25*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

MOUNTAIN RESEARCH, LLC

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-33R 7-9'

8010179-03 (Solid) Sampled: 01/02/18 15:45

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**86.7**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	**233**	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	**1680**	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<231	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	**1600**	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	**286**	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<231	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	**409**	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<231	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<231	231	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	**610**	461	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<692	692	µg/Kg dry	01/09/18 17:45	01/09/18 17:45	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*102 %*	*80-120*	*01/09/18 17:45*	*01/09/18 17:45*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*97.3 %*	*80-120*	*01/09/18 17:45*	*01/09/18 17:45*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*99.0 %*	*80-120*	*01/09/18 17:45*	*01/09/18 17:45*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.7 %*	*80-120*	*01/09/18 17:45*	*01/09/18 17:45*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Duplicate

8010179-04 (Solid) Sampled: 01/02/18 00:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**86.6**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	**1830**	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	**6560**	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<231	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	**5560**	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	**1150**	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<231	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	**1610**	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<231	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<231	231	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	**2600**	462	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	**2620**	693	µg/Kg dry	01/09/18 18:11	01/09/18 18:11	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*95.5 %*	*80-120*	*01/09/18 18:11*	*01/09/18 18:11*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*98.5 %*	*80-120*	*01/09/18 18:11*	*01/09/18 18:11*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*97.7 %*	*80-120*	*01/09/18 18:11*	*01/09/18 18:11*	*EPA 8260 B*				
Surrogate: Toluene-d8		*95.8 %*	*80-120*	*01/09/18 18:11*	*01/09/18 18:11*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-45/MW-14 12-13"

8010179-05 (Solid) Sampled: 01/03/18 12:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**85.0**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Toluene	**3.23**	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.35	2.35	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.70	4.70	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<7.06	7.06	µg/Kg dry	01/09/18 18:38	01/09/18 18:38	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.4 %*	*80-120*	*01/09/18 18:38*	*01/09/18 18:38*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*102 %*	*80-120*	*01/09/18 18:38*	*01/09/18 18:38*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*01/09/18 18:38*	*01/09/18 18:38*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.7 %*	*80-120*	*01/09/18 18:38*	*01/09/18 18:38*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-46/MW-15 17"

8010179-06 (Solid) Sampled: 01/04/18 09:15

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**82.9**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Toluene	**2.71**	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.41	2.41	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.82	4.82	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<7.23	7.23	µg/Kg dry	01/09/18 19:06	01/09/18 19:06	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.2 %*	*80-120*	*01/09/18 19:06*	*01/09/18 19:06*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*102 %*	*80-120*	*01/09/18 19:06*	*01/09/18 19:06*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*111 %*	*80-120*	*01/09/18 19:06*	*01/09/18 19:06*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.4 %*	*80-120*	*01/09/18 19:06*	*01/09/18 19:06*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-47 7"

8010179-07 (Solid) Sampled: 01/04/18 16:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**90.9**	1.00	wt%	01/12/18 17:00	01/12/18 17:00		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.20	2.20	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.40	4.40	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<6.60	6.60	µg/Kg dry	01/09/18 19:33	01/09/18 19:33	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*104 %*	*80-120*	*01/09/18 19:33*	*01/09/18 19:33*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*103 %*	*80-120*	*01/09/18 19:33*	*01/09/18 19:33*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*110 %*	*80-120*	*01/09/18 19:33*	*01/09/18 19:33*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.6 %*	*80-120*	*01/09/18 19:33*	*01/09/18 19:33*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/22/18 14:22
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Trip Blank

8010179-08 (Aqueous) Sampled: 01/02/18 07:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/09/18 19:59	01/09/18 19:59	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*102 %*	*80-120*	*01/09/18 19:59*	*01/09/18 19:59*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.7 %*	*80-120*	*01/09/18 19:59*	*01/09/18 19:59*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*101 %*	*80-120*	*01/09/18 19:59*	*01/09/18 19:59*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.9 %*	*80-120*	*01/09/18 19:59*	*01/09/18 19:59*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010179
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/22/18 14:22

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

O1	The VOC vial contained an amount of soil outside the EPA recommendation.
CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Store
MR Project #	SITE LOCATION	
4559.15.01	McClure, PA	
CLIENT	SAMPLER(S)	
Point Store	BA	

NOTES:
Received On Ice: (Y) N
Sample Temp: 4.1°
Comp Set
Comments:

MOUNTAIN RESEARCH LLC
825 25th Street, Altoona, PA 16601 (814) 949-2034 (8
110 McCracken Run Road, Dubois, PA 15801 (814) 371-6030 F

CHAIN OF CUSTODY RECORD

MR PROJ. MGR. MC
Shipping Carrier:
Turn Around Time:
10 Day X
3 Day
1 Day
Comments:

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
SB-43 16-17'	1/2/18	1400	X		Soil	1 4 oz JAR	2A, 3A		X		None	01
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-42 18-19'		1515				1 4 oz JAR	2A, 3A		X		None	02
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-33R 7-9'		1545				1 4 oz JAR	2A, 3A		X		None	03
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
BA DUPLICATE						1 4 oz JAR	2A, 3A		X		None	04
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Lab Workorder #:	Log In Time: 1142
	1/5/18	1100		1/5/18 1120	8010179	Staff: KL
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Labeled By:	Date: 1/8/18

1/2

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Store
MR Project #	SITE LOCATION	
4559.15.01	McClure, PA	
CLIENT		SAMPLER(S)
Point Store		BA

NOTES:
Received On Ice: (Y) N
Sample Temp: 4.1
Comp Set
Comments:

MOUNTAIN RESEARCH LLC

825 25th Street, Altoona, PA 16601 (814) 949-2034 (800) 837-4674 FAX (814) 949-9591
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CHAIN OF CUSTODY RECORD

MR PROJ. MGR. MC

Shipping Carrier:

Turn Around Time:
10 Day X
3 Day
1 Day

Comments:

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
SB-45/MW-14 12ft	1/3/18	1200	X		SOIL	1 4 oz JAR	2A, 3A		X		None	05
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-46/MW-15 17'	1/4/18	0915	X		SOIL	1 4 oz JAR	2A, 3A		X		None	06
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-47/MW-16 8'	1/4/18	1600	X		SOIL	1 4 oz JAR	2A, 3A		X		None	07
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
BA SB TRIP BLANK	1/2/18	0700	X		AQ	2 40mL VOA ~~1 4 oz JAR~~	2A, 3A	X	BA X		HCl ~~None~~ BA	08
BA 1/5/18						1 40 mL VOA	2A, 3A	X			MEOH	
BA ↓						3 40 mL VOA	2A, 3A			X	NAHSO4	

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME
	1/5/18	1100		1/5/18 1100
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME

Lab Workorder #: 8010179
Labeled By:

Log In Time: 1142
Staff: RD
Date: 1/8/18

2/2

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 8010177

CLIENT: Point Store

DATE SAMPLED: 1/2-3-4/18 DATE RECEIVED: 1/5/18 TIME RECEIVED: 1110

1. CHECK ALL THAT APPLY: PA ☐ ~~WV~~ ☐ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐

2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ ~~NO ☐~~

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 37

4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? ~~YES ☐~~ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 4.6°C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____

6. WERE THE SAMPLES PROPERLY PRESERVED? ~~YES ☐~~ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☐ ~~NO ☐~~

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☑ N/A ☐

9. WAS THE COC FILLED OUT PROPERLY? YES ☐ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ ~~NO ☐~~

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ ~~NO ☐~~

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☐

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☐ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: _____ CLIENT SPOKEN TO: _____ DATE/TIME: _____

OUTCOME: _____

SIGNATURE: _____

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14 February 2018

Lab ID #: 8010570

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 01/19/18 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Stephen Gampe

Stephen Gampe
Assistant Laboratory Manager

Authorized Reviewer

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/14/18 16:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
SB-50 8-9.5' /MW-17	8010570-01	Solid	Grab	01/15/18 15:30	01/19/18 16:30
SB-51 7' /MW-16	8010570-02	Solid	Grab	01/16/18 11:15	01/19/18 16:30
SB-52 8-9" /MW-19BR	8010570-03	Solid	Grab	01/16/18 14:55	01/19/18 16:30
Trip Blank	8010570-04	Aqueous	Grab	01/15/18 06:00	01/19/18 16:30
P2-3BR (3.0) US	8010570-05	Solid	Grab	01/18/18 14:45	01/19/18 16:30
P2-3BR (9.0) US	8010570-06	Solid	Grab	01/18/18 14:50	01/19/18 16:30

Mountain Research, LLC

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Stephen Gampe

Stephen Gampe, Assistant Laboratory Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/14/18 16:32
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-50 8-9.5' /MW-17

8010570-01 (Solid) Sampled: 01/15/18 15:30

Mountain Research, LLC

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
General Chemistry										
Total Solids	**85.8**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										**O1**
1,2,4-Trimethylbenzene	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.33	2.33	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.66	4.66	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<7.00	7.00	µg/Kg dry	01/24/18 01:04	01/24/18 01:04	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*95.4 %*	*80-120*	*01/24/18 01:04*	*01/24/18 01:04*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*98.8 %*	*80-120*	*01/24/18 01:04*	*01/24/18 01:04*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*106 %*	*80-120*	*01/24/18 01:04*	*01/24/18 01:04*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.8 %*	*80-120*	*01/24/18 01:04*	*01/24/18 01:04*	*EPA 8260 B*				

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Stephen Gampe

Stephen Gampe, Assistant Laboratory Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/14/18 16:32
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-51 7' /MW-16

8010570-02 (Solid) Sampled: 01/16/18 11:15

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**89.3**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										Q1
1,2,4-Trimethylbenzene	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.24	2.24	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.48	4.48	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<6.72	6.72	µg/Kg dry	01/24/18 01:32	01/24/18 01:32	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4	*94.4 %*	*80-120*		*01/24/18 01:32*	*01/24/18 01:32*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene	*98.6 %*	*80-120*		*01/24/18 01:32*	*01/24/18 01:32*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane	*106 %*	*80-120*		*01/24/18 01:32*	*01/24/18 01:32*	*EPA 8260 B*				
Surrogate: Toluene-d8	*99.4 %*	*80-120*		*01/24/18 01:32*	*01/24/18 01:32*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/14/18 16:32
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-52 8-9" /MW-19BR

8010570-03 (Solid) Sampled: 01/16/18 14:55

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**84.4**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										**O1**
1,2,4-Trimethylbenzene	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.37	2.37	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.74	4.74	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<7.11	7.11	µg/Kg dry	01/24/18 01:59	01/24/18 01:59	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*95.0 %*	*80-120*	*01/24/18 01:59*	*01/24/18 01:59*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*98.7 %*	*80-120*	*01/24/18 01:59*	*01/24/18 01:59*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*01/24/18 01:59*	*01/24/18 01:59*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*01/24/18 01:59*	*01/24/18 01:59*	*EPA 8260 B*				

Mountain Research, LLC

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Stephen Gampe

Stephen Gampe, Assistant Laboratory Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/14/18 16:32
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Trip Blank

8010570-04 (Aqueous) Sampled: 01/15/18 06:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Benzene	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Ethylbenzene	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
MTBE	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Naphthalene	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Toluene	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Xylene o	<2.00	2.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Xylene p/m	<4.00	4.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	
Xylenes, Total	<6.00	6.00	µg/L	01/22/18 21:00	01/22/18 21:00	EPA 5030B	EPA 8260 B	A	JSA	CC
Surrogate: 1,2-Dichloroethane-d4		*101 %*	*80-120*	*01/22/18 21:00*	*01/22/18 21:00*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*91.4 %*	*80-120*	*01/22/18 21:00*	*01/22/18 21:00*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*01/22/18 21:00*	*01/22/18 21:00*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.4 %*	*80-120*	*01/22/18 21:00*	*01/22/18 21:00*	*EPA 8260 B*				

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Stephen Gampe, Assistant Laboratory Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/14/18 16:32

P2-3BR (3.0) US

8010570-05 (Solid) Sampled: 01/18/18 14:45

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**82.6**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										**O1**
1,2,4-Trimethylbenzene	**30100**	2420	µg/Kg dry	01/22/18 21:26	01/22/18 21:26	EPA 5035	EPA 8260 B	A	JSA	D1
1,3,5-Trimethylbenzene	**8720**	2420	µg/Kg dry	01/22/18 21:26	01/22/18 21:26	EPA 5035	EPA 8260 B	A	JSA	D1
Benzene	**1250**	242	µg/Kg dry	01/22/18 21:26	01/24/18 03:17	EPA 5035	EPA 8260 B	A	JSA	
Ethylbenzene	**13600**	2420	µg/Kg dry	01/22/18 21:26	01/22/18 21:26	EPA 5035	EPA 8260 B	A	JSA	D1
Isopropylbenzene (Cumene)	**920**	242	µg/Kg dry	01/22/18 21:26	01/24/18 03:17	EPA 5035	EPA 8260 B	A	JSA	
MTBE	<242	242	µg/Kg dry	01/22/18 21:26	01/24/18 03:17	EPA 5035	EPA 8260 B	A	JSA	
Naphthalene	**9670**	2420	µg/Kg dry	01/22/18 21:26	01/22/18 21:26	EPA 5035	EPA 8260 B	A	JSA	D1
Toluene	**448**	242	µg/Kg dry	01/22/18 21:26	01/24/18 03:17	EPA 5035	EPA 8260 B	A	JSA	
Xylene o	**952**	242	µg/Kg dry	01/22/18 21:26	01/24/18 03:17	EPA 5035	EPA 8260 B	A	JSA	
Xylene p/m	**53700**	4840	µg/Kg dry	01/22/18 21:26	01/22/18 21:26	EPA 5035	EPA 8260 B	A	JSA	D1
Xylenes, Total	**54700**	5090	µg/Kg dry	01/22/18 21:26	01/24/18 03:17	EPA 5035	EPA 8260 B	A	JSA	CC, D1
Surrogate: 1,2-Dichloroethane-d4		*101 %*	*80-120*	*01/22/18 21:26*	*01/22/18 21:26*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*93.8 %*	*80-120*	*01/22/18 21:26*	*01/22/18 21:26*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*106 %*	*80-120*	*01/22/18 21:26*	*01/22/18 21:26*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.2 %*	*80-120*	*01/22/18 21:26*	*01/22/18 21:26*	*EPA 8260 B*				

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Stephen Gampe

Stephen Gampe, Assistant Laboratory Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/14/18 16:32
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

P2-3BR (9.0) US

8010570-06 (Solid) Sampled: 01/18/18 14:50

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**71.5**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										**Q1**
1,2,4-Trimethylbenzene	**231000**	28000	µg/Kg dry	01/22/18 21:52	01/24/18 03:43	EPA 5035	EPA 8260 B	A	JSA	D1
1,3,5-Trimethylbenzene	**79000**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Benzene	**3310**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Ethylbenzene	**110000**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Isopropylbenzene (Cumene)	**9410**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
MTBE	<349	349	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Naphthalene	**41400**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Toluene	**8400**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Xylene o	**68100**	2800	µg/Kg dry	01/22/18 21:52	01/22/18 21:52	EPA 5035	EPA 8260 B	A	JSA	D1
Xylene p/m	**336000**	55900	µg/Kg dry	01/22/18 21:52	01/24/18 03:43	EPA 5035	EPA 8260 B	A	JSA	D1
Xylenes, Total	**404000**	58700	µg/Kg dry	01/22/18 21:52	01/24/18 03:43	EPA 5035	EPA 8260 B	A	JSA	CC, D1
Surrogate: 1,2-Dichloroethane-d4		*97.6 %*	*80-120*	*01/22/18 21:52*	*01/22/18 21:52*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.0 %*	*80-120*	*01/22/18 21:52*	*01/22/18 21:52*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*102 %*	*80-120*	*01/22/18 21:52*	*01/22/18 21:52*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.4 %*	*80-120*	*01/22/18 21:52*	*01/22/18 21:52*	*EPA 8260 B*				

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Stephen Gampe

Stephen Gampe, Assistant Laboratory Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010570
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/14/18 16:32

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

O1	The VOC vial contained an amount of soil outside the EPA recommendation.
D1	The sample was analyzed at a dilution.
CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

Report Revised:.....2/14/18 This report was reissued to report MTBE down to the MDL on sample 8010570-06 per the clients request.. This replaces all previous reports for this work order.

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Stephen Gampe

Stephen Gampe, Assistant Laboratory Manager

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Store
MR Project #	SITE LOCATION	
4559.15.01	McClure, PA	
CLIENT		SAMPLER(S)
Point Store		BA

NOTES:
Received On Ice: Y / N
Sample Temp: 4.7
Comp Set
Comments:

MOUNTAIN RESEARCH LLC
825 25th Street, Altoona, PA 16601 (814) 949-2034 (800)
110 McCracken Run Road, Dubois, PA 15801 (814) 371-6030 Fax

CHAIN OF CUSTODY RECORD

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
SB-50/MW-19 (3-3.5)	1/15/18	1530	X		Soil	1 4 oz JAR	2A, 3A		X		None	01
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-51/MW-18 (7')	1/16/18	1115	X		Soil	1 4 oz JAR	2A, 3A		X		None	02
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-52/MW-18R (8-9')	1/16/18	1455	X		Soil	1 4 oz JAR	2A, 3A		X		None	03
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
TRIP BLANK SB-	1/15/18	0600	X		AQ	2 40 mL VOA ~~1 4 oz JAR~~	2A, 3A ~~2A, 3A~~	X	X		HCl None	04
						~~1 40 mL VOA~~	~~2A, 3A~~	~~X~~			~~MEOH~~	
						~~3 40 mL VOA~~	~~2A, 3A~~			~~X~~	~~NAHSO4~~	

MR PROJ. MGR. MC

Shipping Carrier:

Turn Around Time:
10 Day X
3 Day
1 Day

Comments:

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME
	1/17/18	1600	Adam Moore	1/17/18 1600
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME
	1-19-18	4:30		1/19/18 16:30

Lab Workorder #: 801057@
Labeled By:

Log In Time: ~~09:30~~
Staff: MC
Date: 1/22/18

Page 10 of 12

Pg 1 of 2

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Stone
MR Project #		SITE LOCATION
4559.15.01		McClure PA
CLIENT		SAMPLER(S)
Point Stone		AK

NOTES:
Received On Ice: (Y) / N
Sample Temp: 4.7
PWSID #:
Comments:

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(814) 371-6030 Fax (814) 375-0823

CHAIN OF CUSTODY RECORD

MR PROJ. MGR. MC
Shipping Carrier:
Turn Around Time:
10 Day X
3 Day
1 Day
Comments:

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	Analyses Requested: 8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
PZ-3BR(30)45	1-18-18	2:45pm	X		So.	402 Jar	1		X		None	
"	"	"				40 mL	2	X			MEOH	
"	"	"				40 mL	3			X	Na_2SO_4	
PZ-3BR(90)45	1-18-18	2:50pm	X		So.	"			X		None	
"	"	"				"		X			MEOH	
"	"	"				"				X	Na_2SO_4	

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME
[signature]	1-19-18	4:30pm	[signature]	16:30 1-19-18
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME

Lab Workorder #: 8010570
Labeled By:

Log In Time: 0830
Staff: AK
Date: 1/22/18

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 1801057D

CLIENT: Point Store

DATE SAMPLED: 1/15-16-18 | DATE RECEIVED: 1/19/18 TIME RECEIVED: 1630

1. CHECK ALL THAT APPLY: PA ☑ WV ☐ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐
2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ NO ☑

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 27
4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? YES ☑ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 4.7 °C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____
6. WERE THE SAMPLES PROPERLY PRESERVED? YES ☑ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☑ NO ☐

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☐ N/A ☑
9. WAS THE COC FILLED OUT PROPERLY? YES ☑ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ NO ☑

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☑ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: CLIENT SPOKEN TO: DATE/TIME:

OUTCOME:

SIGNATURE: KDeRon

L60.30.A r2 Sample Receipt Form

For MR Use Only

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29 January 2018

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

Lab ID #: 8010400

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 01/15/18 07:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan Davidson-Rager

Megan Davidson-Rager
Project Manager

Authorized Reviewer

MOUNTAIN RESEARCH, LLC

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010400
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 13:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
SB-48 -2 5'	8010400-01	Solid	Grab	01/09/18 13:40	01/15/18 07:00
SB-49/MW 18 10'	8010400-02	Solid	Grab	01/12/18 11:47	01/15/18 07:00
Trip Blank	8010400-03	Aqueous	Grab	01/09/18 06:00	01/15/18 07:00

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010400
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:45
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-48 -2 5'

8010400-01 (Solid) Sampled: 01/09/18 13:40

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**89.2**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										**O1**
1,2,4-Trimethylbenzene	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.24	2.24	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.48	4.48	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<6.73	6.73	µg/Kg dry	01/18/18 22:22	01/18/18 22:22	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*96.4 %*	*80-120*	*01/18/18 22:22*	*01/18/18 22:22*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*103 %*	*80-120*	*01/18/18 22:22*	*01/18/18 22:22*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*119 %*	*80-120*	*01/18/18 22:22*	*01/18/18 22:22*	*EPA 8260 B*				
Surrogate: Toluene-d8		*102 %*	*80-120*	*01/18/18 22:22*	*01/18/18 22:22*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010400
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:45
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-49/MW 18 10'

8010400-02 (Solid) Sampled: 01/12/18 11:47

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**85.8**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										Q1
1,2,4-Trimethylbenzene	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
MTBE	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Toluene	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	<2.33	2.33	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	<4.66	4.66	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	<6.99	6.99	µg/Kg dry	01/18/18 22:50	01/18/18 22:50	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*104 %*	*80-120*	*01/18/18 22:50*	*01/18/18 22:50*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*102 %*	*80-120*	*01/18/18 22:50*	*01/18/18 22:50*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*117 %*	*80-120*	*01/18/18 22:50*	*01/18/18 22:50*	*EPA 8260 B*				
Surrogate: Toluene-d8		*102 %*	*80-120*	*01/18/18 22:50*	*01/18/18 22:50*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010400
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 13:45

Trip Blank

8010400-03 (Aqueous) Sampled: 01/09/18 06:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/19/18 00:11	01/19/18 00:11	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.4 %*	*80-120*	*01/19/18 00:11*	*01/19/18 00:11*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.1 %*	*80-120*	*01/19/18 00:11*	*01/19/18 00:11*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*114 %*	*80-120*	*01/19/18 00:11*	*01/19/18 00:11*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*01/19/18 00:11*	*01/19/18 00:11*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010400
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 13:45

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

O1	The VOC vial contained an amount of soil outside the EPA recommendation.
CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Store
MR Project #		SITE LOCATION
4559.15.01		McClure, PA
CLIENT		SAMPLER(S)
Point Store		BA, JC

NOTES:
Received On Ice: (Y) / N
Sample Temp: 4.8°C
Comp Set
Comments:

MOUNTAIN RESEARCH LLC
825 25th Street, Altoona, PA 16601 (814) 949-2034 (80(
110 McCracken Run Road, Dubois, PA 15801 (814) 371-6030 Fax

CHAIN OF CUSTODY RECORD

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
SB-48/MW-2 5'	1/9/18	1348	X		SOIL	1 4 oz JAR	2A, 3A		X		None	01
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
SB-49/MW-15 10'	1/12/18	1147	X			1 4 oz JAR	2A, 3A		X		None	02
"	"	"	"		"	1 40 mL VOA	2A, 3A	X			MEOH	"
"	"	"	"		"	3 40 mL VOA	2A, 3A			X	NAHSO4	"
TRIP BLANK	1/9/18	0600	X		AQ	1 4 oz JAR	2A, 3A	X	X		HCl	03
SB-						1 4 oz JAR	2A, 3A				None	
						1 40 mL VOA	2A, 3A	X			MEOH	
						3 40 mL VOA	2A, 3A			X	NAHSO4	
SB-						1 4 oz JAR	2A, 3A		X		None	
						1 40 mL VOA	2A, 3A	X			MEOH	
						3 40 mL VOA	2A, 3A			X	NAHSO4	

MR PROJ. MGR. MC
Shipping Carrier:
Turn Around Time:
10 Day X
3 Day
1 Day
Comments:

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Lab Workorder #:
[signature]	1/12/18	1820	[signature]	1/15/18 07:30	810400
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Labeled By:

Log In Time: 1402
Staff: AC
Date: 1/15/18

BA
BA

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 8010400

CLIENT: Post Store

DATE SAMPLED: 1/9/18 DATE RECEIVED: 1/15/18 TIME RECEIVED: 07:30

1. CHECK ALL THAT APPLY: PA ☑ WV ☐ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐

2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ NO ☑

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 16

4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? YES ☑ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 4.8 °C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____

6. WERE THE SAMPLES PROPERLY PRESERVED? YES ☑ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☑ NO ☐

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☐ N/A ☑

9. WAS THE COC FILLED OUT PROPERLY? YES ☑ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ NO ☑

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☑ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: CLIENT SPOKEN TO: DATE/TIME:

OUTCOME:

SIGNATURE:

L60.30.A r2 Sample Receipt Form

For MR Use Only

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29 January 2018

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

Lab ID #: 8010571

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 01/18/18 07:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan Davidson-Rager

Megan Davidson-Rager
Project Manager

Authorized Reviewer

MOUNTAIN RESEARCH, LLC

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
SB-44 (8'10')	8010571-01	Solid	Grab	01/17/18 15:25	01/18/18 07:30
SB-44 (10'-12')	8010571-02	Solid	Grab	01/17/18 15:30	01/18/18 07:30
SB-44 (12'-14')	8010571-03	Solid	Grab	01/17/18 15:45	01/18/18 07:30
MW-20 BR (4'-6')	8010571-04	Solid	Grab	01/17/18 16:45	01/18/18 07:30
MW-20 BR (6'-8')	8010571-05	Solid	Grab	01/17/18 16:50	01/18/18 07:30
MW-20 BR (8'-10')	8010571-06	Solid	Grab	01/17/18 16:55	01/18/18 07:30

Mountain Research, LLC

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-44 (8'10')

8010571-01 (Solid) Sampled: 01/17/18 15:25

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**86.0**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
1,3,5-Trimethylbenzene	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Benzene	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Ethylbenzene	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Isopropylbenzene (Cumene)	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
MTBE	**12.8**	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Naphthalene	**3.00**	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Toluene	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Xylene o	<2.32	2.32	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Xylene p/m	<4.65	4.65	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	
Xylenes, Total	<6.97	6.97	µg/Kg dry	01/22/18 16:32	01/22/18 16:32	EPA 5035	EPA 8260 B	A	JSA	CC
Surrogate: 1,2-Dichloroethane-d4		*95.0 %*	*80-120*	*01/22/18 16:32*	*01/22/18 16:32*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.6 %*	*80-120*	*01/22/18 16:32*	*01/22/18 16:32*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*113 %*	*80-120*	*01/22/18 16:32*	*01/22/18 16:32*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*01/22/18 16:32*	*01/22/18 16:32*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-44 (10'-12')

8010571-02 (Solid) Sampled: 01/17/18 15:30

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**86.3**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
1,3,5-Trimethylbenzene	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Benzene	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Ethylbenzene	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Isopropylbenzene (Cumene)	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
MTBE	**63.4**	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Naphthalene	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Toluene	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Xylene o	<2.32	2.32	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Xylene p/m	<4.64	4.64	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	
Xylenes, Total	<6.95	6.95	µg/Kg dry	01/22/18 16:59	01/22/18 16:59	EPA 5035	EPA 8260 B	A	JSA	CC
Surrogate: 1,2-Dichloroethane-d4		*95.7 %*	*80-120*	*01/22/18 16:59*	*01/22/18 16:59*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.5 %*	*80-120*	*01/22/18 16:59*	*01/22/18 16:59*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*108 %*	*80-120*	*01/22/18 16:59*	*01/22/18 16:59*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.1 %*	*80-120*	*01/22/18 16:59*	*01/22/18 16:59*	*EPA 8260 B*				

Mountain Research, LLC

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

SB-44 (12'-14')

