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October 4, 2019

Submitted Via Email

Mr. Brian Sadowski
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Subject: Former Carborundum Company, Globar
3425 Hyde Park Boulevard, Town of Niagara, Niagara County, New York
NYSDEC Site No. 932036
2019 Remedy Enhancement Evaluation Work Plan

Dear Mr. Sadowski,

On behalf of Elm Holdings Inc., AECOM Technical Services, Inc. (AECOM) is pleased to provide this 2019 Remedy Enhancement Evaluation Work Plan (Work Plan). Remedy enhancement (i.e., enhanced *in situ* bioremediation of chlorinated compounds of concern (COCs) in groundwater) is currently being evaluated for the former Carborundum Company, Globar Site located at 3425 Hyde Park Boulevard, Town of Niagara, Niagara County, New York (Site), New York State Department of Environmental Conservation (NYSDEC) Site No. 932036. This Work Plan describes baseline sampling being evaluated for the Site. Data collected during the baseline sampling would be used to aid in the development of a groundwater remedy enhancement (i.e., bioremediation injections), if appropriate. The goal of the remedy enhancement would be to further progress the remedy for the Site to allow for reclassification from a Registry of Inactive Hazardous Waste Disposal Sites (Registry) Class 4 site to Class C (delisted) Site. Groundwater remedy enhancement would be considered following agreement with NYSDEC that the goal of delisting the site can be met.

The baseline sampling would be performed to determine which injectate (through biostimulation and/or bioaugmentation) would present best likelihood to further reduce remnant chlorinated volatile organic compound (CVOC) concentrations at select areas of the Site. The evaluation of available Site data, including data obtained from the proposed baseline sampling, would inform the evaluation parameters required to apply this enhancement as part of ongoing remedial efforts at the Site.

This Work Plan provides the following information:

- A brief summary of the Site background, including Site history, previous investigation and remediation activities, remedial action objectives (RAOs), and Site geology/hydrogeology;
- A summary of the recently completed membrane interface probe / hydraulic profiling tool (MIP/HPT) study completed at the Site;
- A detailed scope of work for remedy enhancement baseline sampling;
- A conceptual remedy enhancement including post-enhancement groundwater sampling and reporting plan to monitor the effectiveness of the enhancement; and,
- Schedule.

I. Site Background

The following summary presents a brief description of Site history, previous investigation and remediation activities, Site RAOs, and Site geology and hydrogeology.

Figure 1 presents Project Location Plan and Figure 2 presents monitoring well locations, injection well locations, performance monitoring well locations, and Site features. The Site property is a 5 acre active manufacturing plant located in the Town of Niagara at the intersection of Hyde Park Boulevard and Rhode Island Street. The Carborundum Company purchased the property from the Globar Company in 1936. BP America subsequently purchased the Carborundum Company. The Globar facility was subsequently sold in 1993 to CESIWID, Inc. and CESIWID, Inc. sold the facility to Kanthal-Globar. Kanthal-Globar then sold the property in 2008 to 3425 Hyde Park Boulevard, LLC, the current owner; however, BP America retained the responsibility for certain pre-existing conditions when they sold the facility to CESIWID, Inc.

In 1985, the Carborundum Company collected samples to assess soil and groundwater contamination. In 1987, the United States Environmental Protection Agency completed a preliminary assessment and referred the Site to the State of New York. In 1990, NYSDEC completed a Preliminary Site Assessment (PSA). As a result of the completed investigations, the Site remained on the Registry as a Class 2a site. Subsequently, the Carborundum Company completed a PSA in 1993, which found contamination (hazardous waste) in Site soils and groundwater resulting from past spills and leaks from bulk chemical storage. As a result, the Site was upgraded to a Class 2 Registry site. Since 1993, a series of investigations were completed to define the extent of soil and groundwater contamination.

This contamination is being addressed under the direction of NYSDEC under the 1995 Order on Consent and associated modifications. The Order on Consent required a Remedial Investigation/Feasibility Study (RI/FS). The RI Report was issued in January 1997. A supplemental investigation was completed, and the Phase II RI Report was issued in May 1998. The results of these investigations lead to a soil removal interim remedial measure, which was completed in 1999, to remove on-site soils with residual volatile organic compounds (VOCs).

The FS was completed in January 2000. Later in 2000, the NYSDEC issued a Record of Decision (ROD) which segmented the Site into three Operable Units (OUs):

- OU1 – On-site soil,
- OU2 – Groundwater beneath the Site, and
- OU3 – Off-site soil east of the Site.

Following the issuance of the ROD for OU3, additional soil removal was conducted east of the property boundaries in 2002. Since that time, OU1 and OU3 have been closed.

For OU2, NYSDEC selected No Further Action with groundwater monitoring. Semi-annual groundwater sampling began in 2000. In 2005, NYSDEC requested that groundwater monitoring be continued but annually on an alternating spring/fall schedule. Since this request from NYSDEC in 2005, annual groundwater monitoring has been conducted and includes the collection of groundwater samples for chemical analysis of CVOCs and natural attenuation parameters. Key chlorinated COCs present at select locations in the groundwater at the Site are trichloroethene (TCE), dichloroethene (DCE), 1,1-dichloroethane (DCA), and vinyl chloride (VC).

As stated in the ROD, the remedial goals for the Site are dependent on natural attenuation. In 2005, after review of the first Five Year Review Report (Intera, 2005), NYSDEC suggested that,

although natural attenuation was occurring, progress towards remediation was slow. Therefore, remedial alternatives were evaluated and in the 2006 Remedial Alternatives Report (Parsons 2006) that was submitted to NYSDEC, application of enhanced *in situ* bioremediation was chosen as the preferred alternative for pilot testing.

Bioremediation injections using emulsified vegetable oil (EVO) and microorganisms were completed in 2008 (overburden), 2009 (overburden and bedrock), 2011 (overburden) and 2013 (overburden and bedrock). Terra Systems, Inc. (TSI) SRS®-SD was used for all overburden injections, SRS®-FR was used for all bedrock injections, and TSI-DC® bioaugmentation culture was used for microorganism bioaugmentation. The remedial objective of enhancing the natural attenuation process in groundwater was achieved through the bioremediation injections conducted between 2008 and 2013.

In March 2013 the NYSDEC reclassified the Site from Class 2 to Class 4 on the Registry. The Class 4 classification is assigned to a site that has been properly closed but requires continued site management. Class 4 sites have not necessarily been brought into compliance with standards, criteria, or guidance (SCGs). Based on the current CVOC concentrations observed in groundwater at the Site greater than Site SCGs, additional injections are being considered to further progress the Site to the remedial goals set forth in the ROD (i.e., meet Site SCGs and be protective of human health and the environment). If the remedial goals are met, the goal is to then have the Site delisted from a Class 4 Registry site and classified as a Class C non-registry site.

Site Geology/Hydrogeology

Overburden

The native soils underlying the Site generally consist of a heterogeneous mixture of silt and clay, with minor proportions of sand and gravel, with the coarse fraction existing as both embedded grains in the silt and clay and as lenses. There is a zone of coarser grained material observed near (or at) the top of bedrock. Groundwater in the overburden is observed from approximately five to 20 feet below ground surface (bgs). Top of bedrock is typically occurs 20 to 27 feet bgs. In general, overburden groundwater flow is from northeast to southwest with a gently sloping gradient in the central portion of the Site with steeper gradients in both the northeast and southwest portions of the Site.

Bedrock

Overburden at the Site is underlain by fractured Middle Silurian Dolostone (greater than 20 feet bgs) of the Lockport Group. The bedrock groundwater flow direction is west/southwesterly towards Hyde Park Boulevard and Rhode Island Avenue. Regionally, groundwater flow is affected by the Niagara River Gorge located approximately 1.5 miles west of the Site.

Attachment 1 presents the following:

- overburden and bedrock groundwater elevation contour figures developed using data collected Fall 2017 and Spring 2018;
- figures presenting CVOC concentrations in the overburden and bedrock zones for 2000 through Spring 2018;
- long-term time-series plots for total CVOCs at source area and downgradient wells; and,
- long-term CVOC trends for six overburden (MW-4A, -7A, -5A, -10A, -12A, and -16A) and ten bedrock (MW-5B, -10B, 11B, -12B, -13B, -14B, -15, -16B, -17B, and -18B) wells.

II. MIP/HPT Study – November 2016

A Membrane Interface Probe/Hydraulic Profiling Tool (MIP/HPT) study was completed to provide additional data to supplement the site conceptual model (SCM) with respect to deeper overburden lithology and groundwater quality. The MIP/HPT data along with data collected during the potential baseline sampling described below would provide for improved understanding of long-term groundwater monitoring data interpretation and assessment of remedy enhancement.

In accordance with the Work Plan submitted to NYSDEC on November 21, 2016, the MIP/HPT study was performed on November 29 and 30, 2016 by Parratt-Wolff, Inc. (East Syracuse, NY) under the supervision of a qualified AECOM geologist.

The MIP/HPT study focused on three areas of monitoring wells: MW-10A/MW-5A, MW-17A, and MW-18A. A total of nine investigation points were completed, as follows:

- MW-10/MW-5A area - MIP-1 through MIP-4;
- MW-17A area - MIP-5 through MIP-7; and,
- MW-18A area - MIP-8 and MIP-9.

The locations of the investigation points are shown on Figure 3.

The MIP/HPT logs are provided in Attachment 2. The MIP/HPT logs present direct-reading, continuous screening using the following sensors:

- PID – Photoionization Detector (detects general VOCs);
- FID – Flame Ionization Detector (detects general VOCs; greater ionization potential than PID);
- XSD – Halogen Specific Detector (detects chlorinated VOCs);
- EC – Electrical Conductivity Detector – Conductivity of soils to help determine soil composition (cohesive materials show higher response; granular materials show lesser response); and,
- HPT – Flow and pressure measurements are produced to estimate hydraulic conductivity values and to help confirm soil composition.

Table 1 presents a summary of MIP/HPT boring details.

The MIP logs show VOC impacts peak at just above refusal, which has been interpreted to be the top of glacial till based on review of boring logs from surrounding wells. HPT logs show limited hydraulic conductivity nearer ground surface with an increase in hydraulic conductivity nearer the bottom approximately 5-8 feet at each sample point (approximately 15 to 20 feet bgs).

The increase in VOC impacts and the increased hydraulic conductivity at the bottom of each point are conditions considered favorable for implementation of an injection-related technology to reduce CVOC concentrations and enhance control of CVOCs in the zones of interest. MIP/HPT cross-sections are presented in Attachment 3. The cross-sections present XSD response (halogenated organics); a greater response indicates potential for greater presence of halogenated organics. The cross-sections show greatest response west of MW-5A and south of PMW-7. This information would be considered when evaluating the locations of the potential remedy enhancement pilot study areas.

III. Baseline Sampling

Currently, annual groundwater monitoring is conducted on an alternating spring/fall schedule at the Site. The next annual groundwater monitoring is scheduled to be completed in Fall 2019. AECOM is evaluating expanding the annual sampling to include baseline sampling for the contemplated remedy enhancement. Annual sampling includes the collection of groundwater samples for chemical analysis of the following parameters:

- select CVOCs including tetrachloroethene (PCE), TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, DCA, 1-1-1-trichloroethane (TCA), VC, and chloroethane,
- natural attenuation parameters (at 15 wells):
    - dissolved iron
    - methane, ethane, ethene, and propane;
    - chloride, sulfate, and sulfide; and,
    - total organic carbon (TOC), BOD, chemical oxygen demand, and total chloride, nitrate, nitrite, and sulfate.

AECOM is considering in addition to the collection of the routine annual samples that samples be collected for the analysis for dechlorinating bacteria (*Dehalococcoides* and *Dehalobactor*) and reductase enzymes, which are indicative of degradation of TCE and VC. These additional samples would be collected from an overburden and a bedrock well from focused areas of the site, where total CVOC concentrations are typically greater than 50 ppb; including:

- Overburden wells: MW-7A, MW-10A, MW-18A
- Bedrock wells: MW-6, MW-10B, MW-18B

A site plan showing the monitoring well locations is provided as Figure 2. Annual samples will be collected in accordance with the groundwater monitoring work plan (DE&S 2000) for Operable Unit 2 (OU2), approved by the NYSDEC, correspondence from NYSDEC dated September 28, 2005 (NYSDEC 2005) and April 8, 2014 (NYSDEC 2014), and letters to NYSDEC dated August 20, 2013 (Parsons 2013) and April 3, 2014 (Parsons 2014).

IV. Remedy Enhancement Details

Following the evaluation of available Site data, including historical data, MIP/HPT field study data, and baseline sampling results, if collected, a pilot study to evaluate the performance of an injectate would be evaluated at the Site. Details of the pilot study would be provided to NYSDEC upon completion of the evaluation and prior to implementing a pilot study.

Objectives

The injection pilot study would be performed to determine the effectiveness of CVOC mass reduction within the treatment zone. The objectives of the pilot study would include the following:

- Evaluate the reduction of CVOC concentrations following pilot study injections;
- Assess the distribution and persistence of CVOCs post-injections; and,
- Evaluate the longer-term response of Site geochemistry post-injections.

Approach

The approach/final design, including injection point spacing, number of injection points, and target treatment area and thickness, for injectate delivery to the subsurface would be provided to NYSDEC once the injectate is determined. The injection may be completed using a series of DPT

injection points (overburden) and/or a series of existing or new dedicated overburden and bedrock wells.

Injectate Background

The remedial objective of enhancing the natural attenuation process in groundwater was achieved through the bioremediation injections conducted between 2008 and 2013; therefore, AECOM would evaluate injecting the previously used substrate (Terra Systems, Inc. (TSI) SRS®-SD for overburden injections, SRS®-FR for bedrock injections, and TSI-DC® bioaugmentation culture for microorganism bioaugmentation). Alternately, AECOM would also evaluate the use of an emulsified fatty acidy product (ABC-Ole+®). Additional information on ABC-Ole+® is provided below:

ABC-Ole+® Background

ABC-Ole+® is an emulsified fatty acid product designed to address anaerobic bioremediation sites. ABC-Olé is a modified blend of ABC® which contains a fatty acid content ranging from 50-85%. ABC®, which has been onthe market since 2004, is a patented mixture of carbon substrates that historically included lactates, lactate esters (ethyl lactate), alcohols, fatty acids, and a phosphate buffer. The lactate components serve as the short-term (more quickly consumed) components and the fatty acids serve as long- term releasing components. The phosphate buffer provides phosphates and pH control. Phosphates are an essential micronutrient for bioremediation. A pH range of 5.5 to 8.5 is optimal for complete dechlorination. The addition of zero valent iron (ZVI) to the ABC® mixture provides several advantages for enhanced reductive dechlorination (ERD). The ZVI will provide an immediate abiotic reductive dechlorination process. Redox Tech originally utilized soybean oil for a long-lasting component, but after having an emulsion break in situ in 2005, Redox Tech switched to C18 fatty acids (Oleic Acid). Additional information would be provided to NYSDEC if upon evaluation this injectate may be more effective based on current Site conditions.

V. Pilot Study Injection Plan

Health and Safety

The approved Site-specific health and safety plan (HASP) would be updated to include task-specific health and safety concerns associated with subsurface drilling and injections. The Site-specific HASP would be updated and reviewed by the project team prior to initiating work contemplated in this Work Plan. The update would include addition of the Safety Data Sheet (SDS) for the injectate.

Pre-Mobilization

A United States Environmental Protection Agency (EPA) Region 2 Underground Injection Control (UIC) Permit is not required for Class V Remediation Wells; however, notification for inventory is required. A EPA Region 2 UIC Notification Form (accessed at https://www.epa.gov/uic/underground-injection-control-reporting-forms-owners-or-operators) would be completed and submitted to EPA Region 2 prior to implementing the pilot study, if performed; see https://www.epa.gov/uic/underground-injection-control-epa-region-2-nj-ny-pr-and-vi for

submittal information. A copy of the completed form would be provided to NYSDEC prior to mobilizing to the Site.

Mobilization

Prior to beginning any intrusive activities, the drilling subcontractor would contact the Underground Facilities Protection Organization (UFPO) to markout utilities in proposed investigation areas. The intended drilling locations would be marked with spray paint or flagging and an independent utility mark out subcontractor would be called out to locate utilities in drilling areas not covered by the UFPO. In addition, the current property owner would be contacted to provide available utility information to assist in locating on-site underground utilities. If necessary based on utility locations, drilling locations would be moved to avoid potential utilities.

Geophysical surveys would be conducted to obtain information on subsurface conditions or features, including utilities or obstructions. It is anticipated that ground-penetrating radar (GPR) would be the method utilized in this investigation. GPR utilizes high frequency radio waves to acquire subsurface information. From a small antenna, which is moved slowly across the ground surface, energy is radiated downward into the subsurface. This energy is then reflected back to the receiving antenna, where variations in the return signal are continuously recorded. This produces a continuous cross-section of the shallow subsurface conditions. Radar responds well to the different electrical properties between rock units, soils, groundwater, and most importantly for this application, buried pipes, utilities, and foundations.

At the start of intrusive fieldwork, clearance of underground utilities would be performed using non-mechanical means. An air knife and vacuum or equivalent would be utilized to advance each boring from the ground surface to approximately five feet to prevent disruption of any potential underground utilities. Disturbed soils would be collected in approved 55-gallon steel drums and staged onsite. A sample would be collected and submitted for characterization analysis to determine appropriate disposal.

Injections

NYSDEC would be informed of the proposed area(s) for the pilot study pending the completion of the remedy enhancement evaluation. NYSDEC would be informed of the final determined number, type, and locations prior to implementation.

Injectate

The injectate selected for the remedy enhancement would be a product that has been proven effective addressing similar CVOCs at similar concentrations as are present at this Site.

Injection Procedures

Details of the injection procedures would be provided to NYSDEC following the data evaluation.

The following data, associated with delivery hydraulics, would be collected during the injection process.

- Injection location;
- Injection interval;
- Injection solution flow rate;
- Injection pressure;
- Temperature, pH, and specific conductance of the injection solution; and,

- Cumulative volume of injection solution delivered to the injection point.

An injection log sheet would be used to record data during injection activities.

A critical component of the pilot study would be groundwater monitoring to monitor performance. The performance monitoring program would include laboratory analysis and field measurement of selected parameters during performance monitoring events. The groundwater monitoring program established for the field test consists of three components:

- Baseline groundwater monitoring, as previously described above;
- Injection monitoring; and,
- Post-injection monitoring (process and performance).

Details of the injection and post-injection monitoring would be provided following the remedy enhancement evaluation.

VI. Pilot Study Reporting

Data obtained during the pilot study would be utilized in real-time to evaluate the performance monitoring program, and evaluate the need for follow-up injections, if appropriate. Monitoring data would be tabulated, reviewed, and interpreted to evaluate the effectiveness of the pilot study injections in terms of distribution, trending of aquifer geochemical conditions (i.e., field parameter data), and contaminant reduction. If necessary, adjustments would be made to the monitoring program based on the results of the previous sampling round.

The results of the pilot study would be used to further refine the site conceptual model. The Pilot Study Report would contain, at a minimum, the following information:

- Statement of the pilot study objective and purpose;
- Summary of the pilot study field activities including any deviations from the approved work plan;
- Summary and interpretation of the pilot study results; and,
- Subsequent recommendations whether or not to move forward with additional studies.

The report appendices would include relevant boring logs, injection logs, sample collection logs or field notes, and analytical data reports.

VII. Schedule

Pending approval of this Evaluation Work Plan, AECOM would schedule baseline sampling. AECOM has tentatively scheduled to complete this work in Fall 2019. Following completion of the remedy enhancement evaluation, a meeting with NYSDEC would be scheduled to discuss remedy enhancement options and to determine if delisting of the Site could be accomplished. If it is agreed that delisting of the Site would be feasible, a letter would be prepared and submitted to NYSDEC which will include details of the injection pilot study, such as recommended number, type, and location of injection points, as well as type (percent solution) and volume of injectate.

If you have any questions regarding this submission, please do not hesitate to contact me at (716) 923-1300 or via email at james.kaczor@aecom.com.