8010571-03 (Solid) Sampled: 01/17/18 15:45

Mountain Research, LLC

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
General Chemistry										
Total Solids	**81.5**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
1,3,5-Trimethylbenzene	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Benzene	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Ethylbenzene	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Isopropylbenzene (Cumene)	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
MTBE	**390**	246	µg/Kg dry	01/22/18 17:27	01/23/18 23:42	EPA 5035	EPA 8260 B	A	JSA	
Naphthalene	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Toluene	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Xylene o	<2.46	2.46	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Xylene p/m	<4.91	4.91	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	
Xylenes, Total	<7.37	7.37	µg/Kg dry	01/22/18 17:27	01/22/18 17:27	EPA 5035	EPA 8260 B	A	JSA	CC
Surrogate: 1,2-Dichloroethane-d4		*95.4 %*	*80-120*	*01/22/18 17:27*	*01/22/18 17:27*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.1 %*	*80-120*	*01/22/18 17:27*	*01/22/18 17:27*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*116 %*	*80-120*	*01/22/18 17:27*	*01/22/18 17:27*	*EPA 8260 B*				
Surrogate: Toluene-d8		*102 %*	*80-120*	*01/22/18 17:27*	*01/22/18 17:27*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

MOUNTAIN RESEARCH, LLC

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814.375.0823 Fax

Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-20 BR (4'-6')

8010571-04 (Solid) Sampled: 01/17/18 16:45

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**87.3**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	**8550**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
1,3,5-Trimethylbenzene	**2870**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Benzene	<229	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Ethylbenzene	**2160**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Isopropylbenzene (Cumene)	**342**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
MTBE	<229	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Naphthalene	**1470**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Toluene	**854**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Xylene o	**3400**	229	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Xylene p/m	**9000**	458	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	
Xylenes, Total	**12400**	687	µg/Kg dry	01/22/18 17:53	01/22/18 17:53	EPA 5035	EPA 8260 B	A	JSA	CC
Surrogate: 1,2-Dichloroethane-d4		*99.5 %*	*80-120*	*01/22/18 17:53*	*01/22/18 17:53*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.6 %*	*80-120*	*01/22/18 17:53*	*01/22/18 17:53*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*104 %*	*80-120*	*01/22/18 17:53*	*01/22/18 17:53*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.7 %*	*80-120*	*01/22/18 17:53*	*01/22/18 17:53*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-20 BR (6'-8')

8010571-05 (Solid) Sampled: 01/17/18 16:50

Mountain Research, LLC

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
General Chemistry										
Total Solids	**86.0**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	**6340**	2330	µg/Kg dry	01/22/18 18:19	01/24/18 02:51	EPA 5035	EPA 8260 B	A	JSA	D1
1,3,5-Trimethylbenzene	**4350**	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Benzene	<233	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Ethylbenzene	**3560**	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Isopropylbenzene (Cumene)	**560**	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
MTBE	<233	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Naphthalene	**2320**	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Toluene	**1590**	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Xylene o	**4430**	233	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Xylene p/m	**13100**	465	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	
Xylenes, Total	**17500**	698	µg/Kg dry	01/22/18 18:19	01/22/18 18:19	EPA 5035	EPA 8260 B	A	JSA	CC
Surrogate: 1,2-Dichloroethane-d4		*98.6 %*	*80-120*	*01/22/18 18:19*	*01/22/18 18:19*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.3 %*	*80-120*	*01/22/18 18:19*	*01/22/18 18:19*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*102 %*	*80-120*	*01/22/18 18:19*	*01/22/18 18:19*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.0 %*	*80-120*	*01/22/18 18:19*	*01/22/18 18:19*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 13:44
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-20 BR (8'-10')

8010571-06 (Solid) Sampled: 01/17/18 16:55

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
General Chemistry										
Total Solids	**85.6**	1.00	wt%	01/22/18 15:30	01/22/18 15:30		SM(22) 2540 G-1997	A	STG	
Volatile Organic Compounds by GC/MS										**O1**
1,2,4-Trimethylbenzene	**7.44**	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	**2.73**	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Benzene	<2.34	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Ethylbenzene	**3.67**	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.34	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
MTBE	**80.1**	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Naphthalene	<2.34	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Toluene	**2.44**	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Xylene o	**4.07**	2.34	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Xylene p/m	**12.1**	4.67	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	
Xylenes, Total	**16.2**	7.01	µg/Kg dry	01/24/18 00:37	01/24/18 00:37	EPA 5035	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*97.4 %*	*80-120*	*01/24/18 00:37*	*01/24/18 00:37*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*100 %*	*80-120*	*01/24/18 00:37*	*01/24/18 00:37*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*105 %*	*80-120*	*01/24/18 00:37*	*01/24/18 00:37*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.5 %*	*80-120*	*01/24/18 00:37*	*01/24/18 00:37*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010571
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 13:44

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

O1	The VOC vial contained an amount of soil outside the EPA recommendation.
D1	The sample was analyzed at a dilution.
CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Store
MR Project #		SITE LOCATION
4559.15.01		McClure, PA
CLIENT		SAMPLER(S)
Point Store		MR BA MRC

NOTES:
Received On Ice: (Y) / N
Sample Temp: 3.7°C
Comp Set
Comments:

MOUNTAIN RESEARCH LLC
825 25th Street, Altoona, PA 16601 (814) 949-2034 (800)
110 McCracken Run Road, Dubois, PA 15801 (814) 371-6030 Fax (8

CHAIN OF CUSTODY RECORD

MR PROJ. MGR. MC

Shipping Carrier:

Turn Around Time:
10 Day X
5 Day
1 Day

Comments:

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
SB-44(8-10)	1/17/18	3:25	X		SL	1 4 oz JAR	2A, 3A		X		None	01
↓	↓	↓	↓		↓	1 40 mL VOA	2A, 3A	X			MEOH	↓
↓	↓	↓	↓		↓	3 40 mL VOA	2A, 3A			X	NAHSO4	↓
SB-44(10-12)	1/17/18	3:30	X		SL	1 4 oz JAR	2A, 3A		X		None	02
↓	↓	↓	↓		↓	1 40 mL VOA	2A, 3A	X			MEOH	↓
↓	↓	↓	↓		↓	3 40 mL VOA	2A, 3A			X	NAHSO4	↓
SB-44(12-14)	1/17/18	3:45	X		SL	1 4 oz JAR	2A, 3A		X		None	03
↓	↓	↓	↓		↓	1 40 mL VOA	2A, 3A	X			MEOH	↓
↓	↓	↓	↓		↓	3 40 mL VOA	2A, 3A			X	NAHSO4	↓
MW-20BR(4-6) ~~SB-~~	1/17/18	4:45	X		SL	1 4 oz JAR	2A, 3A		X		None	04
↓	↓	↓	↓		↓	1 40 mL VOA	2A, 3A	X			MEOH	↓
↓	↓	↓	↓		↓	3 40 mL VOA	2A, 3A			X	NAHSO4	↓

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Lab Workorder #:	Log In Time: 0844
[signature]	1/17/18	7:15	[signature]	1/18/18 0735	8610571	Staff: KL
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Labeled By:	Date: 1-22-18

Billing Group:	Phase:	PROJECT NAME
	SCR	Point Store
MR Project #		SITE LOCATION
4559.15.01		McClure, PA
CLIENT		SAMPLER(S)
Point Store		MRC

NOTES:
Received On Ice: (Y) / N
Sample Temp: 3.7°C
Comp Set
Comments:

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110 McCracken Run Road, Dubois, PA 15801
(814) 949-2034 (800) 837-4674 FAX (814) 949-9591
(814) 371-6030 Fax (814) 375-0823

CHAIN OF CUSTODY RECORD

MR PROJ. MGR. MC

Shipping Carrier:

Turn Around Time:
10 Day X
3 Day
1 Day

Comments:

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Total Solids	8260B Low Level	Preserve	LAB NUMBER
MW-20ER (6-8) SB- mpe		~~4:45~~ mpe	X		SL	1 4 oz JAR	2A, 3A		X		None	05
		~~4:45~~ mpe	(SB)			1 40 mL VOA	2A, 3A	X			MEOH	J
		~~4:45~~ mpe				3 40 mL VOA	2A, 3A			X	NAHSO4	J
MW-20BR (8-10) SB-		4:55	X		SL	1 4 oz JAR	2A, 3A		X		None	06
						1 40 mL VOA	2A, 3A	X			MEOH	J
						3 40 mL VOA	2A, 3A			X	NAHSO4	J
~~SB-~~ mpe						1 4 oz JAR	2A, 3A		X		None	
						1 40 mL VOA	2A, 3A	X			MEOH	
						3 40 mL VOA	2A, 3A			X	NAHSO4	
SB-						1 4 oz JAR	2A, 3A		X		None	
						1 40 mL VOA	2A, 3A	X			MEOH	
						3 40 mL VOA	2A, 3A			X	NAHSO4	

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME
[signature]	1/17/18	7:30 pm	[signature]	07:39 1-18-18
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME

Lab Workorder #: 8010571
Labeled By:

Log In Time: 08:44
Staff: MK
Date: 1-22-18

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 8010571

CLIENT: Point Store

DATE SAMPLED: 1/17/18 DATE RECEIVED: 1/18/18 TIME RECEIVED: 07:38

1. CHECK ALL THAT APPLY: PA ☑ WV ☐ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐
2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ NO ☑

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 30
4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? YES ☑ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 3.7 °C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____
6. WERE THE SAMPLES PROPERLY PRESERVED? YES ☑ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☑ NO ☐

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☐ N/A ☑
9. WAS THE COC FILLED OUT PROPERLY? YES ☑ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ NO ☑

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☑ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: _____ CLIENT SPOKEN TO: _____ DATE/TIME: _____

OUTCOME: _____

SIGNATURE: KDeRose

APPENDIX J

SOIL ISOCONCENTRATION MAPS

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

DORMANTOWN ROAD (T-707)

U.S. ROUTE 522

SB-9 (<257)
SB-39 (<25.1)
SB-5 (<241)
SB-25 (72,400)
SB-8 (SS)
SB-4 (<236)
SB-10 (72,600)
SB-14 (11,400)
PZ-3BR (231,000)
SB-7 (<241)
SB-11 (104,000)
SB-6 (NS)
SB-38 (25.7)
SB-40 (<248)
SB-42 (SS, No PID Response)
SB-3 (<241)
SB-12 (99,300)
SB-13 (1,170,000)
SB-15 (SS)
SB-26 (<236)
SB-24 (704)
SB-37 (<229)
SB-43 (SS)
SB-2 (<260)
SB-16 (<236)
SB-31 (41,100)
SB-1 (<228)
SB-17 (260,000)
SB-22 (<240)
SB-21 (<265)
SB-18 (525,000)
SB-23 (39,900)
SB-19 (<237)
SB-20 (<245)
SB-27 (SS)
500,000
8,400
SB-34 (68.3)
SB-32 (SS, No PID Response)
SB-30 (622)
SB-28 (<25.4)
SB-29 (<24.6)
SB-41 (70.5)
MW-20BR (8,350)
SB-33R (233)
SB-33 (NU)
SB-35 (SS, No PID Response)
SB-46 (SS, No PID Response)
SB-36 (<25.5)
SB-44 (<2.46)

VENT PIPES
ROOF
ICE
RAMP
TRUCK TRAILER
CONC. PAD
SHED
VACUUM
DRINK DISPENSER
GRAVEL
DC INVERTER
PLANTER
GRAVEL / BROKEN MAC.
SIGN
CONC. PIER W/ POLE
FORMER VENT PIPE & FUEL OIL FILL PIPE
AIR COMP.
CONC. PAD

N
MAGNETIC

SCALE: 1" = 20'
10' 0 20'

LEGEND

- SOIL BORING
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) 1,2,4 TRIMETHYLBENZENE SOIL CONCENTRATION (ug/L)
- 500 1,2,4 TRIMETHYLBENZENE SOIL ISOCONCENTRATION CONTOUR (ug/L)
- 8,400 MSC
- (NU) NOT UTILIZED, SB-33 REPLACED BY SB-33R
- (SS) SATURATED SAMPLE ONLY
- (NS) NOT SAMPLED

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Drawn By: JMB 7/9/18 Last Saved By: DWESTLEY
Submitted By:
Project Manager:
Checked By:

4559.15.01

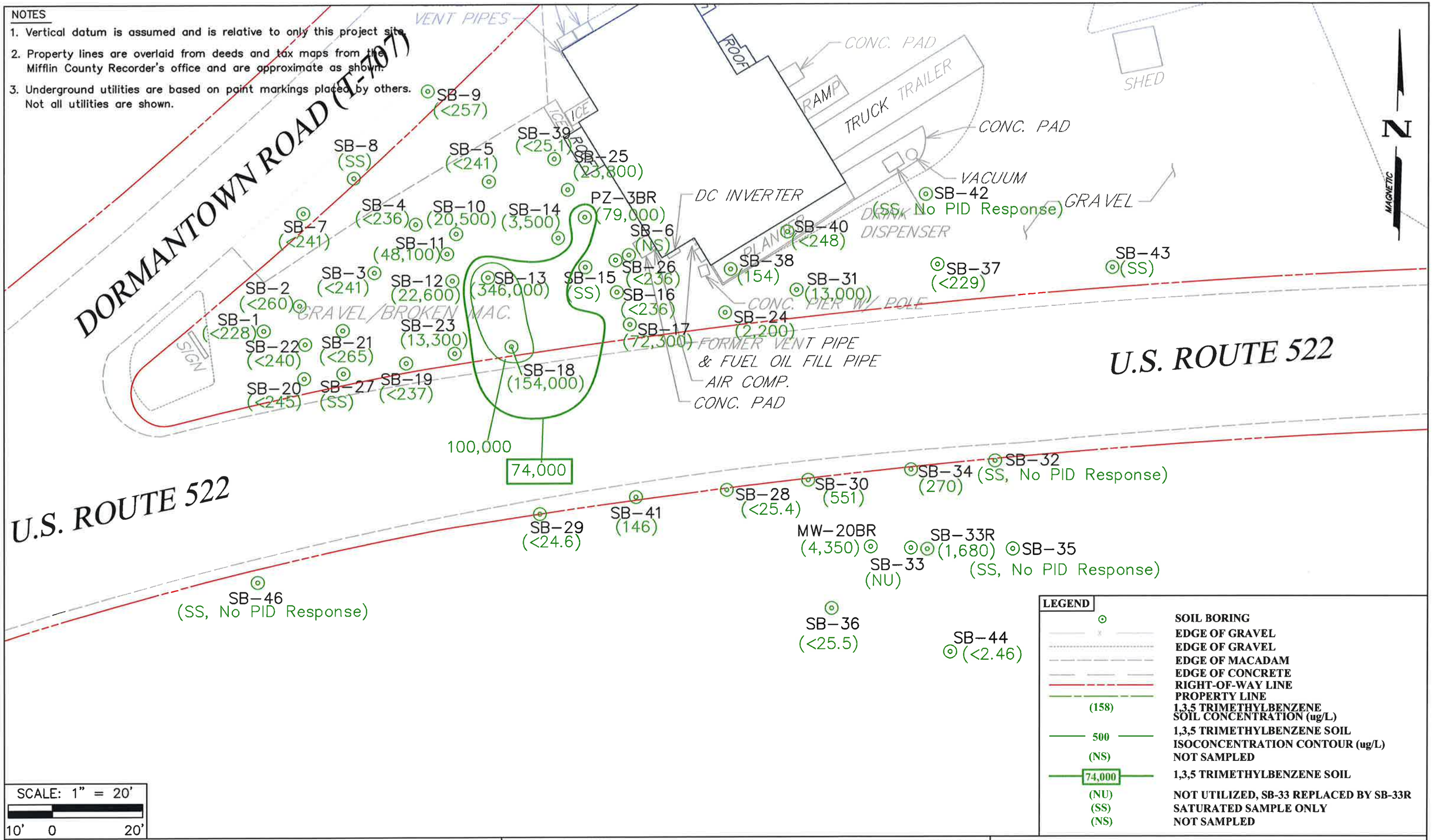
H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\2018\1ST\124 TMB SOIL 2018.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
1,2,4 TRIMETHYLBENZENE SOIL ISOCONCENTRATION MAP
2018

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 20'

10' 0 20'

LEGEND

⊙	SOIL BORING
	EDGE OF GRAVEL
	EDGE OF GRAVEL
	EDGE OF MACADAM
	EDGE OF CONCRETE
	RIGHT-OF-WAY LINE
	PROPERTY LINE
(158)	1,3,5 TRIMETHYLBENZENE SOIL CONCENTRATION (ug/L)
500	1,3,5 TRIMETHYLBENZENE SOIL ISOCONCENTRATION CONTOUR (ug/L)
(NS)	NOT SAMPLED
74,000	1,3,5 TRIMETHYLBENZENE SOIL
(NU)	NOT UTILIZED, SB-33 REPLACED BY SB-33R
(SS)	SATURATED SAMPLE ONLY
(NS)	NOT SAMPLED

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Drawn By: JMB 7/9/18 Last Saved By: DWESTLEY 4559.15.01
Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\135 TMB SOIL 2018.DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

1,3,5 TRIMETHYLBENZENE SOIL ISOCONCENTRATION MAP
2018

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

DORMANTOWN ROAD (T-707)

U.S. ROUTE 522

PROPANE REFILL TANKS
FORMER VENT PIPES
porch
ROOF
CONC. PAD
RAMP
TRUCK TRAILER
SHED
ICE
CONC. PAD
VACUUM
GRAVEL
DC INVERTER
PLANTER
DRINK DISPENSER
CONC. PIER W/ POLE
FORMER VENT PIPE & FUEL OIL FILL PIPE
AIR COMP.
CONC. PAD
SIGN
GRAVEL/BROKEN MAC.

SB-1 (<228)
SB-2 (<260)
SB-3 (<241)
SB-4 (<236)
SB-5 (<241)
SB-6 (NS)
SB-7 (<241)
SB-8 (SS)
SB-9 (<257)
SB-10 (809)
SB-11 (1,880)
SB-12 (1,850)
SB-13 (107,000)
SB-14 (510)
SB-15 (SS)
SB-16 (<236)
SB-17 (40,100)
SB-18 (68,000)
SB-19 (<237)
SB-20 (<245)
SB-21 (<265)
SB-22 (<240)
SB-23 (2,890)
SB-24 (1,250)
SB-25 (1,380)
SB-26 (<236)
SB-27 (SS)
SB-31 (2,940)
SB-37 (758)
SB-38 (130)
SB-39 (122)
SB-40 (<248)
SB-42 (SS, No PID Response)
SB-43 (SS)
PZ-3BR (3,310)

100,000
500
50,000

SB-28 (<25.4)
SB-29 (<24.6)
SB-30 (874)
SB-32 (SS, No PID Response)
SB-33 (NU)
SB-33R (<231)
SB-34 (1,040)
SB-35 (SS, No PID Response)
SB-36 (<25.5)
SB-41 (134)
SB-44 (<2.46)
SB-46 (SS, No PID Response)
MW-20BR (<233)

N
MAGNETIC

SCALE: 1" = 20'
10' 0 20'

LEGEND

⊙	SOIL BORING
	EDGE OF GRAVEL
	EDGE OF GRAVEL
	EDGE OF MACADAM
	EDGE OF CONCRETE
	RIGHT-OF-WAY LINE
	PROPERTY LINE
(158)	BENZENE SOIL CONCENTRATION (ug/L)
500	BENZENE SOIL ISOCONCENTRATION CONTOUR (ug/L)
500	MSC
(NU)	NOT UTILIZED, SB-33 REPLACED BY SB-33R
(SS)	SATURATED SAMPLE ONLY
(NS)	NOT SAMPLED

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Submitted By:
Project Manager:
Checked By:

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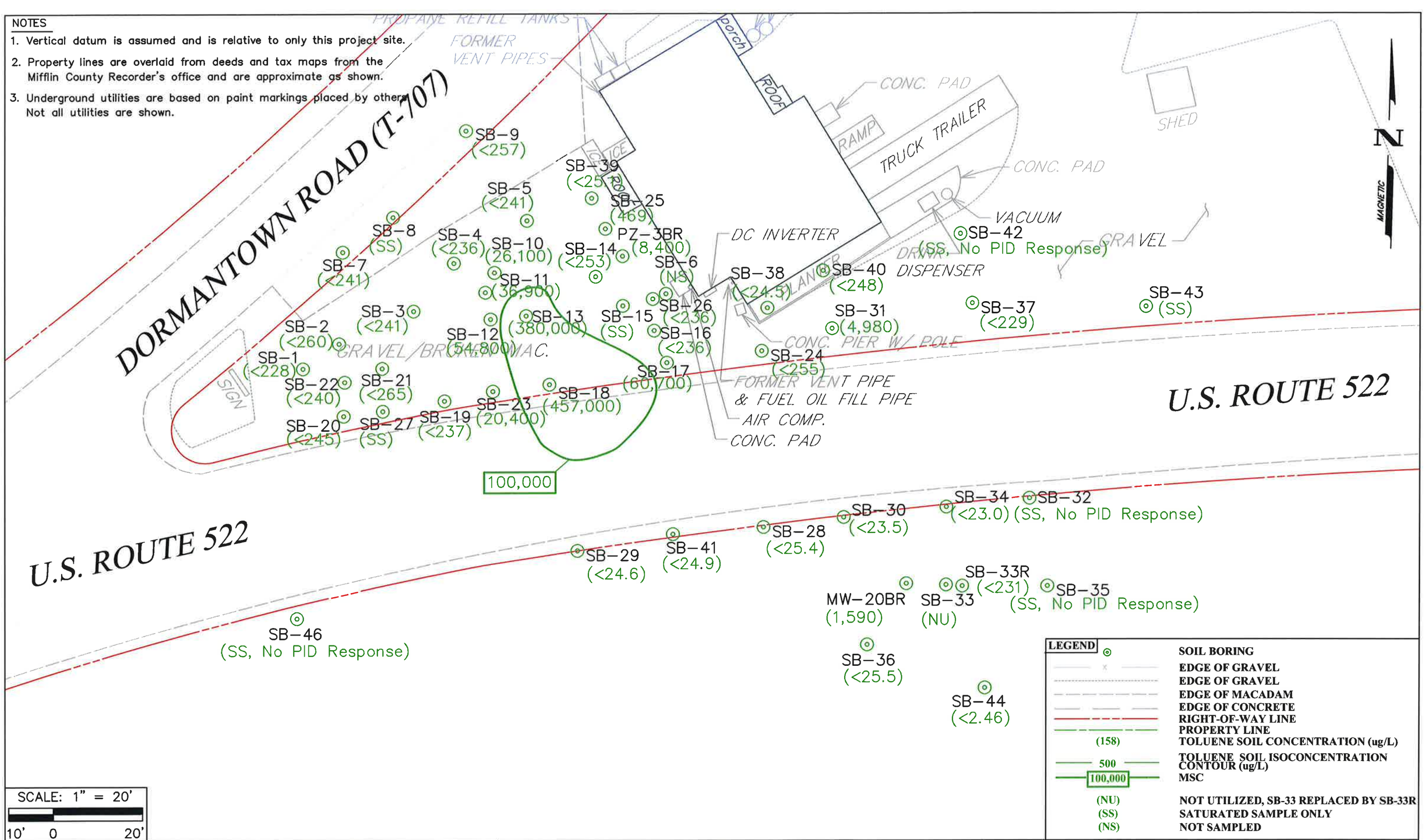
POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
BENZENE SOIL ISOCONCENTRATION MAP
2018

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 20'

10' 0 20'

LEGEND

⊙	SOIL BORING
x	EDGE OF GRAVEL
	EDGE OF GRAVEL
	EDGE OF MACADAM
	EDGE OF CONCRETE
	RIGHT-OF-WAY LINE
	PROPERTY LINE
(158)	TOLUENE SOIL CONCENTRATION (ug/L)
500	TOLUENE SOIL ISOCONCENTRATION CONTOUR (ug/L)
100,000	MSC
(NU)	NOT UTILIZED, SB-33 REPLACED BY SB-33R
(SS)	SATURATED SAMPLE ONLY
(NS)	NOT SAMPLED

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Submitted By:
Project Manager:
Checked By:

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
TOLUENE SOIL ISOCONCENTRATION MAP
2018

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

DORMANTOWN ROAD (T-707)

U.S. ROUTE 522

U.S. ROUTE 522

FORMER VENT PIPES

ROOF

ICE

ICE

ROOF

CONC. PAD

RAMP

TRUCK TRAILER

SHED

CONC. PAD

VACUUM

SB-42 (SS, No PID Response)

GRAVEL

DRAIN

DISPENSER

DC INVERTER

CONC. PIER W/ POLE

FORMER VENT PIPE & FUEL OIL FILL PIPE

AIR COMP.

CONC. PAD

GRAVEL / BROKEN MAC.

SIGN

70,000

N

MAGNETIC

| | | |

NOTES

1. Vertical datum is assumed and is relative to only this project site.
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3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

DORMANTOWN ROAD (T-707)

U.S. ROUTE 522

U.S. ROUTE 522

FORMER VENT PIPES
PROPANE REFILL TANKS
Porch
ROOF
CONC. PAD
RAMP
TRUCK TRAILER
SHED
ROOF
ICE
CONC. PAD
VACUUM
GRAVEL
DRINK DISPENSER
DC INVERTER
CANOPY
CONC. UTILITY POLE
FORMER VENT PIPE & FUEL OIL FILL PIPE
AIR COMP.
CONC. PAD
GRAVEL/BROKEN MAC.
SIGN

SB-1 (<686)
SB-2 (<781)
SB-3 (<724)
SB-4 (<707)
SB-5 (<723)
SB-6 (NS)
SB-7 (<724)
SB-8 (SS)
SB-9 (<772)
SB-10 (166,000)
SB-11 (287,000)
SB-12 (145,000)
SB-13 (2,640,000)
SB-14 (17,800)
SB-15 (SS)
SB-16 (<692)
SB-17 (446,000)
SB-18 (1,040,000)
SB-19 (<711)
SB-20 (<734)
SB-21 (<796)
SB-22 (<721)
SB-23 (85,500)
SB-24 (<766)
SB-25 (84,700)
SB-26 (<705)
SB-27 (SS)
SB-28 (<76.3)
SB-29 (<73.7)
SB-30 (701)
SB-31 (54,300)
SB-32 (SS, No PID Response)
SB-33 (NU)
SB-33R (<692)
SB-34 (<69.0)
SB-35 (SS, No PID Response)
SB-36 (255)
SB-37 (<687)
SB-38 (<73.6)
SB-39 (120)
SB-40 (<744)
SB-41 (<74.6)
SB-42 (SS, No PID Response)
SB-43 (SS, No PID Response)
SB-44 (7.37)
SB-46 (SS, No PID Response)
PZ-3BR (404,000)
MW-20BR (17,500)

1,000,000

N
MAGNETIC

SCALE: 1" = 20'
10' 0 20'

LEGEND

⊙	SOIL BORING
x	EDGE OF GRAVEL
	EDGE OF GRAVEL
	EDGE OF MACADAM
	EDGE OF CONCRETE
	RIGHT-OF-WAY LINE
	PROPERTY LINE
(158)	TOTAL XYLENES SOIL CONCENTRATION (ug/L)
500	TOTAL XYLENES SOIL ISOCONCENTRATION CONTOUR (ug/L)
1,000,000	MSC
(NU)	NOT UTILIZED
(SS)	SATURATED SAMPLE ONLY
(NS)	NOT SAMPLED

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Submitted By:
Project Manager:
Checked By:

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
TOTAL XYLENES SOIL ISOCONCENTRATION MAP
2018

NOTES

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3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.