Sincerely yours,

James L. Kaczor, PG
Hyde Park Site Task Manager
james.kaczor@aecom.com

Attachments

cc: Glenn May, NYSDEC
Project File 6048176.17

Table

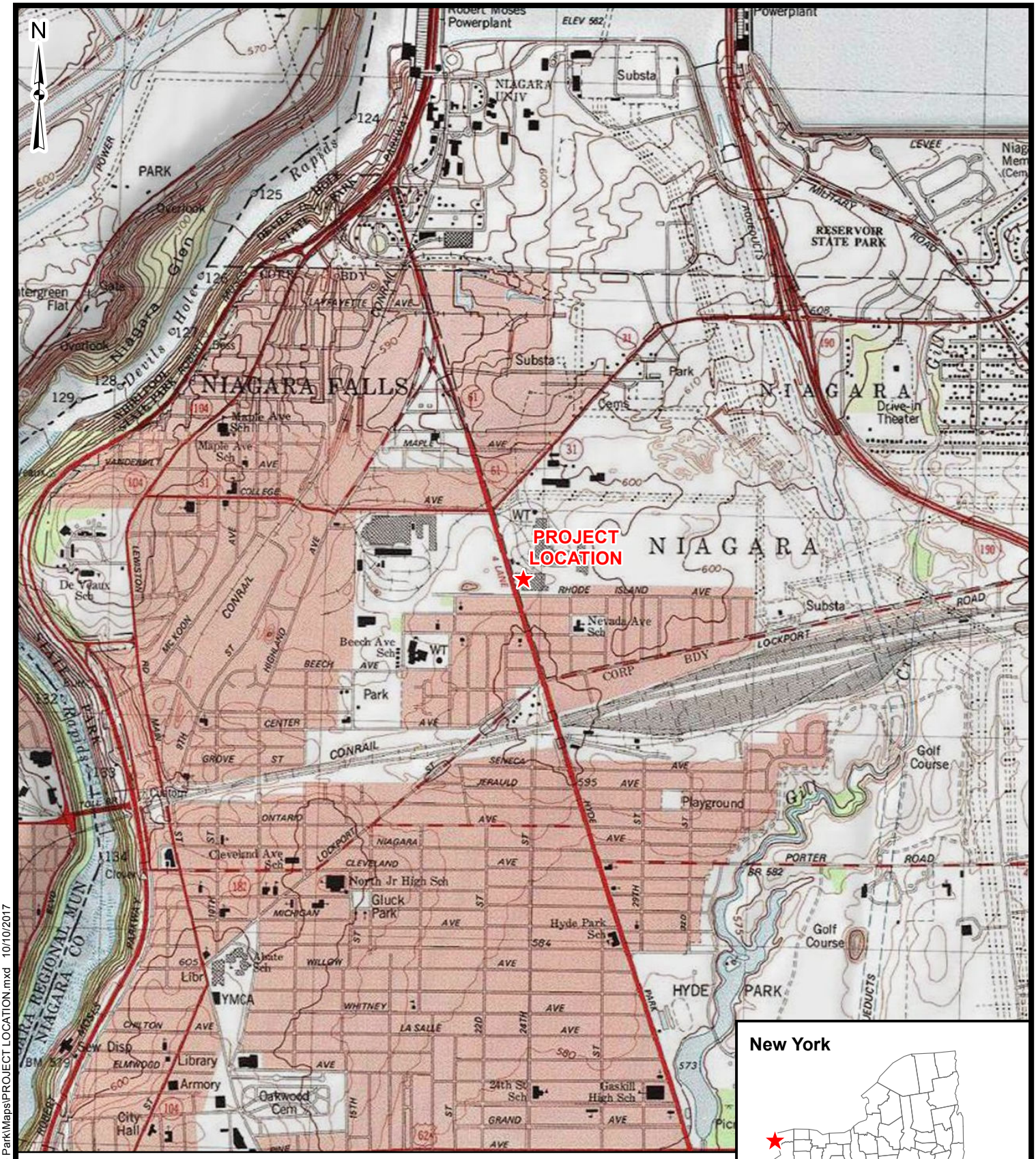
Table 1

MIP/HPT Summary
Former Carborundum Company, Hyde Park Facility
Town of Niagara, New York
NYSDEC Site No. 932036

Boring ID	Date Completed	Time Started	Time Finished	Depth to Refusal (ft)	Notes
MIP-1	11/29/2016	8:27 AM	9:35 AM	19.85	
MIP-2	11/29/2016	10:11 AM	11:01 AM	19.65	
MIP-3	11/29/2016	3:24 PM	4:04 PM	18	Elevated response
MIP-4	11/30/2016	9:02 AM	10:01 AM	18.50	
MIP-5	11/30/2016	11:14 AM	11:41 AM	19	
MIP-6	11/30/2016	11:58 AM	12:36 PM	19.55	Elevated response
MIP-7	11/30/2016	12:56 PM	1:38 PM	21.7	
MIP-8	11/30/2016	2:13 PM	2:53 PM	18.4	
MIP-9	11/30/2016	4:28 PM	4:55 PM	15.3	

Notes:
MIP/HPT - Membrane Interface Probe / Hydraulic Profiling Tool
ft - feet

Figures



Source: USA Topo Maps, ESRI Map Service;
1:24,000-scale USGS Topographic Map,
Lewiston, 1996
Niagara Falls, 1996

2,000 0 2,000 Feet

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FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
PROJECT LOCATION PLAN

FIGURE 1

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N

PMW- 1
INJ- 2
INJ- 5L
INJ- 5U
PMW- 4
MW-7A
INJ- 1
MW- 8
MW- 3B
MW- 3A
INJ- 9
MW- 4B
INJ-10
MW- 4A
MW- 6
MW- 2B
MW- 2A
PMW- 3
PMW- 2
MW-7B
INJ- 6L
INJ- 6U
INJ- 7
INJ- 8
MW-16A
MW-16B
PMW- 8
KANTHAL-GLOBAR BUILDING
INJ- 3
MW-17A
INJ- 4
PMW- 5
MW-17B
PMW- 7
PMW- 6
MW-19B
MW-19A
BRICK
BLDG
PMW- 9
MW-18A
MW-18B
HYDE PARK BOULEVARD
MW-12B
MW-12A
MW-11A
MW-11B
MW-10B
MW-10A
MW- 5A
MW- 5B
MW- 1A
MW- 1B
RHODE ISLAND AVENUE
MW-14B
MW-14A
MW-13B
MW-13A
MW-15

Legend

- Injection Well
- Monitoring Well
- Performance Monitoring Well
- Fence Line

Source: ESRI World Imagery

60 0 60 Feet

FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
SITE PLAN

AECOM

FIGURE 2

J:\Projects\60481767_BPIPO\MtSC\GIS\Hyde Park\Maps\SITE PLAN.mxd 10/26/2017

N

PMW- 1
INJ- 2
INJ- 5L
INJ- 5U
PMW- 4
MW-7A
INJ- 1
PMW- 3
MW- 6
MW- 2B
MW- 2A
PMW- 2
MW-7B
INJ- 6L
INJ- 6U
INJ- 7
INJ- 8
MW-16A
MW-16B
PMW- 8
INJ- 9
MW- 4B
INJ-10
MW- 4A
MW- 8
MW- 3B
MW- 3A
KANTHAL-GLOBAR BUILDING
MW-17A
MIP-7
MW-17A AREA
INJ- 3
INJ- 4
MIP-5
PMW- 5
MW-17B
PMW- 7
PMW-6
MIP-6
MW-19B
MW-19A
BRICK
BLDG
PMW- 9
MW-18A
MIP-8
MIP-9
MW-18A AREA
MW-18B
MW-12B
MW-12A
HYDE PARK BOULEVARD
MW-10A/MW-5A AREA
MW-11A
MW-11B
MW-10B
MW-10A
MW- 5A
MIP-1
MIP-2
MIP-3
MIP-4
MW- 5B
MW- 1A
MW- 1B
RHODE ISLAND AVENUE
MW-14B
MW-14A
MW-13B
MW-13A
MW-15

Legend

- MIP Sample Location
- Injection Well
- Monitoring Well
- Performance Monitoring Well
- Fence Line

Source: ESRI World Imagery

60 0 60 Feet

FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
MIP/HPT LOCATIONS
(NOVEMBER 2016)

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FIGURE 3

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Attachment 1

N

INJ- 9, 587.39
INJ-10, 587.36
MW- 4A, 587.45
KANTHAL-GLOBAR BUILDING
HYDE PARK BOULEVARD
MW-12A, 586.04
MW-11A, 586.64
MW-14A, 585.35
MW-10A, 587.06
MW-13A, 586.96
MW- 7A, 588.24
PMW- 4, 588.20
INJ- 2, 587.99
PMW- 1, 588.24
INJ- 1, 588.61
MW- 2A, 588.59
PMW- 3, 588.88
INJ- 5U, 588.19
INJ- 6U, 589.41
INJ- 5L, 587.98
INJ- 6L, 587.79
PMW- 2, 588.32
INJ- 7, 589.38
INJ- 8, 588.03
MW-16A, 588.43
MW-17A, 588.48
BRICK BLDG
MW-18A, 588.37
MW- 5A, 587.17
MW- 3A, 584.59
MW-19A, 588.35
MW- 1A, 588.04
RHODE ISLAND AVENUE
585
586
587
588
589

Legend

- Injection Well
- Monitoring Well
- Performance Monitoring Well
- Groundwater Flow Direction
- Fence Line
- Groundwater Elevation Contour

Source: ESRI World Imagery

60 0 60 Feet

FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
GROUNDWATER CONTOURS
OVERBURDEN WELLS (SEPTEMBER 11, 2017)

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ATTACHMENT 1
FIGURE 1

J:\Projects\60481767_BPIP\MISC\GIS\Hyde ParkMaps\MIP_WorkPlan\2017 GROUNDWATER CONTOURS - OVERBURDEN.mxd 9/19/2017

N

MW- 4B, 587.49

MW- 6, 587.56

MW- 2B, 587.65

MW-7B, 587.94

MW- 8, 588.20

MW- 3B, 587.98

588.0

PMW- 8, 587.55

MW-16B, 588.03

KANTHAL-GLOBAR BUILDING

INJ- 3, 587.49

INJ- 4, 587.72

PMW- 5, 587.51

MW-17B, 587.49

PMW- 7, 587.24

PMW- 6, 587.21

588.2

MW-19B, 588.19

BRICK BLDG

PMW- 9, 587.53

587.4

MW-12B, 587.48

MW-18B, 587.55

HYDE PARK BOULEVARD

MW-11B, 587.01

MW-10B, 587.47

MW- 5B, 587.48

588.0

MW- 1B, 588.02

587.8

587.6

MW-14B, 587.32

587.2

587.4

RHODE ISLAND AVENUE

MW-13B, 587.02

MW-15, 587.07

587.2

Legend

- Injection Well
- Monitoring Well
- Performance Monitoring Well
- Groundwater Flow Direction
- Fence Line
- Groundwater Elevation Contour

Source: ESRI World Imagery

60 0 60 Feet

FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
GROUNDWATER CONTOURS
BEDROCK WELLS (SEPTEMBER 11, 2017)

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ATTACHMENT 1
FIGURE 2

J:\Projects\60481767_BPIPO\MISC\GIS\Hyde Park\Maps\MIP_WorkPlan\2017 GROUNDWATER CONTOURS - BEDROCK.mxd 9/19/2019

N

INJ- 9, 589.38
INJ-10, 589.46
MW- 4A, 589.36
KANTHAL-GLOBAR BUILDING
HYDE PARK BOULEVARD
MW-12A, 587.54
MW-11A, 588.53
MW-10A, 589.15
MW-14A, 583.62
MW-13A, 589.23
MW- 5A, 589.23
MW-18A, 590.14
MW-17A, 590.44
BRICK BLDG
INJ- 2, 590.17
PMW- 4, 590.50
MW- 7A, 590.76
PMW- 1, 590.56
INJ- 1, 590.79
MW- 2A, 591.15
PMW- 3, 591.17
INJ- 5U, 590.52
INJ- 6U, 592.09
INJ- 5L, 590.03
INJ- 6L, 589.99
PMW- 2, 590.81
INJ- 7, 590.42
INJ- 8, 590.46
MW-16A, 590.89
MW- 3A, 595.49
MW-19A, 590.65
MW- 1A, 590.59
RHODE ISLAND AVENUE
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Legend

- Injection Well
- Monitoring Well
- Performance Monitoring Well
- Groundwater Flow Direction
- Fence Line
- Groundwater Elevation Contour

Source: ESRI World Imagery

60 0 60 Feet

FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
GROUNDWATER CONTOURS
OVERBURDEN WELLS (APRIL 23, 2018)

AECOM

ATTACHMENT 1
FIGURE 3

J:\Projects\60481767_BPIPO\MISC\GIS\Hyde Park\Maps\MIP_WorkPlan\2018 GROUNDWATER CONTOURS - OVERBURDEN.mxd 9/19/2018

NOTE: PMW-6 and INJ-4 were not used in production of groundwater contours due to anomalous readings.

FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
GROUNDWATER CONTOURS
BEDROCK WELLS (APRIL 23, 2018)

AECOM

ATTACHMENT 1
FIGURE 4

J:\Projects\60481767_BPIPOMISC\GIS\Hyde Park\Maps\MIP_WorkPlan\2018 GROUNDWATER CONTOURS - BEDROCK.mxd 9/19/2019

MW-7A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	1200	1.8 J	1 U	1 U	1.2 J	1 U	0.5 U	0.5 U	0.5 U	0.66 U	1.7 U
DCE	4800	210	65	20	3.8 J	3.9 J	3	1.5	1.9	26	46
VC	220	150	50	19	1 U	2.2 J	1	3.1	3.7	33	42
DCA	1000	49	33	22	9.1	15	12	11	12	61 J	140

MW-4A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	2.8 J	130	94	160	7.5	4.2 J	1.2	1.2	3.4	1.3	0.44 J
DCE	74	115.7	254.9	150	140	31	3.7	1.3	2.8	0.68 J	1.1
VC	45	41	45	73	20	11	4.1	1.1	1.1	2.6	0.96 J
DCA	4.6 J	17	21	18	5.4	1.3 J	0.5 U	1	1.4	1.4	1.8

MW-2A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	NS	NS	NS	NS	NS	NS	NS	NS
DCE	1.2 J	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS
VC	2 U	1.3 J	1.2 U	NS	NS	NS	NS	NS	NS	NS	NS
DCA	13 J	26	18	NS	NS	NS	NS	NS	NS	NS	NS

MW-3A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	0.43 J	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	1.5 J	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	2 U	2 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

MW-16A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	NS	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	3.3 U	0.33 U
DCE	NS	8.2	10	11	8.4	8.5	5.9	9.1	6.5	7.3 J	1.4
VC	NS	75	180	340	110	300	140	250	18	190	33
DCA	NS	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	2.5 U	0.25 U

KANTHAL-GLOBAR BUILDING

MW-17A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	115	22	15	11	5.3	3.1 J	0.62 J	0.5 U	0.5 U	1.7 U	1.7 U
DCE	230	180	210	160	140	180	150	160	110	120	59
VC	18	25	27	30	25	45	49	86	89	120	91
DCA	59	30	20	26	21	22	16	18	15	17	11

MW-19A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	1.7 J	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	33	3.7	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	2 U	2.8	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

BRICK BLDG

MW-12A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	2.6 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	540	64	16	19	19	22	8.9	1.6	9.5	21	16
VC	49	38	16	16	13	14	6.8	9.6	8.8	13	9.2
DCA	5.9	2.7	1.6 J	1.8 J	1.8 J	1.9 J	0.89 J	0.7 J	1.1	1.6	0.91 J

MW-18A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	36	25	25	23	21	25	27	38	37	29	36
DCE	47	43	51	42	56	58	43	53	51	58	42
VC	4.4	7	2.6 J	8.4	2.4 J	3.4 J	0.86 J	2.3	0.62 J	1.8 J	1.1
DCA	5.6	4.7 J	4.2 J	4.7 J	4.2 J	4.9 J	3.6	4.7	4.3	5.0	3.7

MW-10A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.57 J	6.6 U	6.6 U
DCE	1200	409.4	397.6	630	620	580	560	710	960 D	590	540
VC	86	140	140	250	170	130	95	130	83	130	94
DCA	25	6.4	5.7	7.7	7	5.6	4.4	5.3	5.4	5.0 UJ	5.0 U

MW-5A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	1.3 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.66 U	4.1 U
DCE	320	5.9	110.97	5.7	88	110	240	150	340 D	61	250
VC	42	1.8	84	3.3 J	82	190	300	140	340 D	68	310
DCA	2.1 J	5 U	1 U	1 U	1 U	1.3 U	3.3	1.4	4.2	0.88 J	3.3 J

MW-11A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	NS	NS	NS	NS	NS	NS	NS	NS
DCE	1.3 J	5 U	1.9 J	NS	NS	NS	NS	NS	NS	NS	NS
VC	2 U	2 U	3.2 J	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5 U	5 U	1 U	NS	NS	NS	NS	NS	NS	NS	NS

RHODE ISLAND AVENUE

MW-1A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	1 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	2.4 J	1 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	0.44 J	1 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5 UJ	1 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

MW-14A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	1.6 J	1.4	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	0.37 J	2.7	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

MW-13A	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	2 U	2 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

HYDE PARK BOULEVARD

Legend

- ð Monitoring Well
- Fence Line

LOCATION ID — DATE

	MW-1A	2000
TRICHLOROETHENE	TCE	5 U
CIS 1,2-DICHLOROETHENE	DCE	2.4 J
VINYL CHLORIDE	VC	0.44 J
1,1 DICHLOROETHANE	DCA	5 UJ

RESULT

Notes:
1. Units are shown in µg/L
2. NS = Not Sampled
3. D = Result reported from a secondary dilution analysis.
4. J = The reported concentration is an estimated value.
5. U = Not detected above the reported method detection limit.
6. UJ = Not detected. The reported method detection limit is an estimated value.

Source:
ESRI World Imagery

60 0 60 Feet

FORMER CARBORUNDUM COMPANY TOWN OF NIAGARA, NEW YORK VOC CONCENTRATIONS IN OVERBURDEN GROUNDWATER (2000 - 2018)

AECOM

ATTACHMENT 1
FIGURE 5

J:\Projects\60481767_BPIPOWISC\GIS\Hyde Park\Maps\MIP_WorkPlan\2018 GROUNDWATER VOC - OVERBURDEN.mxd 9/19/2019

MW-6	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	1.7 U	0.33 U
DCE	560	85	39	33	30	24	18	20	18	16	12
VC	91	69	48	57	47	42	39	57	59	79	48
DCA	0.28 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	1.3 U	0.25 U

MW-7B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-17
TCE	5 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	84	7.3	4.5 J	6	1.6 J	1.2 J	0.5 U	1.2	0.82 J	2.2	2.2
VC	39	24	31	25	9.2	75	5.5	6.1	10	18	17
DCA	5 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U

MW-3B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	4.8 J	1.5	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	2.3	2.9	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	5	5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

MW-4B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17
TCE	3.2 J	5 U	1 U	NS	NS	NS	NS	NS	NS	NS
DCE	39	9.7	2.8	NS	NS	NS	NS	NS	NS	NS
VC	35	9.5	12	NS	NS	NS	NS	NS	NS	NS
DCA	3.2 J	5 U	1 U	NS	NS	NS	NS	NS	NS	NS

MW-2B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	0.44 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	260	9.1	3.7 J	1.8 J	2.7 J	2.3 J	1	0.87 J	0.95 J	0.77 J	1.3
VC	92	16	7.6 J	2.6 J	8.6	4 J	2.2	3.4	2.2	1.8	2.6
DCA	5 UJ	5 U	1 U	1 U	1 U	1 U	0.92 J	0.65 J	0.96 J	0.50 J	0.25 U

MW-8	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	5.55	2.1	2.3	1.9 J	1.6 J	1.7 J	1.6	1.7	1.9	1.7	1.9
VC	1.9 J	2.6	2.2	2.1 J	1.1 J	1.8 J	1.5	1.9	1.8	1.4	1.6
DCA	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U

MW-16B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	0.97 J	5 U	1 U	1 U	74	2.2 J	2.5 U	4.8	0.5 U	0.33 U	0.33 U
DCE	130	511.8	81	27	4700	600	2300	1100	0.5 U	0.30 U	0.63 J
VC	35	130	48	43	600	610	2000	780	4.3	2.6	4.6
DCA	5 U	5 U	1 U	1 U	4 J	1 J	3.4 J	6.6	2	0.39 J	0.25 U

MW-17B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	22	3.1 J	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.68 J	0.33 U
DCE	1000	280	8.5	19	20	35	1.3	0.5 U	0.5 U	10	4.9
VC	69	69	9.6	27	18	40	2.1	0.8 J	0.88 J	12	7.9
DCA	5.4	26	45	48	43	38	8.2	1.5	1.7	6.3 J	4.5

MW-19B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	2.4 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	41	68	2.1	8.7	2.3 J	2.1 J	2.9	1.8	1.1	1.6	24
VC	6.3	7.2	2.1 J	3.3 J	1.6 J	1.2 J	0.65 J	1	1.1	1.5	5.0
DCA	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.25 UJ	0.25 U

MW-12B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.66 U	0.83 U
DCE	210	2.6	11	0.98 J	5.6	43	57	13	73	52	62
VC	77	2 U	1 U	1 U	10	73	75	9.1	59	110	73
DCA	2.3 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.66 J	0.63 U

MW-18B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	7.7	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	6.6 U	0.83 U
DCE	690	62	69	150	110	120	43	35	90	380	69
VC	90	220	190	220	140	190	71	40	120	210	92
DCA	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	5.0 UJ	0.63 U

MW-11B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	1 U	1 U	1 U	1 U	0.8 U	0.5 U	0.56 J	0.54 J	1.1	0.65 J
DCE	590	56	1.9 J	2.2 J	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
VC	81	48	7.4	4.6 J	6.1	1.4 J	1.2	1.7	9.7	6.5	1.9
DCA	3.5 J	0	1.3 J	1.8 J	1.4 J	1.9 J	2	1	1.7	0.95 J	1.9

MW-10B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	68	1 U	1 U	2 U	1 U	1 U	0.5 U	0.5 U	0.5 U	3.3 U	2.6 U
DCE	1800	370	220	960	280	230	190	190	220	360	210
VC	95	150	83	180	110	120	22	190	6.1	270	12
DCA	1.2 J	1 U	1 U	2 U	1 U	1 U	0.5 U	0.9 J	0.59 J	2.5 UJ	2.0 U

MW-5B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	2.6 J	5 U	1.1 J	1 U	1 U	1 U	0.97 J	0.58 J	0.5 U	1.7 U	0.33 U
DCE	420	39	36	48	33	32	19	34	32	36	32
VC	45	37	39	63	34	44	33	63	71	91	78
DCA	1.1 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	1.3 U	0.30 J

MW-14B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	300	64	16	4.1 J	1.5 J	0.8 U	0.67 J	0.95 J	0.94 J	0.92 J	0.72 J
VC	110	86	33	5.4	5.4	1.5 J	1.2	1.5	1.2	2.9	1.3
DCA	0.61 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.53 J	0.5 U	0.43 J	0.34 J

MW-1B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	1 U	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCE	4.7 J	0.8	NS	NS	NS	NS	NS	NS	NS	NS	NS
VC	3.8	1.7	NS	NS	NS	NS	NS	NS	NS	NS	NS
DCA	1.5 J	1 U	NS	NS	NS	NS	NS	NS	NS	NS	NS

MW-15	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	5 U	5 U	1 U	1 U	1 U	1 U	NS	NS	NS	NS	0.10 UJ
DCE	400	57.1	5.9	32	0.8 U	0.8 U	NS	NS	NS	NS	5.2
VC	120	82	17	52	1.8 J	2 J	NS	NS	NS	NS	16
DCA	0.95 J	2	1.3 J	1.4 J	1.2 J	1 U	NS	NS	NS	NS	1.1

MW-13B	2000	Oct-09	May-10	Oct-11	Jun-12	Aug-13	Apr-14	Nov-15	Apr-16	Sep-17	Apr-18
TCE	12	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.33 U	0.33 U
DCE	310	88	46	17	27	8.6	19	18	9.9	22	7.8
VC	40	68	47	24	57	48	15	21	12	38	9.7
DCA	0.91 J	5 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.25 UJ	0.25 U

KANTHAL-GLOBAR BUILDING

BRICK BLDG

HYDE PARK BOULEVARD

RHODE ISLAND AVENUE

Legend

- Monitoring Well
- Fence Line

LOCATION ID	DATE
MW-1B	2000
TRICHLOROETHENE	TCE 5 U
CIS 1,2-DICHLOROETHENE	DCE 4.7 J
VINYL CHLORIDE	VC 3.8
1,1 DICHLOROETHANE	DCA 1.5 J
	RESULT

Notes:
1. Units are shown in µg/L
2. NS = Not Sampled
3. D = Result reported from a secondary dilution analysis.
4. J = The reported concentration is an estimated value.
5. U = Not detected above the reported method detection limit.
6. UJ = Not detected. The reported method detection limit is an estimated value.