DORMANTOWN ROAD (T-707)

U.S. ROUTE 522

PROPANE REFILL TANKS
FORMER VENT PIPES
porch
ROOF
CONC. PAD
RAMP
TRUCK TRAILER
SHED
ICE
ICE
CONC. PAD
VACUUM
GRAVEL
DRIVE
DISPENSER
PLANTER
DC INVERTER
CONC. PIER W/ POLE
FORMER VENT PIPE & FUEL OIL FILL PIPE
AIR COMP.
CONC. PAD
GRAVEL / BROKEN MAC.
SIGN
N
MAGNETIC

SB-1 (<228)
SB-2 (<260)
SB-3 (<241)
SB-4 (<236)
SB-5 (<241)
SB-6 (NS)
SB-7 (<241)
SB-8 (SS)
SB-9 (<257)
SB-10 (<290)
SB-11 (<1,050)
SB-12 (<1,160)
SB-13 (<3,050)
SB-14 (<253)
SB-15 (SS)
SB-16 (<236)
SB-17 (<275)
SB-18 (2,070)
SB-19 (<237)
SB-20 (<245)
SB-21 (<265)
SB-22 (<240)
SB-23 (<1,140)
SB-24 (<255)
SB-25 (<263)
SB-26 (<236)
SB-27 (SS)
SB-28 (454)
SB-29 (<24.6)
SB-30 (1,030)
SB-31 (<228)
SB-32 (SS, No PID Response)
SB-33 (NU)
SB-33R (<231)
SB-34 (464)
SB-35 (SS, No PID Response)
SB-36 (617)
SB-37 (471)
SB-38 (101)
SB-39 (<25.1)
SB-40 (<248)
SB-41 (<24.9)
SB-42 (SS, No PID Response)
SB-43 (SS)
SB-44 (390)
SB-46 (SS, No PID Response)
PZ-3BR (<349)
MW-20BR (80.1)

2,000

SCALE: 1" = 20'
10' 0 20'

LEGEND

- SOIL BORING
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) MTBE SOIL CONCENTRATION (ug/L)
- 500 MTBE SOIL ISOCONCENTRATION CONTOUR (ug/L)
- 2,000 MSC
- (NU) NOT UTILIZED, SB-33 REPLACED BY SB-33R
- (SS) SATURATED SAMPLE ONLY
- (NS) NOT SAMPLED

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Submitted By:
Project Manager:
Checked By:

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
MTBE SOIL ISOCONCENTRATION MAP
2018

NOTES

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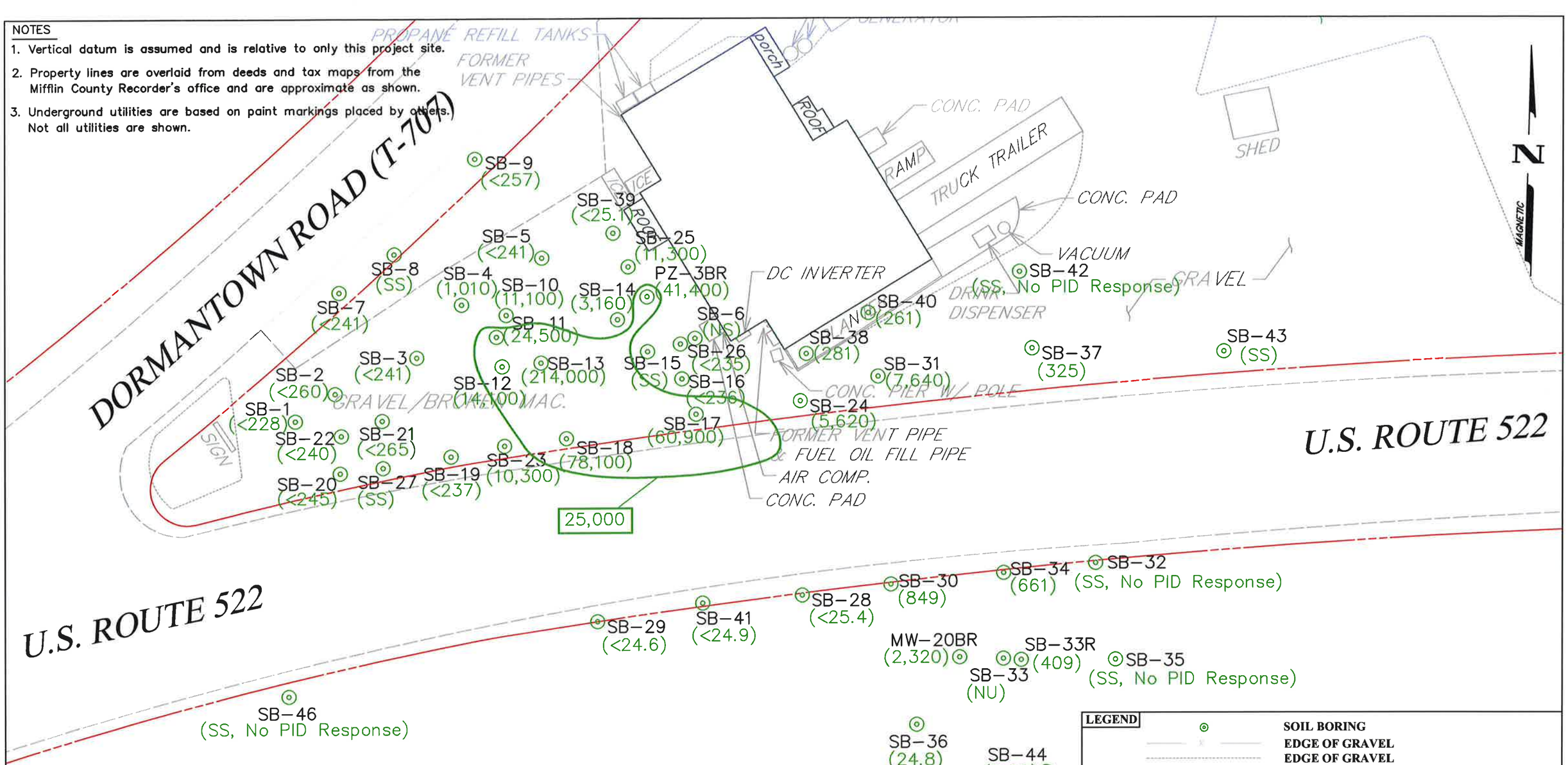

SCALE: 1" = 20'

10' 0 20'

LEGEND

⊙	SOIL BORING
	EDGE OF GRAVEL
	EDGE OF GRAVEL
	EDGE OF MACADAM
	EDGE OF CONCRETE
	RIGHT-OF-WAY LINE
	PROPERTY LINE
(158)	NAPHTHALENE SOIL CONCENTRATION (ug/L)
500	NAPHTHALENE SOIL ISOCONCENTRATION CONTOUR (ug/L)
25,000	MSC
(NU)	NOT UTILIZED, SB-33 REPLACED BY SB-33R
(SS)	SATURATED SAMPLE ONLY
(NS)	NOT SAMPLED

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Submitted By:
Project Manager:
Checked By:

4559.15.01

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA
NAPHTHALENE SOIL ISOCONCENTRATION MAP
2018

APPENDIX K

LABORATORY DATA SHEETS – GROUNDWATER

MOUNTAIN RESEARCH, LLC

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DuBois Office and Laboratory
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DuBois, PA 15801
814.371.6030 Phone
814.375.0823 Fax

Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

29 January 2018

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

Lab ID #: 8010682

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 01/25/18 08:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan Davidson-Rager

Megan Davidson-Rager
Project Manager

Authorized Reviewer

MOUNTAIN RESEARCH, LLC

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814.375.0823 Fax

Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 16:16
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
Trip Blank	8010682-01	Aqueous	Grab	01/24/18 08:00	01/25/18 08:30
MW-14	8010682-02	Aqueous	Grab	01/24/18 15:53	01/25/18 08:30
MW-15	8010682-03	Aqueous	Grab	01/24/18 14:55	01/25/18 08:30
MW-16	8010682-04	Aqueous	Grab	01/24/18 15:15	01/25/18 08:30
MW-17	8010682-05	Aqueous	Grab	01/24/18 15:15	01/25/18 08:30
MW-18	8010682-06	Aqueous	Grab	01/24/18 15:30	01/25/18 08:30
MW-19BR	8010682-07	Aqueous	Grab	01/24/18 12:05	01/25/18 08:30
MW-20BR	8010682-08	Aqueous	Grab	01/24/18 14:46	01/25/18 08:30
Duplicate	8010682-09	Aqueous	Grab	01/24/18 15:30	01/25/18 08:30

Mountain Research, LLC

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 16:16

Trip Blank

8010682-01 (Aqueous) Sampled: 01/24/18 08:00

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 17:18	01/26/18 17:18	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*96.7 %*	*80-120*	*01/26/18 17:18*	*01/26/18 17:18*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.0 %*	*80-120*	*01/26/18 17:18*	*01/26/18 17:18*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*102 %*	*80-120*	*01/26/18 17:18*	*01/26/18 17:18*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.2 %*	*80-120*	*01/26/18 17:18*	*01/26/18 17:18*	*EPA 8260 B*				

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(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 16:16

MW-14

8010682-02 (Aqueous) Sampled: 01/24/18 15:53

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 17:43	01/26/18 17:43	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*98.6 %*	*80-120*	*01/26/18 17:43*	*01/26/18 17:43*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.3 %*	*80-120*	*01/26/18 17:43*	*01/26/18 17:43*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*98.8 %*	*80-120*	*01/26/18 17:43*	*01/26/18 17:43*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.4 %*	*80-120*	*01/26/18 17:43*	*01/26/18 17:43*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 16:16
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-15

8010682-03 (Aqueous) Sampled: 01/24/18 14:55

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 18:09	01/26/18 18:09	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*100 %*	*80-120*	*01/26/18 18:09*	*01/26/18 18:09*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.6 %*	*80-120*	*01/26/18 18:09*	*01/26/18 18:09*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*98.1 %*	*80-120*	*01/26/18 18:09*	*01/26/18 18:09*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*01/26/18 18:09*	*01/26/18 18:09*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 16:16

MW-16

8010682-04 (Aqueous) Sampled: 01/24/18 15:15

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 18:36	01/26/18 18:36	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*98.5 %*	*80-120*	*01/26/18 18:36*	*01/26/18 18:36*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.0 %*	*80-120*	*01/26/18 18:36*	*01/26/18 18:36*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*99.0 %*	*80-120*	*01/26/18 18:36*	*01/26/18 18:36*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*01/26/18 18:36*	*01/26/18 18:36*	*EPA 8260 B*				

Mountain Research, LLC

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 16:16
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-17

8010682-05 (Aqueous) Sampled: 01/24/18 15:15

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 19:02	01/26/18 19:02	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*96.4 %*	*80-120*	*01/26/18 19:02*	*01/26/18 19:02*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.2 %*	*80-120*	*01/26/18 19:02*	*01/26/18 19:02*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*100 %*	*80-120*	*01/26/18 19:02*	*01/26/18 19:02*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.8 %*	*80-120*	*01/26/18 19:02*	*01/26/18 19:02*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 16:16
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-18

8010682-06 (Aqueous) Sampled: 01/24/18 15:30

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 19:28	01/26/18 19:28	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*97.1 %*	*80-120*	*01/26/18 19:28*	*01/26/18 19:28*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.1 %*	*80-120*	*01/26/18 19:28*	*01/26/18 19:28*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*100 %*	*80-120*	*01/26/18 19:28*	*01/26/18 19:28*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.1 %*	*80-120*	*01/26/18 19:28*	*01/26/18 19:28*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 16:16
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-19BR

8010682-07 (Aqueous) Sampled: 01/24/18 12:05

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 19:54	01/26/18 19:54	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*94.8 %*	*80-120*	*01/26/18 19:54*	*01/26/18 19:54*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.0 %*	*80-120*	*01/26/18 19:54*	*01/26/18 19:54*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*100 %*	*80-120*	*01/26/18 19:54*	*01/26/18 19:54*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.0 %*	*80-120*	*01/26/18 19:54*	*01/26/18 19:54*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 16:16

MW-20BR

8010682-08 (Aqueous) Sampled: 01/24/18 14:46

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 20:20	01/26/18 20:20	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*96.2 %*	*80-120*	*01/26/18 20:20*	*01/26/18 20:20*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*98.4 %*	*80-120*	*01/26/18 20:20*	*01/26/18 20:20*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*98.8 %*	*80-120*	*01/26/18 20:20*	*01/26/18 20:20*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.8 %*	*80-120*	*01/26/18 20:20*	*01/26/18 20:20*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 01/29/18 16:16
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Duplicate

8010682-09 (Aqueous) Sampled: 01/24/18 15:30

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	01/26/18 20:46	01/26/18 20:46	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*93.2 %*	*80-120*	*01/26/18 20:46*	*01/26/18 20:46*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*80-120*	*01/26/18 20:46*	*01/26/18 20:46*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*101 %*	*80-120*	*01/26/18 20:46*	*01/26/18 20:46*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*01/26/18 20:46*	*01/26/18 20:46*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8010682
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	01/29/18 16:16

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

BALL POINT PEN ONLY

Billing Group:	Phase:	PROJECT NAME	MOUNTAIN RESEARCH
		GW Sampling	825 25th Street, Altoona, PA 16601 (814) 949-203
MR Project # 4559.15.01		SITE LOCATION McClure, PA	110 McCracken Run Road, Dubois, PA 15801 (814) 371-603
CLIENT Point Store		SAMPLER(S) JB / AB	

CHAIN OF CUSTODY RECORD

NOTES:
Received On Ice: (Y) / N
Sample Temp: 11.0 / 4.4 1-25-18 KL
PWSID #:
Seal In Tack: Y / N
Other:
Comments:

MR PROJ. MGR. MC
Shipping Carrier:
Turn Around Time:
10 Day X
3 Day
1 Day
Comments:

SAMPLE ID.NO.	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	Analyses Requested: 8260 B	Preserve	LAB NUMBER
Trip Blank	1/24/18	0800	X		AQ	2 40 mL VOA	2A	1	HCL	01
MW-14		1553								02
MW-15	~~1/25~~ AB	1485								03
MW-16		1515								04
MW-17		1515								05
MW-18		1530								06
MW-19 BR	~~1205~~ AB	1205								07
MW-20BR	~~1446~~ AB	1446								08
Duplicate		1530								09

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE	TIME	Lab WO #: 8010482	Log In Time: 1355
RELINQUISHED BY:	1/24/18	1800	ACCEPTED BY:	1/25/18	09:30	Labeled By:	Staff: KL
	DATE	TIME		DATE	TIME		Date: 1/25/18

White - Lab; Blue - File; Yellow - Project Manager; Pink - Staff

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 8010682

CLIENT: Point Stone

DATE SAMPLED: 1/24/18 DATE RECEIVED: 1/25/18 TIME RECEIVED: 08:30

1. CHECK ALL THAT APPLY: PA ☐ WV ☑ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐
2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ NO ☑

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 18
4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? YES ☑ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 11.0/4.9 °C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____
6. WERE THE SAMPLES PROPERLY PRESERVED? YES ☑ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☑ NO ☐

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☐ N/A ☑ KLC 1/26/18
9. WAS THE COC FILLED OUT PROPERLY? YES ☑ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ NO ☑

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☑ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: _____ CLIENT SPOKEN TO: _____ DATE/TIME: _____

OUTCOME: _____

SIGNATURE: KDeRose

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21 February 2018

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

Lab ID #: 8020217

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 02/09/18 07:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan Davidson-Rager

Megan Davidson-Rager
Project Manager

Authorized Reviewer

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
Trip Blank	8020217-01	Aqueous	Grab	02/08/18 06:10	02/09/18 07:30
MW-1	8020217-02	Aqueous	Grab	02/08/18 16:20	02/09/18 07:30
MW-2	8020217-03	Aqueous	Grab	02/08/18 14:05	02/09/18 07:30
MW-3	8020217-04	Aqueous	Grab	02/08/18 14:00	02/09/18 07:30
MW-4	8020217-05	Aqueous	Grab	02/08/18 14:30	02/09/18 07:30
MW-5	8020217-06	Aqueous	Grab	02/08/18 16:15	02/09/18 07:30
MW-6	8020217-07	Aqueous	Grab	02/08/18 15:55	02/09/18 07:30
MW-7	8020217-08	Aqueous	Grab	02/08/18 14:35	02/09/18 07:30
MW-8	8020217-09	Aqueous	Grab	02/08/18 15:00	02/09/18 07:30
MW-9	8020217-10	Aqueous	Grab	02/08/18 15:25	02/09/18 07:30
MW-10	8020217-11	Aqueous	Grab	02/08/18 13:35	02/09/18 07:30
MW-11	8020217-12	Aqueous	Grab	02/08/18 12:30	02/09/18 07:30
MW-12	8020217-13	Aqueous	Grab	02/08/18 13:00	02/09/18 07:30
MW-13	8020217-14	Aqueous	Grab	02/08/18 12:35	02/09/18 07:30
MW-14	8020217-15	Aqueous	Grab	02/08/18 15:50	02/09/18 07:30
MW-15	8020217-16	Aqueous	Grab	02/08/18 13:05	02/09/18 07:30
MW-16	8020217-17	Aqueous	Grab	02/08/18 10:20	02/09/18 07:30
MW-17	8020217-18	Aqueous	Grab	02/08/18 09:55	02/09/18 07:30
MW-18	8020217-19	Aqueous	Grab	02/08/18 10:45	02/09/18 07:30
MW-19BR	8020217-20	Aqueous	Grab	02/08/18 09:30	02/09/18 07:30
Potable Well	8020217-21	Aqueous	Grab	02/08/18 13:10	02/09/18 07:30
Mellott Well	8020217-22	Aqueous	Grab	02/08/18 10:30	02/09/18 07:30
MW-20BR	8020217-23	Aqueous	Grab	02/08/18 12:05	02/09/18 07:30

Mountain Research, LLC

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Trip Blank

8020217-01 (Aqueous) Sampled: 02/08/18 06:10

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/10/18 14:16	02/10/18 14:16	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.4 %*	*80-120*	*02/10/18 14:16*	*02/10/18 14:16*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*80-120*	*02/10/18 14:16*	*02/10/18 14:16*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*101 %*	*80-120*	*02/10/18 14:16*	*02/10/18 14:16*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.6 %*	*80-120*	*02/10/18 14:16*	*02/10/18 14:16*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-1

8020217-02 (Aqueous) Sampled: 02/08/18 16:20

Mountain Research, LLC

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Volatile Organic Compounds by GC/MS										**O3**
1,2,4-Trimethylbenzene	**115**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
1,3,5-Trimethylbenzene	**55.1**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Benzene	**13.8**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Ethylbenzene	**158**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Isopropylbenzene (Cumene)	**13.4**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
MTBE	<10.0	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Naphthalene	**39.6**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Toluene	**11.6**	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylene o	<10.0	10.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylene p/m	**115**	20.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylenes, Total	**115**	30.0	µg/L	02/10/18 14:42	02/10/18 14:42	EPA 5030B	EPA 8260 B	A	JMG	CC, D1
Surrogate: 1,2-Dichloroethane-d4		*92.8 %*	*80-120*	*02/10/18 14:42*	*02/10/18 14:42*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.4 %*	*80-120*	*02/10/18 14:42*	*02/10/18 14:42*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*95.6 %*	*80-120*	*02/10/18 14:42*	*02/10/18 14:42*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*02/10/18 14:42*	*02/10/18 14:42*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-2

8020217-03 (Aqueous) Sampled: 02/08/18 14:05

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/10/18 15:09	02/10/18 15:09	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*101 %*	*80-120*	*02/10/18 15:09*	*02/10/18 15:09*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.3 %*	*80-120*	*02/10/18 15:09*	*02/10/18 15:09*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*101 %*	*80-120*	*02/10/18 15:09*	*02/10/18 15:09*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*02/10/18 15:09*	*02/10/18 15:09*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-3

8020217-04 (Aqueous) Sampled: 02/08/18 14:00

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/10/18 15:35	02/10/18 15:35	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.8 %*	*80-120*	*02/10/18 15:35*	*02/10/18 15:35*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.4 %*	*80-120*	*02/10/18 15:35*	*02/10/18 15:35*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*99.1 %*	*80-120*	*02/10/18 15:35*	*02/10/18 15:35*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.1 %*	*80-120*	*02/10/18 15:35*	*02/10/18 15:35*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-4

8020217-05 (Aqueous) Sampled: 02/08/18 14:30

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	**105**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
1,3,5-Trimethylbenzene	**51.6**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Benzene	**39.2**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Ethylbenzene	**31.2**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Isopropylbenzene (Cumene)	<10.0	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
MTBE	<10.0	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Naphthalene	**13.6**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Toluene	**120**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylene o	**87.6**	10.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylene p/m	**184**	20.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylenes, Total	**271**	30.0	µg/L	02/13/18 12:53	02/13/18 12:53	EPA 5030B	EPA 8260 B	A	JMG	CC, D1
Surrogate: 1,2-Dichloroethane-d4		*100 %*	*80-120*	*02/13/18 12:53*	*02/13/18 12:53*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.7 %*	*80-120*	*02/13/18 12:53*	*02/13/18 12:53*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*105 %*	*80-120*	*02/13/18 12:53*	*02/13/18 12:53*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*02/13/18 12:53*	*02/13/18 12:53*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-5

8020217-06 (Aqueous) Sampled: 02/08/18 16:15

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**3.54**	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/10/18 16:53	02/10/18 16:53	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*102 %*	*80-120*	*02/10/18 16:53*	*02/10/18 16:53*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.8 %*	*80-120*	*02/10/18 16:53*	*02/10/18 16:53*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*99.9 %*	*80-120*	*02/10/18 16:53*	*02/10/18 16:53*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.0 %*	*80-120*	*02/10/18 16:53*	*02/10/18 16:53*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/21/18 13:11

MW-6

8020217-07 (Aqueous) Sampled: 02/08/18 15:55

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	**29.7**	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	**140**	10.0	µg/L	02/10/18 17:19	02/13/18 13:19	EPA 5030B	EPA 8260 B	A	JMG	D1
Isopropylbenzene (Cumene)	**22.0**	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**76.0**	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	**2.08**	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/10/18 17:19	02/10/18 17:19	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*98.4 %*	*80-120*	*02/10/18 17:19*	*02/10/18 17:19*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.5 %*	*80-120*	*02/10/18 17:19*	*02/10/18 17:19*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*95.4 %*	*80-120*	*02/10/18 17:19*	*02/10/18 17:19*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.8 %*	*80-120*	*02/10/18 17:19*	*02/10/18 17:19*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-7

8020217-08 (Aqueous) Sampled: 02/08/18 14:35

Mountain Research, LLC

Volatile Organic Compounds by GC/MS — Q3

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	**279**	200	µg/L	02/10/18 17:45	02/10/18 17:45	EPA 5030B	EPA 8260 B	A	JMG	D1
1,3,5-Trimethylbenzene	**113**	10.0	µg/L	02/10/18 17:45	02/13/18 18:56	EPA 5030B	EPA 8260 B	A	JMG	D1
Benzene	**3420**	200	µg/L	02/10/18 17:45	02/10/18 17:45	EPA 5030B	EPA 8260 B	A	JMG	D1
Ethylbenzene	**420**	200	µg/L	02/10/18 17:45	02/10/18 17:45	EPA 5030B	EPA 8260 B	A	JMG	D1
Isopropylbenzene (Cumene)	**19.4**	10.0	µg/L	02/10/18 17:45	02/13/18 18:56	EPA 5030B	EPA 8260 B	A	JMG	D1
MTBE	**474**	200	µg/L	02/10/18 17:45	02/10/18 17:45	EPA 5030B	EPA 8260 B	A	JMG	D1
Naphthalene	**85.4**	10.0	µg/L	02/10/18 17:45	02/13/18 18:56	EPA 5030B	EPA 8260 B	A	JMG	D1
Toluene	**548**	200	µg/L	02/10/18 17:45	02/10/18 17:45	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylene o	**142**	10.0	µg/L	02/10/18 17:45	02/13/18 18:56	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylene p/m	**501**	400	µg/L	02/10/18 17:45	02/10/18 17:45	EPA 5030B	EPA 8260 B	A	JMG	D1
Xylenes, Total	**642**	410	µg/L	02/10/18 17:45	02/13/18 18:56	EPA 5030B	EPA 8260 B	A	JMG	CC, D1
Surrogate: 1,2-Dichloroethane-d4		*96.2 %*	*80-120*	*02/10/18 17:45*	*02/10/18 17:45*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.9 %*	*80-120*	*02/10/18 17:45*	*02/10/18 17:45*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*104 %*	*80-120*	*02/10/18 17:45*	*02/10/18 17:45*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.4 %*	*80-120*	*02/10/18 17:45*	*02/10/18 17:45*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-8

8020217-09 (Aqueous) Sampled: 02/08/18 15:00

Mountain Research, LLC

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Volatile Organic Compounds by GC/MS										**O3**
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 19:22	02/13/18 19:22	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*98.3 %*	*80-120*	*02/13/18 19:22*	*02/13/18 19:22*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.5 %*	*80-120*	*02/13/18 19:22*	*02/13/18 19:22*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*108 %*	*80-120*	*02/13/18 19:22*	*02/13/18 19:22*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*02/13/18 19:22*	*02/13/18 19:22*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/21/18 13:11

MW-9

8020217-10 (Aqueous) Sampled: 02/08/18 15:25

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**4.07**	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 12:26	02/13/18 12:26	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*95.5 %*	*80-120*	*02/13/18 12:26*	*02/13/18 12:26*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.9 %*	*80-120*	*02/13/18 12:26*	*02/13/18 12:26*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*02/13/18 12:26*	*02/13/18 12:26*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.6 %*	*80-120*	*02/13/18 12:26*	*02/13/18 12:26*	*EPA 8260 B*				

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14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-10

8020217-11 (Aqueous) Sampled: 02/08/18 13:35

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**19.9**	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 16:46	02/13/18 16:46	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.2 %*	*80-120*	*02/13/18 16:46*	*02/13/18 16:46*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*80-120*	*02/13/18 16:46*	*02/13/18 16:46*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*104 %*	*80-120*	*02/13/18 16:46*	*02/13/18 16:46*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*02/13/18 16:46*	*02/13/18 16:46*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-11

8020217-12 (Aqueous) Sampled: 02/08/18 12:30

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**122**	20.0	µg/L	02/13/18 19:48	02/16/18 12:44	EPA 5030B	EPA 8260 B	A	JMG	D1
Naphthalene	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 19:48	02/13/18 19:48	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.8 %*	*80-120*	*02/13/18 19:48*	*02/13/18 19:48*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.4 %*	*80-120*	*02/13/18 19:48*	*02/13/18 19:48*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*02/13/18 19:48*	*02/13/18 19:48*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*02/13/18 19:48*	*02/13/18 19:48*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-12

8020217-13 (Aqueous) Sampled: 02/08/18 13:00

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**52.5**	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 17:13	02/13/18 17:13	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*104 %*	*80-120*	*02/13/18 17:13*	*02/13/18 17:13*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*80-120*	*02/13/18 17:13*	*02/13/18 17:13*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*106 %*	*80-120*	*02/13/18 17:13*	*02/13/18 17:13*	*EPA 8260 B*				
Surrogate: Toluene-d8		*101 %*	*80-120*	*02/13/18 17:13*	*02/13/18 17:13*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-13

8020217-14 (Aqueous) Sampled: 02/08/18 12:35

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	**3.37**	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	**11.5**	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	**56.4**	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	**334**	20.0	µg/L	02/13/18 20:14	02/16/18 16:40	EPA 5030B	EPA 8260 B	A	JMG	D1
Isopropylbenzene (Cumene)	**28.9**	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	**1330**	100	µg/L	02/13/18 20:14	02/16/18 17:59	EPA 5030B	EPA 8260 B	A	JMG	D1
Naphthalene	**40.4**	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	**9.66**	4.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	**9.66**	6.00	µg/L	02/13/18 20:14	02/13/18 20:14	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*101 %*	*80-120*	*02/13/18 20:14*	*02/13/18 20:14*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.8 %*	*80-120*	*02/13/18 20:14*	*02/13/18 20:14*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*98.7 %*	*80-120*	*02/13/18 20:14*	*02/13/18 20:14*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.0 %*	*80-120*	*02/13/18 20:14*	*02/13/18 20:14*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-14

8020217-15 (Aqueous) Sampled: 02/08/18 15:50

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 17:39	02/13/18 17:39	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*94.7 %*	*80-120*	*02/13/18 17:39*	*02/13/18 17:39*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.9 %*	*80-120*	*02/13/18 17:39*	*02/13/18 17:39*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*02/13/18 17:39*	*02/13/18 17:39*	*EPA 8260 B*				
Surrogate: Toluene-d8		*100 %*	*80-120*	*02/13/18 17:39*	*02/13/18 17:39*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-15

8020217-16 (Aqueous) Sampled: 02/08/18 13:05

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 18:04	02/13/18 18:04	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.7 %*	*80-120*	*02/13/18 18:04*	*02/13/18 18:04*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.9 %*	*80-120*	*02/13/18 18:04*	*02/13/18 18:04*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*02/13/18 18:04*	*02/13/18 18:04*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.4 %*	*80-120*	*02/13/18 18:04*	*02/13/18 18:04*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-16

8020217-17 (Aqueous) Sampled: 02/08/18 10:20

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Toluene	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/13/18 18:30	02/13/18 18:30	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*97.8 %*	*80-120*	*02/13/18 18:30*	*02/13/18 18:30*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.8 %*	*80-120*	*02/13/18 18:30*	*02/13/18 18:30*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*107 %*	*80-120*	*02/13/18 18:30*	*02/13/18 18:30*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.6 %*	*80-120*	*02/13/18 18:30*	*02/13/18 18:30*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-17

8020217-18 (Aqueous) Sampled: 02/08/18 09:55

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 00:34	02/15/18 20:08	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 00:34	02/14/18 00:34	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*97.6 %*	*80-120*	*02/14/18 00:34*	*02/14/18 00:34*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.0 %*	*80-120*	*02/14/18 00:34*	*02/14/18 00:34*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*105 %*	*80-120*	*02/14/18 00:34*	*02/14/18 00:34*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.6 %*	*80-120*	*02/14/18 00:34*	*02/14/18 00:34*	*EPA 8260 B*				

Mountain Research, LLC

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-18

8020217-19 (Aqueous) Sampled: 02/08/18 10:45

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
Mountain Research, LLC										
Volatile Organic Compounds by GC/MS										
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 01:00	02/15/18 20:34	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 01:00	02/14/18 01:00	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*101 %*	*80-120*	*02/14/18 01:00*	*02/14/18 01:00*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.5 %*	*80-120*	*02/14/18 01:00*	*02/14/18 01:00*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*108 %*	*80-120*	*02/14/18 01:00*	*02/14/18 01:00*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.6 %*	*80-120*	*02/14/18 01:00*	*02/14/18 01:00*	*EPA 8260 B*				

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Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-19BR

8020217-20 (Aqueous) Sampled: 02/08/18 09:30

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 01:26	02/15/18 21:00	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 01:26	02/14/18 01:26	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.6 %*	*80-120*	*02/14/18 01:26*	*02/14/18 01:26*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*93.6 %*	*80-120*	*02/14/18 01:26*	*02/14/18 01:26*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*101 %*	*80-120*	*02/14/18 01:26*	*02/14/18 01:26*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.8 %*	*80-120*	*02/14/18 01:26*	*02/14/18 01:26*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Potable Well

8020217-21 (Aqueous) Sampled: 02/08/18 13:10

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 01:52	02/15/18 21:26	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	**3.10**	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 01:52	02/14/18 01:52	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*102 %*	*80-120*	*02/14/18 01:52*	*02/14/18 01:52*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.7 %*	*80-120*	*02/14/18 01:52*	*02/14/18 01:52*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*103 %*	*80-120*	*02/14/18 01:52*	*02/14/18 01:52*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.6 %*	*80-120*	*02/14/18 01:52*	*02/14/18 01:52*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

Mellott Well

8020217-22 (Aqueous) Sampled: 02/08/18 10:30

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 02:18	02/15/18 21:52	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	**30.5**	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 02:18	02/14/18 02:18	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*97.9 %*	*80-120*	*02/14/18 02:18*	*02/14/18 02:18*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*95.6 %*	*80-120*	*02/14/18 02:18*	*02/14/18 02:18*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*105 %*	*80-120*	*02/14/18 02:18*	*02/14/18 02:18*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.2 %*	*80-120*	*02/14/18 02:18*	*02/14/18 02:18*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

MW-20BR

8020217-23 (Aqueous) Sampled: 02/08/18 12:05

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	**4.74**	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	**2.31**	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 02:44	02/15/18 22:18	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	<2.00	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	**2.77**	2.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	**7.52**	4.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	**10.3**	6.00	µg/L	02/14/18 02:44	02/14/18 02:44	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.4 %*	*80-120*	*02/14/18 02:44*	*02/14/18 02:44*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*96.3 %*	*80-120*	*02/14/18 02:44*	*02/14/18 02:44*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*103 %*	*80-120*	*02/14/18 02:44*	*02/14/18 02:44*	*EPA 8260 B*				
Surrogate: Toluene-d8		*99.8 %*	*80-120*	*02/14/18 02:44*	*02/14/18 02:44*	*EPA 8260 B*				

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020217
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/21/18 13:11

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

O3	Sample was analyzed with a pH greater than 2.
D1	The sample was analyzed at a dilution.
CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
B	Analyte has been detected at or above the Method Detection Limit but below the Practical Quantitation Limit in the method blank.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

Billing Group:	Phase:	PROJECT NAME	
		GW Sampling	
MR Project #		SITE LOCATION	
4559.15.01		McClure, PA	
CLIENT		SAMPLER(S)	
Point Store		JB, AB	

NOTES:
Received On Ice: (Y) / N
Sample Temp: 5.7
Comp Set
Comments:

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CHAIN OF CUSTODY RECORD

MR PROJ. MGR. MC
Shipping Carrier:
Turn Around Time:
10 Day X
3 Day
1 Day
Comments:

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Preserve	LAB NUMBER
MW-12	2/8/18	1300	X		AQ	2 40 mL VOA's	2A/3A	X	HCl	13
MW-13	"	1235	"		"	"	"	"	"	14
MW-14		1550								15
MW-15		1305								16
MW-16		1020								17
MW-17		0955								18
MW-18		1045								19
MW-19BR		0930								20
Potable well		1310								21
Mellott well	"	1030	"		"	"	"	"	"	22
MW-20BR	"	1205	"		"	"	"	"	"	23

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME
Allison Murray	2/9/18	1755	K DeHaas	2/9/18 07:30
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME

Lab Workorder #: 8020217
Labeled By:

Log In Time: 0857
Staff: KL
Date: 2/9/18

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 8020217

CLIENT: Point Store

DATE SAMPLED: 2/8/18 DATE RECEIVED: 2/8/18 TIME RECEIVED: 0730

1. CHECK ALL THAT APPLY: PA ☑ WV ☐ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐

2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ NO ☑

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 46

4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? YES ☑ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 5.7 °C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____

6. WERE THE SAMPLES PROPERLY PRESERVED? YES ☑ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☑ NO ☐

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☐ N/A ☑

9. WAS THE COC FILLED OUT PROPERLY? YES ☑ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ NO ☑

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☑ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: _____ CLIENT SPOKEN TO: _____ DATE/TIME: _____

OUTCOME: _____

SIGNATURE: K DeRose

MOUNTAIN RESEARCH, LLC

Corporate Office and Laboratory
825 25th Street
Altoona, PA 16601
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800.837.4674 Toll Free
814.949.9591 Fax

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814.371.6030 Phone
814.375.0823 Fax

Hydrochem Laboratories
85 Potomac Avenue
Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

21 February 2018

Jeff Bell
Point Store
14 Armory Lane
Lewistown, PA 17044

Lab ID #: 8020218

RE: Lewistown, PA

Enclosed are the results of analyses for samples received by the laboratory on 02/09/18 07:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Megan Davidson-Rager

Megan Davidson-Rager
Project Manager

Authorized Reviewer

MOUNTAIN RESEARCH, LLC

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(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020218
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/21/18 13:11

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Sample Type	Date Sampled	Date Received
GAC Effluent 1	8020218-01	Aqueous	Grab	02/08/18 13:37	02/09/18 07:30
GAC Effluent 2	8020218-02	Aqueous	Grab	02/08/18 16:17	02/09/18 07:30

Mountain Research, LLC

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Hydrochem Laboratories
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(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020218
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

GAC Effluent 1

8020218-01 (Aqueous) Sampled: 02/08/18 13:37

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 03:10	02/15/18 22:44	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 03:10	02/14/18 03:10	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*99.9 %*	*80-120*	*02/14/18 03:10*	*02/14/18 03:10*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*93.2 %*	*80-120*	*02/14/18 03:10*	*02/14/18 03:10*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*103 %*	*80-120*	*02/14/18 03:10*	*02/14/18 03:10*	*EPA 8260 B*				
Surrogate: Toluene-d8		*98.7 %*	*80-120*	*02/14/18 03:10*	*02/14/18 03:10*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Shenandoah Junction, WV 25442
(304) 930-1972
Fax (304) 930-1975

Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020218
14 Armory Lane	Project Number: 4559.15.01	**Reported:** 02/21/18 13:11
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	

GAC Effluent 2

8020218-02 (Aqueous) Sampled: 02/08/18 16:17

Mountain Research, LLC

Volatile Organic Compounds by GC/MS

Analyte	Result	RL	Units	Prepared	Analyzed	Prep Method	Method	Lab	Analyst	Notes
1,2,4-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
1,3,5-Trimethylbenzene	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Benzene	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Ethylbenzene	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Isopropylbenzene (Cumene)	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
MTBE	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Naphthalene	<2.00	2.00	µg/L	02/14/18 03:36	02/15/18 23:10	EPA 5030B	EPA 8260 B	A	JMG	B
Toluene	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Xylene o	<2.00	2.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Xylene p/m	<4.00	4.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	
Xylenes, Total	<6.00	6.00	µg/L	02/14/18 03:36	02/14/18 03:36	EPA 5030B	EPA 8260 B	A	JMG	CC
Surrogate: 1,2-Dichloroethane-d4		*102 %*	*80-120*	*02/14/18 03:36*	*02/14/18 03:36*	*EPA 8260 B*				
Surrogate: 4-Bromofluorobenzene		*94.9 %*	*80-120*	*02/14/18 03:36*	*02/14/18 03:36*	*EPA 8260 B*				
Surrogate: Dibromofluoromethane		*104 %*	*80-120*	*02/14/18 03:36*	*02/14/18 03:36*	*EPA 8260 B*				
Surrogate: Toluene-d8		*97.6 %*	*80-120*	*02/14/18 03:36*	*02/14/18 03:36*	*EPA 8260 B*				

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Megan Davidson-Rager

Megan Davidson-Rager, Project Manager

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Point Store	Project Name: Lewistown, PA	**Lab ID#:** 8020218
14 Armory Lane	Project Number: 4559.15.01	**Reported:**
Lewistown PA, 17044	Lab Project Manager: Megan Davidson-Rager	02/21/18 13:11

Certifications

Code	Description	Number	Expires
MDDOE	Maryland Department of the Environment	257	06/30/2018
PADEP-Altoona	Pennsylvania Department of Environmental Protection	009	03/31/2018
WVDEP-Altoona	West Virginia Department of Environmental Protection	225	12/31/2018
PADEP-DuBois	Pennsylvania Department of Environmental Protection	008	09/30/2018
WVDEP-HydroChem	West Virginia Department of Environmental Protection	038	11/01/2018

Notes and Definitions

CC	Calculated analytes are reported based on unrounded results of the individual analytes used in the calculation. Therefore, using the rounded values of the analytes as reported may lead to a result that varies slightly from the reported result.
B	Analyte has been detected at or above the Method Detection Limit but below the Practical Quantitation Limit in the method blank.
RL	Reporting Limit - either the practical quantitation limit or the method detection limit
dry	Sample results reported on a dry weight basis
A	Analysis Performed by Mountain Research Altoona Laboratory - PADEP #07-00418, WVDEP #225
D	Analysis Performed by Mountain Research DuBois Laboratory - PADEP # 33-00258
W	Analysis Performed by Mountain Research - HydroChem Laboratory - WVDEP #038

Billing Group:	Phase:	PROJECT NAME
		GW Sampling
MR Project #		SITE LOCATION
4559.15.01		McClure, PA
CLIENT		SAMPLER(S)
Point Store		JB, AB

NOTES:
Received On Ice: Y / N
Sample Temp: 5.7
Comp Set
Comments:

MOUNTAIN RESEARCH LLC
825 25th Street, Altoona, PA 16601 (814) 949-2034 (800) 8
110 McCracken Run Road, Dubois, PA 15801 (814) 371-6030 Fax (8

CHAIN OF CUSTODY RECORD

SAMPLE ID	DATE	TIME	GRAB	COMP	MATRIX	NUMBER OF CONTAINERS	PRODUCT CODE	8260B	Preserve	LAB NUMBER
GAC Effluent 1	2/8/18	13:37	X		AQ	2 40 mL VOA's	2A/3A	X	HCl	01
GAC Effluent 2	1	1617	1		1	1	1	1	1	02

MR PROJ. MGR. MC
Shipping Carrier:
Turn Around Time:
10 Day X
3 Day
1 Day
Comments:

RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Lab Workorder #:	Log In Time:
[signature]	2/8/18	1555	[signature]	0730 ~~2-9-18~~	8020218	0948
RELINQUISHED BY:	DATE	TIME	ACCEPTED BY:	DATE/TIME	Labeled By:	Staff: KL
				2-9-18		Date: 2-9-18

MOUNTAIN RESEARCH SAMPLE RECEIPT PROTOCOL

WORK ORDER: 8020218

CLIENT: Point None

DATE SAMPLED: 2/8/18 DATE RECEIVED: 2/9/18 TIME RECEIVED: 0730

1. CHECK ALL THAT APPLY: PA ☐ WV ☑ MD ☐ P W S ☐ NPDES/COMPLIANCE ☐ DAIRY ☐ RUSH ☐

2. WERE ANY OF THE SAMPLE CONTAINERS DAMAGED/LEAKING? (ARE CUSTODY SEALS BROKEN?) YES ☐ NO ☑

IF YES, EXPLAIN: _____

3. NUMBER OF CONTAINERS RECEIVED: 4

4. WERE THE SAMPLES RECEIVED ON ICE/OTHER ACCEPTABLE REFRIGERANT? YES ☑ NO ☐

IF NO, EXPLAIN: _____

5. RECEIVING TEMP: 5.7 °C TEMP CONTROL(S) PRESENT YES ☐ NO ☐ BOTTLE(S) TEMPED: _____

6. WERE THE SAMPLES PROPERLY PRESERVED? YES ☑ NO ☐

IF NO, EXPLAIN: _____

7. WERE THE SAMPLES COLLECTED IN THE CORRECT CONTAINERS? YES ☑ NO ☐

IF NO, EXPLAIN: _____

8. IS THERE HEADSPACE PRESENT FOR VOLATILES/ODOR SAMPLES? YES ☐ NO ☑ N/A ☐

9. WAS THE COC FILLED OUT PROPERLY? YES ☑ NO ☐

IF NO, EXPLAIN: _____

10. DID THE SAMPLE LABEL(S) CONTAIN ADEQUATE INFO? (CLIENT/DATE/TIME/PRESERVATIVE) YES ☑ NO ☐

IF NO, EXPLAIN: _____

11. WERE ANY OF THE SAMPLES RECEIVED OUTSIDE OF HOLDING TIME? YES ☐ NO ☑

IF YES, EXPLAIN: _____

12. DO THE SAMPLES REQUIRE ANALYSES THAT HAVE A SHORT HOLDING TIME? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____ **PLEASE NOTIFY LABORATORY ANALYSTS!**

13. IS SUBCONTRACTING REQUIRED? YES ☐ NO ☑

IF YES, WHAT ANALYSES? _____

14. WAS THE CLIENT CONTACTED? YES ☐ NO ☑ IF YES, FILL OUT THE FOLLOWING:

MR EMPLOYEE INITIALS: CLIENT SPOKEN TO: DATE/TIME:

OUTCOME:

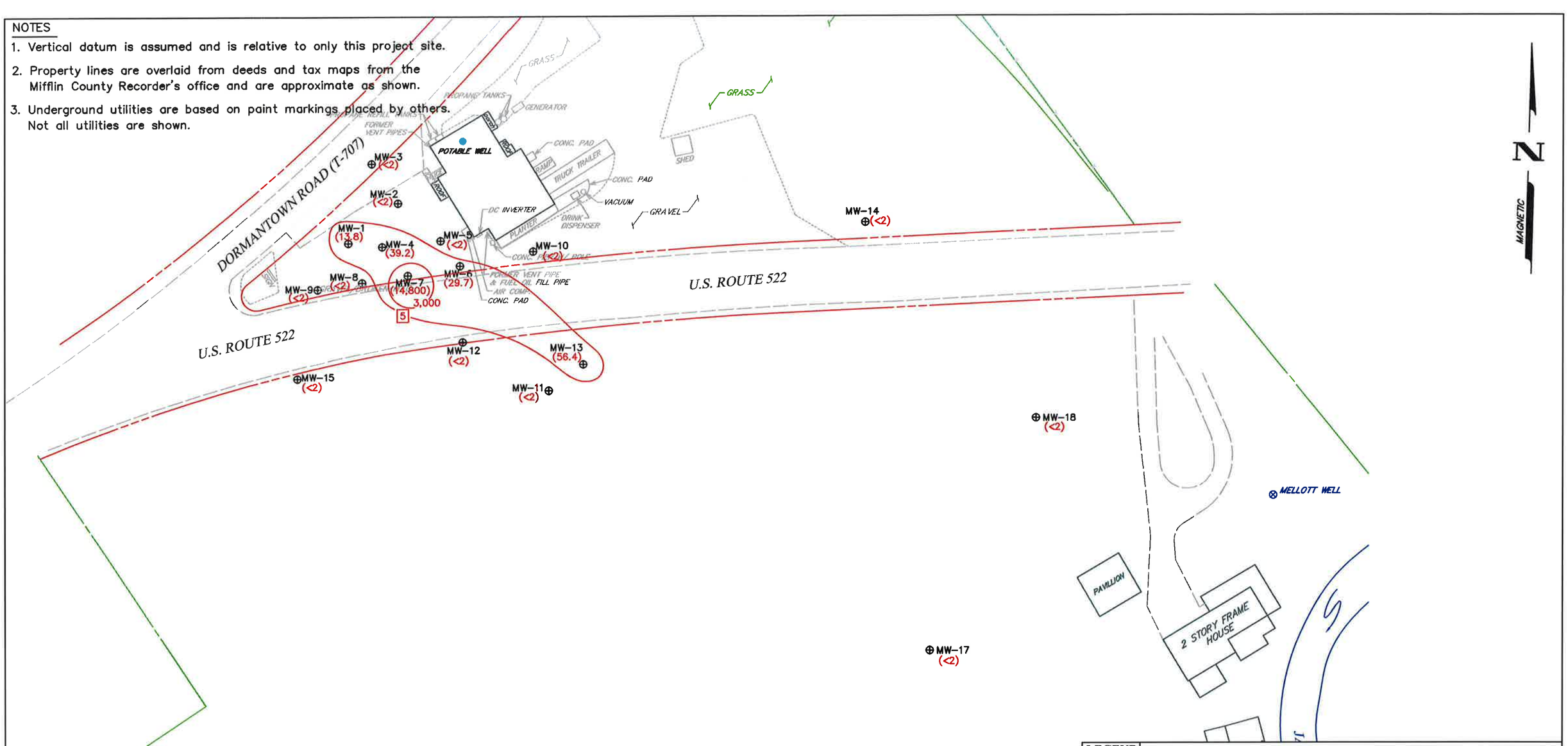
SIGNATURE: KDeRose

APPENDIX L

GROUNDWATER ISOCONCENTRATION MAPS

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) BENZENE CONCENTRATION (ug/L)
- 500 BENZENE ISOCONCENTRATION CONTOUR (ug/L)

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Drawn By: JMB 7/9/18 Last Saved By: DWESTLEY 4559.15.01
Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\BENZ (2-8-18).DWG

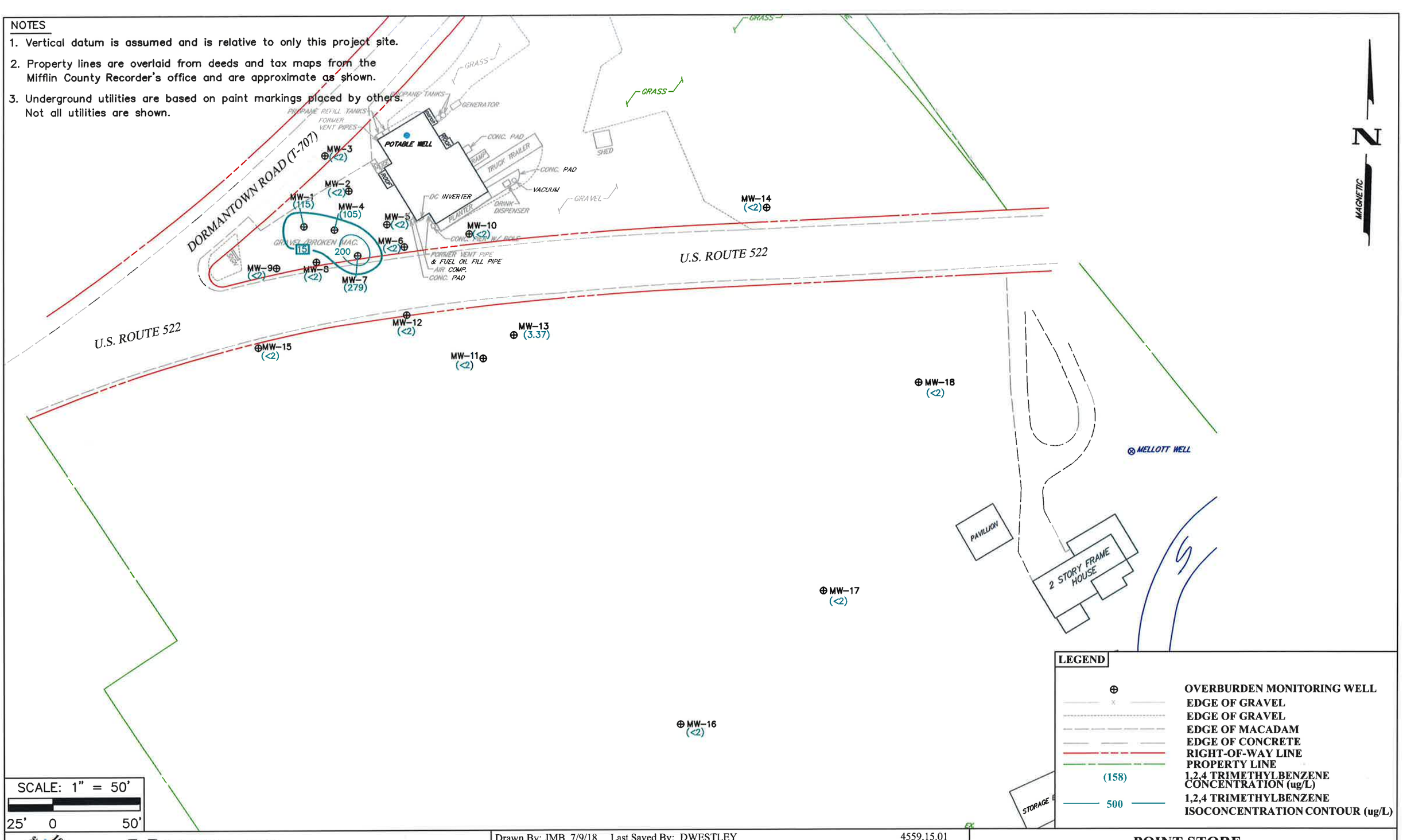
POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

BENZENE OVERBURDEN ISOCONCENTRATION MAP
February 8, 2018

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) 1,2,4 TRIMETHYLBENZENE CONCENTRATION (ug/L)
- 500 1,2,4 TRIMETHYLBENZENE ISOCONCENTRATION CONTOUR (ug/L)

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Drawn By: JMB 7/9/18 Last Saved By: DWESTLEY 4559.15.01
Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\124 TMB (2-8-18).DWG

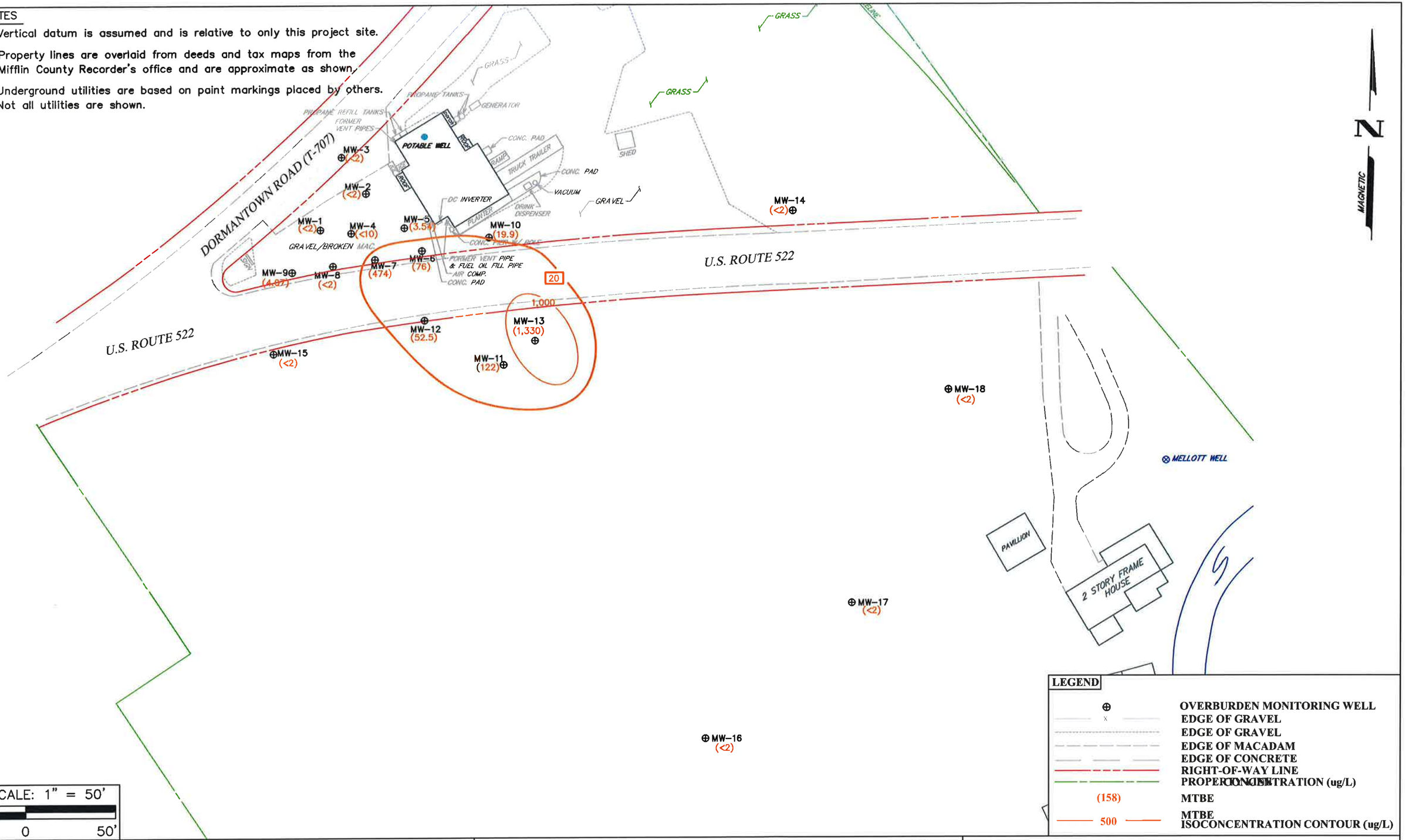
POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

1,2,4 TRIMETHYLBENZENE OVERBURDEN ISOCONCENTRATION MAP
February 8, 2018

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) MTBE CONCENTRATION (ug/L)
- 500 MTBE ISOCONCENTRATION CONTOUR (ug/L)

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Fax (814) 949-9591

Drawn By: JMB 7/9/18 Last Saved By: DWESTLEY 4559.15.01
Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\MTBE (2-8-18).DWG

POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

MTBE OVERBURDEN ISOCONCENTRATION MAP
February 8, 2018

APPENDIX M

J & E MODEL- SOIL

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box) **SOIL DATA**

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

PA DEP J&E version 6.6R April 2018

User Project Information

date

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
95636	1.17E+06	TRIMETHYLBENZENE, 1,3,4- (TRIMETHYLBENZENE, 1,2,4-)

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
6.07E-02	7.92E-06	2.52E-01	6.16E-03	25	9,369	442.15	649.17	2.20E+03	5.60E+01	0.0E+00	6.0E-02		0.0E+00

END

Substance:
TRIMETHYLBENZENE, 1,3,4- (TRIMETHYLBENZENE

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4,000	3.13E+05	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	11,613	3.35E-03	1.37E-01	1.77E-04	9.50E-03	5.10E-03	5.86E-03	5.34E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term ($sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
5.50E+00	7.66E+06	0.10	8.33E+01	9.50E-03	4.00E+02	1.62E+95	4.08E-03	3.12E+04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	NA	6.0E-02	76	1.00

END

Substance:
TRIMETHYLBENZENE, 1,3,4- (TRIMETHYLBENZENE, 1,2,4-)
1.17E+06 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

TRIMETHYLBENZENE, 1,3,4- (T
1.17E+06 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	3.13E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**5.0E+02**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
3.1E+04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model
Pennsylvania Department of Environmental Protection
Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

Version	Date	Description
6.2	Sep 2016	Original public release (Nov 2016)
6.3	Feb 2017	Corrections: DATENTER NR ΔP & ER; added user info box;
		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
6.4	MAY 2017	Updated Dioxane 1,4-, Methanol, PCB-1221, PCB-1232 toxicity
6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