Source:
ESRI World Imagery

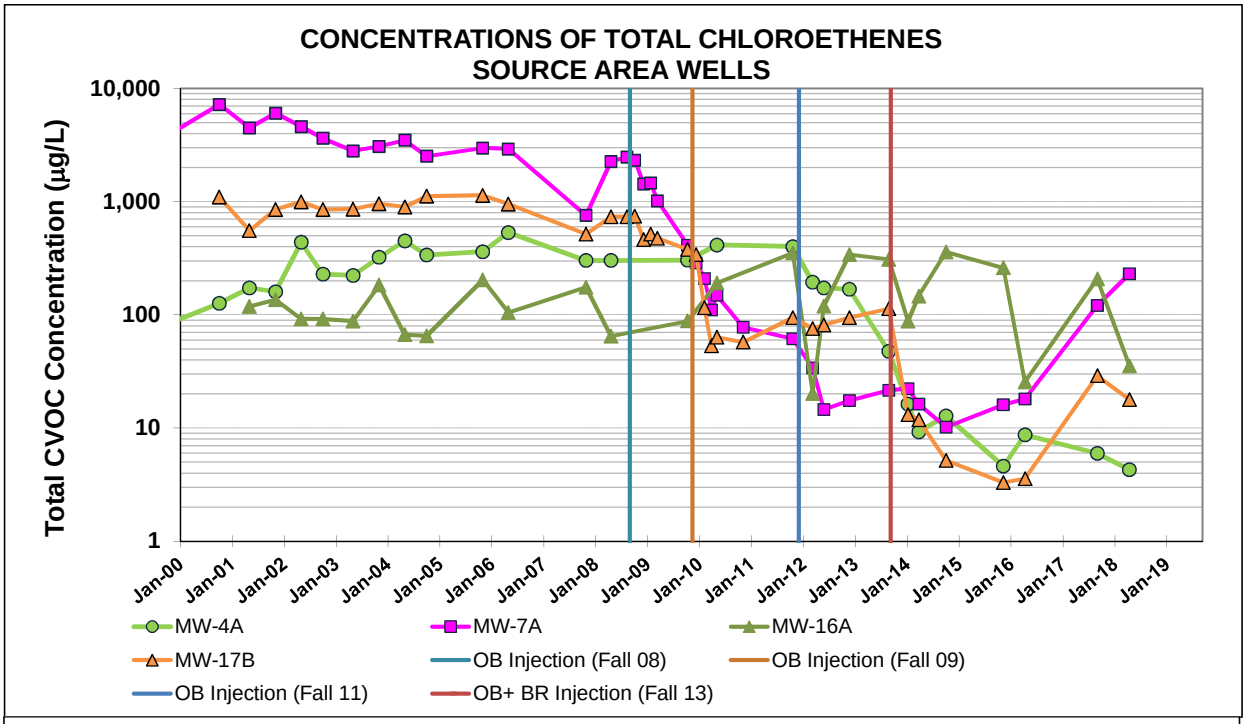
60 0 60 Feet

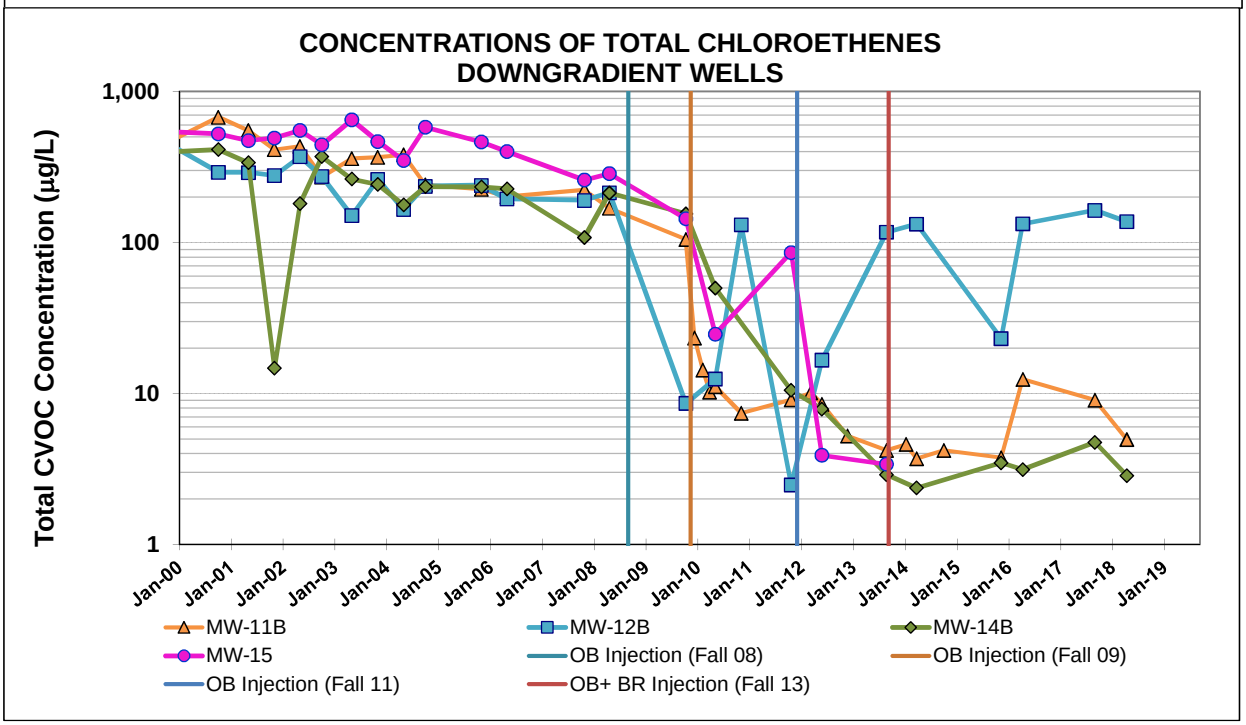
FORMER CARBORUNDUM COMPANY
TOWN OF NIAGARA, NEW YORK
VOC CONCENTRATIONS IN BEDROCK GROUNDWATER
(2000 - 2018)

AECOM

ATTACHMENT 1
FIGURE 6

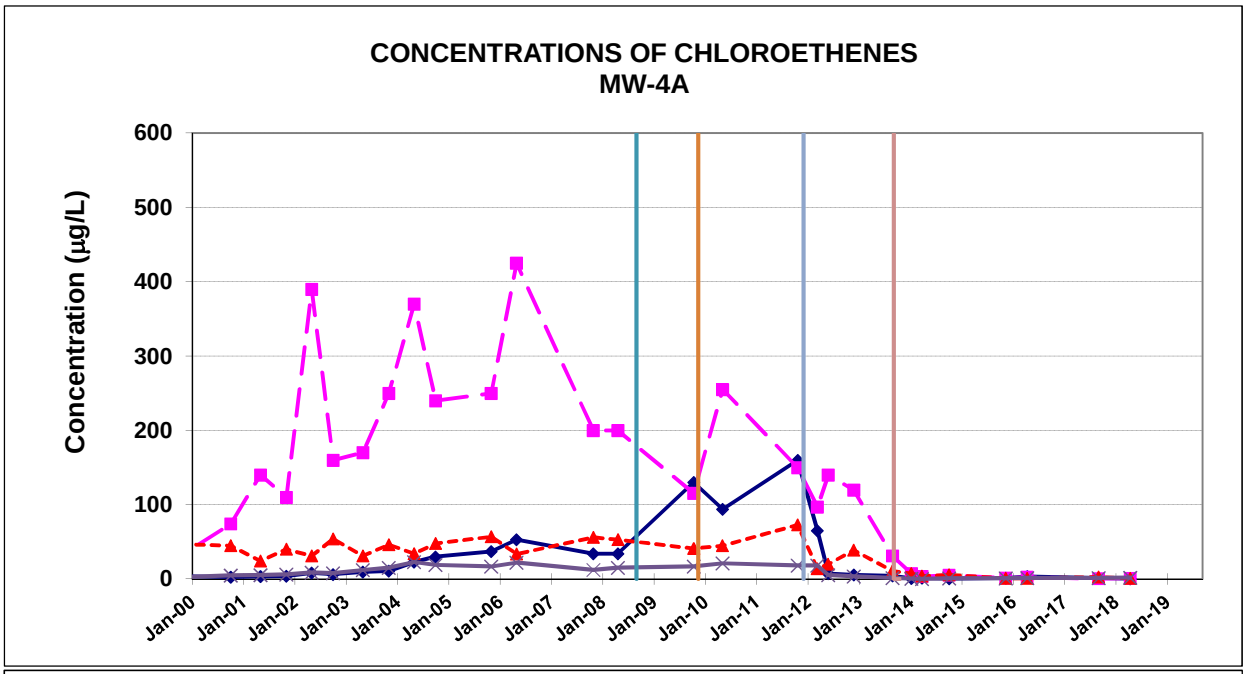
J:\Projects\60481767_BPIPO\MISC\GIS\Hyde Park\Maps\MIP_WorkPlan\2018 GROUNDWATER VOC - BEDROCK.mxd 9/19/2019

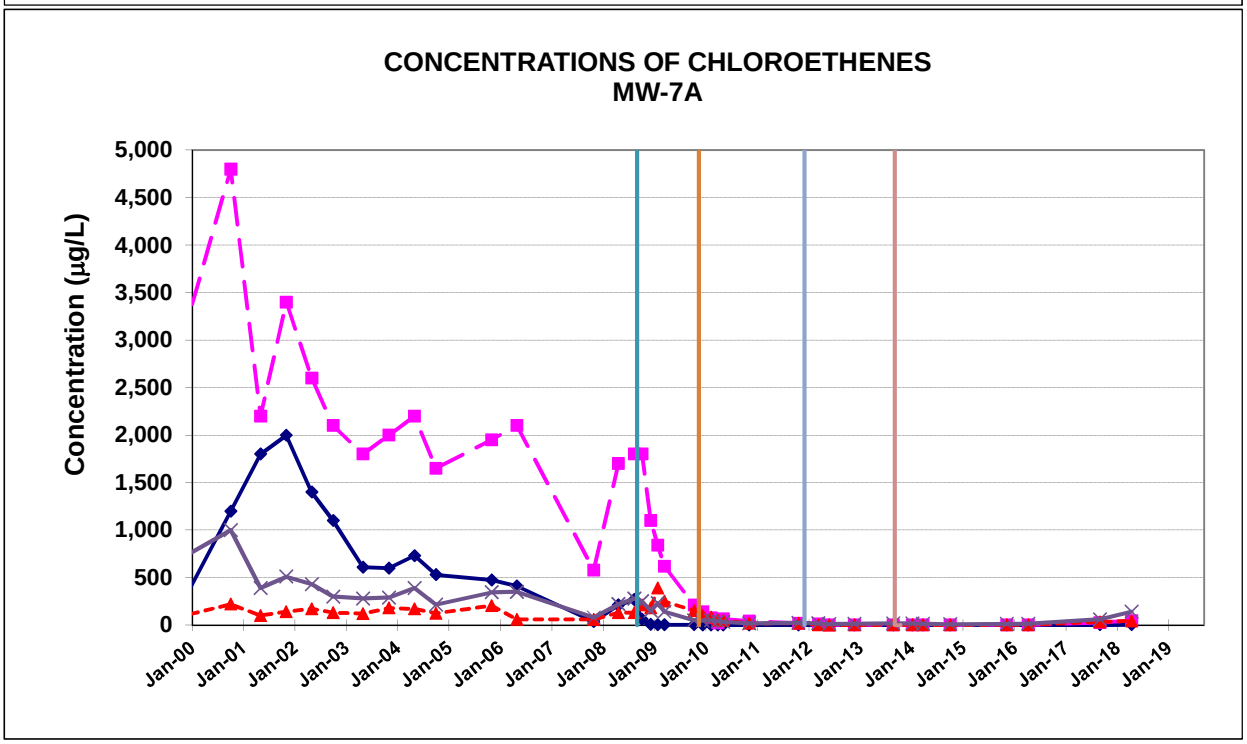


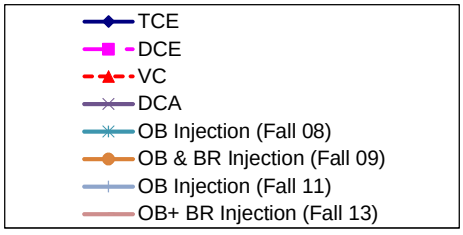


Note:
Total CVOC Concentration is the sum of TCE, cis-1,2-DCE, VC, and DCA concentrations.

ATTACHMENT 1 - FIGURE 7
FORMER CARBORUNDUM COMPANY
LONG TERM TRENDS OF TOTAL CHLORINATED ETHENES IN SOURCE AREA AND DOWNGRADIENT WELLS
AECOM
257 West Genesee Street, Buffalo, NY 14202







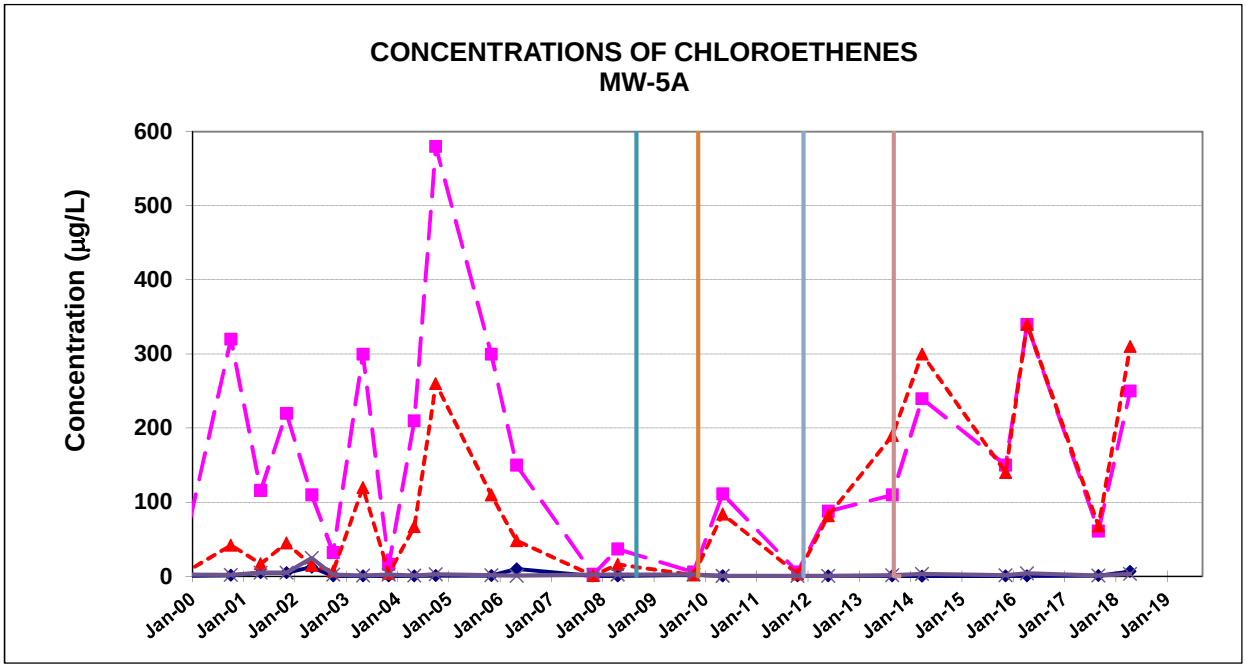
ATTACHMENT 1 - FIGURE 8

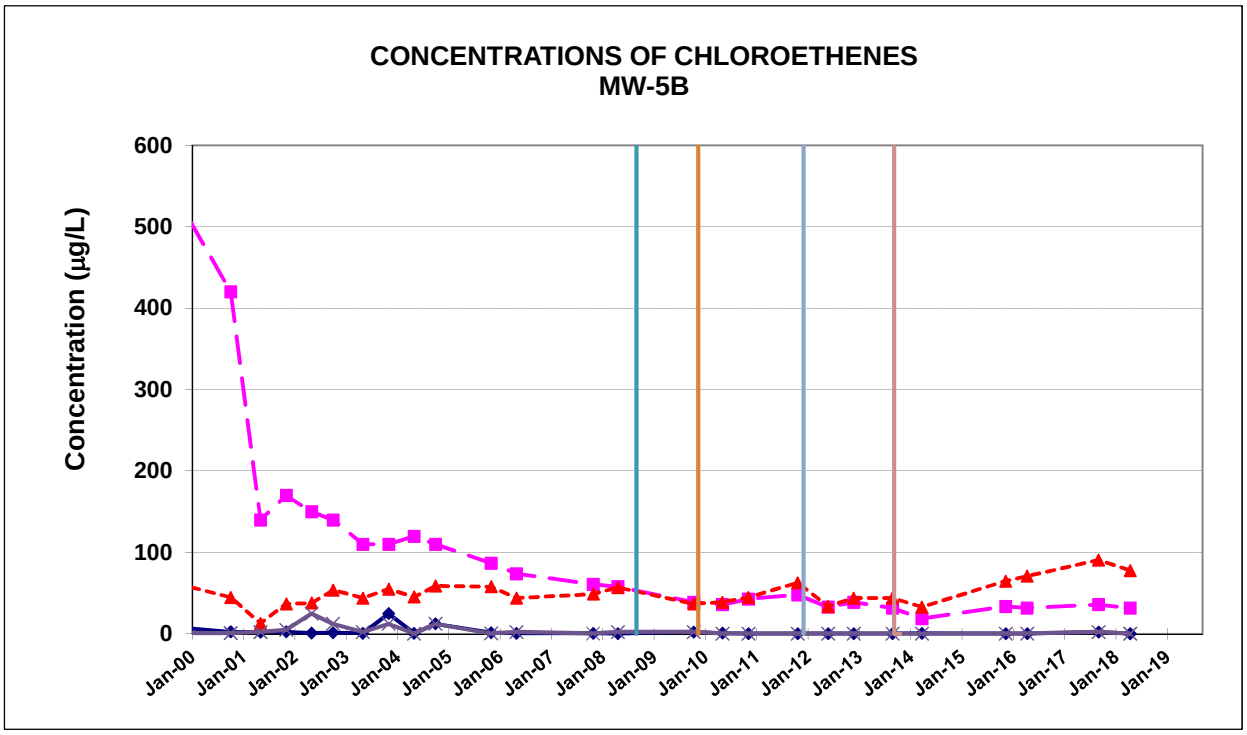
FORMER CARBORUNDUM COMPANY

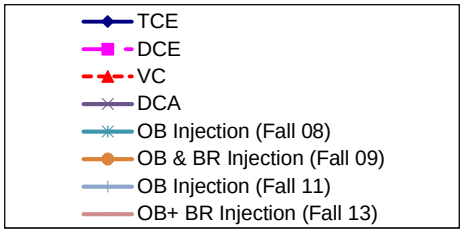
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-4A AND MW-7A

AECOM

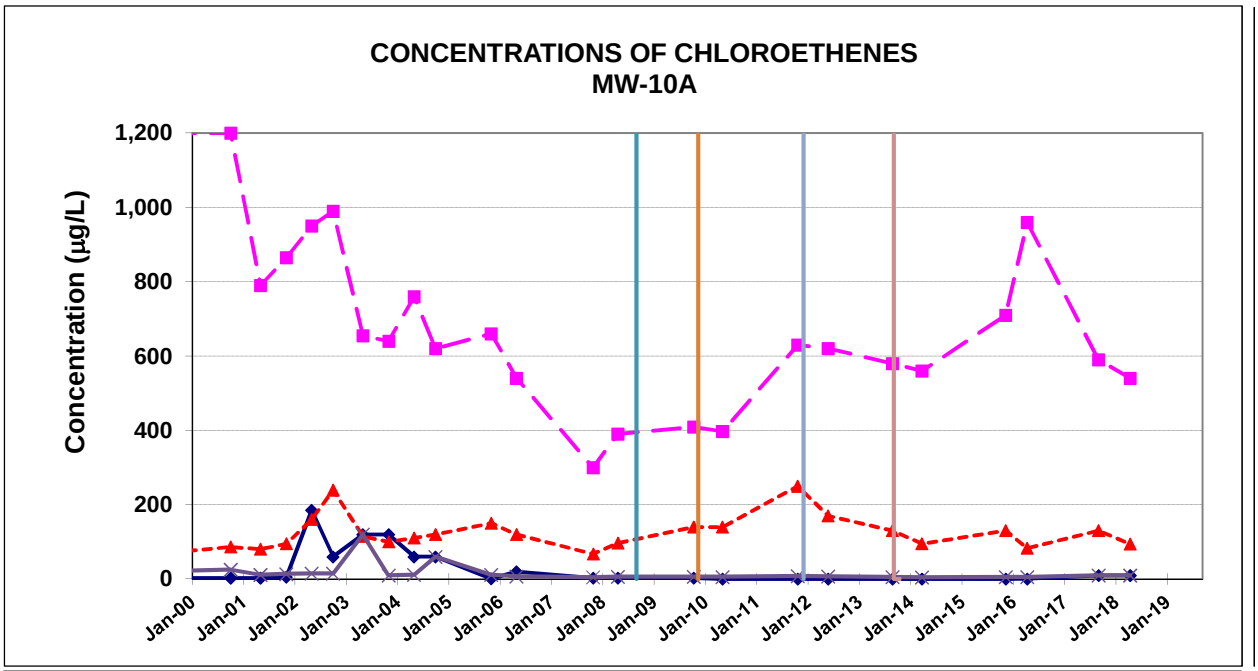
257 West Genesee Street, Buffalo, NY 14202

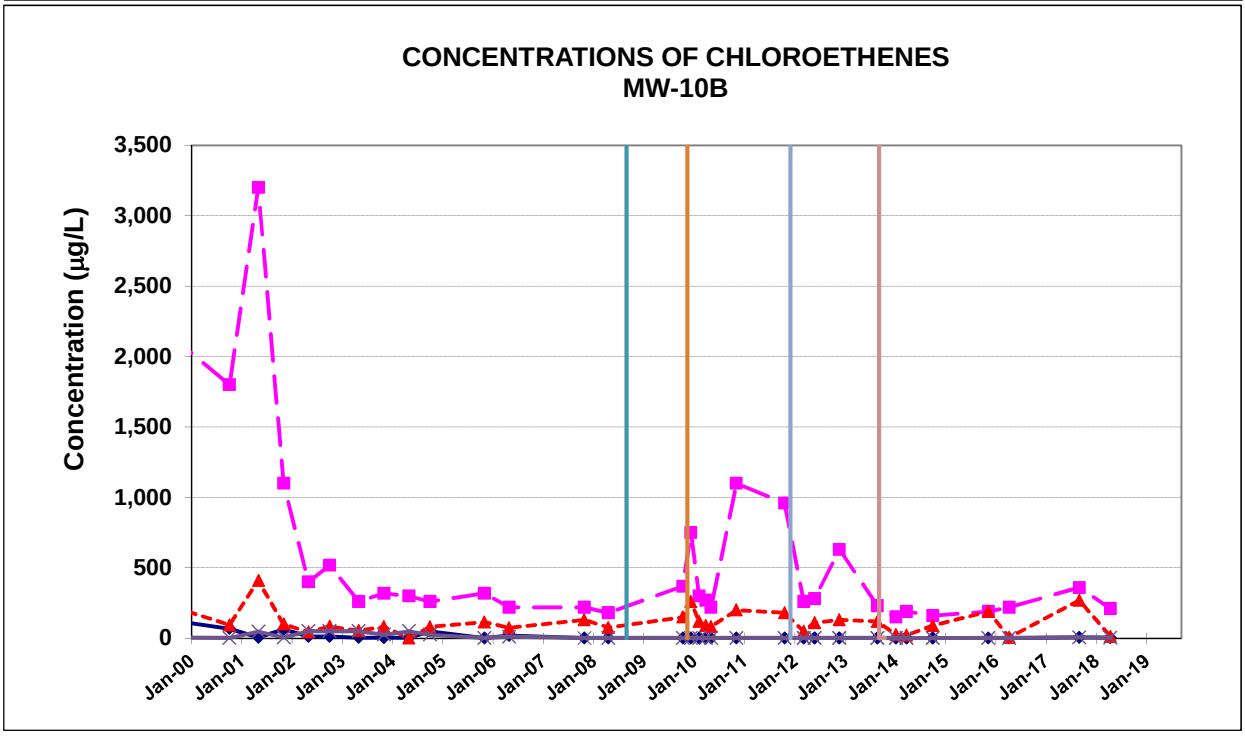


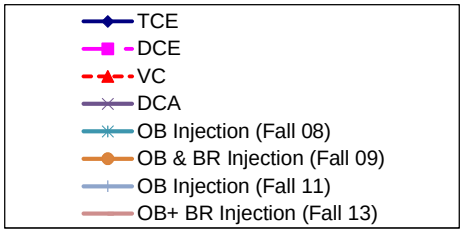




ATTACHMENT 1 - FIGURE 9
FORMER CARBORUNDUM COMPANY
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-5A AND MW-5B
AECOM
257 West Genesee Street, Buffalo, NY 14202