SOIL DATA

PA DEP J&E version 6.6R April 2018

User Project Information

date

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
108678	3.46E+05	TRIMETHYLBENZENE, 1,3,5-

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
6.02E-02	7.84E-06	3.59E-01	8.77E-03	25	9,321	437.85	637.25	6.60E+02	4.89E+01	0.0E+00	6.0E-02		0.0E+00

END

Substance:
TRIMETHYLBENZENE, 1,3,5-

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4,000	8.52E+04	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	11,599	4.77E-03	1.95E-01	1.77E-04	9.43E-03	5.06E-03	5.82E-03	5.31E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.65E+00	9.53E+06	0.10	8.33E+01	9.43E-03	4.00E+02	8.36E+95	4.06E-03	3.87E+04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	NA	6.0E-02	76	1.00

END

Substance:
TRIMETHYLBENZENE, 1,3,5-
3.46E+05 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

TRIMETHYLBENZENE, 1,3,5-
3.46E+05 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	8.52E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**6.2E+02**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
3.9E+04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

Version	Date	Description
6.2	Sep 2016	Original public release (Nov 2016)
6.3	Feb 2017	Corrections: DATENTER NR ΔP & ER; added user info box;
		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
6.4	MAY 2017	Updated Dioxane 1,4-, Methanol, PCB-1221, PCB-1232 toxicity
6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

SOIL DATA

PA DEP J&E version 6.6R April 2018

User Project Information

date

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
71432	1.07E+05	BENZENE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
8.95E-02	1.03E-05	2.27E-01	5.55E-03	25	7,342	354.05	562.16	5.80E+01	1.78E+03	7.8E-06	3.0E-02		0.0E+00

END

Substance:
BENZENE

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4.000	1.07E+05	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	8,074	3.63E-03	1.48E-01	1.77E-04	1.40E-02	7.53E-03	8.65E-03	7.89E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.45E-01	6.91E+07	0.10	8.33E+01	1.40E-02	4.00E+02	3.31E+64	4.68E-03	3.24E+05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	7.8E-06	3.0E-02	76	1.00

END

Substance:
BENZENE
1.07E+05 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

BENZENE
1.07E+05 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	4.09E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E+00	**1.0E+04**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
3.2E+05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

Version	Date	Description
6.2	Sep 2016	Original public release (Nov 2016)
6.3	Feb 2017	Corrections: DATENTER NR ΔP & ER; added user info box;
		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
6.4	MAY 2017	Updated Dioxane 1,4-, Methanol, PCB-1221, PCB-1232 toxicity
6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SOIL DATA

PA DEP J&E version 6.6R April 2018

User Project Information

date

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
98828	6.17E+04	CUMENE (ISOPROPYL BENZENE)

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
6.03E-02	7.86E-06	4.70E-01	1.15E-02	25	10,335	425.55	631.10	2.80E+03	5.00E+01	0.0E+00	4.0E-01		0.0E+00

END

Substance:
CUMENE (ISOPROPYL BENZENE)

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4.000	6.17E+04	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	12,560	5.94E-03	2.43E-01	1.77E-04	9.44E-03	5.07E-03	5.82E-03	5.31E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
7.00E+00	2.11E+06	0.10	8.33E+01	9.44E-03	4.00E+02	6.27E+95	4.07E-03	8.59E+03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	NA	4.0E-01	76	1.00

END

Substance:
CUMENE (ISOPROPYL BENZENE)
6.17E+04 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

CUMENE (ISOPROPYL BENZENE
6.17E+04 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	3.55E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**2.1E+01**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
8.6E+03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

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		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
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6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SOIL DATA

PA DEP J&E version 6.6R April 2018

User Project Information

date

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
100414	4.95E+05	ETHYL BENZENE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
6.85E-02	8.46E-06	3.22E-01	7.88E-03	25	8,501	409.34	617.20	2.20E+02	1.61E+02	2.5E-06	1.0E+00		0.0E+00

END

Substance:
ETHYL BENZENE

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4,000	1.03E+05	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	10,087	4.64E-03	1.90E-01	1.77E-04	1.07E-02	5.76E-03	6.61E-03	6.03E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
5.50E-01	3.05E+07	0.10	8.33E+01	1.07E-02	4.00E+02	2.39E+84	4.27E-03	1.30E+05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	2.5E-06	1.0E+00	76	1.00

END

Substance:
ETHYL BENZENE
4.95E+05 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

ETHYL BENZENE
4.95E+05 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.3E-01	**1.2E+02**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
1.3E+05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

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		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
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6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SOIL DATA

PA DEP J&E version 6.6R April 2018

User Project Information

date

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
1634044	2.44E+04	METHYL TERT-BUTYL ETHER (MTBE)

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
7.53E-02	8.59E-06	2.40E-02	5.87E-04	25	6,678	328.35	497.10	1.20E+01	4.50E+04	2.6E-07	3.0E+00		0.0E+00

END

Substance:
METHYL TERT-BUTYL ETHER (MTBE)

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4,000	2.44E+04	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	7,218	4.02E-04	1.64E-02	1.77E-04	1.18E-02	6.33E-03	7.27E-03	6.63E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.00E-02	4.31E+06	0.10	8.33E+01	1.18E-02	4.00E+02	5.56E+76	4.42E-03	1.91E+04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(µg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	2.6E-07	3.0E+00	76	1.00

END

Substance:
METHYL TERT-BUTYL ETHER (MTBE)
2.44E+04 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

METHYL TERT-BUTYL ETHER (M
2.44E+04 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	4.18E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-03	**6.1E+00**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
1.9E+04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

Version	Date	Description
6.2	Sep 2016	Original public release (Nov 2016)
6.3	Feb 2017	Corrections: DATENTER NR ΔP & ER; added user info box;
		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
6.4	MAY 2017	Updated Dioxane 1,4-, Methanol, PCB-1221, PCB-1232 toxicity
6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

SOIL DATA

PA DEP J&E version 6.6R April 2018

User Project Information

date

YES [ ] *Not available for PA DEP models*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
91203	2.14E+05	NAPHTHALENE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	60.96	0	15.24	30.48	15.24	C		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
C	1.43	0.459	0.1	0.0025	SC	1.63	0.385	0.117	0.0025	S	1.66	0.375	0.1	0.0025

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based soil concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
6.05E-02	8.38E-06	1.80E-02	4.40E-04	25	10,373	491.05	748.40	9.50E+02	3.00E+01	3.4E-05	3.0E-03		0.0E+00

END

Substance:
NAPHTHALENE

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4,000	7.31E+04	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	12,849	2.24E-04	9.16E-03	1.77E-04	9.48E-03	5.09E-03	5.85E-03	5.33E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.38E+00	2.75E+05	0.10	8.33E+01	9.48E-03	4.00E+02	2.94E+95	4.07E-03	1.12E+03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	3.4E-05	3.0E-03	76	1.00

END

Substance:
NAPHTHALENE
2.14E+05 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

NAPHTHALENE
2.14E+05 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	7.31E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.6E-02	**3.6E+02**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
1.1E+03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

Version	Date	Description
6.2	Sep 2016	Original public release (Nov 2016)
6.3	Feb 2017	Corrections: DATENTER NR ΔP & ER; added user info box;
		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
6.4	MAY 2017	Updated Dioxane 1,4-, Methanol, PCB-1221, PCB-1232 toxicity
6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

PA DEP J&E version 6.6R
April 2018

SOIL RESULTS

TOLUENE
1.38E+06 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.20E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**7.7E+01**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
4.0E+05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
7.78E-02	9.20E-06	2.71E-01	6.64E-03	25	7,930	383.78	591.79	1.30E+02	5.32E+02	0.0E+00	5.0E+00		0.0E+00

END

Substance:
TOLUENE

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4,000	2.20E+05	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	9,089	4.12E-03	1.68E-01	1.77E-04	1.22E-02	6.54E-03	7.52E-03	6.85E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.25E-01	8.97E+07	0.10	8.33E+01	1.22E-02	4.00E+02	1.77E+74	4.47E-03	4.01E+05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(µg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	NA	5.0E+00	76	1.00

END

Substance:
TOLUENE
1.38E+06 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

TOLUENE
1.38E+06 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.20E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**7.7E+01**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
4.0E+05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

landrecycling@pa.gov

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Reference: Land Recycling Program Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2 (261-0300-101) 18 Jan 2017

Version	Date	Description
6.2	Sep 2016	Original public release (Nov 2016)
6.3	Feb 2017	Corrections: DATENTER NR ΔP & ER; added user info box;
		Updated ammonia, 1,2,4-TMB & 1,3,5-TMB toxicity
6.4	MAY 2017	Updated Dioxane 1,4-, Methanol, PCB-1221, PCB-1232 toxicity
6.5	SEP 2017	Corrected toxicity errors for Dioxane 1,4-, Methanol, PCB-1221, PCB-1232
		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

XYLENES (TOTAL)
2.64E+06 µg/kg

User Project Information

date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.67E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**9.6E+02**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ (µg/m^3)
1.0E+05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)	Mutagen indicator (M)
8.47E-02	9.90E-06	2.12E-01	5.18E-03	25	8,523	413.15	616.20	3.50E+02	1.75E+02	0.0E+00	1.0E-01		0.0E+00

END

Substance:
XYLENES (TOTAL)

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.47E+08	45.96	0.359	0.268	0.275	0.006	2.28E-09	0.997	2.28E-09	4.000	1.67E+05	1.22E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.06E+06	3.77E-04	15	10,216	3.03E-03	1.24E-01	1.77E-04	1.33E-02	7.13E-03	8.18E-03	7.46E-03	45.96	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
8.75E-01	2.17E+07	0.10	8.33E+01	1.33E-02	4.00E+02	1.49E+68	4.60E-03	9.97E+04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(µg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
NA	NA	NA	NA	NA	1.0E-01	76	1.00

END

Substance:
XYLENES (TOTAL)
2.64E+06 µg/kg

User Project Information

date

PA DEP J&E version 6.6R April 2018

SOIL RESULTS

XYLENES (TOTAL)
2.64E+06 µg/kg

User Project Information

_ date

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.67E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	**9.6E+02**

INDOOR AIR CALCULATIONS:

Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
1.0E+05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

PA DEP Johnson & Ettinger Vapor Intrusion Model

Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

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		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR 2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2-
		Removed Chlorodibromomethane and Dichloroethylene, trans- 1,2-

APPENDIX N

J & E MODEL – GROUNDWATER

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" t **GROUNDWATER DATA**

PA DEP J&E version 6.6R April 2018

User Project Information

date

YES [ ] *Not available for PA DEP models.*

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Entries highlighted in yellow should be verified and updated with site-specific information by the user, if appropriate. (Other parameters may also be modified.) Refer to the PA DEP Technical Guidance Manual for Vapor Intrusion, Appendix B.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
1634044	1.44E+01	METHYL TERT-BUTYL ETHER (MTBE)

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16	15	35.97	35.97	0	0	A	S	S		

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
S	1.66	0.375	0.1	S	1.66	0.375	0.1	S	1.66	0.375	0.1

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.18	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure time, ET (hr/day)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	24	1.0E-05	1

Residential Exposure Factors. Use default residential or nonresidential values for Statewide health standard models.

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagen indicator (M)
7.53E-02	8.59E-06	2.40E-02	5.87E-04	25	6,678	328.35	497.10	1.20E+01	4.50E+04	2.6E-07	3.0E+00	0

END

Substance:
METHYL TERT-BUTYL ETHER (MTBE)

User Project Information

date

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.47E+08	20.97	0.275	0.275	0.275	0.146	1.00E-07	0.849	8.51E-08	17.05	0.375	0.122	0.253	4.000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
1.22E+04	1.06E+06	3.77E-04	15	7,218	4.02E-04	1.64E-02	1.77E-04	7.27E-03	0.00E+00	0.00E+00	5.20E-04	6.30E-04	20.97

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Mutagenic Adjustment Factor and Exposure Duration AED (yr)	Mutagenic Risk Factor MRF (unitless)
15	2.37E+02	0.10	8.33E+01	7.27E-03	4.00E+02	2.67E+124	1.89E-03	4.47E-01	2.6E-07	3.0E+00	76	1.00

END

Substance:
METHYL TERT-BUTYL ETHER (MTBE)
1.44E+01 µg/L

User Project Information

date

PA DEP J&E version 6.6R April 2018

GROUNDWATER RESULTS

METHYL TERT-BUTYL ETHER (M
1.44E+01 µg/L

User Project Information

date

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	4.50E+07	NA

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)
4.8E-08	**1.4E-04**	**4.5E-01**

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Pennsylvania Department of Environmental Protection

Based on U.S. EPA J&E model, version 3.1, Feb 2004

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		Updated toxicity for Trichloro-1,2,2-Trifluoroethane,1,1,2- and Dichloropropane,1,2-
6.6	APR2018	Added Bromobenzene
		Updated toxicity for Dichloropropane, 1,2
		Removed Chlorodibromomethane and Dichloroethylene, trans-1,2

APPENDIX O

QUICK DOMENICO DOCUMENTATION

Point Store; McClure, PA
Quick Domenico overburden groundwater 1,2,4-trimethylbenzene model input and sensitivity analysis MW-4 to MW-13

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	3.46 mg/L	Used this value based on highest 1,2,4-trimethylbenzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	420 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	80 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.0005	The PADEP supplied value was used initially and adjusted to 0.0005 during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	30 feet	Based on estimated width of plume	QD is slightly sensitive to this value. Doubling the source width slightly increases the model centerline values.
Source Thickness	14.35 feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	7.46 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and adjusted to 7.46 during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	2200	Value set to PADEP value for 1,2,4-trimethylbenzene	QD is not sensitive to this value. Increasing or decreasing the KOC yields no change in model output.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA

1,2,4-Trimethylbenzene Calibration evaluation MW-4 to MW-13

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	420	0.0001	will not calibrate
2	0.746	4200	0.0001	steady state
3	0.746	42000	0.015	steady state
4	7.46	420	0.0005	steady state, model used, most representative
5	7.46	4200	0.015	steady state
6	7.46	42000	0.15	steady state
7	0.0746	420	0.0001	will not calibrate
8	0.0746	4200	0.0001	will not calibrate
9	0.0746	42000	0	steady state

30 year predictive simulation t=10,950 (at steady state)

QD MODEL - 1,2,4-Trimethylbenzene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: 1,2,4-Trimethylbenzene Calibration

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
3.46	4.20E+02	8.00E+01	1.00E-03	0.0005	30	14.35	1,260

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	2200	3.89E-02	467.8	0.00241621

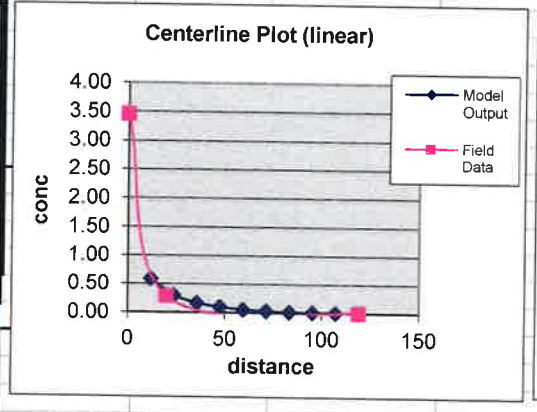
NEW QUICK_DOMENICO.XLS

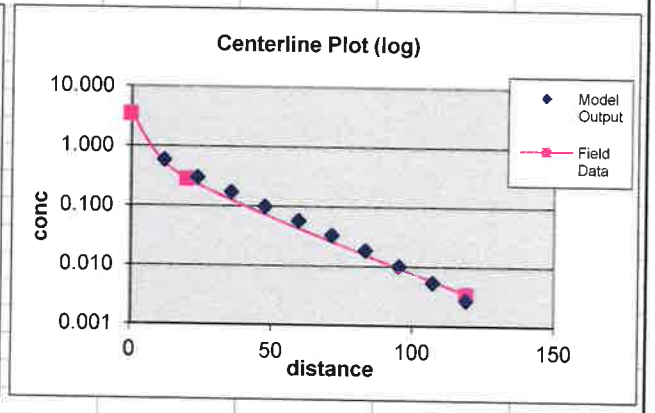
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
119	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	119	0	0
at	1260	days =	0.003 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	119								
	Width (ft)	30								
	11.9	*23.8*	*35.7*	*47.6*	*59.5*	*71.4*	*83.3*	*95.2*	*107.1*	*119*
30	0.469	0.267	0.157	0.094	0.055	0.032	0.018	0.010	0.005	0.003
15	0.556	0.291	0.167	0.098	0.057	0.033	0.018	0.010	0.005	0.003
0	0.589	0.299	0.170	0.099	0.058	0.033	0.019	0.010	0.005	0.003
-15	0.556	0.291	0.167	0.098	0.057	0.033	0.018	0.010	0.005	0.003
-30	0.469	0.267	0.157	0.094	0.055	0.032	0.018	0.010	0.005	0.003
Field Data:	Centerline Cc	Concentration		3.46	0.279	0.00337				
	Distance from Source			0	20	119				

QD MODEL - 1,2,4-Trimethylbenzene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: 1,2,4-Trimethylbenzene 30 year to MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
3.46	4.20E+02	8.00E+01	1.00E-03	0.0005	30	14.35	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	2200	3.89E-02	467.8	0.00241621

NEW QUICK_DOMENICO.XLS

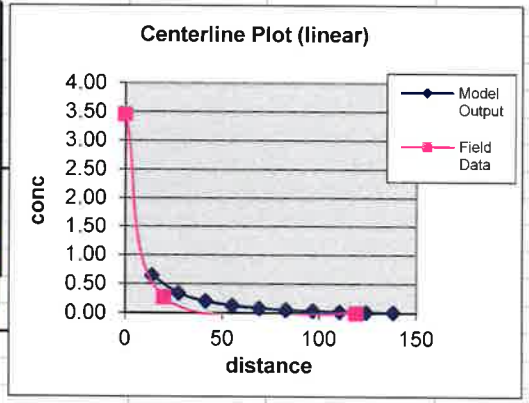
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

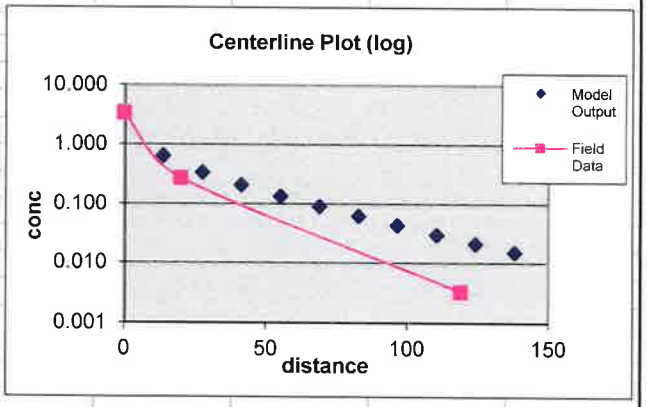
Point Concentration

x(ft)	y(ft)	z(ft)
138	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	138	0	0
at	10950	days =	

0.015 mg/l





	AREAL MODEL	CALCULATION DOMAIN									
	Length (ft)	138									
	Width (ft)	30									
	13.8	27.6	41.4	55.2	69	82.8	96.6	110.4	124.2	138
30	0.532	0.312	0.198	0.130	0.088	0.061	0.042	0.030	0.021	0.015
15	0.617	0.337	0.208	0.135	0.091	0.062	0.043	0.030	0.021	0.015
0	0.648	0.345	0.211	0.137	0.092	0.063	0.043	0.030	0.021	0.015
-15	0.617	0.337	0.208	0.135	0.091	0.062	0.043	0.030	0.021	0.015
-30	0.532	0.312	0.198	0.130	0.088	0.061	0.042	0.030	0.021	0.015
Field Data:	Centerline Cc	Concentration		3.46	0.279	0.00337				
	Distance from Source			0	20	119				

Point Store; McClure, PA
Quick Domenico overburden groundwater 1,3,5-trimethylbenzene model input and sensitivity analysis MW-4 to MW-13

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	0.99 mg/L	Used this value based on highest 1,3,5-trimethylbenzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	370 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	35 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.0009	The PADEP supplied value was used initially and adjusted to 0.001 during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	30 feet	Based on estimated width of plume	QD is slightly sensitive to this value. Doubling the source width slightly increases the model centerline values.
Source Thickness	14.35 feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	7.46 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and adjusted to 7.46 during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	660	Value set to PADEP value for 1,3,5-trimethylbenzene	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA

1,3,5-Trimethylbenzene Calibration evaluation MW-4 to MW-13

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	370	0	will not calibrate
2	0.746	3700	0	steady state
3	0.746	37000	0.013	steady state
4	7.46	370	0.0009	steady state, model used, most representative
5	7.46	3700	0.013	steady state
6	7.46	37000	0.13	steady state
7	0.0746	370	0	will not calibrate
8	0.0746	3700	0	will not calibrate
9	0.0746	37000	0	steady state

30 year predictive simulation t=10,950 (at steady state)

QD MODEL - 1,3,5-Trimethylbenzene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Point Store		
Date:	2/8/2018	Prepared by:	Mountain Research
		Contaminant:	1,3,5-Trimethylbenzene Calibration

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

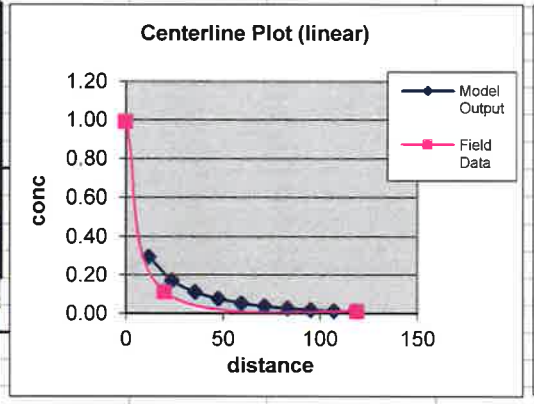
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.99	3.70E+02	3.50E+01	1.00E-03	0.0009	30	14.35	1,260

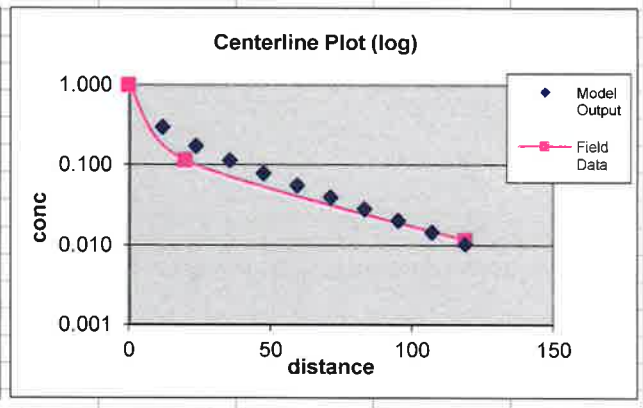
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	660	3.89E-02	141.04	0.00801406

Point Concentration

x(ft)	y(ft)	z(ft)
119	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	119	0	0
at	1260	days =	0.011 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	119								
	Width (ft)	30								
	11.9	*23.8*	*35.7*	*47.6*	*59.5*	*71.4*	*83.3*	*95.2*	*107.1*	*119*
30	0.181	0.133	0.095	0.069	0.050	0.036	0.026	0.019	0.014	0.010
15	0.263	0.162	0.109	0.076	0.054	0.039	0.028	0.020	0.015	0.010
0	0.297	0.173	0.114	0.078	0.056	0.040	0.029	0.021	0.015	0.011
-15	0.263	0.162	0.109	0.076	0.054	0.039	0.028	0.020	0.015	0.010
-30	0.181	0.133	0.095	0.069	0.050	0.036	0.026	0.019	0.014	0.010
Field Data:	**Centerline Cc**	**Concentration**		0.99	0.113	0.0115				
	Distance from Source			0	20	119				

QD MODEL - 1,3,5-Trimethylbenzene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Point Store		
Date:	2/8/2018	Prepared by:	Mountain Research
		Contaminant:	1,3,5-Trimethylbenzene 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
0.99	3.70E+02	3.50E+01	1.00E-03	0.0009	30	14.35	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	660	3.89E-02	141.04	0.00801406

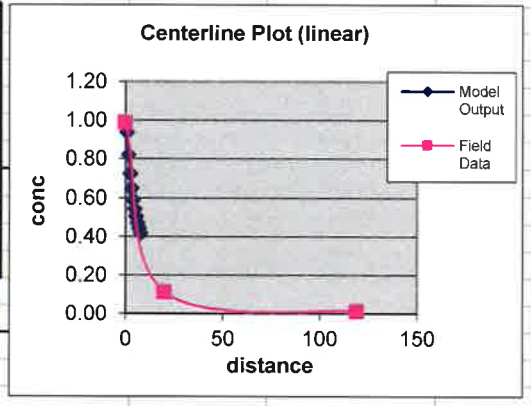
NEW QUICK_DOMENICO.XLS

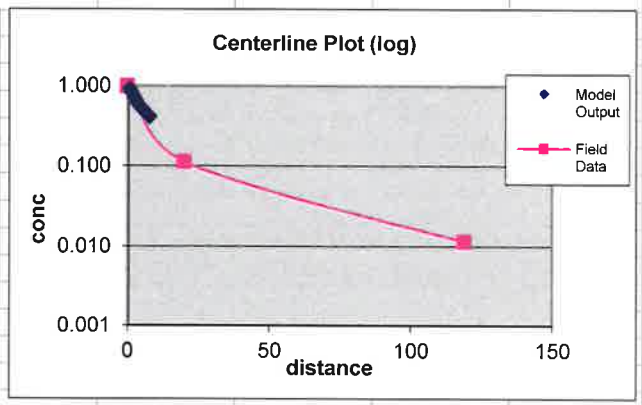
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
7.76	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	7.76	0	0
at	10950	days =	
			0.420 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	7.76								
	Width (ft)	30								
	0.776	*1.552*	*2.328*	*3.104*	*3.88*	*4.656*	*5.432*	*6.208*	*6.984*	*7.76*
30	0.020	0.073	0.114	0.145	0.166	0.181	0.191	0.198	0.202	0.204
15	0.490	0.482	0.469	0.452	0.434	0.416	0.398	0.381	0.366	0.351
0	0.939	0.822	0.726	0.652	0.594	0.547	0.507	0.474	0.445	0.420
-15	0.490	0.482	0.469	0.452	0.434	0.416	0.398	0.381	0.366	0.351
-30	0.020	0.073	0.114	0.145	0.166	0.181	0.191	0.198	0.202	0.204
Field Data:	Centerline Cc	Concentration		0.99	0.113	0.0115				
	Distance from Source			0	20	119				

Point Store; McClure, PA
Quick Domenico overburden groundwater benzene model input and sensitivity analysis MW-7 to MW-13

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	14.80 mg/L	Used this value based on highest benzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	84.5 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	8 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.00095	The PADEP supplied value was used initially and during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	40 feet	Based on estimated width of plume	QD is slightly sensitive to this value. Doubling the source width slightly increases the model centerline values.
Source Thickness	11.85 feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	0.746 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and retained during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	58	Value set to PADEP value for benzene	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA

Benzene Calibration evaluation MW-7 to MW-13

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	8.45	0.00095	will not calibrate
2	0.746	84.5	0.00095	steady state, model used, most representative
3	0.746	845	0.0157	steady state
4	7.46	8.45	0.00542	steady state
5	7.46	84.5	0.0192	steady state
6	7.46	845	0.157	steady state
7	0.0746	8.45	0.00095	will not calibrate
8	0.0746	84.5	0.00095	will not calibrate
9	0.0746	845	0.00022	will not calibrate

30 year predictive simulation t=10,950 (at steady state)

QD MODEL - Benzene
MW-7 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Benzene Calibration

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
14.80	8.45E+01	8.00E+00	1.00E-03	0.00095	40	11.85	1,260

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E-01	0.05	0.33	1.8	58	3.89E-02	13.30654545	0.008494339