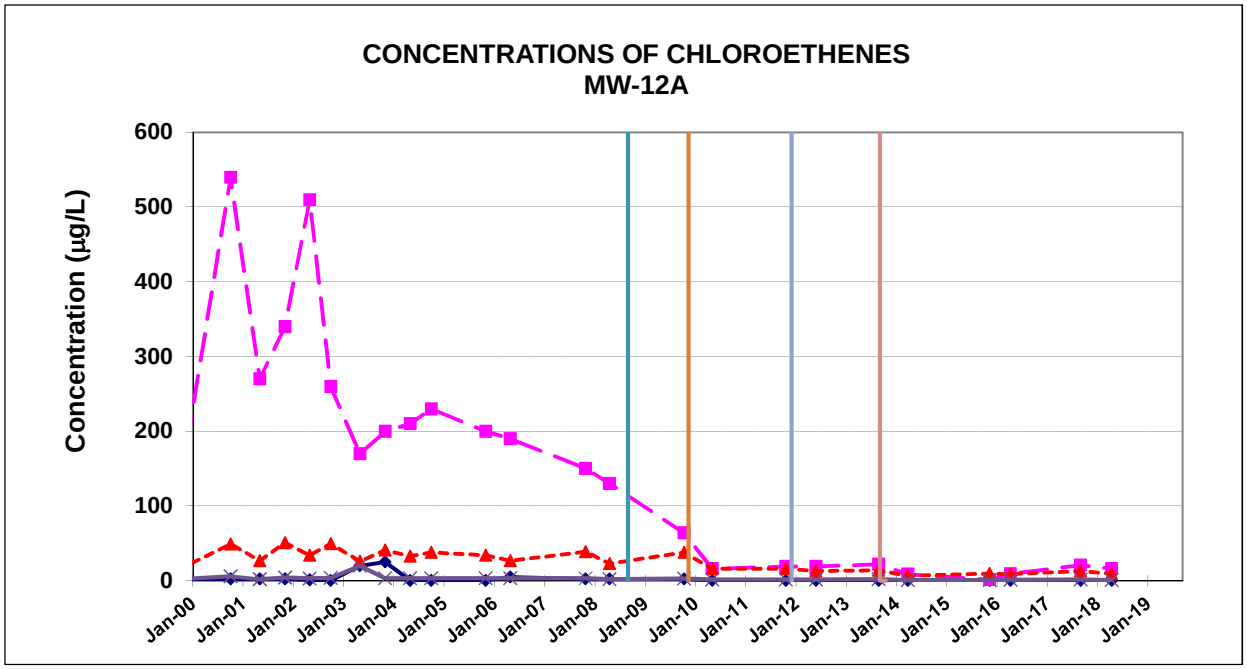
ATTACHMENT 1 - FIGURE 10

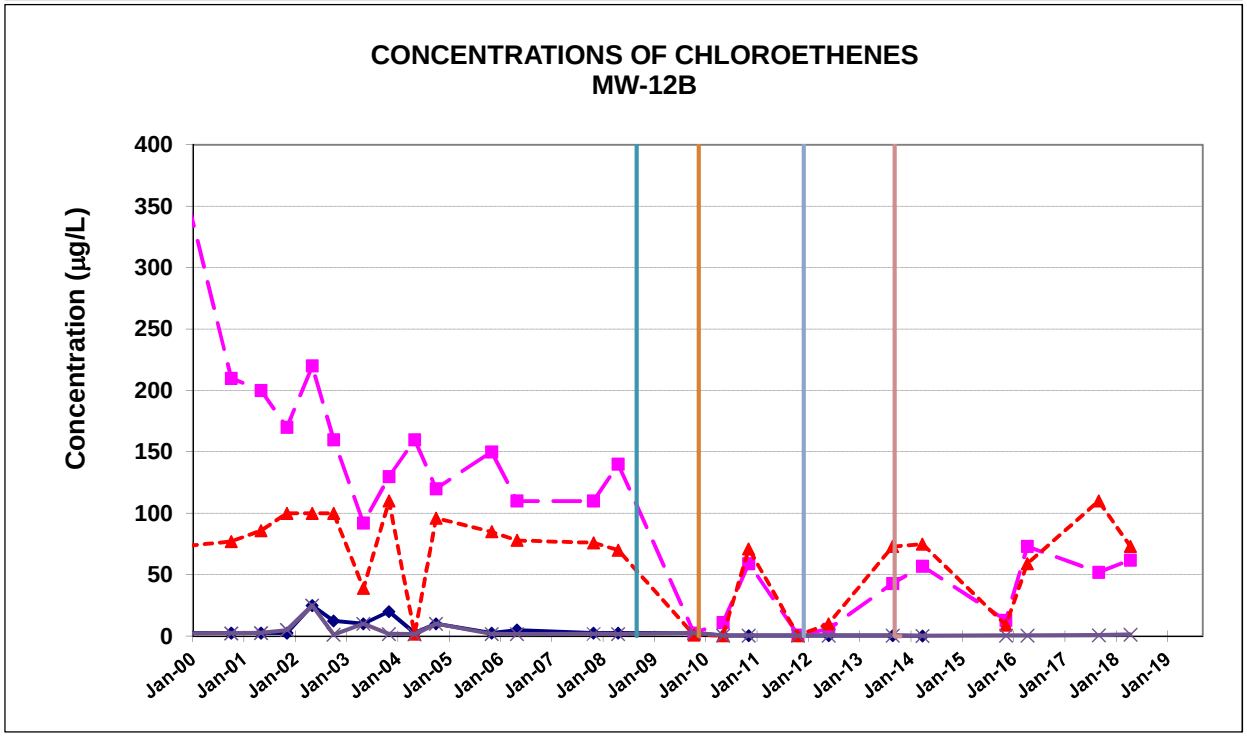
FORMER CARBORUNDUM COMPANY

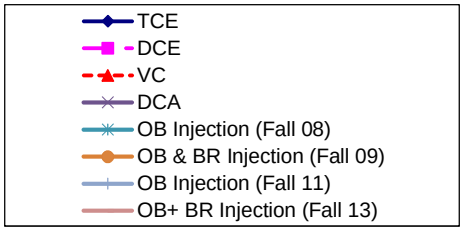
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-10A AND MW-10B

AECOM

257 West Genesee Street, Buffalo, NY 14202







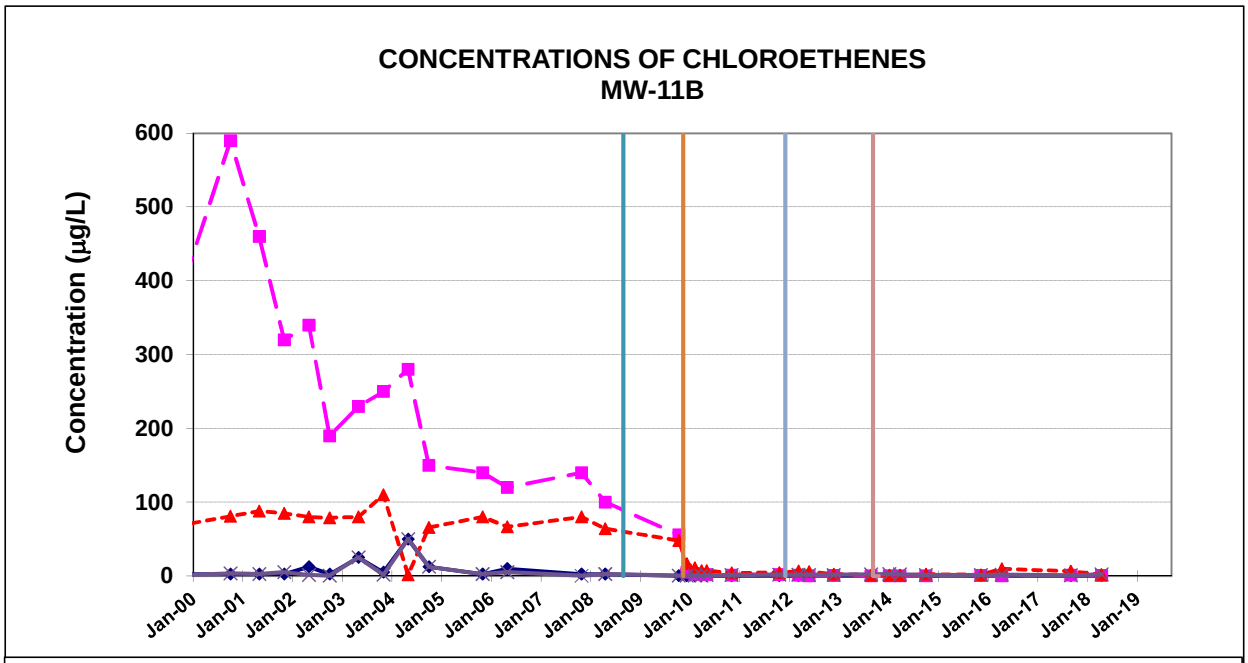
ATTACHMENT 1 - FIGURE 11

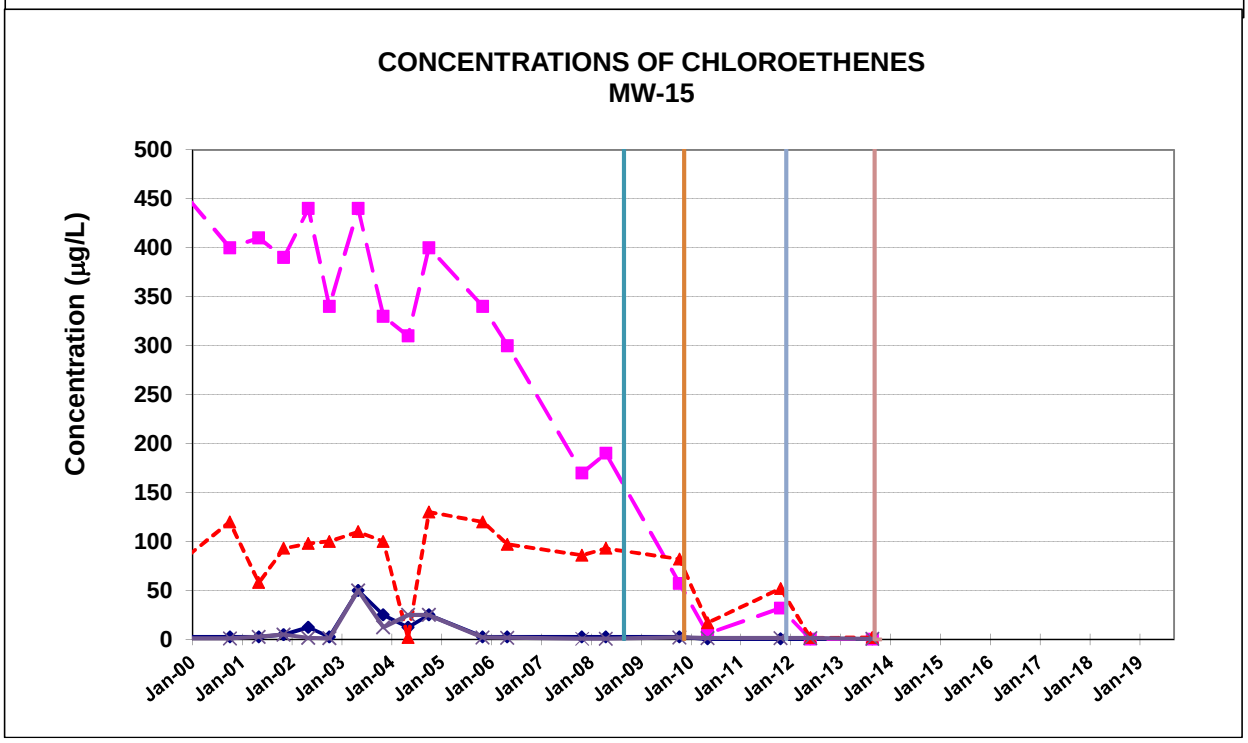
FORMER CARBORUNDUM COMPANY

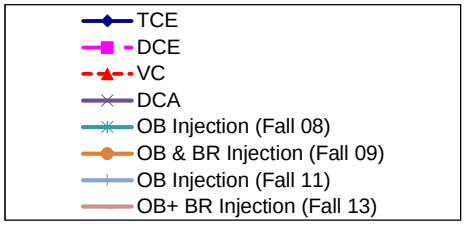
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-12A AND MW-12B

AECOM

257 West Genesee Street, Buffalo, NY 14202







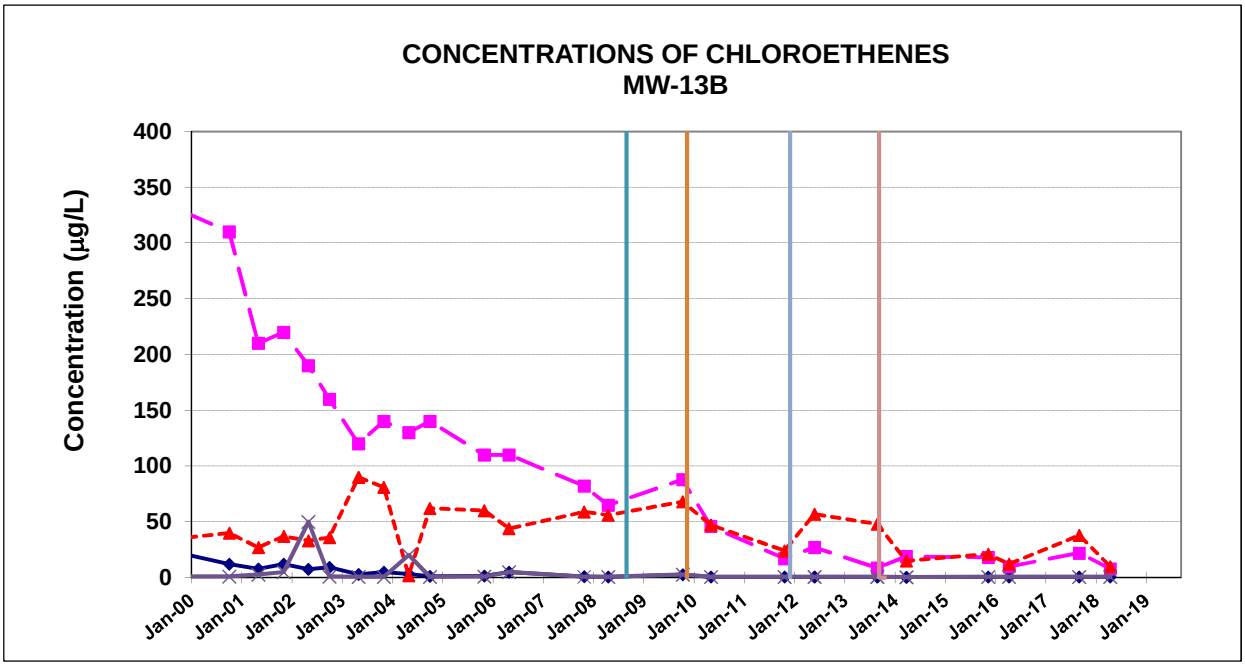
ATTACHMENT 1 - FIGURE 12

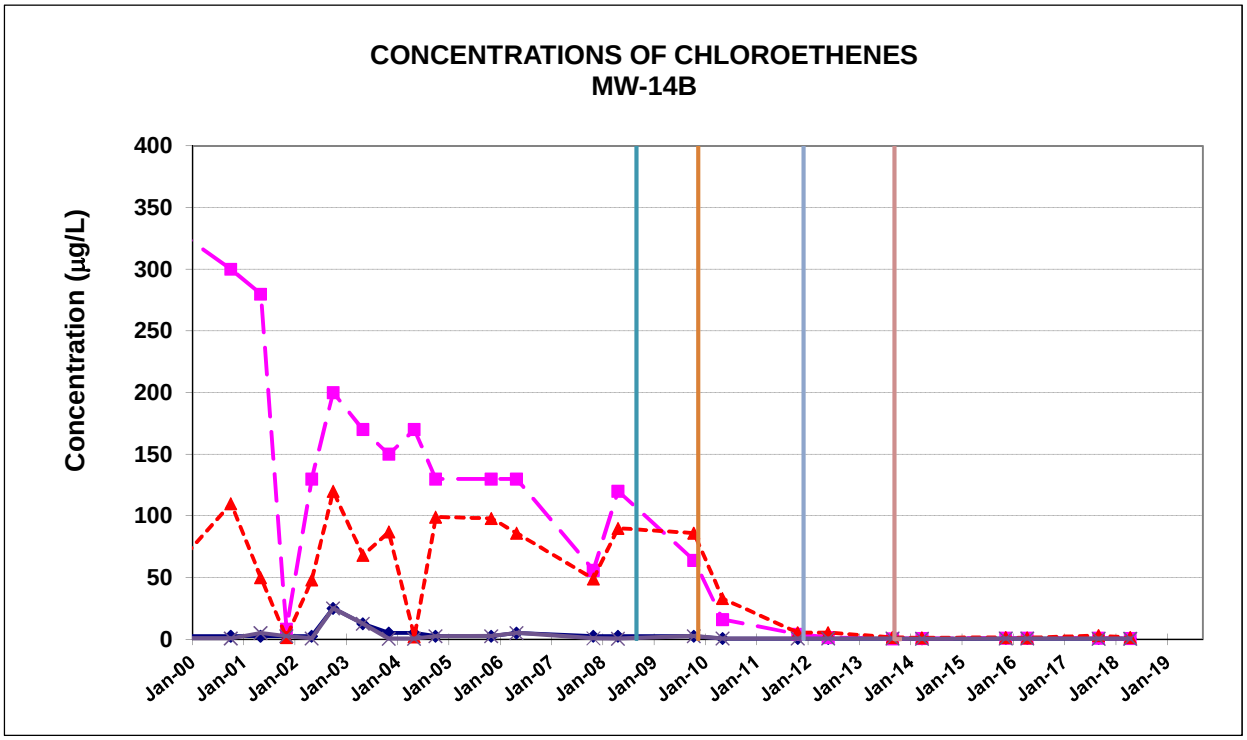
FORMER CARBORUNDUM COMPANY

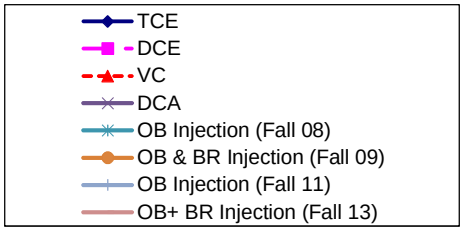
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-11B AND MW-15

AECOM

257 West Genesee Street, Buffalo, NY 14202







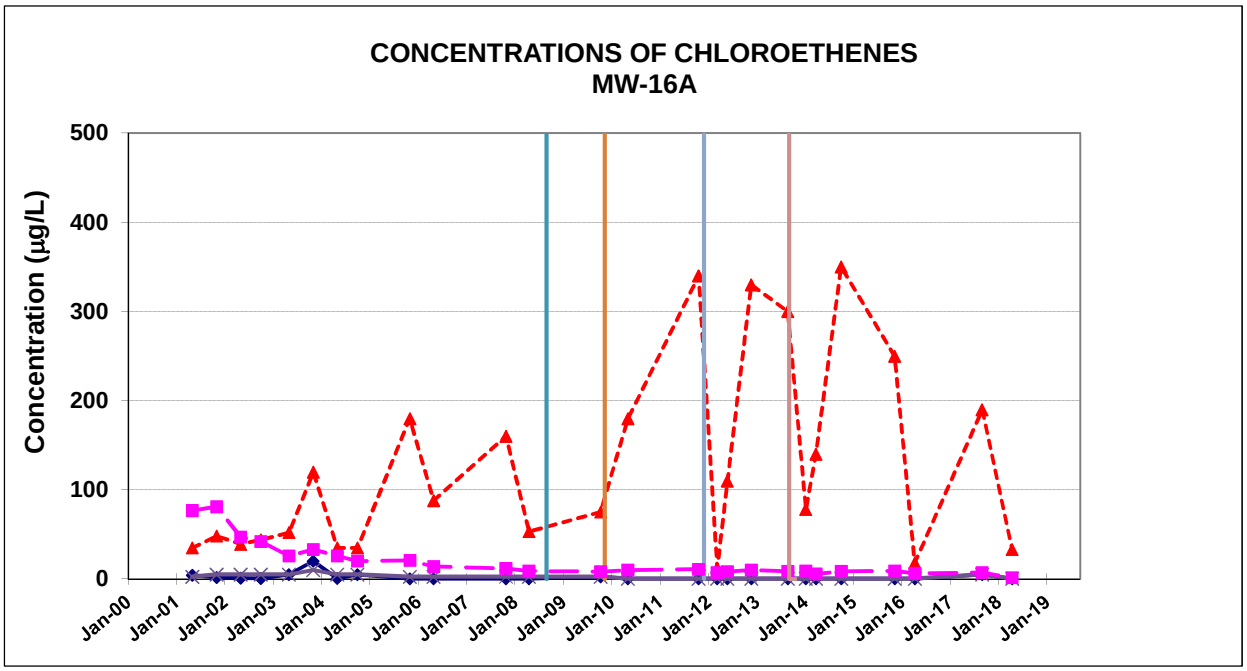
ATTACHMENT 1 - FIGURE 13

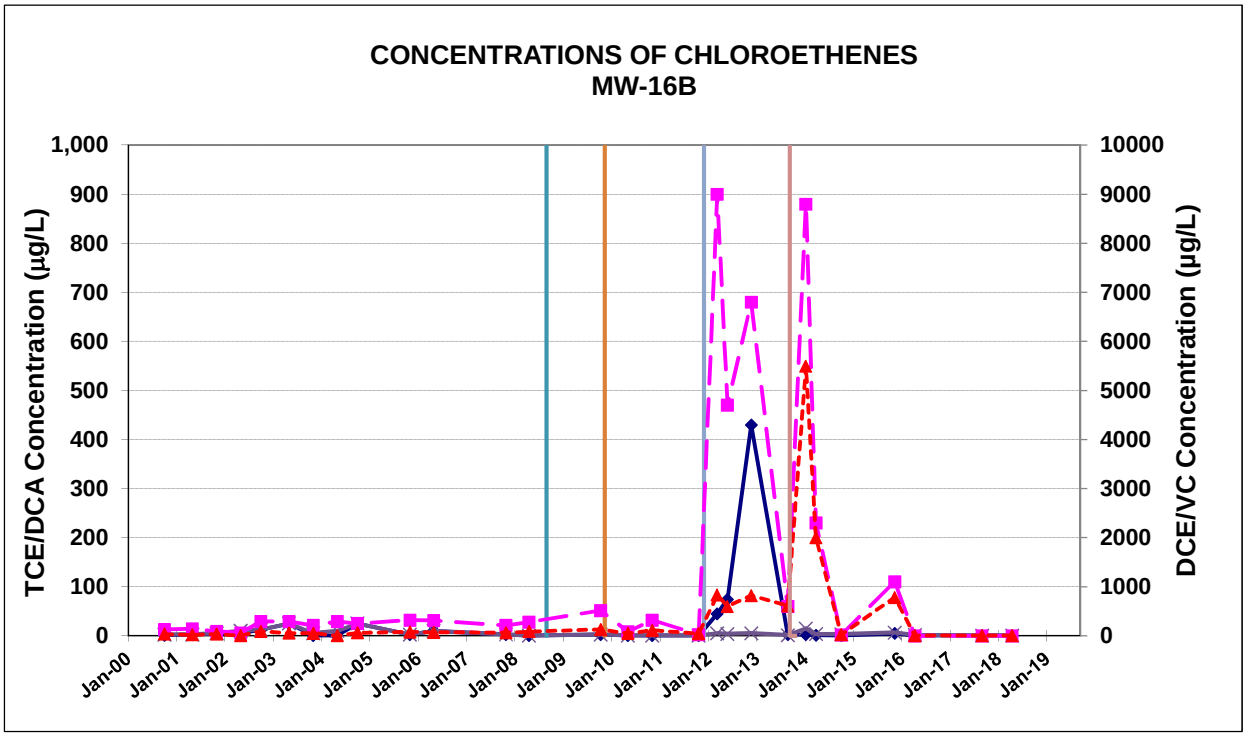
FORMER CARBORUNDUM COMPANY

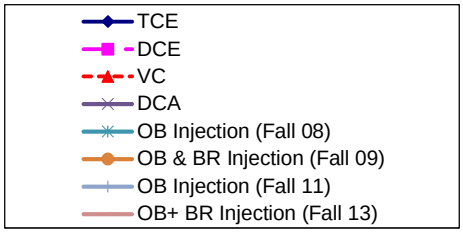
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-13B AND MW-14B

AECOM

257 West Genesee Street, Buffalo, NY 14202







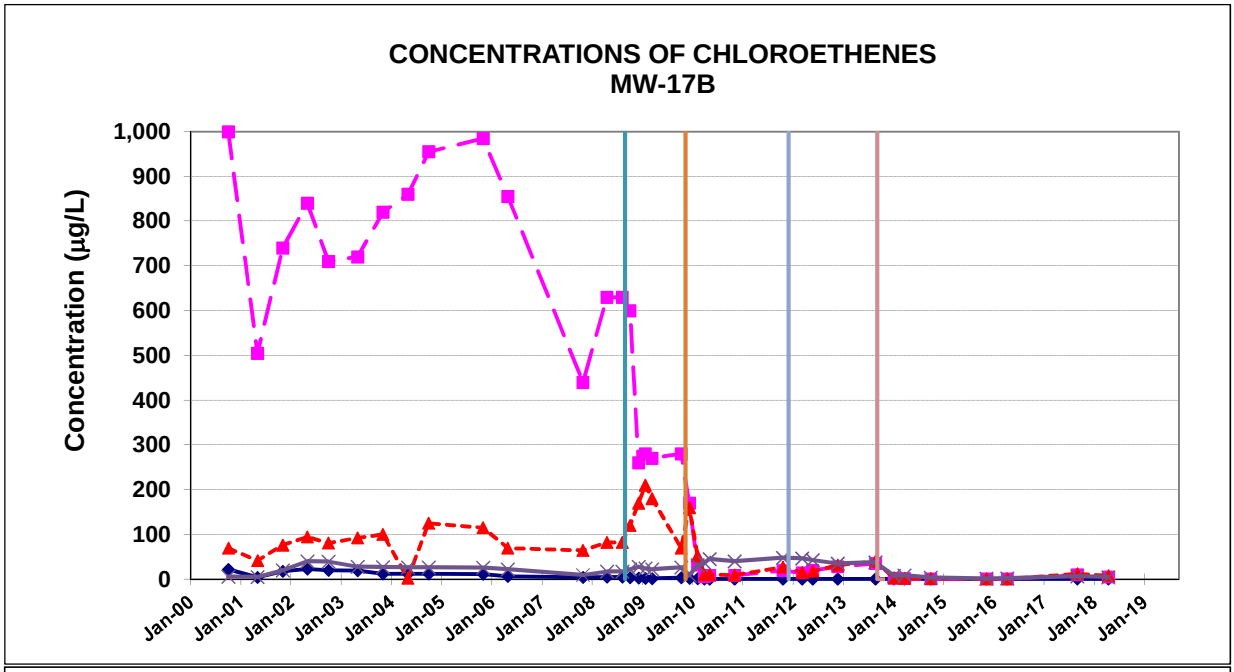
ATTACHMENT 1 - FIGURE 14

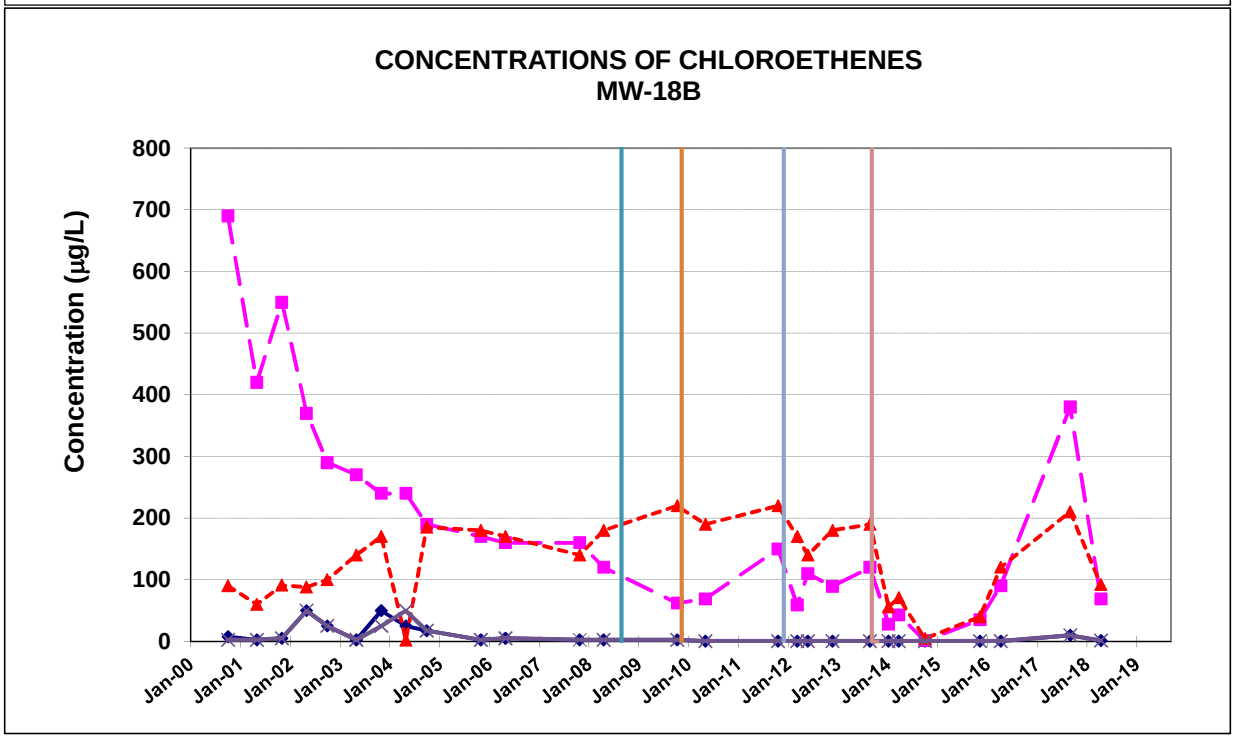
FORMER CARBORUNDUM COMPANY

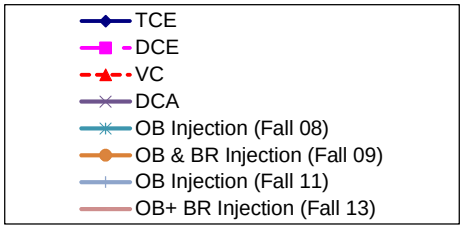
LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-16A AND MW-16B

AECOM

257 West Genesee Street, Buffalo, NY 14202







ATTACHMENT 1 - FIGURE 15

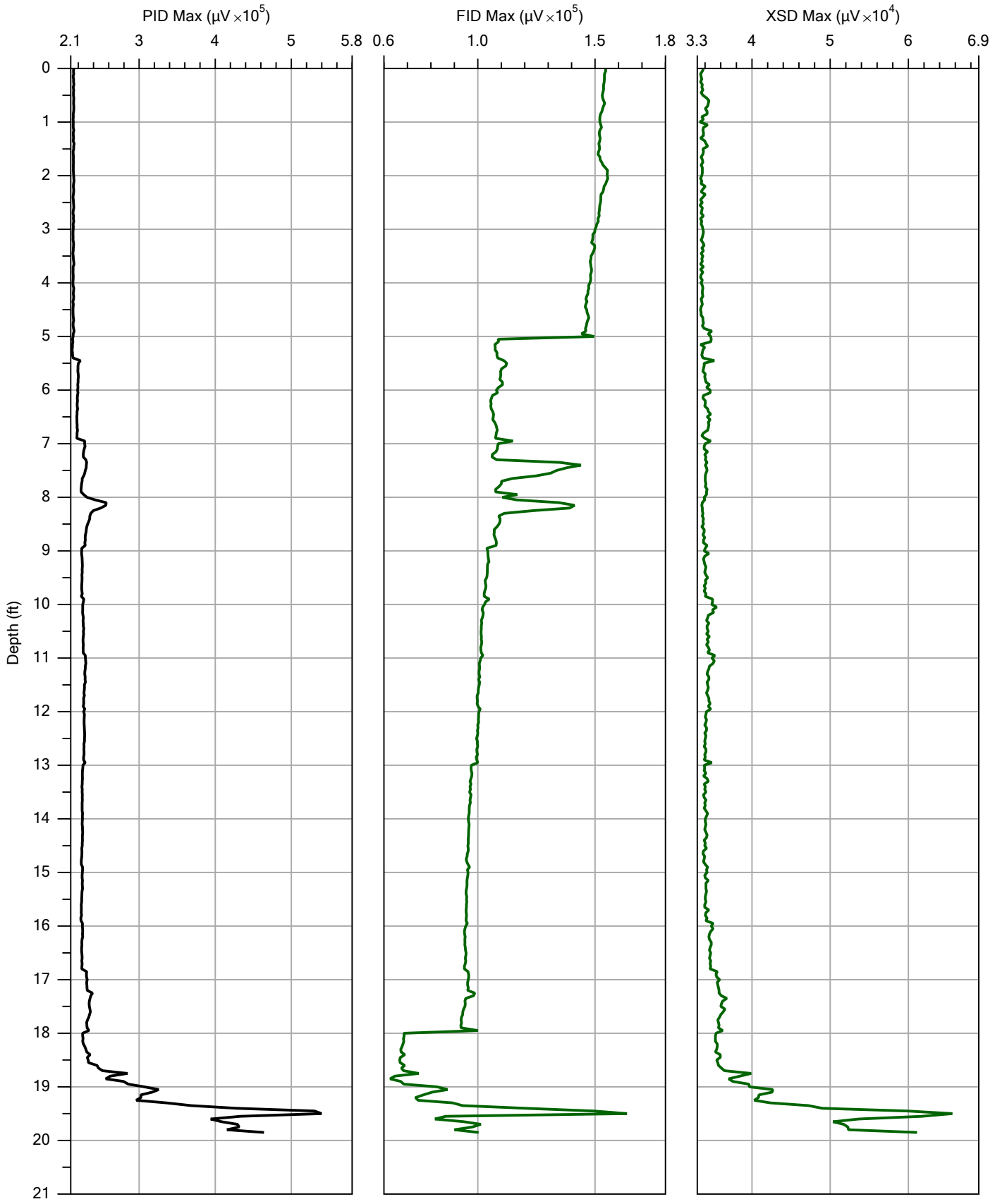
FORMER CARBORUNDUM COMPANY

LONG TERM TRENDS OF CHLORINATED ETHENES IN WELLS MW-17B AND MW-18B

AECOM

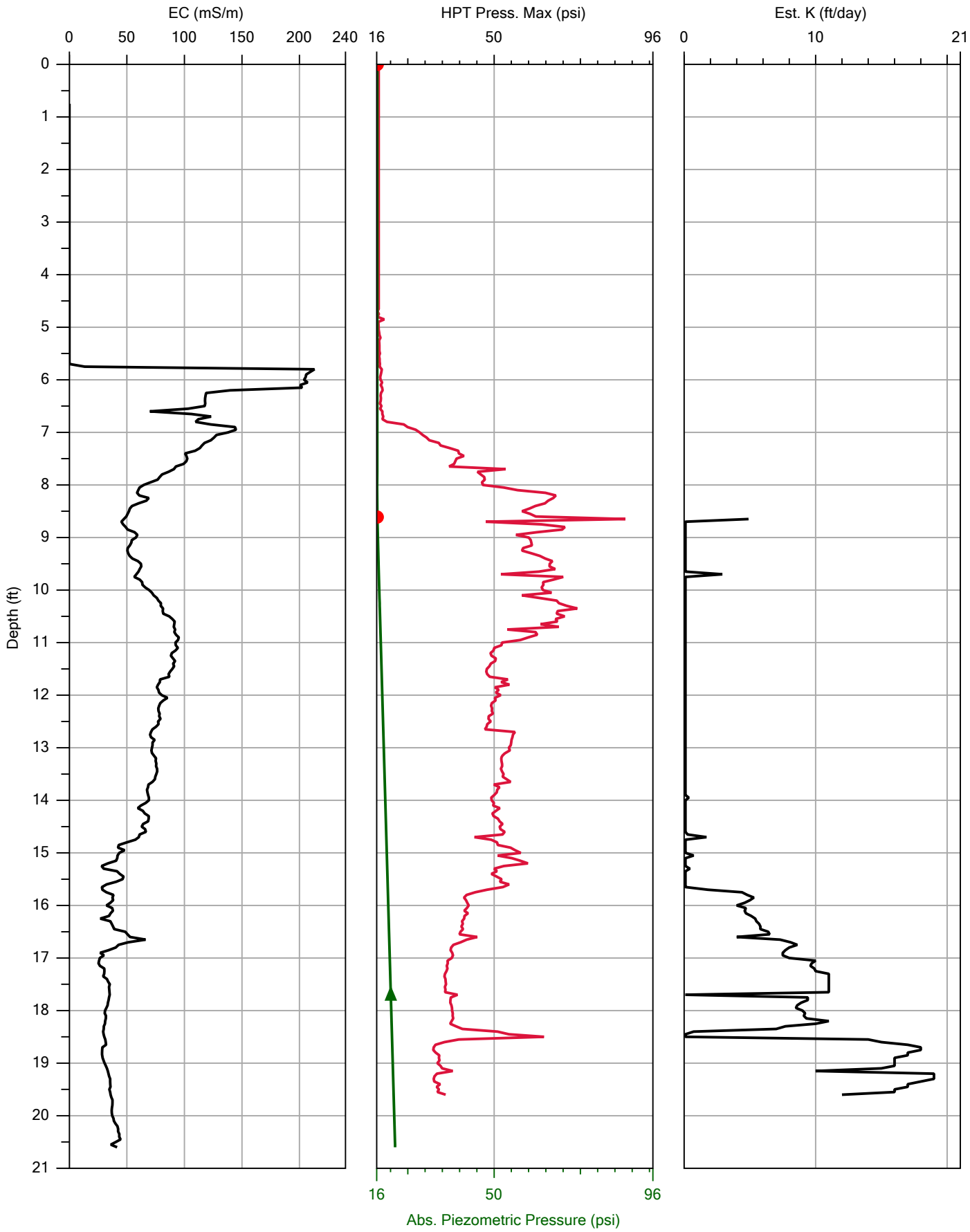
257 West Genesee Street, Buffalo, NY 14202

Attachment 2



parratt wolff inc

		File: MIHPT - 1.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/29/2016
Project ID: 16135	Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 1.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/29/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 1.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	54.8	0.4	PASS
High	290.0	290.3	0.1	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST

FILENAME: MiHPT - 1.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 43.5 mL/min
RESPONSE TEST START TIME: Tue Nov 29 2016 08:14:02

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES

PRE TEST TIME: Tue Nov 29 2016 08:18:06

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.558	0.0	114.160
TOP with FLOW>0	16.975	268.4	117.040
BOTTOM with FLOW=0	16.339	0.0	112.650
BOTTOM with FLOW>0	16.765	270.1	115.590

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (20.9 deg C) at 0.00 ft (0.000 m)

Probe advancement with HPT flow valve and/or pump switch turned off at 0.05 ft (0.015 m).
LOG START TIME: Tue Nov 29 2016 08:27:51

Temperature out of range (16.6 deg C) at 4.90 ft (1.494 m)

Probe advancement with HPT flow valve and/or pump switch turned off at 4.95 ft (1.509 m).
Probe advancement with HPT flow valve and/or pump switch turned off at 5.00 ft (1.524 m).
Probe advancement with HPT flow valve and/or pump switch turned off at 5.10 ft (1.554 m).
ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 19.85 ft (6.050 m)
LOG END TIME: Tue Nov 29 2016 09:35:17

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 1.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 38.9 mL/min
RESPONSE TEST START TIME: Tue Nov 29 2016 10:02:06

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Tue Nov 29 2016 10:06:14

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.521	0.0	113.910
TOP with FLOW>0	16.801	177.0	115.840
BOTTOM with FLOW=0	16.297	0.0	112.360
BOTTOM with FLOW>0	16.588	175.5	114.370

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%

ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

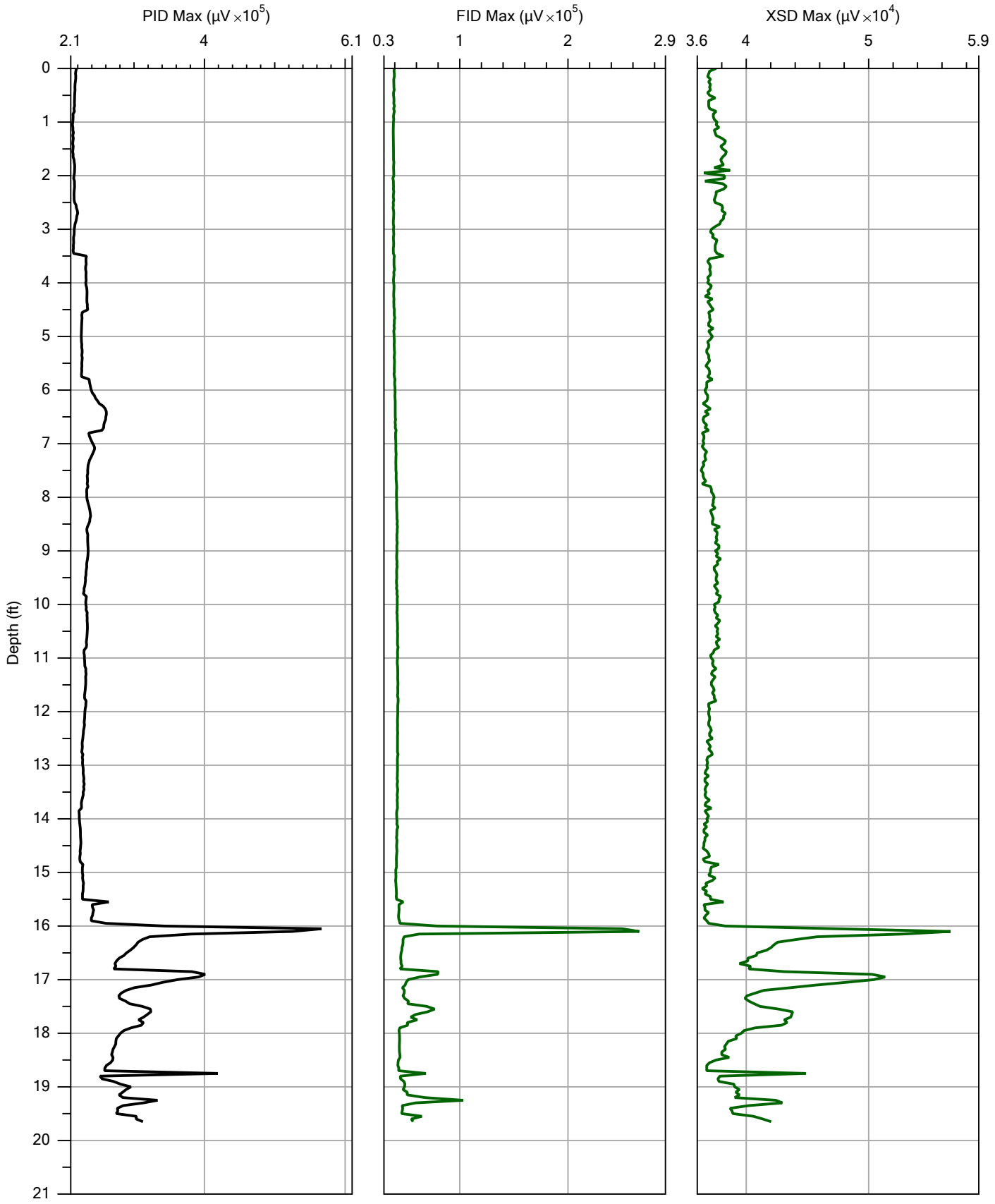
TRANSDUCER TEST PASSED

Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.6	1.1	PASS
High	290.0	301.0	3.8	PASS