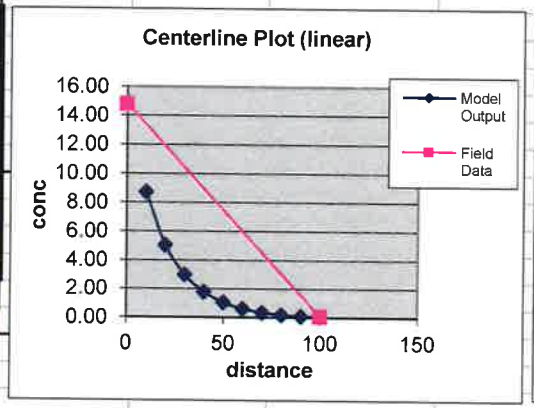
NEW QUICK_DOMENICO.XLS

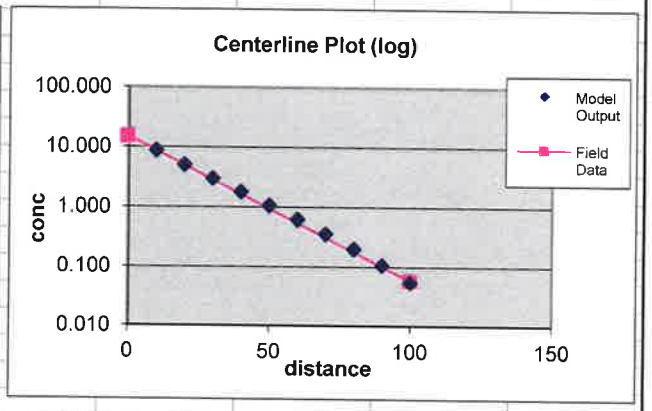
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
100	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	100	0	0
at	1260	days =	
			0.056
			mg/l





AREAL MODEL
CALCULATION DOMAIN
Length (ft) 100
Width (ft) 40

	10	20	30	40	50	60	70	80	90	100
40	0.562	0.905	0.837	0.649	0.458	0.303	0.190	0.113	0.065	0.035
20	4.927	3.355	2.197	1.397	0.866	0.522	0.305	0.173	0.094	0.050
0	8.746	5.070	3.010	1.800	1.070	0.626	0.358	0.199	0.107	0.056
-20	4.927	3.355	2.197	1.397	0.866	0.522	0.305	0.173	0.094	0.050
-40	0.562	0.905	0.837	0.649	0.458	0.303	0.190	0.113	0.065	0.035

Field Data:	Centerline Cc Concentration	14.8	0.0564						
	Distance from Source	0	100						

QD MODEL - Benzene
MW-7 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Benzene 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
14.80	8.45E+01	8.00E+00	1.00E-03	0.00095	40	11.85	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E-01	0.05	0.33	1.8	58	3.89E-02	13.30654545	0.008494339

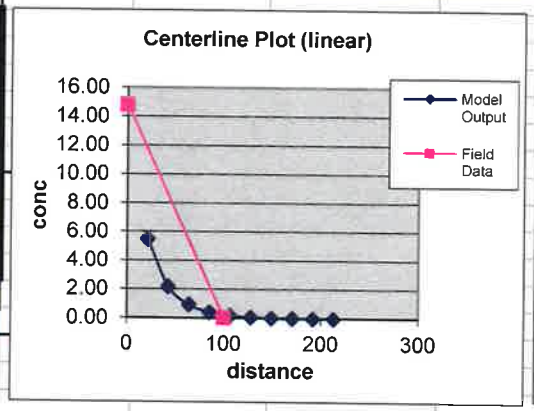
NEW QUICK_DOMENICO.XLS

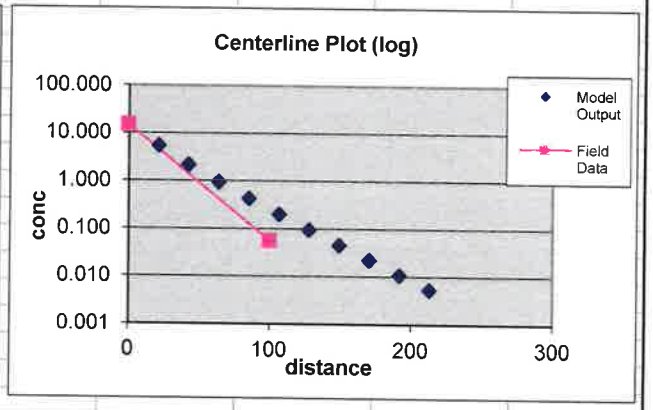
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
213	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	213	0	0
at	10950	days =	
			0.005 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	213								
	Width (ft)	40								
	21.3	*42.6*	*63.9*	*85.2*	*106.5*	*127.8*	*149.1*	*170.4*	*191.7*	*213*
40	1.062	0.836	0.483	0.256	0.132	0.067	0.034	0.017	0.009	0.004
20	3.712	1.732	0.808	0.382	0.183	0.088	0.043	0.021	0.010	0.005
0	5.523	2.204	0.960	0.437	0.204	0.097	0.047	0.023	0.011	0.005
-20	3.712	1.732	0.808	0.382	0.183	0.088	0.043	0.021	0.010	0.005
-40	1.062	0.836	0.483	0.256	0.132	0.067	0.034	0.017	0.009	0.004
Field Data:	Centerline Cc	Concentration		14.8	0.0564					
	Distance from Source			0	100					

Point Store; McClure, PA
Quick Domenico overburden groundwater toluene model input and sensitivity analysis MW-4 to MW-7

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	17.40 mg/L	Used this value based on highest benzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	175.6 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	4 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.02	The PADEP supplied value was used initially and adjusted during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	40 feet	Based on estimated width of plume	QD is moderately sensitive to this value. Doubling the source width doubles the model centerline values.
Source Thickness	14.35feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	0.746	Initial value set to average K value of 0.746 ft/day from slug testing and was utilized during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	130	Value set to PADEP value for toluene	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA

Toluene Calibration evaluation MW-4 to MW-7

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	17.56	0.002343	steady state
2	0.746	175.6	0.02	steady state, model used, most representative
3	0.746	1756	0.194	steady state
4	7.46	17.56	0.02594	steady state
5	7.46	175.6	0.2	steady state
6	7.46	1756	0.02	will not calibrate
7	0.0746	17.56	0.02	will not calibrate
8	0.0746	175.6	0.00158	steady state
9	0.0746	1756	0.0194	steady state

30 year predictive simulation t=10,950 (at steady state)

QD MODEL - Toluene
MW-4 to MW-7

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Toluene Calibration

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
17.40	1.76E+02	4.00E+00	1.00E-03	0.02	40	14.35	1,260

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E-01	0.05	0.33	1.8	130	3.89E-02	28.58363636	0.003954371

NEW QUICK_DOMENICO.XLS

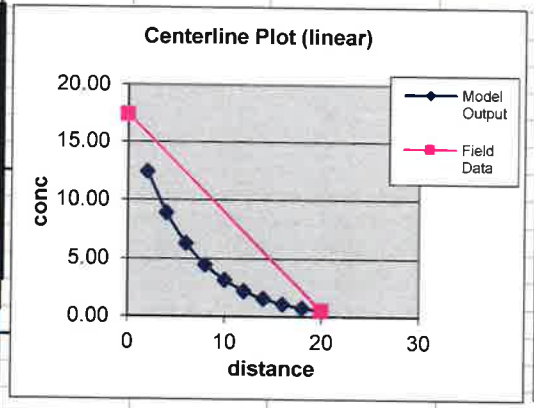
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

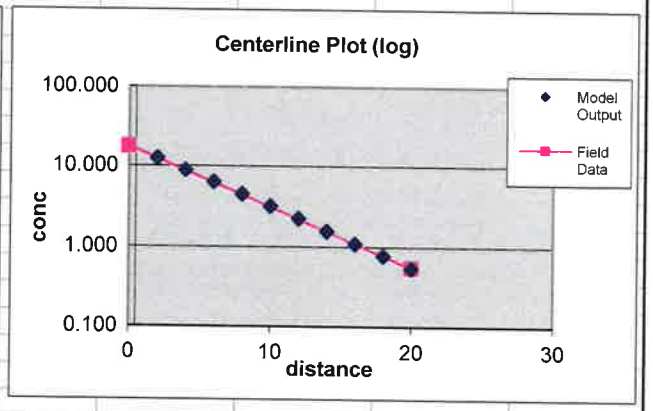
Point Concentration

x(ft)	y(ft)	z(ft)
20	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	20	0	0
at	1260	days =	

0.548 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 20
Width (ft) 40

	2	4	6	8	10	12	14	16	18	20
40	0.000	0.002	0.012	0.028	0.042	0.048	0.049	0.046	0.041	0.035
20	6.231	4.463	3.196	2.289	1.640	1.174	0.841	0.602	0.431	0.309
0	12.462	8.922	6.368	4.522	3.196	2.252	1.583	1.112	0.780	0.548
-20	6.231	4.463	3.196	2.289	1.640	1.174	0.841	0.602	0.431	0.309
-40	0.000	0.002	0.012	0.028	0.042	0.048	0.049	0.046	0.041	0.035

Field Data:	Centerline Cc Concentration			17.4	0.548					
	Distance from Source			0	20					

QD MODEL - Toluene
MW-4 to MW-7

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Toluene 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
17.40	1.76E+02	4.00E+00	1.00E-03	0.02	40	14.35	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E-01	0.05	0.33	1.8	130	3.89E-02	28.58363636	0.003954371

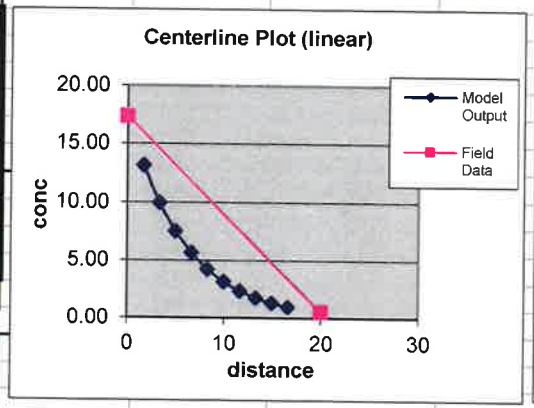
NEW QUICK_DOMENICO.XLS

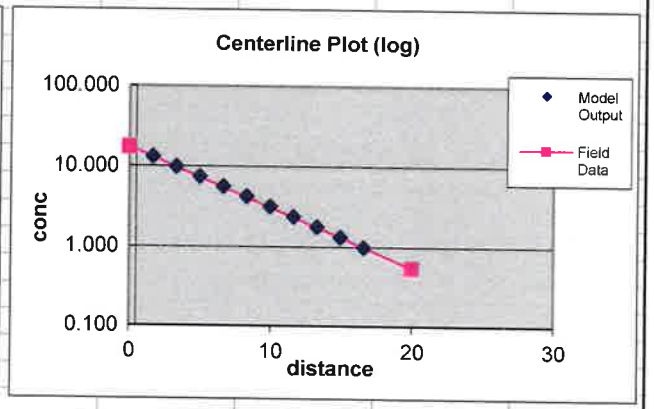
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
16.6	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	16.6	0	0
at	10950	days =	
			1.000 mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 16.6
Width (ft) 30

	1.66	3.32	4.98	6.64	8.3	9.96	11.62	13.28	14.94	16.6
30	0.040	0.262	0.429	0.488	0.478	0.433	0.375	0.315	0.259	0.210
15	12.068	8.339	5.956	4.330	3.180	2.351	1.746	1.301	0.971	0.727
0	13.190	9.997	7.567	5.710	4.293	3.218	2.407	1.798	1.341	1.000
-15	12.068	8.339	5.956	4.330	3.180	2.351	1.746	1.301	0.971	0.727
-30	0.040	0.262	0.429	0.488	0.478	0.433	0.375	0.315	0.259	0.210

Field Data:										
	Centerline Cc Concentration			17.4	0.548					
	Distance from Source			0	20					

Point Store; McClure, PA
Quick Domenico overburden groundwater ethylbenzene model input and sensitivity analysis MW-4 to MW-13

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	2.43 mg/L	Used this value based on highest benzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	1650 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	2.5 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.0032	The PADEP supplied value was used initially and adjusted during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	25 feet	Based on estimated width of plume	QD is moderately sensitive to this value. Doubling the source width doubles the model centerline values.
Source Thickness	14.35 feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	7.46 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and adjusted during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	220	Value set to PADEP value for ethylbenzene	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA

Ethylbenzene Calibration evaluation MW-4 to MW-13

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	1650	0.003	will not calibrate
2	0.746	16500	0.003	steady state
3	0.746	165000	0.0303	steady state
4	7.46	1650	0.0032	steady state, model used, most representative
5	7.46	16500	0.0305	steady state
6	7.46	165000	0.303	steady state
7	0.0746	1650	0.003	will not calibrate
8	0.0746	16500	0.003	will not calibrate
9	0.0746	165000	0.003	will not calibrate

30 year predictive simulation t=10,950 (at steady state)

QD MODEL - Ethylbenzene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Ethylbenzene Calibration

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

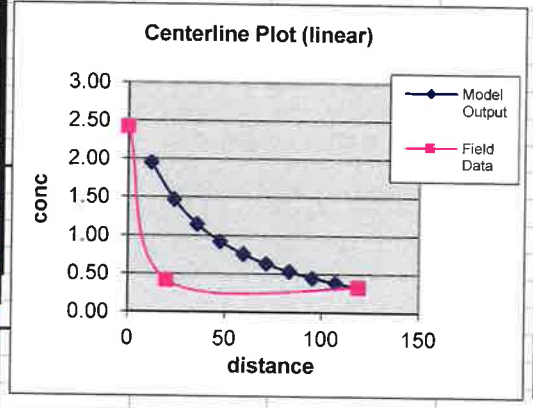
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
2.43	1.65E+03	2.50E+00	1.00E-03	0.0032	25	14.35	1,260

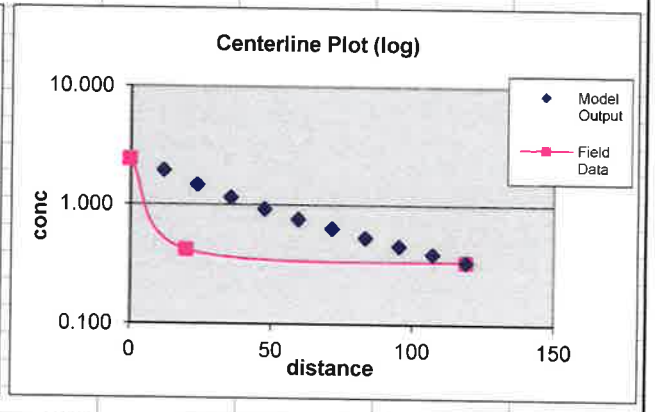
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	220	3.89E-02	47.68	0.02370602

Point Concentration

x(ft)	y(ft)	z(ft)
119	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	119	0	0
at	1260	days =	
			0.334 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	119								
	Width (ft)	25								
	11.9	23.8	35.7	47.6	59.5	71.4	83.3	95.2	107.1	119
25	0.115	0.247	0.305	0.322	0.316	0.299	0.277	0.253	0.229	0.206
12.5	1.091	0.962	0.832	0.714	0.613	0.527	0.455	0.393	0.341	0.296
0	1.955	1.472	1.153	0.930	0.764	0.637	0.536	0.455	0.389	0.334
-12.5	1.091	0.962	0.832	0.714	0.613	0.527	0.455	0.393	0.341	0.296
-25	0.115	0.247	0.305	0.322	0.316	0.299	0.277	0.253	0.229	0.206
Field Data:	Centerline Cc	Concentration		2.43	0.42	0.334				
	Distance from Source			0	20	119				

QD MODEL - Ethylbenzene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Ethylbenzene 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
2.43	1.65E+03	2.50E+00	1.00E-03	0.0032	25	14.35	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	220	3.89E-02	47.68	0.02370602

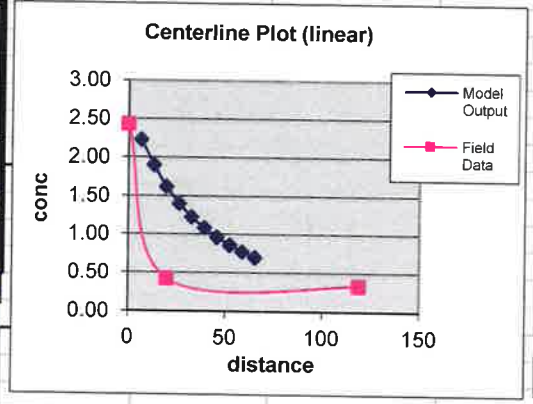
NEW QUICK_DOMENICO.XLS

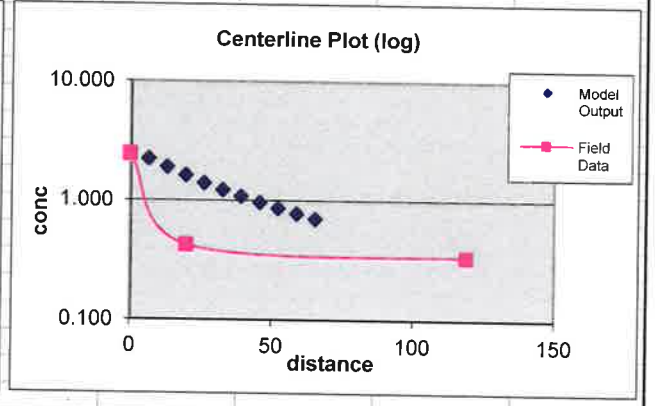
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987)
Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
65.4	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	65.4	0	0
at	10950	days =	
			0.700
			mg/l





AREAL MODEL CALCULATION DOMAIN
Length (ft) 65.4
Width (ft) 25

	6.54	13.08	19.62	26.16	32.7	39.24	45.78	52.32	58.86	65.4
25	0.033	0.132	0.212	0.264	0.297	0.314	0.322	0.322	0.318	0.309
12.5	1.147	1.081	1.012	0.939	0.867	0.798	0.734	0.675	0.621	0.571
0	2.229	1.902	1.623	1.403	1.226	1.082	0.963	0.862	0.775	0.700
-12.5	1.147	1.081	1.012	0.939	0.867	0.798	0.734	0.675	0.621	0.571
-25	0.033	0.132	0.212	0.264	0.297	0.314	0.322	0.322	0.318	0.309
Field Data: Centerline Cc Concentration				2.43	0.42	0.334				
Distance from Source				0	20	119				

Point Store; McClure, PA
Quick Domenico overburden groundwater xylenes model input and sensitivity analysis MW-4 to MW-13

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	14.10 mg/L	Used this value based on highest benzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	80 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	10 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.0033	The PADEP supplied value was used initially and adjusted during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	25 feet	Based on estimated width of plume	QD is moderately sensitive to this value. Doubling the source width doubles the model centerline values.
Source Thickness	14.35feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	7.46 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and adjusted during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	350	Value set to PADEP value for xylenes	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA
Xylenes Calibration evaluation MW-4 to MW-13

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	80	0.001	will not calibrate
2	0.746	800	0.001	steady state
3	0.746	8000	0.018	steady state
4	7.46	80	0.0033	steady state
5	7.46	800	0.019	steady state
6	7.46	8000	0.18	steady state
7	0.0746	80	0.001	will not calibrate
8	0.0746	800	0.001	will not calibrate
9	0.0746	8000	0.0009	steady state

30 year predictive simulation t=10,950 (at steady state)

steady state, model used, most representative

QD MODEL - Xylenes
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Point Store		
Date:	2/8/2018	Prepared by:	Mountain Research
		Contaminant:	Xylenes Calibration

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

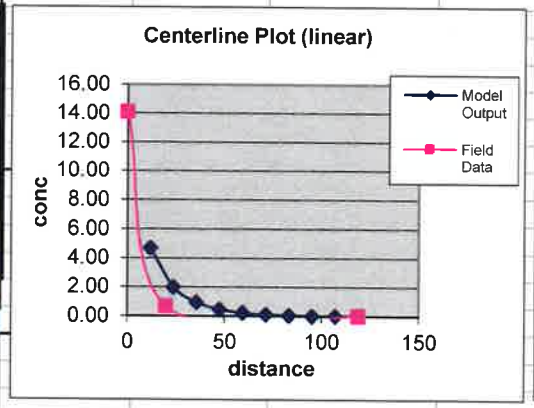
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
14.10	8.00E+01	1.00E+01	1.00E-03	0.0033	25	14.35	1,260

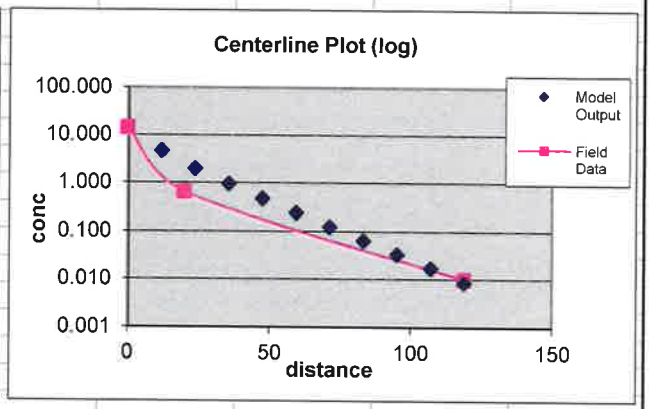
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	350	3.89E-02	75.26363636	0.015017917

Point Concentration

x(ft)	y(ft)	z(ft)
119	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	119	0	0
at	1260	days =	
			0.009
			mg/l





	AREAL MODEL	CALCULATION DOMAIN									
	Length (ft)	119									
	Width (ft)	25									
	11.9	*23.8*	*35.7*	*47.6*	*59.5*	*71.4*	*83.3*	*95.2*	*107.1*	*119*
25	1.626	1.113	0.634	0.348	0.188	0.101	0.054	0.028	0.015	0.008
12.5	3.613	1.731	0.861	0.439	0.227	0.118	0.062	0.032	0.016	0.008
0	4.702	2.005	0.953	0.474	0.242	0.125	0.065	0.033	0.017	0.009
-12.5	3.613	1.731	0.861	0.439	0.227	0.118	0.062	0.032	0.016	0.008
-25	1.626	1.113	0.634	0.348	0.188	0.101	0.054	0.028	0.015	0.008
Field Data:	**Centerline Cc**	**Concentration**		14.1	0.642	0.00966				
	Distance from Source			0	20	119				

QD MODEL - Xylenes
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Point Store		
Date:	2/8/2018	Prepared by:	Mountain Research
		Contaminant:	Xylenes 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
14.10	8.00E+01	1.00E+01	1.00E-03	0.0033	25	14.35	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	350	3.89E-02	75.26363636	0.015017917

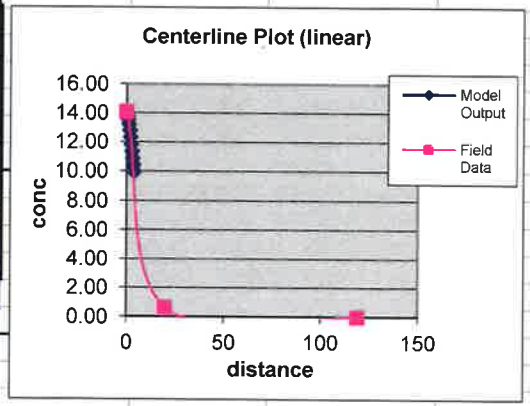
NEW QUICK_DOMENICO.XLS

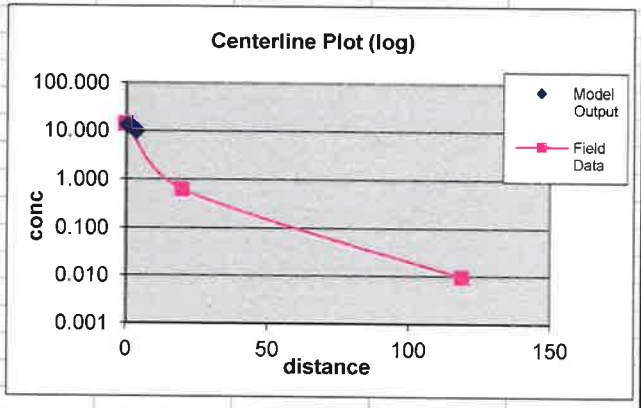
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
3.821	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	3.821	0	0
at	10950	days =	
			10.000
			mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	3.821								
	Width (ft)	25								
	0.3821	*0.7642*	*1.1463*	*1.5284*	*1.9105*	*2.2926*	*2.6747*	*3.0568*	*3.4389*	*3.821*
25	0.000	0.009	0.060	0.156	0.278	0.411	0.544	0.672	0.791	0.901
12.5	6.926	6.804	6.684	6.566	6.450	6.335	6.221	6.107	5.992	5.877
0	13.851	13.589	13.247	12.820	12.344	11.851	11.361	10.887	10.432	10.000
-12.5	6.926	6.804	6.684	6.566	6.450	6.335	6.221	6.107	5.992	5.877
-25	0.000	0.009	0.060	0.156	0.278	0.411	0.544	0.672	0.791	0.901
Field Data:	**Centerline Cc**	**Concentration**		14.1	0.642	0.00966				
	Distance from Source			0	20	119				

Point Store; McClure, PA
Quick Domenico overburden groundwater MTBE model input and sensitivity analysis MW-7 to MW-17

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	4.850 mg/L	Used this value based on highest benzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	23.5 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	2.5 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.009	The PADEP supplied value was used initially and adjusted during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	25 feet	Based on estimated width of plume	QD is moderately sensitive to this value. Doubling the source width doubles the model centerline values.
Source Thickness	11.85 feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	7.46 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and adjusted during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	12	Value set to PADEP value for MTBE	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA
MTBE Calibration evaluation MW-7 to MW-17

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	23.5	0.001	will not calibrate
2	0.746	235	0.001	steady state
3	0.746	2350	0.03	steady state
4	7.46	23.5	0.009	steady state, model used, most representative
5	7.46	235	0.035	steady state
6	7.46	2350	0.3	steady state
7	0.0746	23.5	0.001	will not calibrate
8	0.0746	235	0.001	will not calibrate
9	0.0746	2350	0.0023	steady state

30 year predictive simulation t=10,950 (at steady state)

QD MODEL - MTBE
MW-7 to MW-17

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Point Store		
Date:	2/8/2018	Prepared by:	Mountain Research
		Contaminant:	MTBE Calibration

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

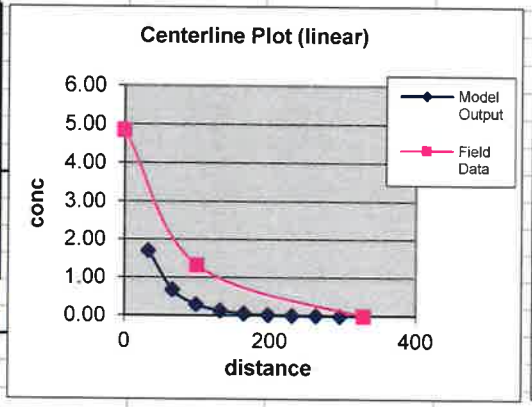
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
4.85	2.35E+01	2.50E+00	1.00E-03	0.009	25	11.85	1,260

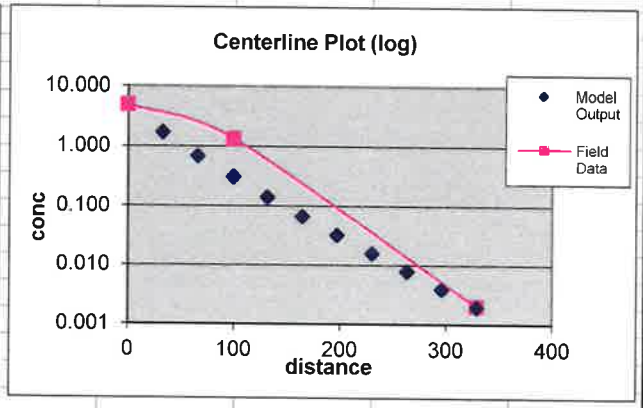
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	12	3.89E-02	3.546181818	0.318738037

Point Concentration

x(ft)	y(ft)	z(ft)
329	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	329	0	0
at	1260	days =	
			0.002 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	329								
	Width (ft)	25								
	32.9	*65.8*	*98.7*	*131.6*	*164.5*	*197.4*	*230.3*	*263.2*	*296.1*	*329*
25	0.418	0.306	0.172	0.091	0.047	0.024	0.012	0.006	0.003	0.002
12.5	1.215	0.563	0.264	0.127	0.062	0.030	0.015	0.007	0.004	0.002
0	1.717	0.689	0.305	0.141	0.067	0.033	0.016	0.008	0.004	0.002
-12.5	1.215	0.563	0.264	0.127	0.062	0.030	0.015	0.007	0.004	0.002
-25	0.418	0.306	0.172	0.091	0.047	0.024	0.012	0.006	0.003	0.002
Field Data:	**Centerline Cc Concentration**			4.85	1.33	0.002				
	Distance from Source			0	100	329				

QD MODEL - MTBE
MW-7 to MW-17

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: MTBE 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
4.85	2.35E+01	2.50E+00	1.00E-03	0.009	25	11.85	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	12	3.89E-02	3.546181818	0.318738037

NEW QUICK_DOMENICO.XLS

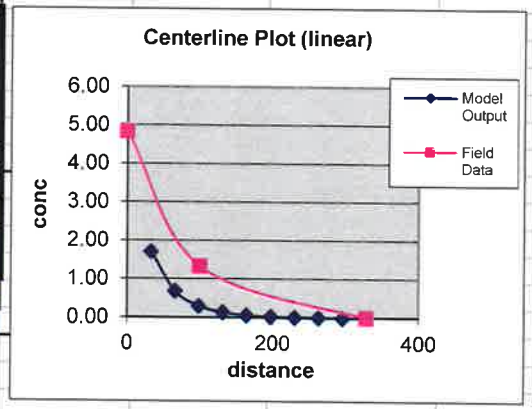
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

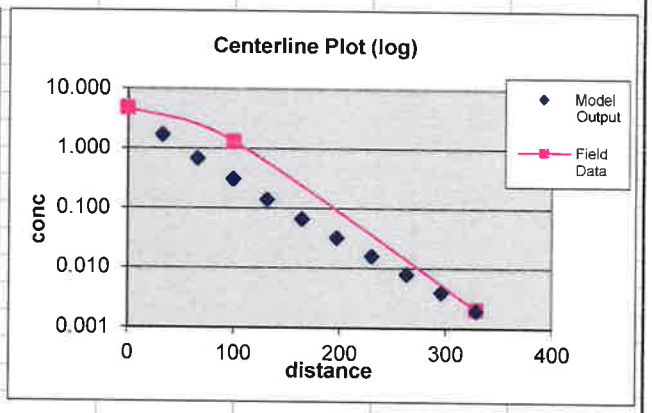
Point Concentration

x(ft)	y(ft)	z(ft)
219	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	219	0	0
at	10950	days =	

0.020 mg/l





	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	329								
	Width (ft)	25								
	32.9	65.8	98.7	131.6	164.5	197.4	230.3	263.2	296.1	329
25	0.418	0.306	0.172	0.091	0.047	0.024	0.012	0.006	0.003	0.002
12.5	1.215	0.563	0.264	0.127	0.062	0.030	0.015	0.007	0.004	0.002
0	1.717	0.689	0.305	0.141	0.067	0.033	0.016	0.008	0.004	0.002
-12.5	1.215	0.563	0.264	0.127	0.062	0.030	0.015	0.007	0.004	0.002
-25	0.418	0.306	0.172	0.091	0.047	0.024	0.012	0.006	0.003	0.002
Field Data:	Centerline Cc	Concentration		4.85	1.33	0.002				
	Distance from Source			0	100	329				

Point Store; McClure, PA
Quick Domenico overburden groundwater naphthalene model input and sensitivity analysis MW-4 to MW-13

Model Input	Input value	Rationale for input	Sensitivity analysis
Initial concentration	1.76 mg/L	Used this value based on highest benzene concentration	QD is highly sensitive to this value. In general, one order of magnitude change in initial concentration will change the output of the model by the same order of magnitude.
A(x)	600 feet	Initial value set at 1/10 of plume length and was adjusted during sensitivity analysis.	QD is slightly sensitive to this value especially near the tail end of modeled contaminant plume. In general, one order of magnitude change in A (x) will change the predicted output of the model by double the calibrated predicted concentration.
A(Y)	10 feet	Initial value set to 1/10 of plume width and adjusted during model calibration	QD is moderately sensitive to this value. A change in one order of magnitude larger will cause model centerline values to decrease.
A(z)	0.001 feet	PADEP suggested value was retained during model calibration	QD is not sensitive to this value. A change in one order of magnitude larger caused no change in model output.
Lambda	0.0005	The PADEP supplied value was used initially and adjusted during sensitivity analysis	QD is highly sensitive to this value. A change in one order of magnitude larger will cause model centerline value to decrease significantly.
Source Width	25 feet	Based on estimated width of plume	QD is moderately sensitive to this value. Doubling the source width doubles the model centerline values.
Source Thickness	14.35feet	Average thickness of impacted overburden.	QD is not sensitive to this value. Doubling the thickness yields no change in model output.
Time	1,260 days	Calculated as days between estimated UST removal August 2014 and the date of model calibration (2/8/2018)	QD is slightly sensitive to this value. A change of +/-1,000 days yields minor change in model output
Hydraulic Conductivity	7.46 feet/day	Initial value set to average K value of 0.746 ft/day from slug testing and adjusted during sensitivity analysis.	QD is highly sensitive to this value. A change in one order of magnitude will cause the model output to change significantly
Gradient	0.05 feet/foot	Average gradient for the overburden during 2018 sampling events	QD is moderately sensitive to this value. A change of + 0.01 feet/foot yields higher model output values.
Effective Porosity	0.33 decimal fraction	Basedon actual geotechnical sampling completed by Mountain Research LLC	QD is moderately sensitive to this value. Doubling the effective porosity decreases the concentration in the model output.
Soil Bulk Density	1.8 g/cm3	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is not sensitive to this value. Increasing or decreasing the bulk density yields no change in model output.
KOC	950	Value set to PADEP value for naphthalene	QD is moderately sensitive to this value. A change in one order of magnitude will cause the model output to change significantly.
Fraction of Organic Carbon	0.0389 decimal fraction	Based on actual geotechnical sampling completed by Mountain Research LLC	QD is highly sensitive to this value. Adding 0.001 FOC significantly decreases the centerline values and significantly decreases the model output

Point Store; McClure, PA

Naphthalene Calibration evaluation MW-4 to MW-13

Calibration at t= 1260 days

Model	K (ft/day)	ax (ft)	λ (day-1)	Comments
1	0.746	600	0.0002	will not calibrate
2	0.746	6000	0.0002	steady state
3	0.746	60000	0.0114	steady state
4	7.46	600	0.0005	steady state
5	7.46	6000	0.0115	steady state
6	7.46	60000	0.113	steady state
7	0.0746	600	0.0002	will not calibrate
8	0.0746	6000	0.0002	will not calibrate
9	0.0746	60000	0.0001	steady state

30 year predictive simulation t=10,950 (at steady state)

steady state, model used, most representative

QD MODEL - Naphthalene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project: Point Store
Date: 2/8/2018 Prepared by: Mountain Research
Contaminant: Naphthalene Calibration

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

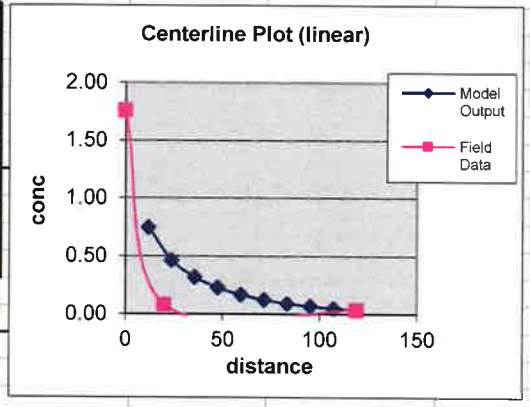
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.76	6.00E+02	1.00E+01	1.00E-03	0.0005	25	14.35	1,260

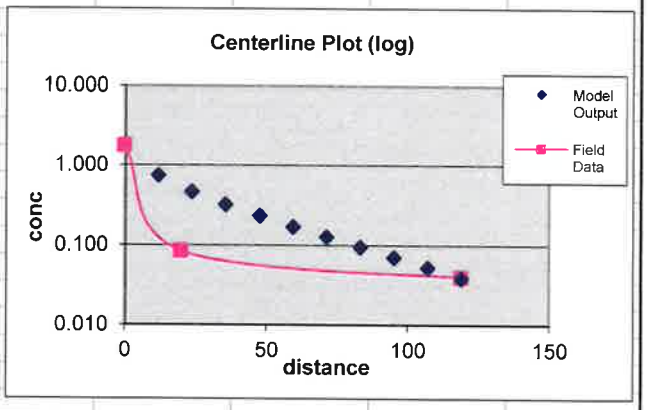
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	950	3.89E-02	202.5727273	0.005579739

Point Concentration

x(ft)	y(ft)	z(ft)
119	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	119	0	0
at	1260	days =	**0.040**
			mg/l





	AREAL MODEL	CALCULATION DOMAIN									
	Length (ft)	119									
	Width (ft)	25									
	11.9	*23.8*	*35.7*	*47.6*	*59.5*	*71.4*	*83.3*	*95.2*	*107.1*	*119*	
25	0.260	0.260	0.216	0.172	0.134	0.104	0.080	0.061	0.046	0.035	
12.5	0.578	0.405	0.293	0.217	0.162	0.122	0.092	0.069	0.052	0.038	
0	0.752	0.469	0.324	0.234	0.173	0.128	0.096	0.072	0.053	0.040	
-12.5	0.578	0.405	0.293	0.217	0.162	0.122	0.092	0.069	0.052	0.038	
-25	0.260	0.260	0.216	0.172	0.134	0.104	0.080	0.061	0.046	0.035	
Field Data:	**Centerline Cc**	**Concentration**		1.76	0.0854	0.0404					
	Distance from Source			0	20	119					

QD MODEL - Naphthalene
MW-4 to MW-13

Point Store
McClure, PA

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Point Store		
Date:	2/8/2018	Prepared by:	Mountain Research
		Contaminant:	Naphthalene 30 year MSC

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
1.76	6.00E+02	1.00E+01	1.00E-03	0.0005	25	14.35	10,950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
7.46E+00	0.05	0.33	1.8	950	3.89E-02	202.5727273	0.005579739

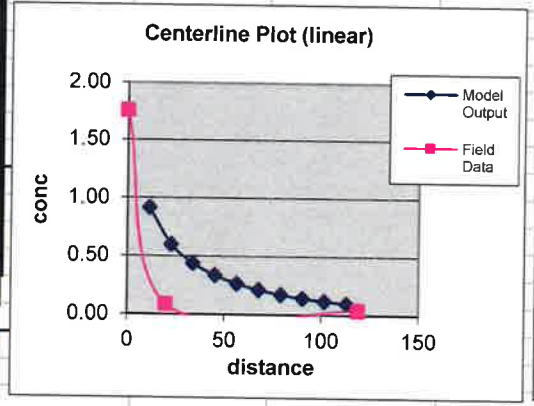
NEW QUICK_DOMENICO.XLS

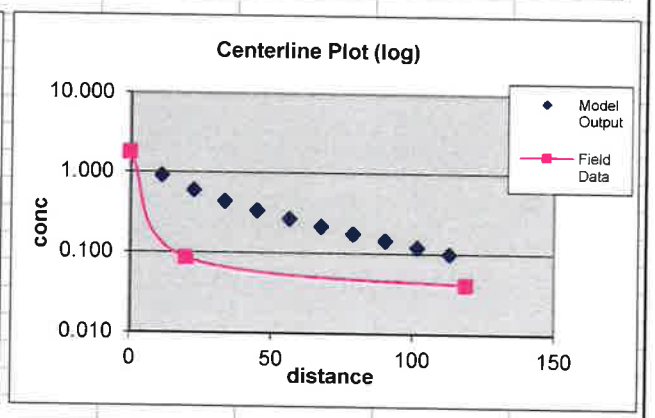
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
113	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	113	0	0
at	10950	days =	
			0.100 mg/l





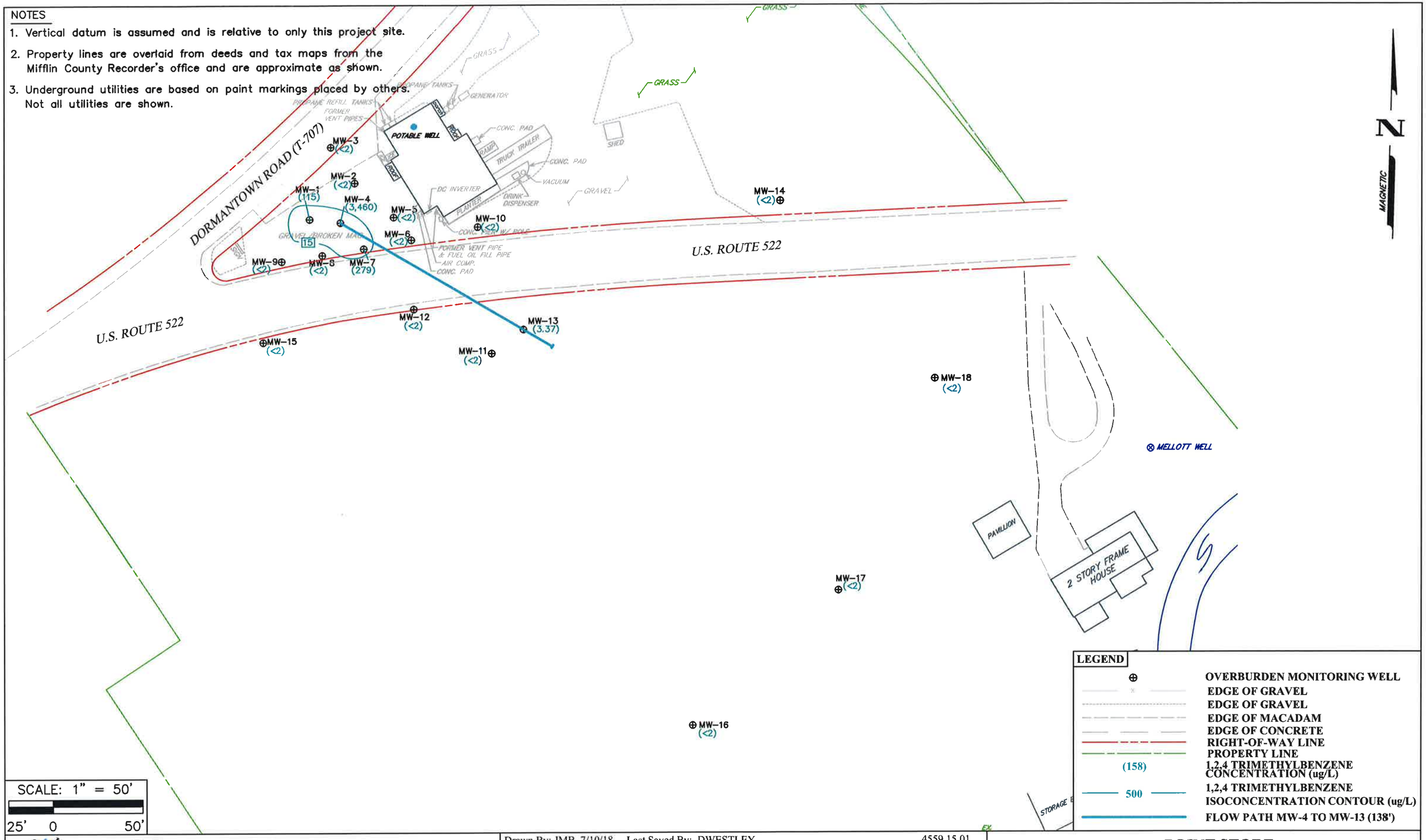
	AREAL MODEL	CALCULATION DOMAIN								
	Length (ft)	113								
	Width (ft)	25								
	11.3	*22.6*	*33.9*	*45.2*	*56.5*	*67.8*	*79.1*	*90.4*	*101.7*	*113*
25	0.304	0.325	0.287	0.244	0.205	0.173	0.145	0.122	0.103	0.088
12.5	0.699	0.517	0.396	0.312	0.250	0.204	0.168	0.139	0.116	0.097
0	0.919	0.603	0.440	0.338	0.268	0.215	0.176	0.145	0.120	0.100
-12.5	0.699	0.517	0.396	0.312	0.250	0.204	0.168	0.139	0.116	0.097
-25	0.304	0.325	0.287	0.244	0.205	0.173	0.145	0.122	0.103	0.088
Field Data:	**Centerline Cc**	**Concentration**		1.76	0.0854	0.0404				
	Distance from Source			0	20	119				

APPENDIX P

QUICK DOMENICO MAPS

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) 1,2,4 TRIMETHYLBENZENE CONCENTRATION (ug/L)
- 500 1,2,4 TRIMETHYLBENZENE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-4 TO MW-13 (138')

SCALE: 1" = 50'

25' 0 50'

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Submitted By:
Project Manager:
Checked By:

H:\P\POINT STORE\4559.15.01 - MCCLURE, PA - POINT STORE\ACAD DWG\SSCR-RAP\124 TMB QD.DWG

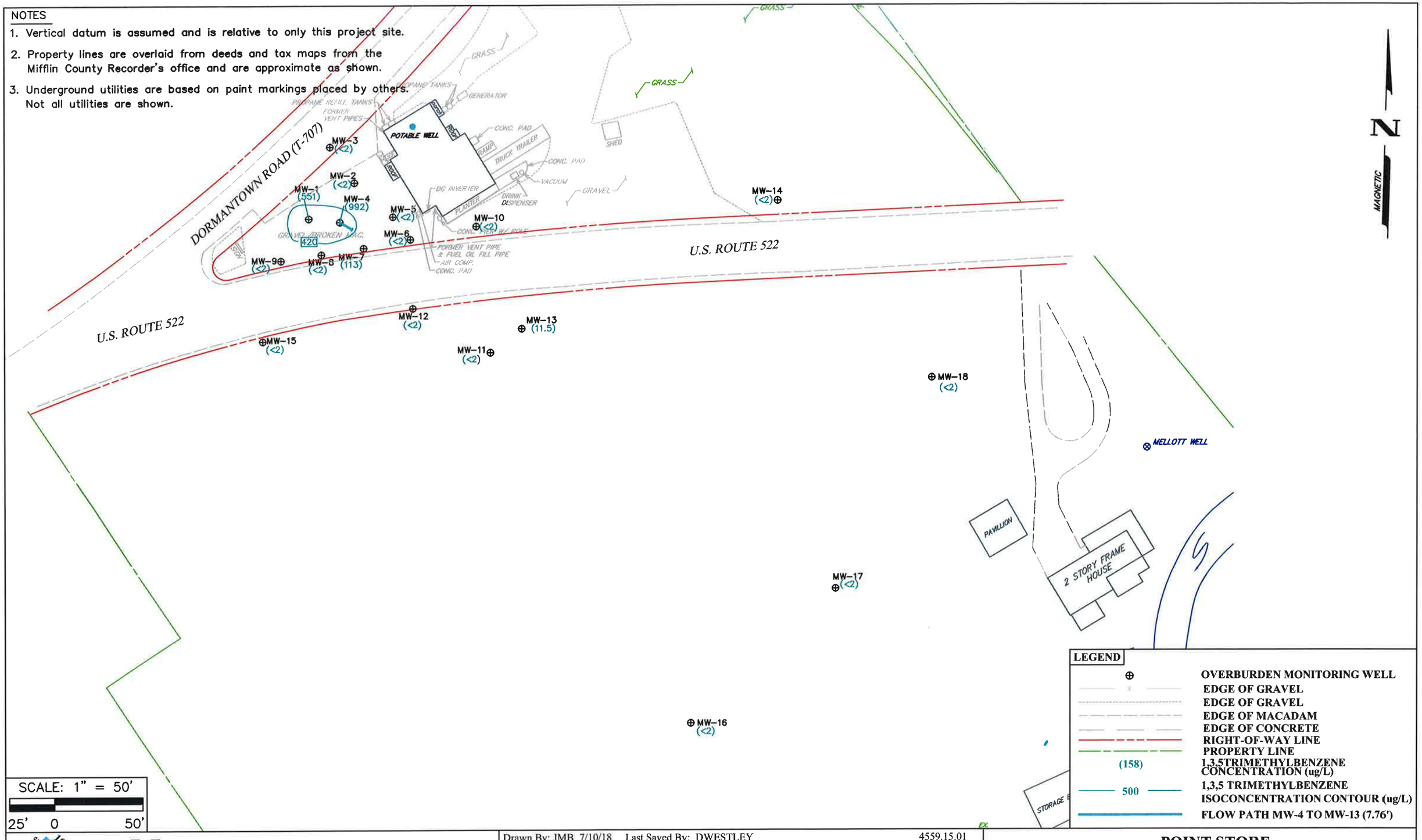
POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

1,2,4 TRIMETHYLBENZENE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

1. Vertical datum is assumed and is relative to only this project site.
2. Property lines are overlaid from deeds and tax maps from the Mifflin County Recorder's office and are approximate as shown.
3. Underground utilities are based on paint markings placed by others. Not all utilities are shown.



LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) 1,3,5TRIMETHYLBENZENE CONCENTRATION (ug/L)
- 500 1,3,5 TRIMETHYLBENZENE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-4 TO MW-13 (7.76')

SCALE: 1" = 50'

25' 0 50'

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Submitted By:
Project Manager:
Checked By:

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POINT STORE

5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

1,3,5 TRIMETHYLBENZENE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

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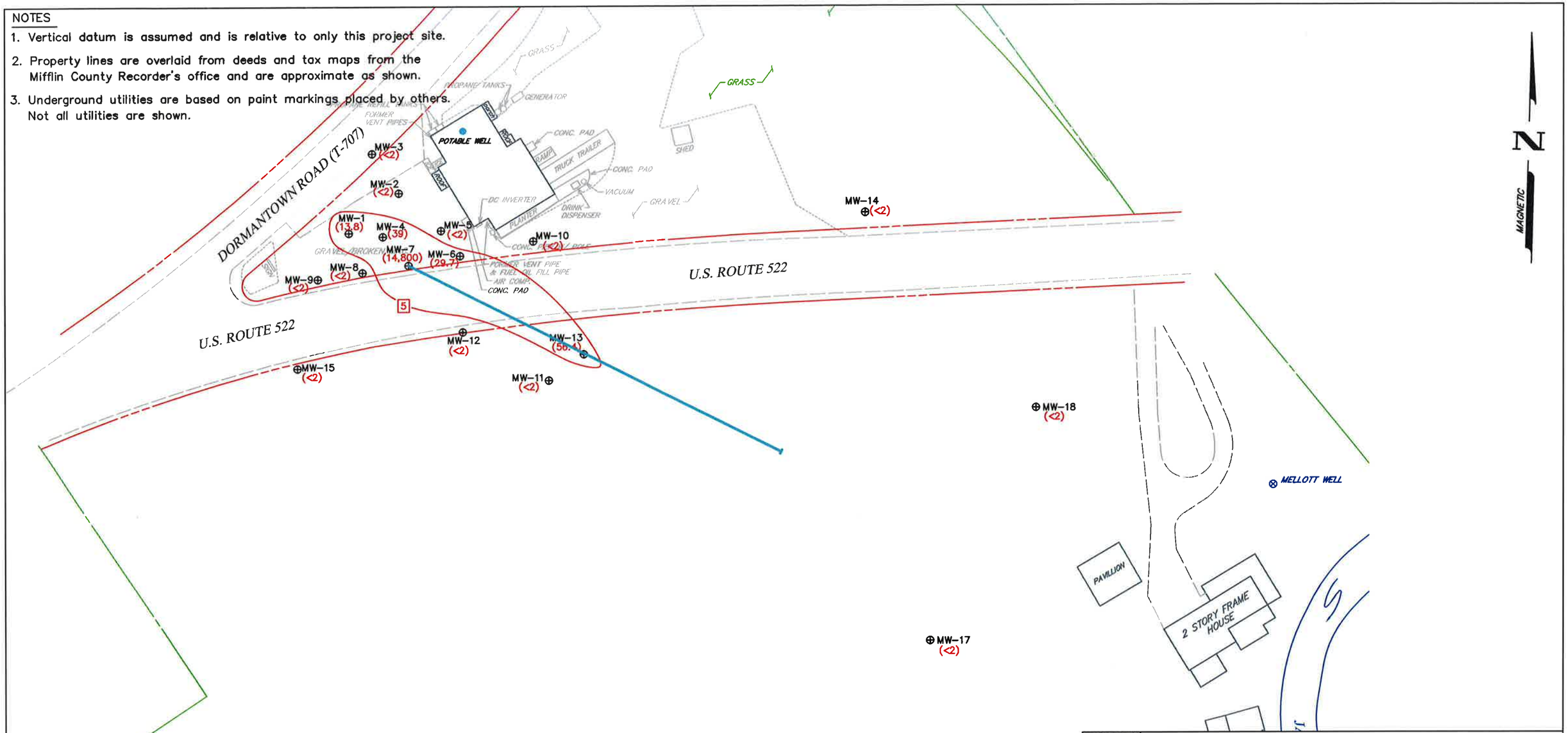

SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) BENZENE CONCENTRATION (ug/L)
- 500 BENZENE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-7 TO MW-13 (213')

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Project Manager:
Checked By:

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POINT STORE

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Mifflin County, McClure, PA

BENZENE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

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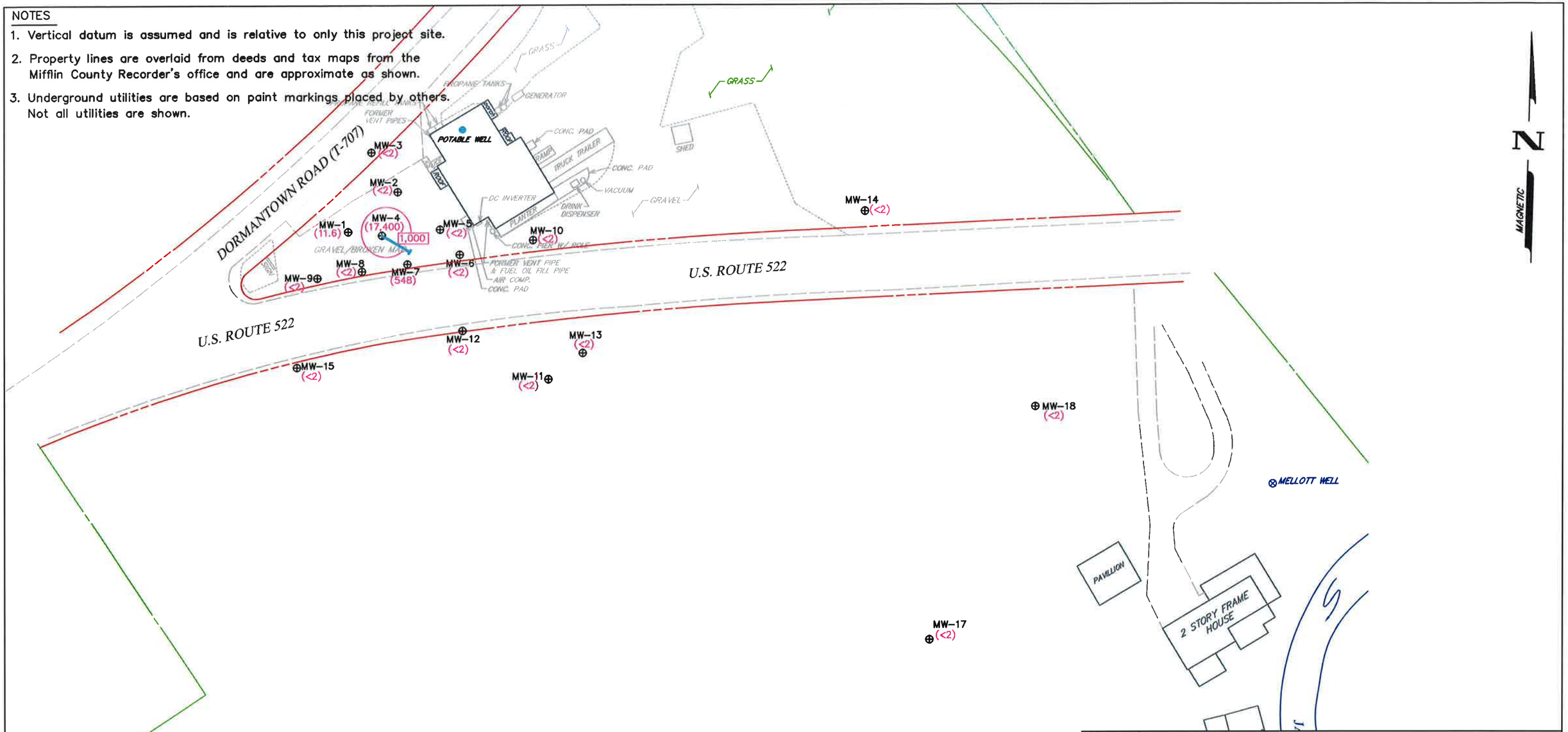

SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (105) TOLUENE CONCENTRATION (ug/L)
- 1,000 TOLUENE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-4 TO MW-13 (16.6')