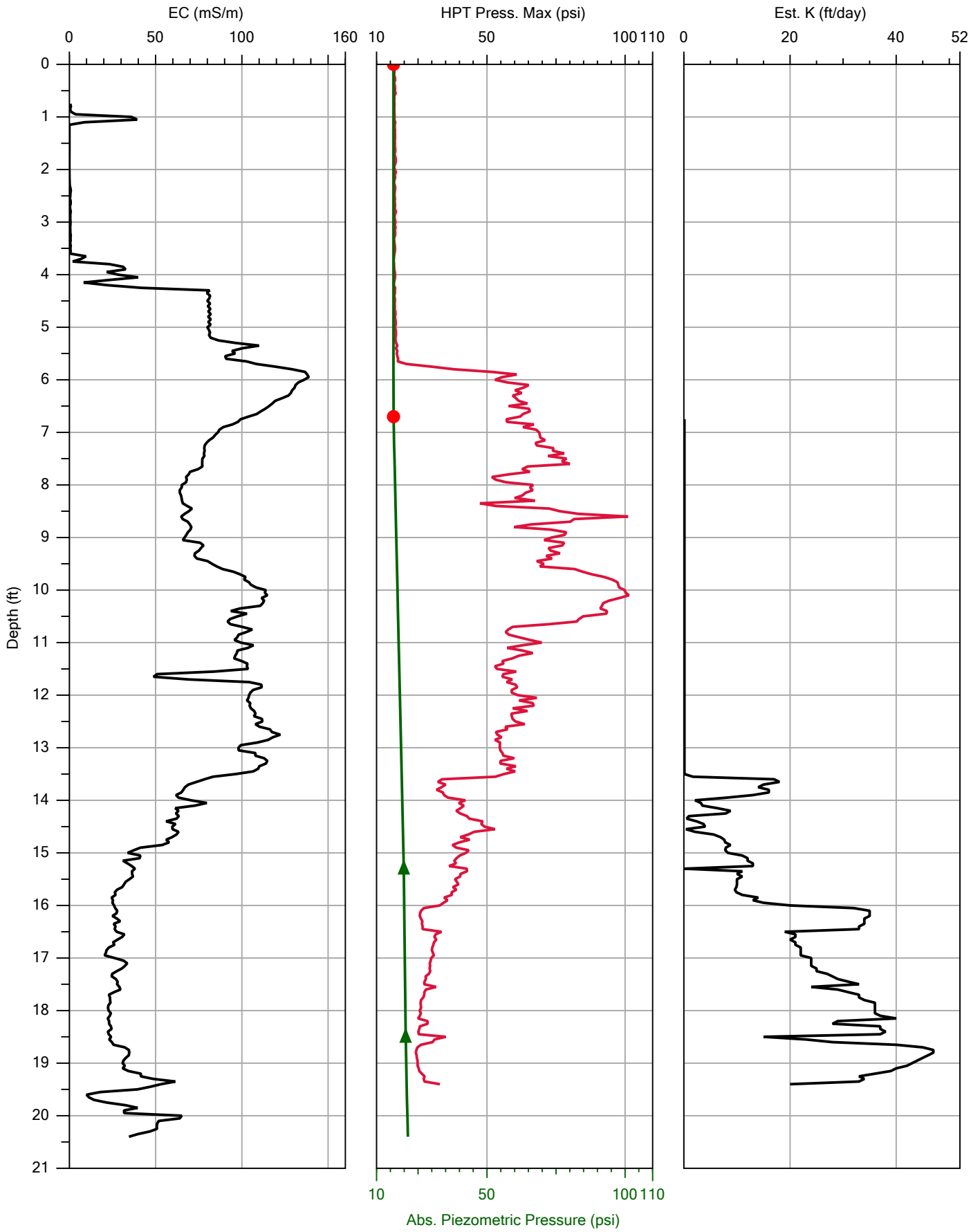
********** USER NOTES **********

0-5' open hole for 5' pre-clear. Pump and heat turned on at 5'.



parratt wolff inc

			File: MIHPT - 2.MHP
Company: Parratt-Wolff, Inc.		Operator: Danylo Kulczycky	Date: 11/29/2016
Project ID: 16135		Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 2.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/29/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 2.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests (Post-Log From MiHPT - 1.zip)

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.6	1.1	PASS
High	290.0	301.0	3.8	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST (Post-Log From MiHPT - 1.zip)

FILENAME: MiHPT - 2.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 38.9 mL/min
RESPONSE TEST START TIME: Tue Nov 29 2016 10:02:06

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES (Post-Log From MiHPT - 1.zip)

PRE TEST TIME: Tue Nov 29 2016 10:06:14

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.521	0.0	113.910
TOP with FLOW>0	16.801	177.0	115.840
BOTTOM with FLOW=0	16.297	0.0	112.360
BOTTOM with FLOW>0	16.588	175.5	114.370

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (34.6 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Tue Nov 29 2016 10:11:16

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 19.65 ft (5.989 m)
LOG END TIME: Tue Nov 29 2016 11:01:19

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 2.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 38.9 mL/min
RESPONSE TEST START TIME: Tue Nov 29 2016 11:13:38

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Tue Nov 29 2016 11:17:47

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.558	0.0	114.170
TOP with FLOW>0	16.915	181.5	116.630
BOTTOM with FLOW=0	16.339	0.0	112.650
BOTTOM with FLOW>0	16.667	180.3	114.910

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

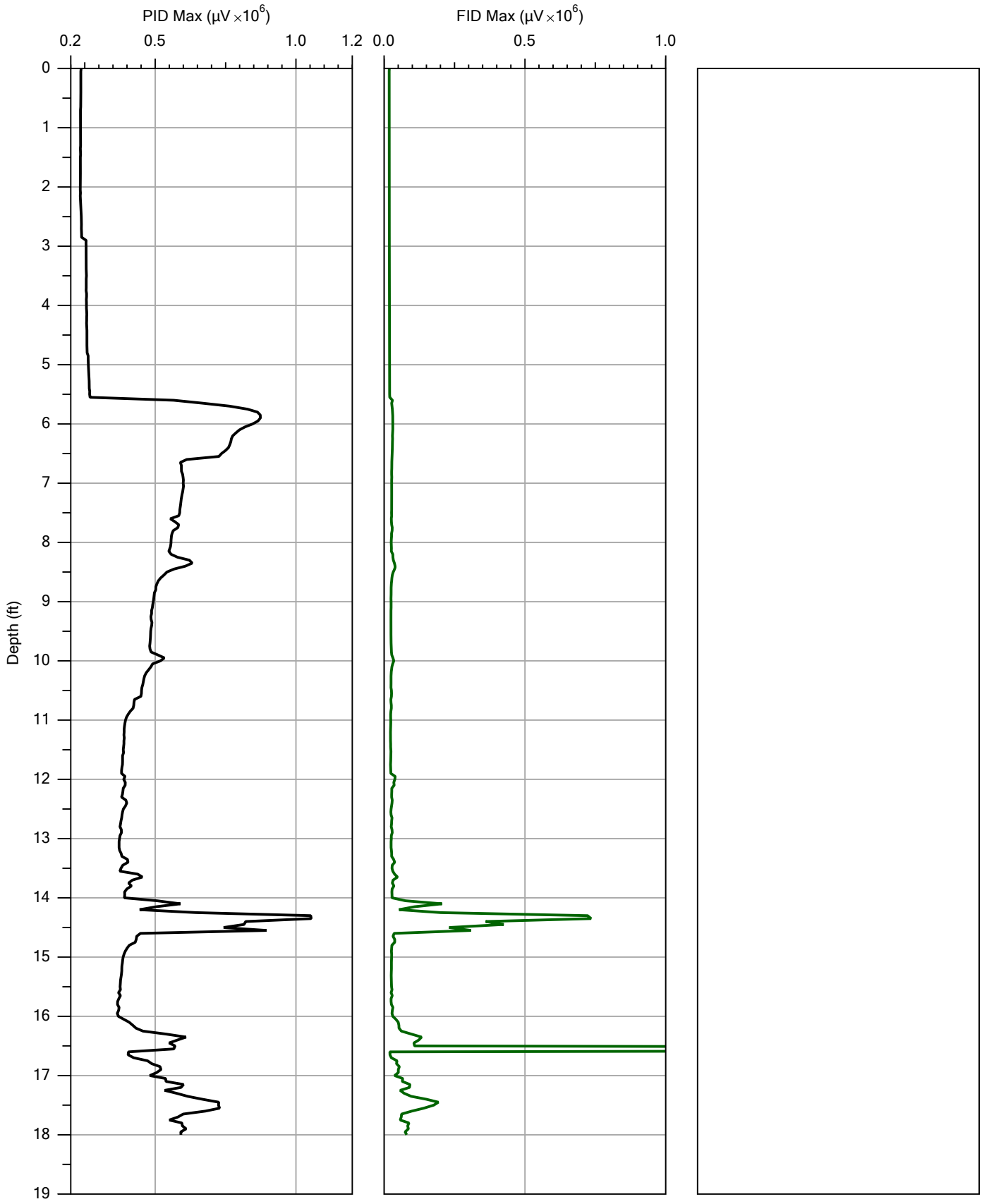
TRANSDUCER TEST PASSED

Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.3	0.5	PASS
High	290.0	301.3	3.9	PASS

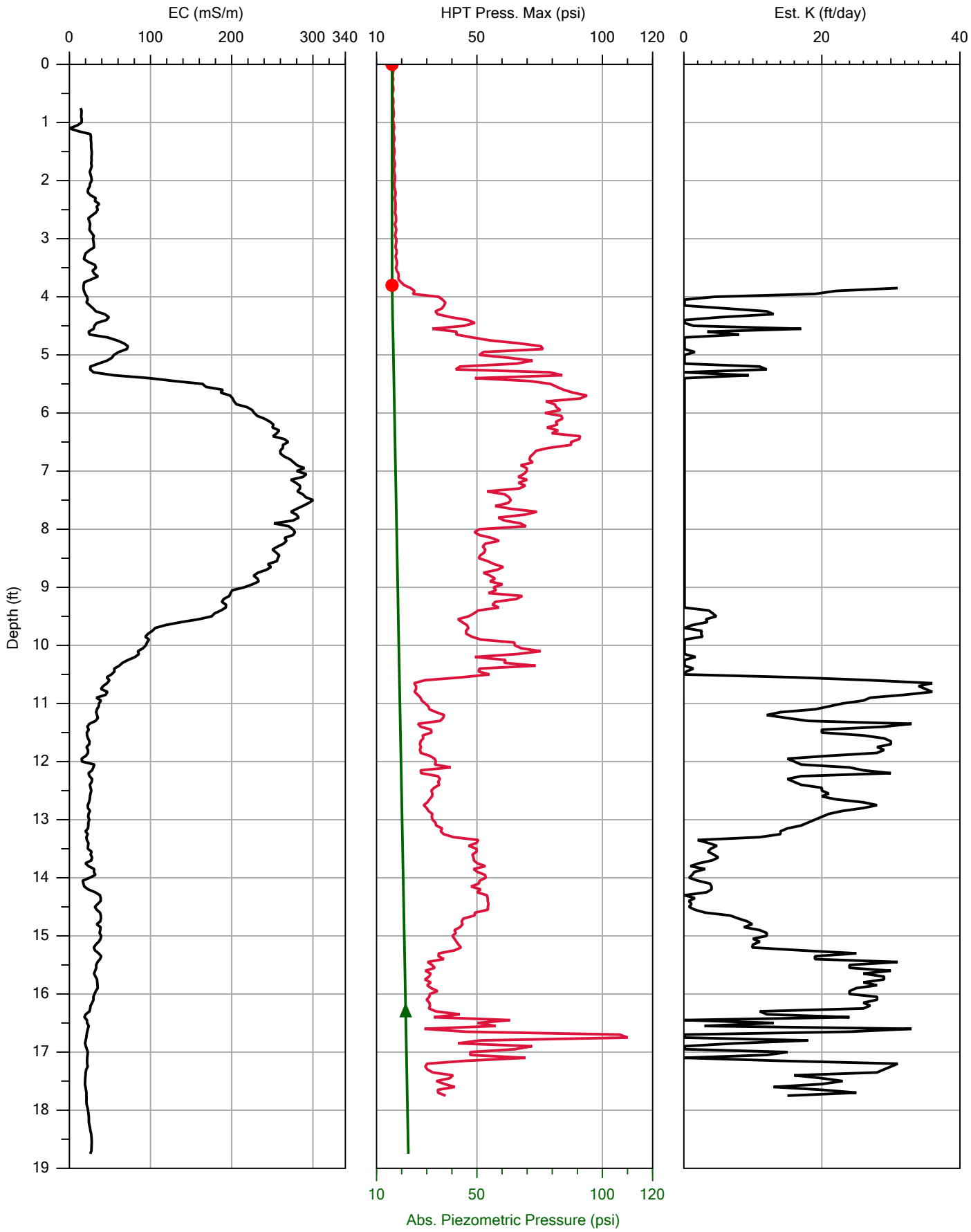
********** USER NOTES **********

5' pre clear.



parratt wolff inc

			File: MIHPT - 3.MHP
Company: Parratt-Wolff, Inc.		Operator: Danylo Kulczycky	Date: 11/29/2016
Project ID: 16135		Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 3.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/29/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 3.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

EC PRE-LOG TESTS BYPASSED

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST

FILENAME: MiHPT - 3.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 38.9 mL/min
RESPONSE TEST START TIME: Tue Nov 29 2016 15:17:10

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES (Post-Log From MiHPT - 1.zip)

PRE TEST TIME: Tue Nov 29 2016 15:22:09

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.546	0.0	114.080
TOP with FLOW>0	16.912	180.4	116.600
BOTTOM with FLOW=0	16.321	0.0	112.530
BOTTOM with FLOW>0	16.699	177.4	115.140

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.23 psi (1.6 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (39.3 deg C) at 0.00 ft (0.000 m)

Temperature out of range (31.6 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Tue Nov 29 2016 15:24:45

MIP Pressure out of range (12.7 psi / 88 kPa) at 4.90 ft (1.494 m)

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 18.00 ft (5.486 m)
LOG END TIME: Tue Nov 29 2016 16:04:09

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 3.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 38.9 mL/min
RESPONSE TEST START TIME: Tue Nov 29 2016 16:18:25

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Tue Nov 29 2016 16:23:11

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.607	0.0	114.500
TOP with FLOW>0	16.845	182.8	116.140
BOTTOM with FLOW=0	16.372	0.0	112.880
BOTTOM with FLOW>0	16.640	183.2	114.730

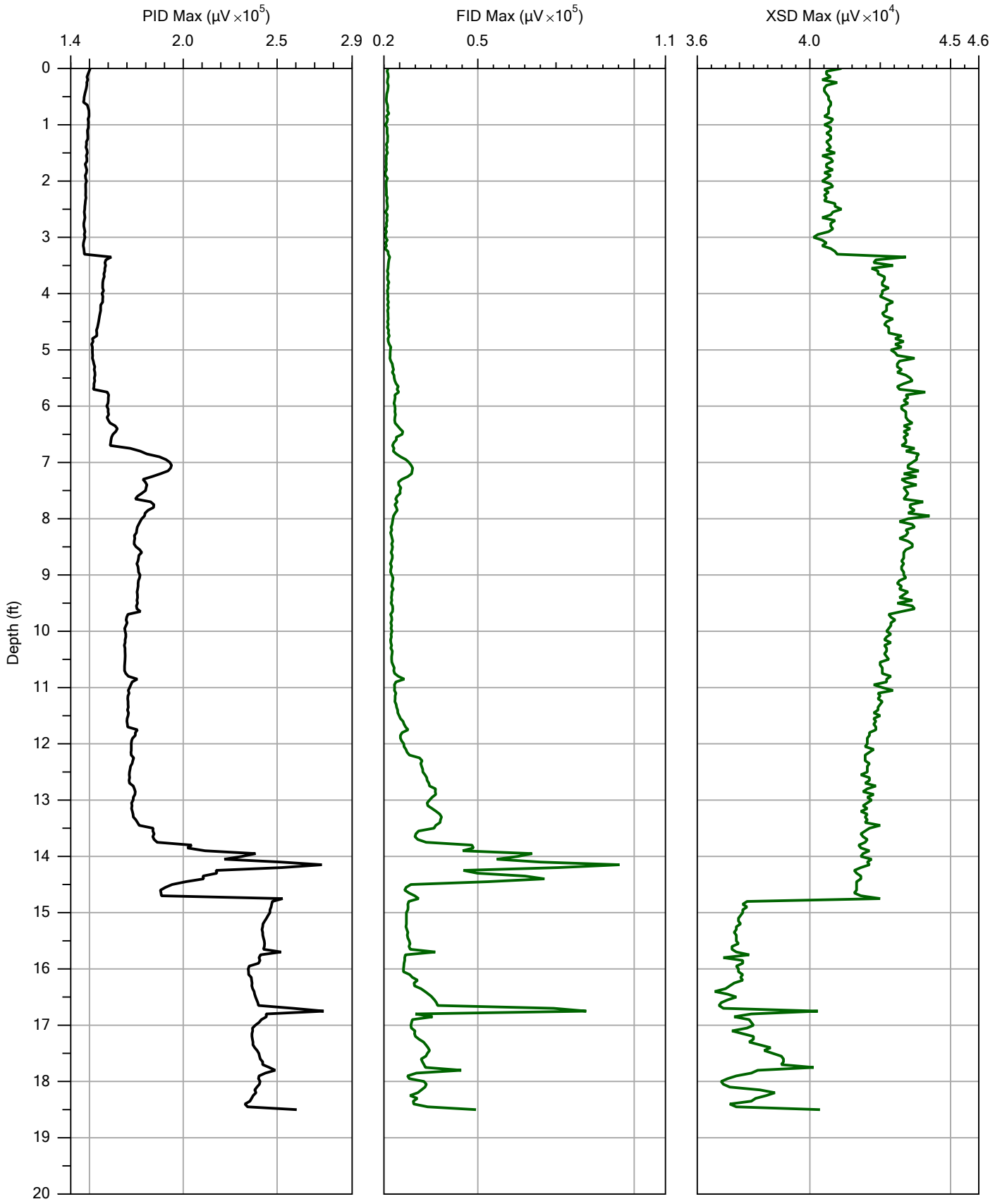
EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.23 psi (1.6 kPa)

TRANSDUCER TEST PASSED

EC POST-LOG TESTS BYPASSED

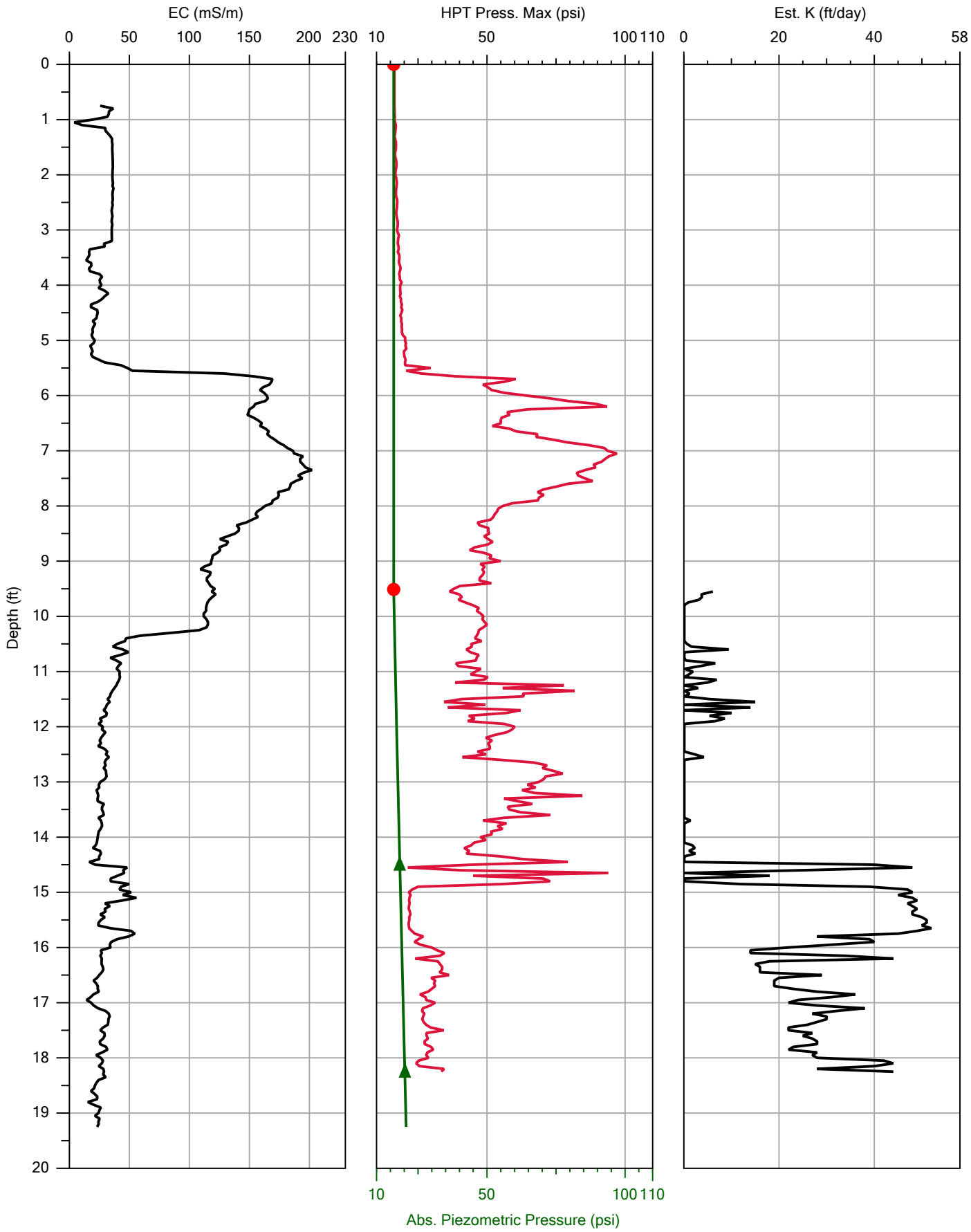
********** USER NOTES **********

0-5' pre clear. XSD not responding.



parratt wolff inc

		File: MIHPT - 4.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:



parratt wolff inc

			File: MIHPT - 4.MHP
Company: Parratt-Wolff, Inc.		Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135		Client: AECOM	Location:

MiHPT - 4.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	54.8	0.4	PASS
High	290.0	286.3	1.3	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST

FILENAME: MiHPT - 4.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 08:50:41

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES

PRE TEST TIME: Wed Nov 30 2016 08:55:39

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.619	0.0	114.580
TOP with FLOW>0	16.865	188.5	116.280
BOTTOM with FLOW=0	16.387	0.0	112.980
BOTTOM with FLOW>0	16.650	187.1	114.800

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.23 psi (1.6 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (33.7 deg C) at 0.00 ft (0.000 m)

Temperature out of range (30.2 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Wed Nov 30 2016 09:02:38

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 18.50 ft (5.639 m)
LOG END TIME: Wed Nov 30 2016 10:01:50

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 4.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 10:12:37

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Wed Nov 30 2016 10:17:12

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.576	0.0	114.290
TOP with FLOW>0	16.940	181.0	116.800
BOTTOM with FLOW=0	16.352	0.0	112.740
BOTTOM with FLOW>0	16.695	182.1	115.110

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

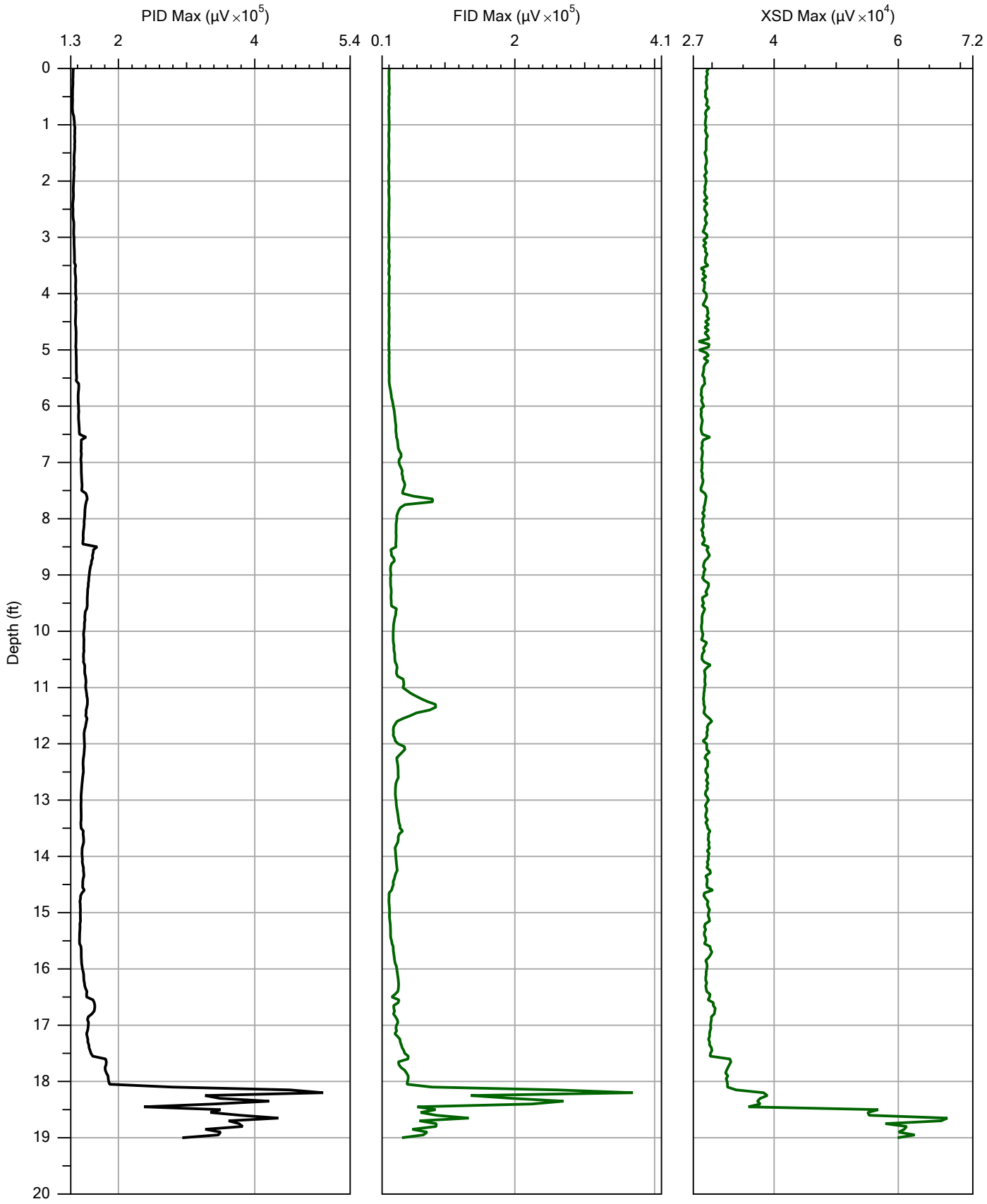
Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F

Low	55.0	55.7	1.4	PASS
High	290.0	294.2	1.5	PASS

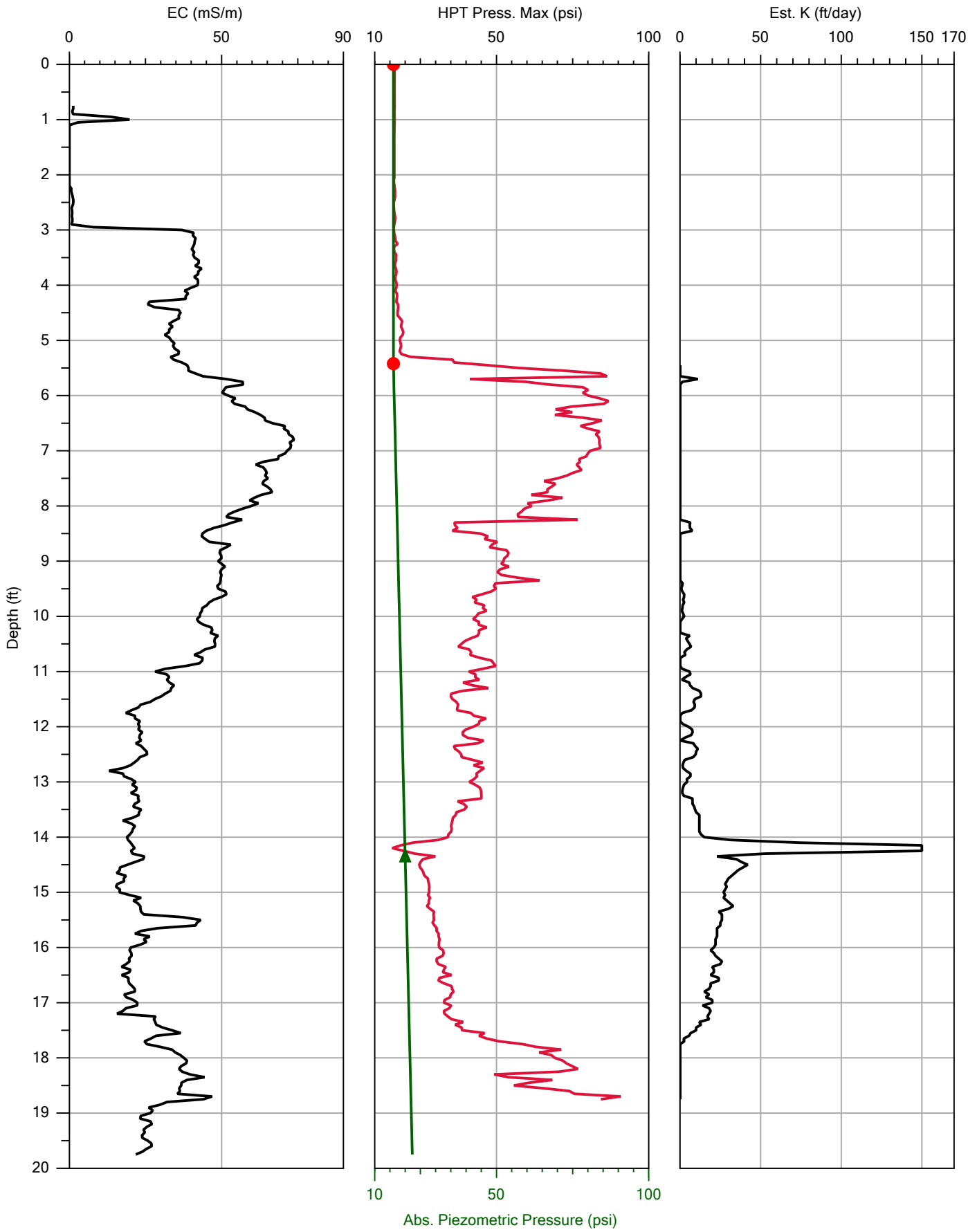
********** USER NOTES **********

Pre clear 0-5'.



parratt wolff inc

			File: MIHPT - 5.MHP
Company: Parratt-Wolff, Inc.		Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135		Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 5.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 5.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.1	0.1	PASS
High	290.0	301.1	3.8	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST

FILENAME: MiHPT - 5.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 11:02:50

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES

PRE TEST TIME: Wed Nov 30 2016 11:09:05

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.559	0.0	114.170
TOP with FLOW>0	16.902	177.9	116.540
BOTTOM with FLOW=0	16.336	0.0	112.630
BOTTOM with FLOW>0	16.674	178.0	114.970

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (39.7 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Wed Nov 30 2016 11:14:20

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 19.00 ft (5.791 m)
LOG END TIME: Wed Nov 30 2016 11:41:10

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 5.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 11:49:14

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Wed Nov 30 2016 11:55:38

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.529	0.0	113.970
TOP with FLOW>0	16.913	185.1	116.610
BOTTOM with FLOW=0	16.310	0.0	112.450
BOTTOM with FLOW>0	16.702	184.7	115.160

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

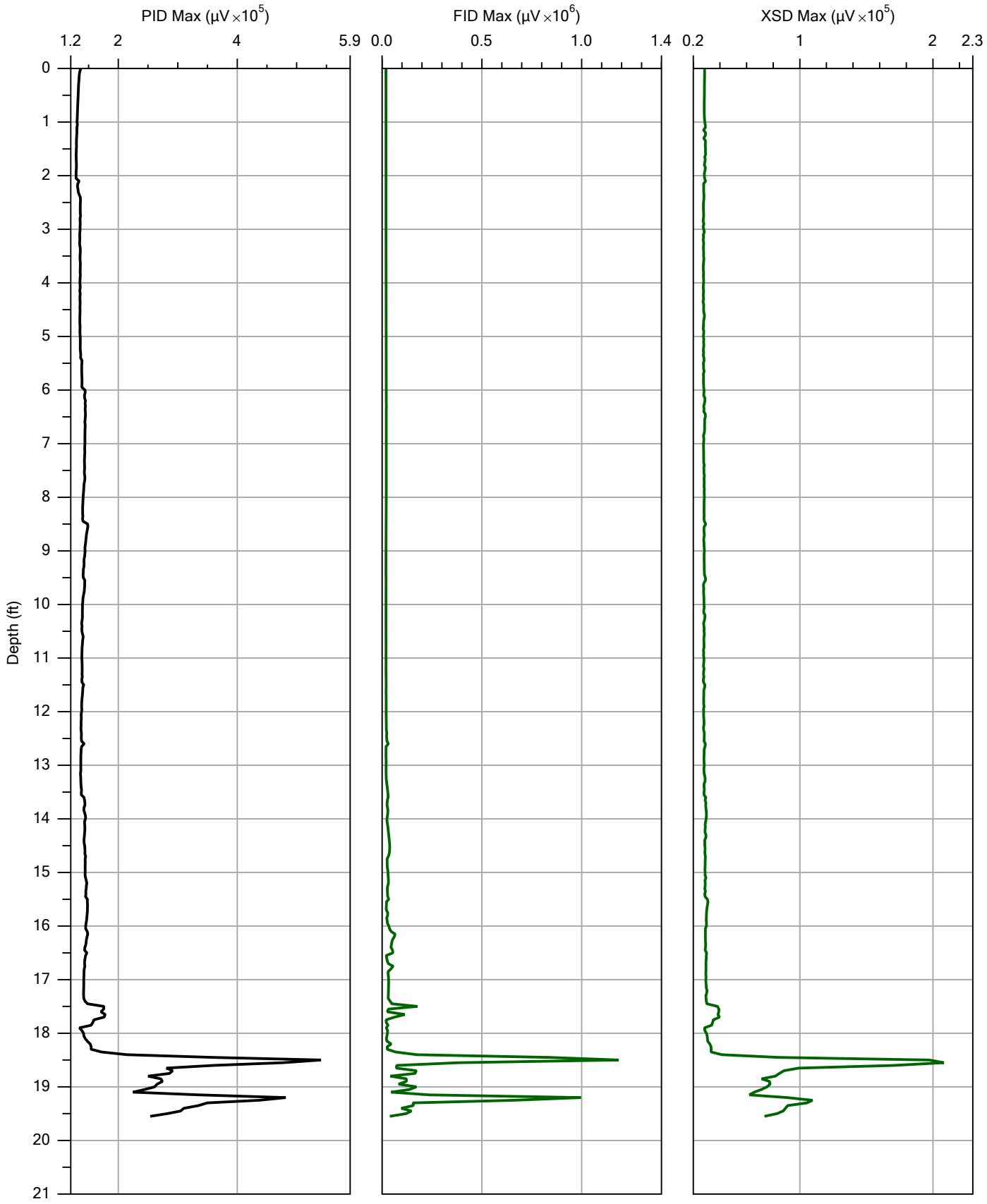
TRANSDUCER TEST PASSED

Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.5	0.8	PASS
High	290.0	300.4	3.6	PASS

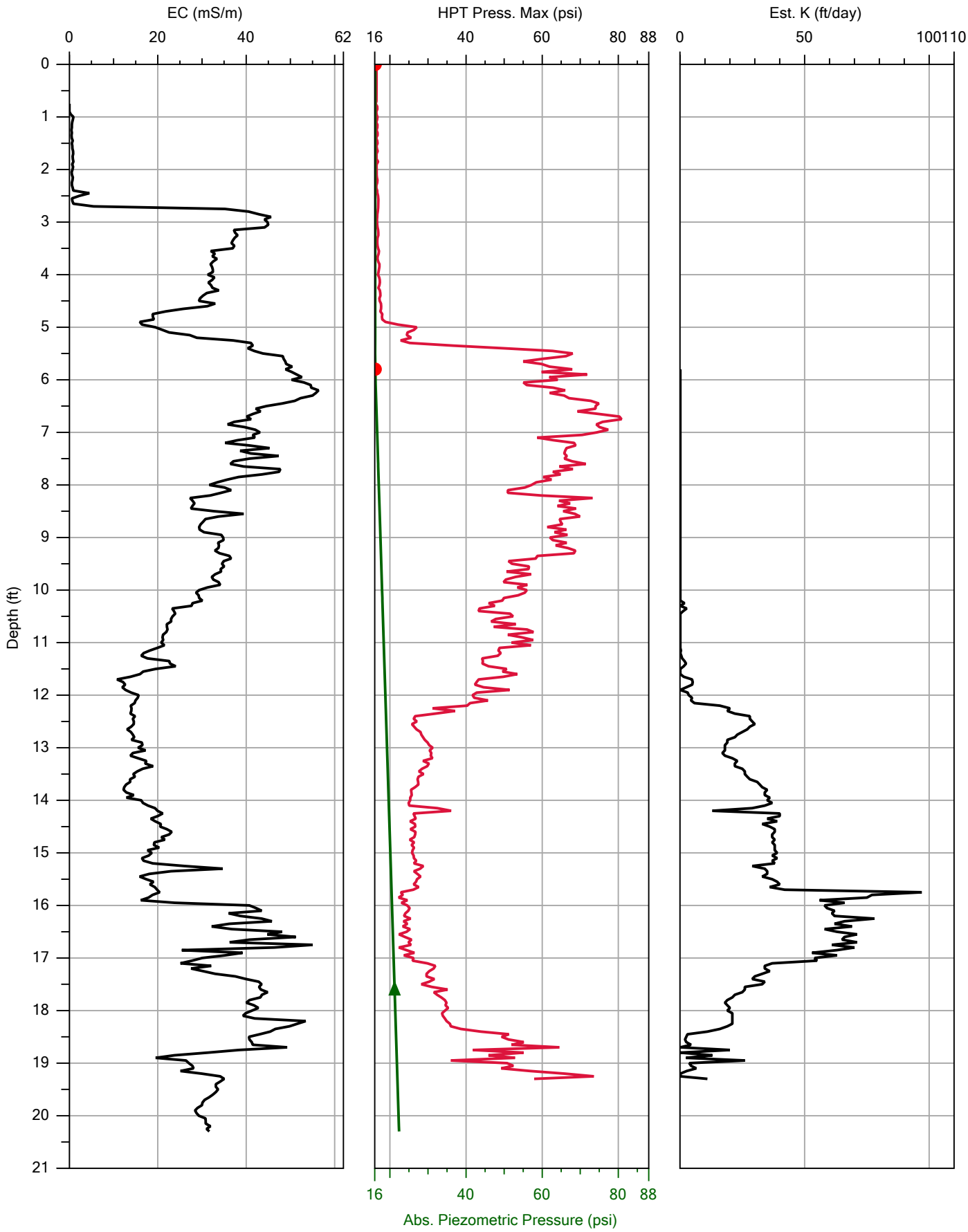
********** USER NOTES **********

0-5' pre clear.



parratt wolff inc

			File: MIHPT - 6.MHP
Company: Parratt-Wolff, Inc.		Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135		Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 6.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 6.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests (Post-Log From MiHPT - 5.zip)

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.5	0.8	PASS
High	290.0	300.4	3.6	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST (Post-Log From MiHPT - 5.zip)

FILENAME: MiHPT - 6.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 11:49:14

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES (Post-Log From MiHPT - 5.zip)

PRE TEST TIME: Wed Nov 30 2016 11:55:38

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.529	0.0	113.970
TOP with FLOW>0	16.913	185.1	116.610
BOTTOM with FLOW=0	16.310	0.0	112.450
BOTTOM with FLOW>0	16.702	184.7	115.160

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (40.1 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Wed Nov 30 2016 11:58:22

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 19.55 ft (5.959 m)
LOG END TIME: Wed Nov 30 2016 12:36:16

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 6.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 12:48:05

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Wed Nov 30 2016 12:53:00

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.518	0.0	113.890
TOP with FLOW>0	16.838	178.9	116.090
BOTTOM with FLOW=0	16.298	0.0	112.370
BOTTOM with FLOW>0	16.623	178.4	114.610

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

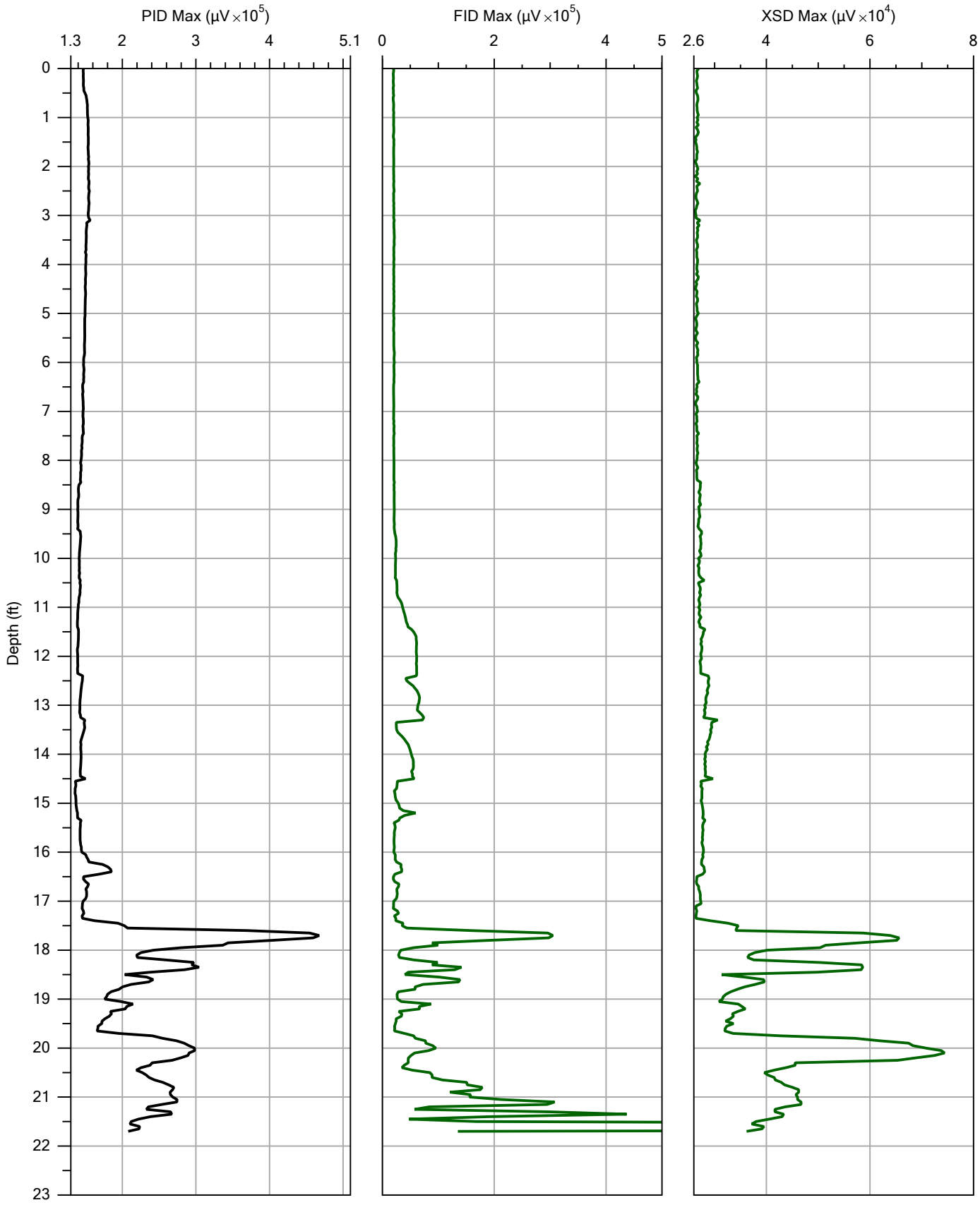
TRANSDUCER TEST PASSED

Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.7	1.3	PASS
High	290.0	281.6	2.9	PASS