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POINT STORE

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TOLUENE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

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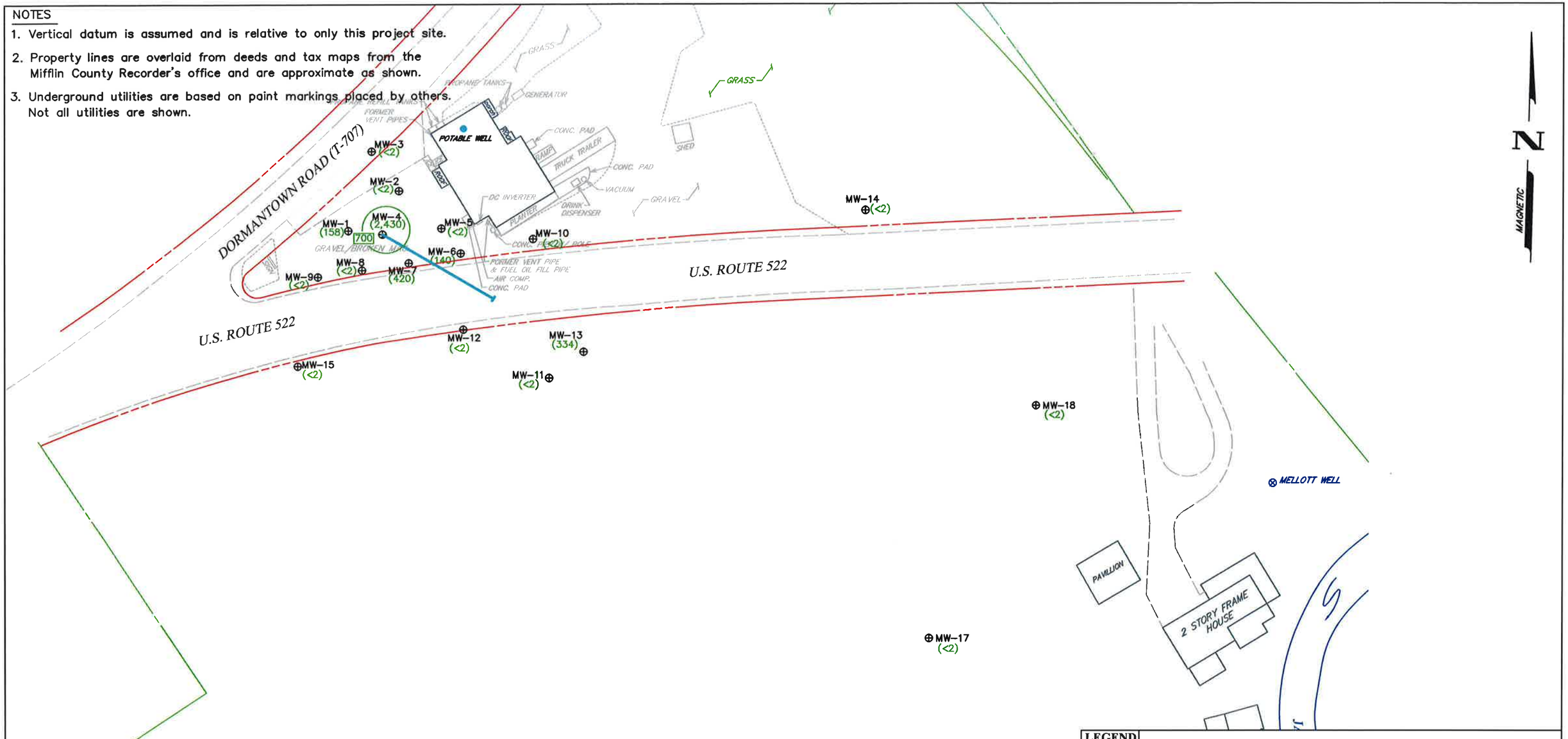

SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) ETHYLBENZENE CONCENTRATION (ug/L)
- 500 ETHYLBENZENE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-4 TO MW-13 (65.4')

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POINT STORE

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ETHYLBENZENE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

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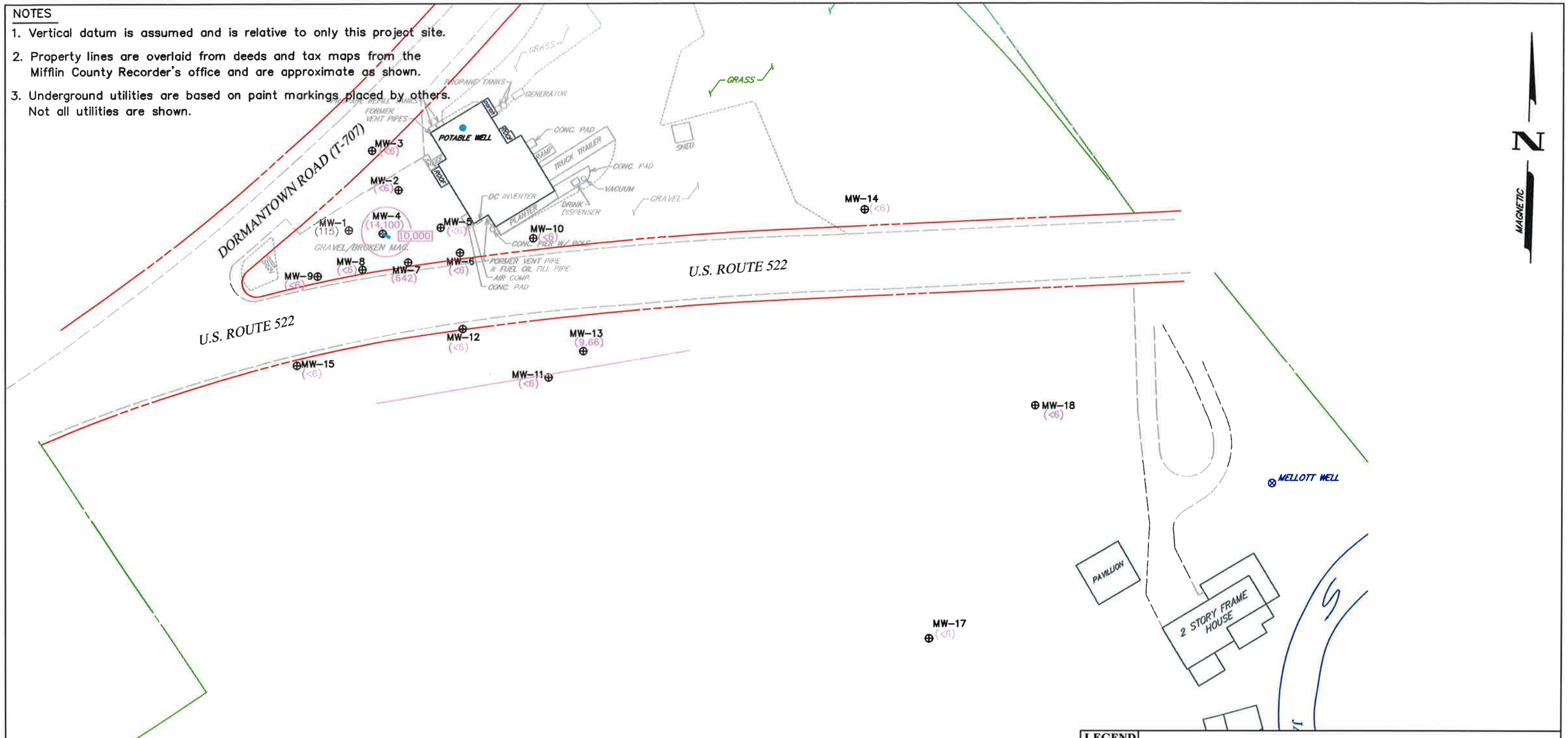

SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (200) XYLENES CONCENTRATION (ug/L)
- 10,000 XYLENES ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-4 TO MW-13 (3.8')

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TOTAL XYLENES
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

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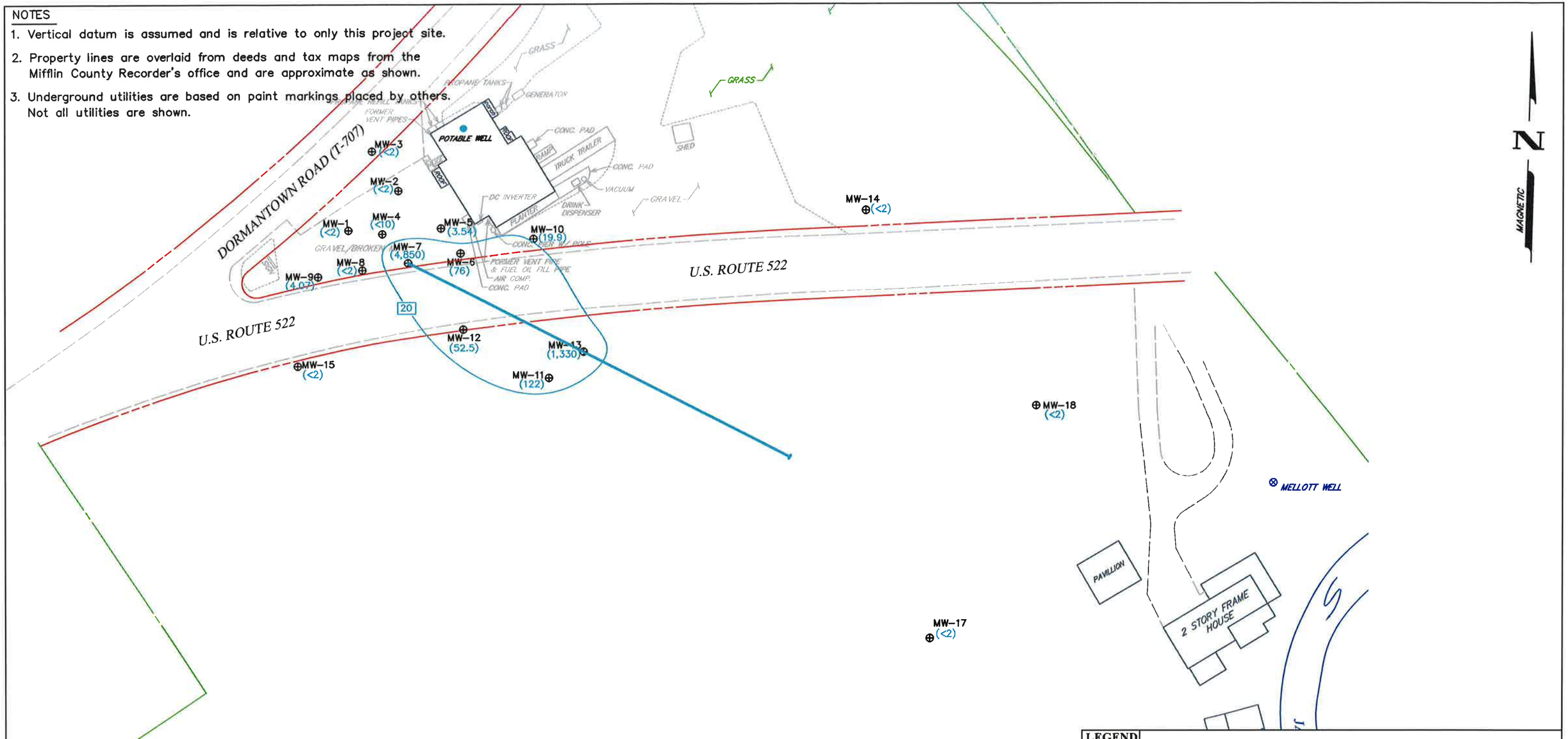

SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (158) MTBE CONCENTRATION (ug/L)
- 500 MTBE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-7 TO MW-13 (219')

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POINT STORE
5867 Highway 522 North, Decatur Township
Mifflin County, McClure, PA

MTBE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

NOTES

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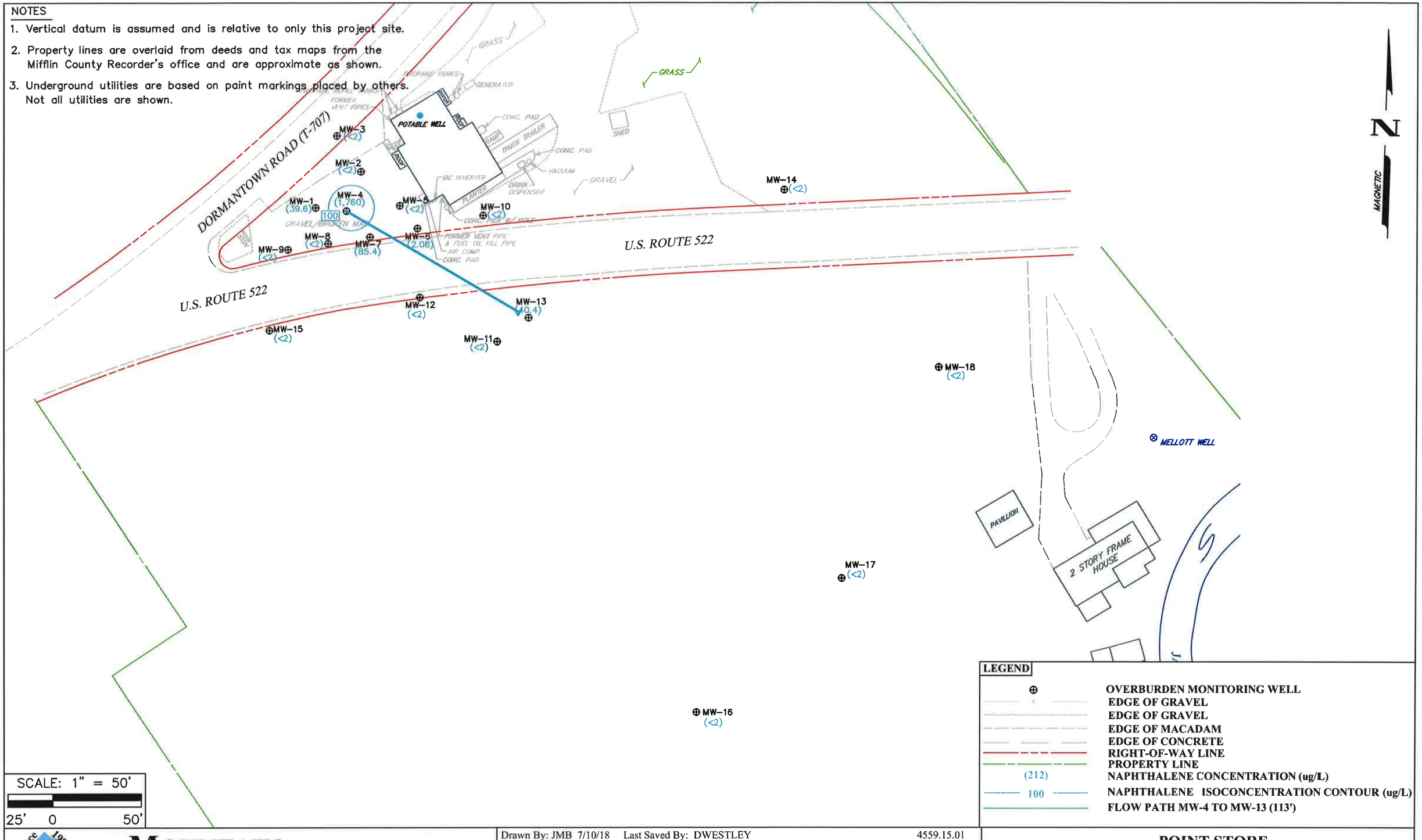

SCALE: 1" = 50'

25' 0 50'

LEGEND

- ⊕ OVERBURDEN MONITORING WELL
- EDGE OF GRAVEL
- EDGE OF GRAVEL
- EDGE OF MACADAM
- EDGE OF CONCRETE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- (212) NAPHTHALENE CONCENTRATION (ug/L)
- 100 NAPHTHALENE ISOCONCENTRATION CONTOUR (ug/L)
- FLOW PATH MW-4 TO MW-13 (113')

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POINT STORE

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NAPHTHALENE
QD MODELING 30 YEAR PREDICTED DISTANCE TO MSC

APPENDIX Q

PNDI ENVIRONMENTAL REVIEW AND WETLANDS INVENTORY MAP

1. PROJECT INFORMATION

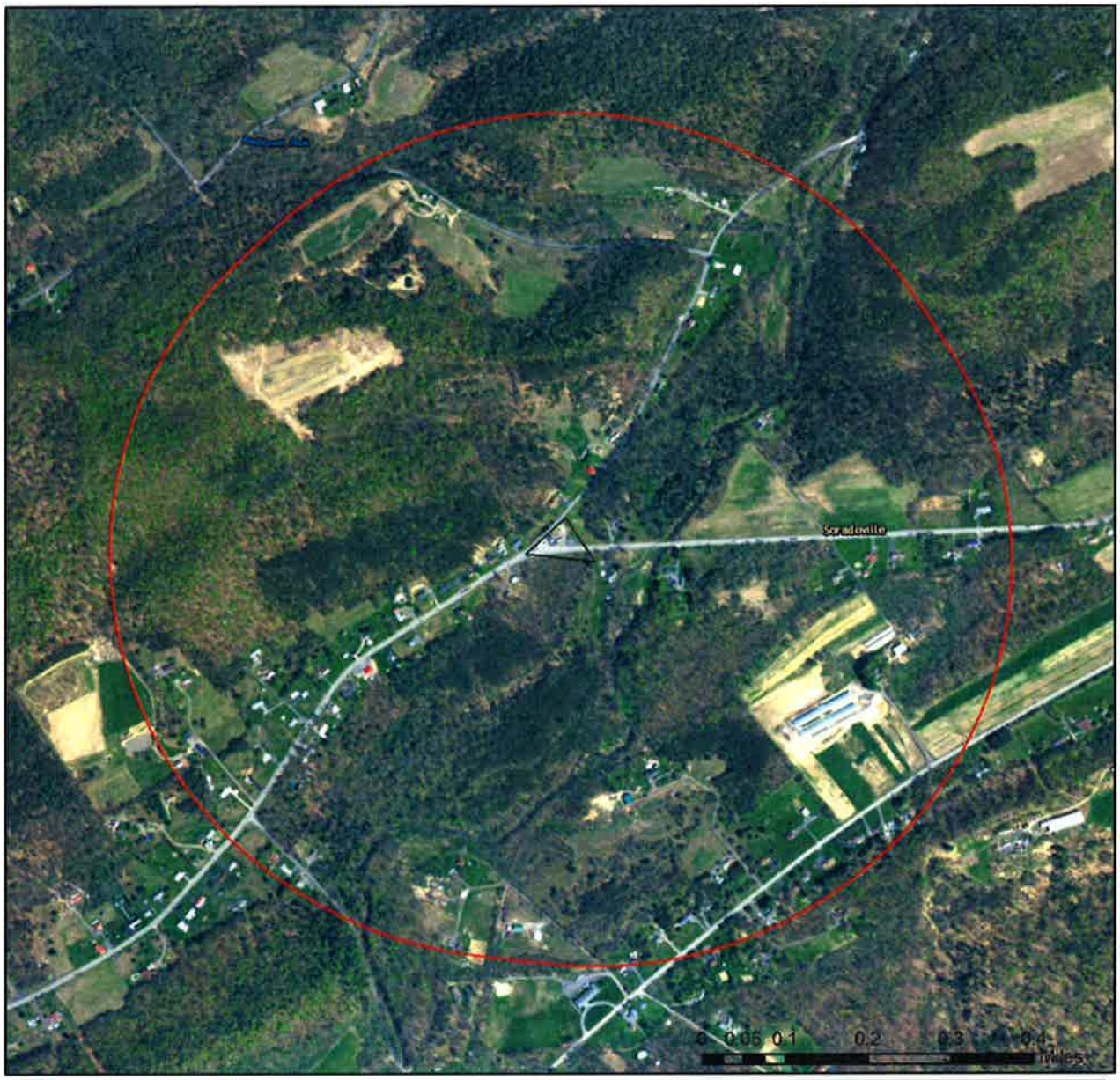
Project Name: **Point Store**
Date of Review: **6/1/2017 01:43:59 PM**
Project Category: **Hazardous Waste Clean-up, Site Remediation, and Reclamation, Spill (e.g., oil, chemical)**
Project Area: **1.32 acres**
County(s): **Mifflin**
Township/Municipality(s): **DECATUR**
ZIP Code: **17841**
Quadrangle Name(s): **ALFARATA**
Watersheds HUC 8: **Lower Juniata**
Watersheds HUC 12: **Meadow Creek-Jacks Creek**
Decimal Degrees: **40.680098, -77.411417**
Degrees Minutes Seconds: **40° 40' 48.3537" N, 77° 24' 41.1000" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Point Store

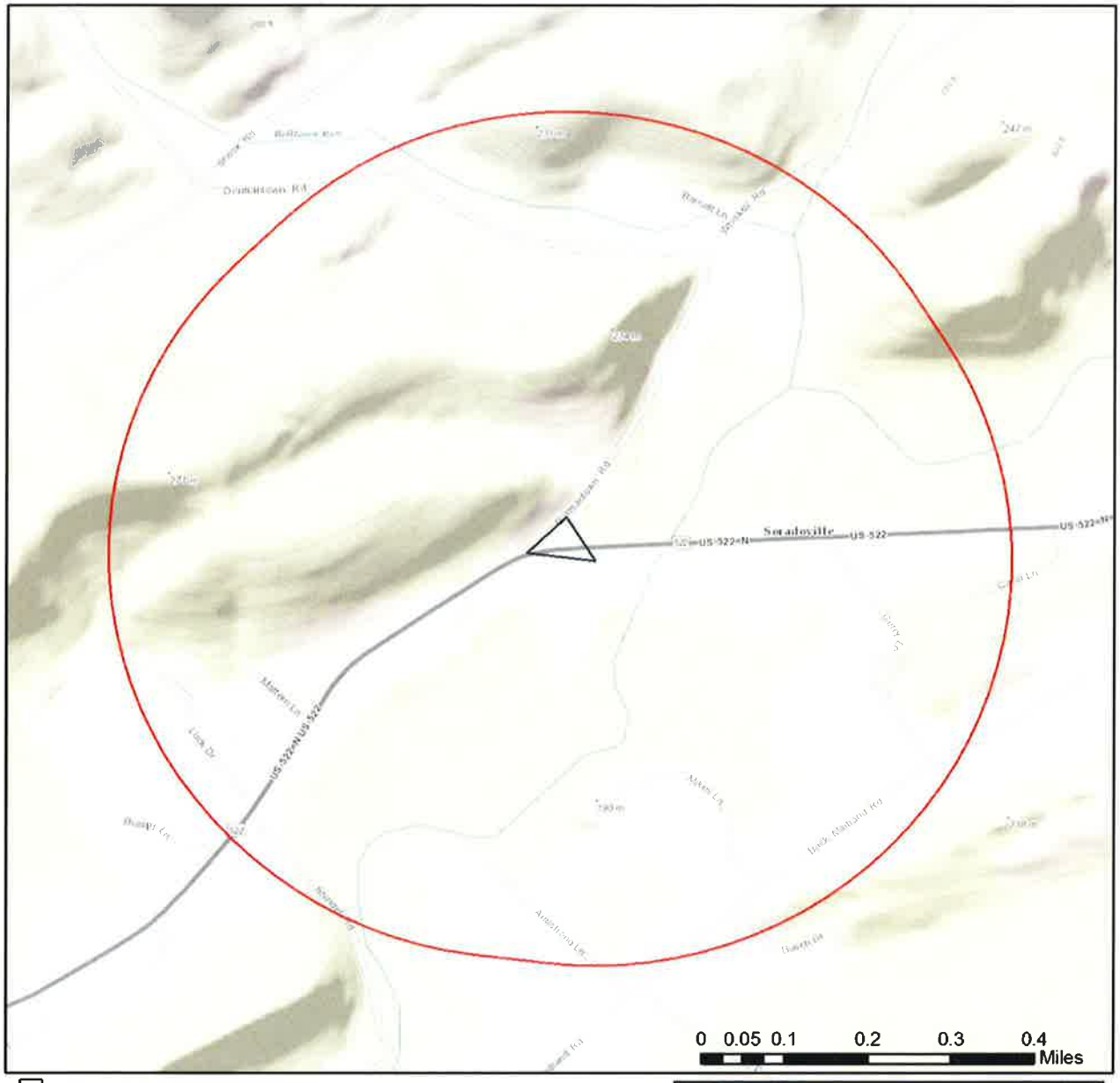


Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user

Point Store



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Will the entire project area (including any discharge), plus a 300 feet buffer around the project area, all occur in or on an existing building, parking lot, driveway, road, road shoulder, street, runway, paved area, railroad bed, maintained (periodically mown) lawn, crop agriculture field or maintained orchard?
Your answer is: Unknown

Q2: Is tree removal, tree cutting or forest clearing necessary to implement all aspects of this project?
Your answer is: No

Q3: How many acres of woodland, forest, forested fencerows and trees will be cut, cleared, removed, disturbed or flooded (inundated) as a result of carrying out all aspects or phases of this project? [Round acreages UP to the nearest acre (e.g., 0.2 acres = 1 acre).]
Your answer is: zero acres

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Carex lupuliformis	False Hop Sedge	Special Concern Species*	Endangered	Frts late July - early October

PA Fish and Boat Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).
***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

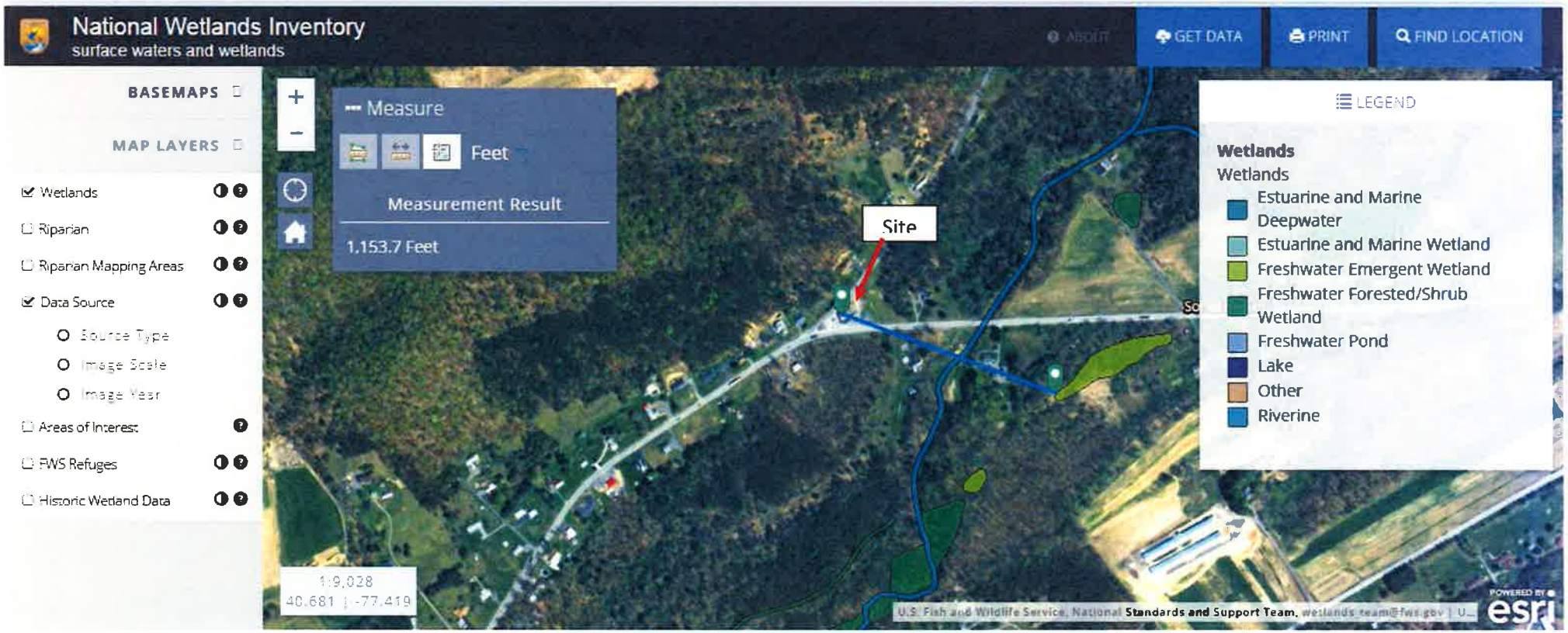
7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date



Wetlands Mapper Inventory Search Conducted June 1, 2017
Point Store, McClure, PA