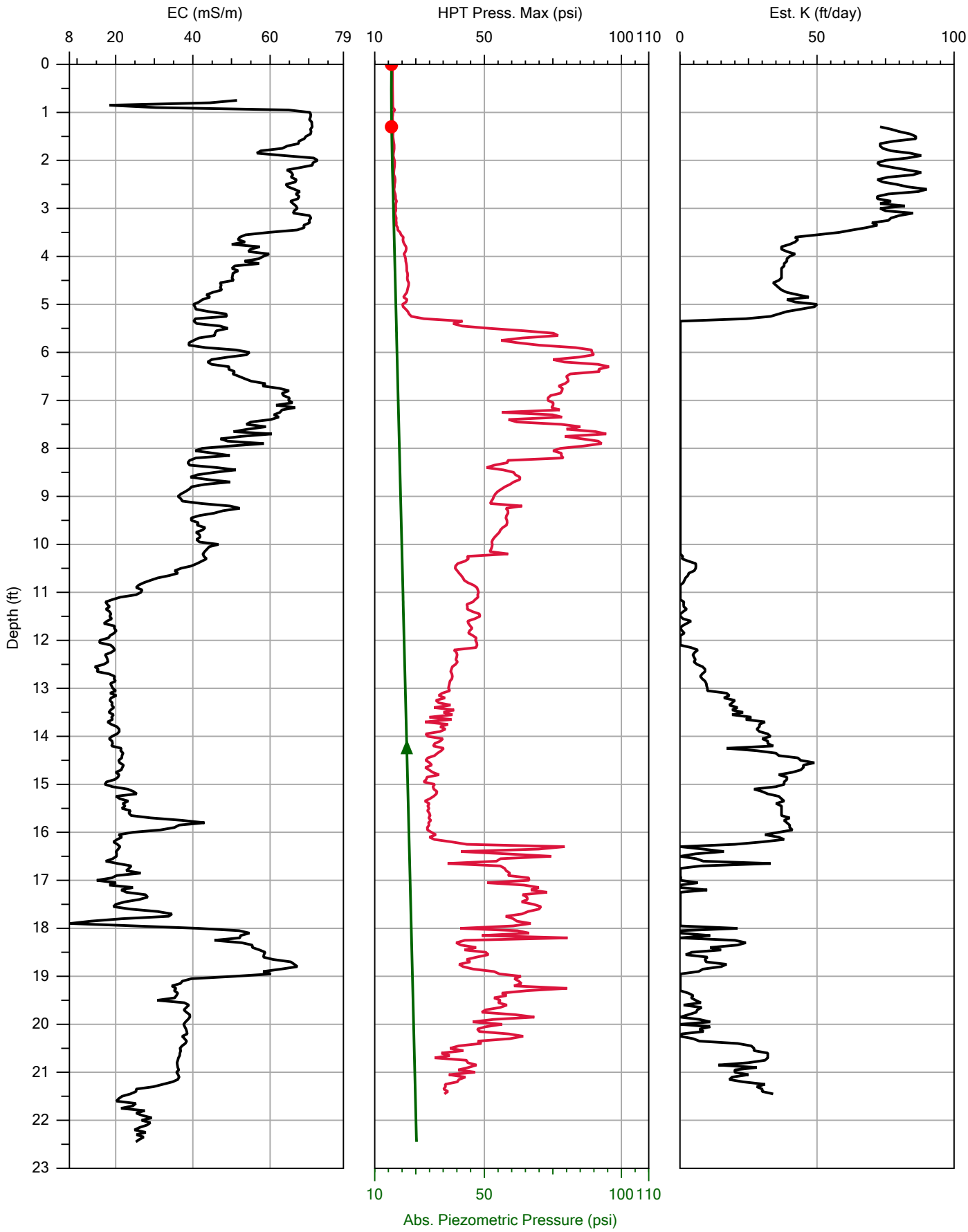
********** USER NOTES **********

Pre clear 0-5'.



parratt wolff inc

		File: MIHPT - 7.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 7.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 7.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests (Post-Log From MiHPT - 6.zip)

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.7	1.3	PASS
High	290.0	281.6	2.9	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST (Post-Log From MiHPT - 6.zip)

FILENAME: MiHPT - 7.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 12:48:05

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES (Post-Log From MiHPT - 6.zip)

PRE TEST TIME: Wed Nov 30 2016 12:53:00

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.518	0.0	113.890
TOP with FLOW>0	16.838	178.9	116.090
BOTTOM with FLOW=0	16.298	0.0	112.370
BOTTOM with FLOW>0	16.623	178.4	114.610

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (32.7 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Wed Nov 30 2016 12:56:46

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 21.70 ft (6.614 m)
LOG END TIME: Wed Nov 30 2016 13:38:48

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 7.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 13:50:45

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Wed Nov 30 2016 13:55:30

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.505	0.0	113.790
TOP with FLOW>0	16.817	178.1	115.950
BOTTOM with FLOW=0	16.281	0.0	112.260
BOTTOM with FLOW>0	16.616	179.5	114.570

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

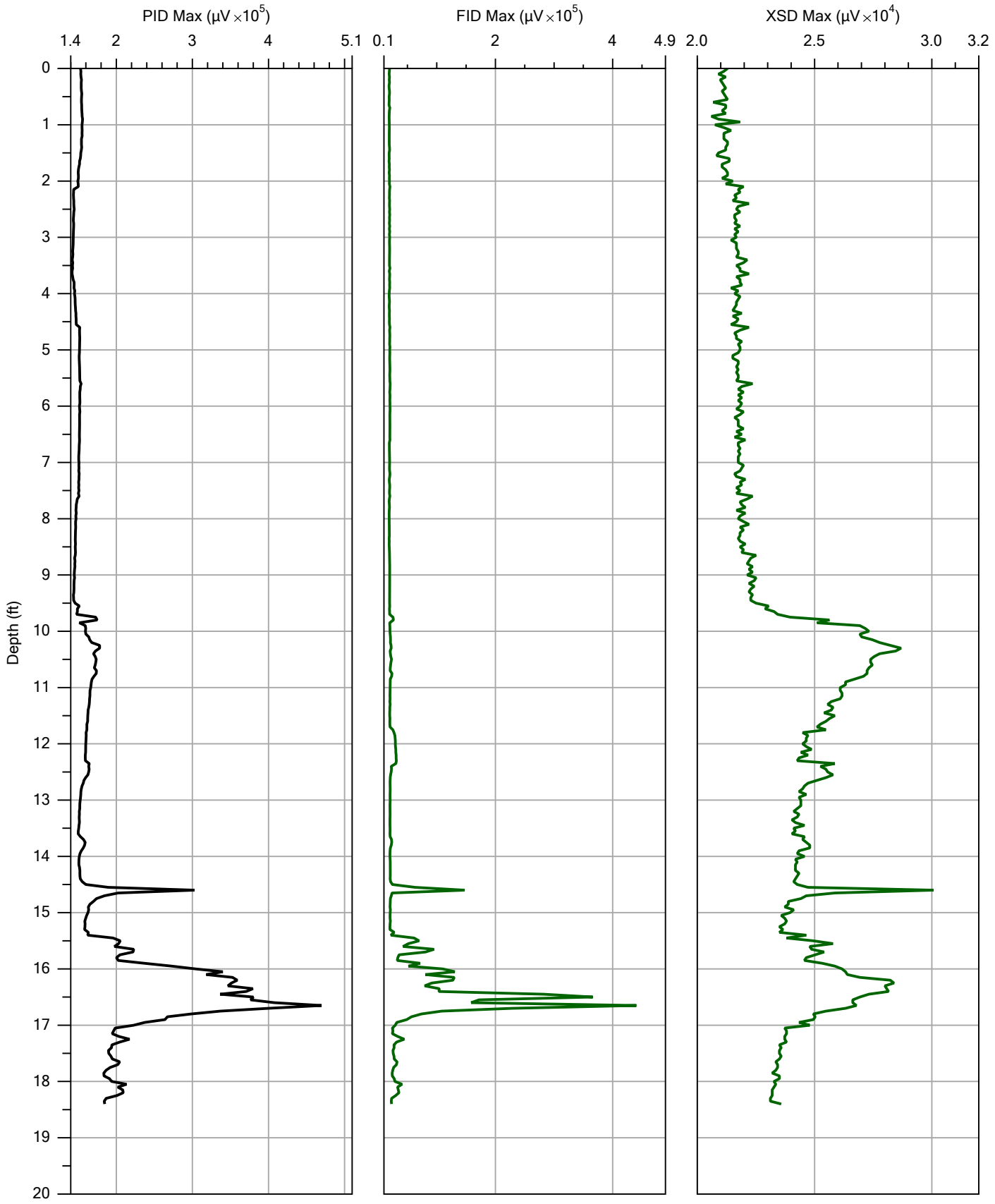
TRANSDUCER TEST PASSED

Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.8	1.5	PASS
High	290.0	301.4	3.9	PASS

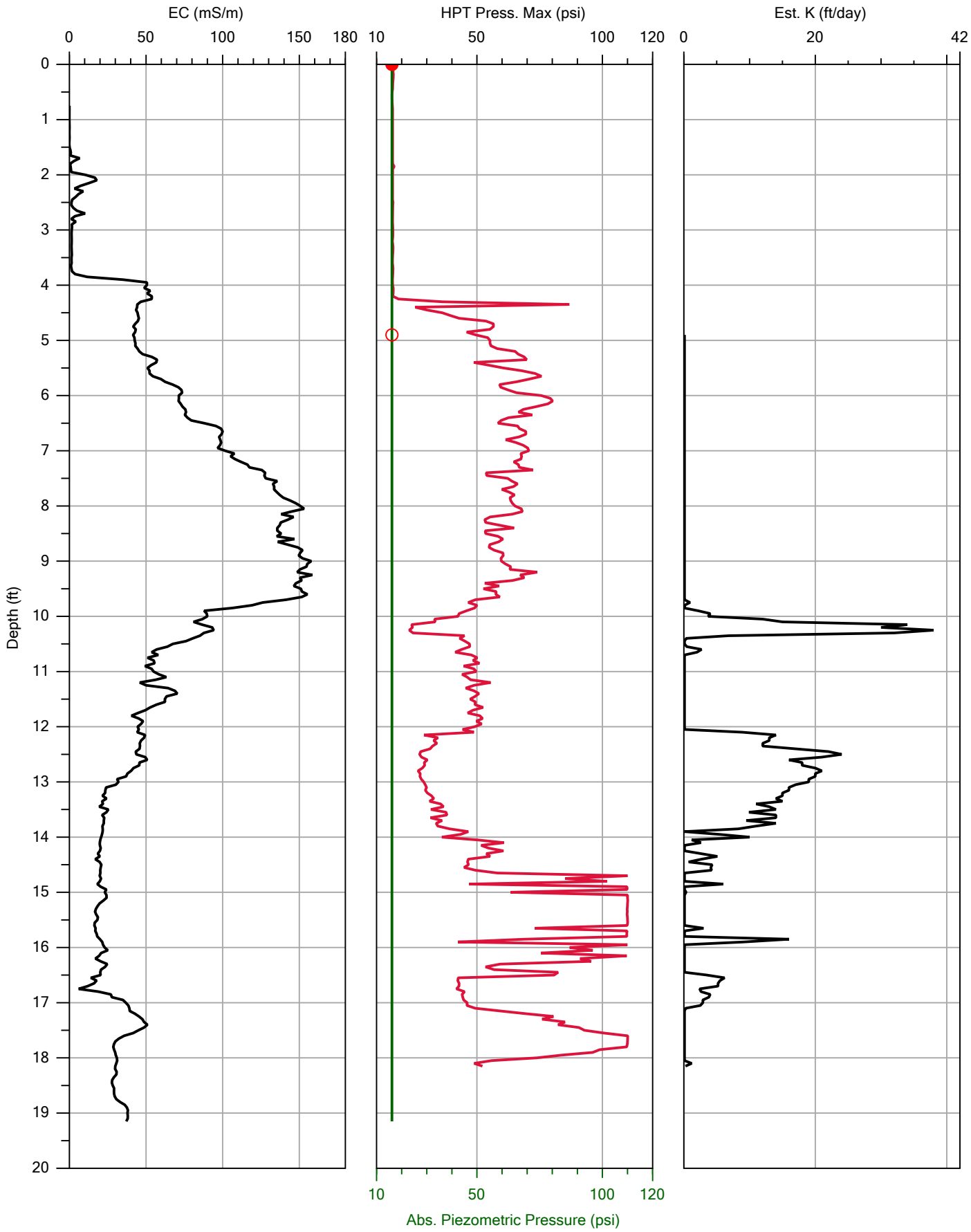
********** USER NOTES **********

Pre clear 0-5'.



parratt wolff inc

		File: MIHPT - 8.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 8.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 8.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests (Post-Log From MiHPT - 7.zip)

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.8	1.5	PASS
High	290.0	301.4	3.9	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST (Post-Log From MiHPT - 7.zip)

FILENAME: MiHPT - 8.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 40.3 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 13:50:45

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES (Post-Log From MiHPT - 7.zip)

PRE TEST TIME: Wed Nov 30 2016 13:55:30

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.505	0.0	113.790
TOP with FLOW>0	16.817	178.1	115.950
BOTTOM with FLOW=0	16.281	0.0	112.260
BOTTOM with FLOW>0	16.616	179.5	114.570

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (26.3 deg C) at 0.00 ft (0.000 m)

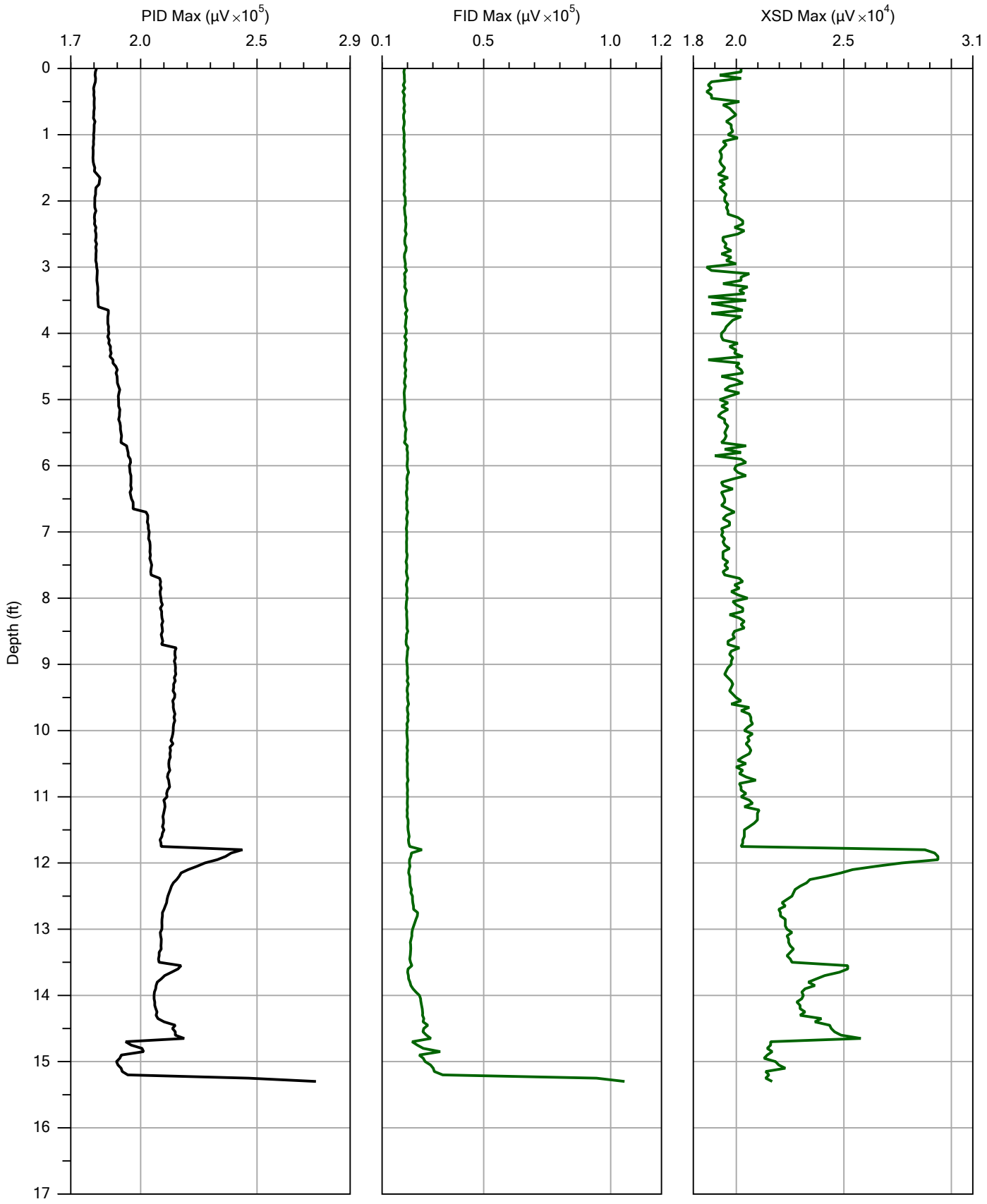
Temperature out of range (25.4 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Wed Nov 30 2016 14:13:16

ATTENUATION CHANGES

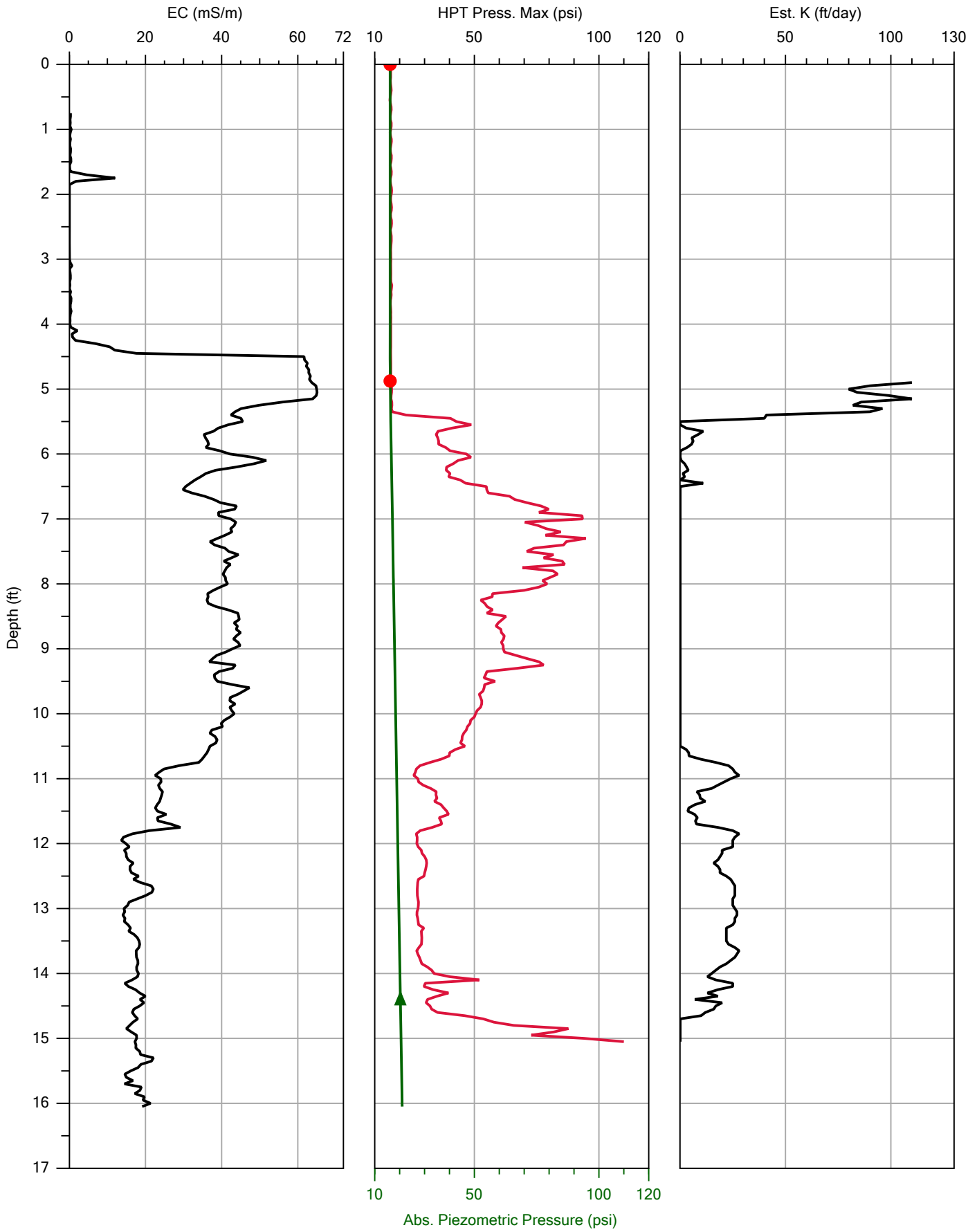
DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 18.40 ft (5.608 m)
LOG END TIME: Wed Nov 30 2016 14:53:49



parratt wolff inc

		File: MIHPT - 9.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:



parratt wolff inc

		File: MIHPT - 9.MHP
Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	Date: 11/30/2016
Project ID: 16135	Client: AECOM	Location:

MiHPT - 9.zip

SITE INFORMATION -- DIRECT IMAGE MIP+HPT PROBE

Geoprobe DI Acquisition Software for Windows
Version: 1.7 Build: 15012

Pre-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.3	0.5	PASS
High	290.0	300.9	3.7	PASS

COMPANY: Parratt-Wolff, Inc.
OPERATOR: Danylo Kulczycky
PROJECT ID: 16135
CLIENT: AECOM
UNITS: ENGLISH
PROBE AND ARRAY: MH6530/6532 MiHPT Probe with Top Dipole
LOCATION: 3425 Hyde Park
100 INCH STRING POT USED
ROD LENGTH: 5 feet

MIP PRE-LOG RESPONSE TEST

FILENAME: MiHPT - 9.pre.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 39.9 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 16:19:11

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

TRIP TIME: 50 sec
Gas Used: nitrogen

PRE-LOG HPT REFERENCE TEST VALUES

PRE TEST TIME: Wed Nov 30 2016 16:24:17

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.557	0.0	114.160
TOP with FLOW>0	16.798	177.2	115.820
BOTTOM with FLOW=0	16.356	0.0	112.770
BOTTOM with FLOW>0	16.573	178.4	114.270

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
  ACTUAL FLOW=0 HPT DIFF.: 0.20 psi (1.4 kPa)

TRANSDUCER TEST PASSED

DETECTOR NAME: XSD NA PID FID
HPT IDEAL COEFFS: 2.2696e1,-2.2356
HPT SENSOR CAL NUMBERS: DEFAULT, 0.000, 0.000, 0.000, 0.000, 1.000, 0.000

Temperature out of range (42.1 deg C) at 0.00 ft (0.000 m)

LOG START TIME: Wed Nov 30 2016 16:28:07

ATTENUATION CHANGES

DEPTH (ft)	DEPTH (m)	DET1	DET2	DET3	DET4
0.00	0.000	1	1	1	1

LOG END DEPTH: 15.30 ft (4.663 m)
LOG END TIME: Wed Nov 30 2016 16:55:54

LATITUDE: 0.000000000
LONGITUDE: 0.000000000
ELEVATION: 0.000 METERS 0.00 FEET
GPS Quality: None

MIP POST-LOG RESPONSE TEST

FILENAME: MiHPT - 9.post.tim
COMPOUND: TCE
CONCENTRATION: 20 ppm
FLOW: 39.9 mL/min
RESPONSE TEST START TIME: Wed Nov 30 2016 17:07:13

RESPONSE TEST ATTENUATION CHANGES

TIME	DET1	DET2	DET3	DET4
0	1	1	1	1

POST-LOG HPT REFERENCE TEST VALUES

POST TEST TIME: Wed Nov 30 2016 17:11:57

TEST	HPT PRESSURE (psi)	FLOW (mL/min)	HPT PRESSURE (kPa)
TOP with FLOW=0	16.614	0.0	114.550
TOP with FLOW>0	16.819	181.8	115.960
BOTTOM with FLOW=0	16.397	0.0	113.050
BOTTOM with FLOW>0	16.603	179.5	114.470

EXPECTED FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa) +/- 10%
ACTUAL FLOW=0 HPT DIFF.: 0.22 psi (1.5 kPa)

TRANSDUCER TEST PASSED

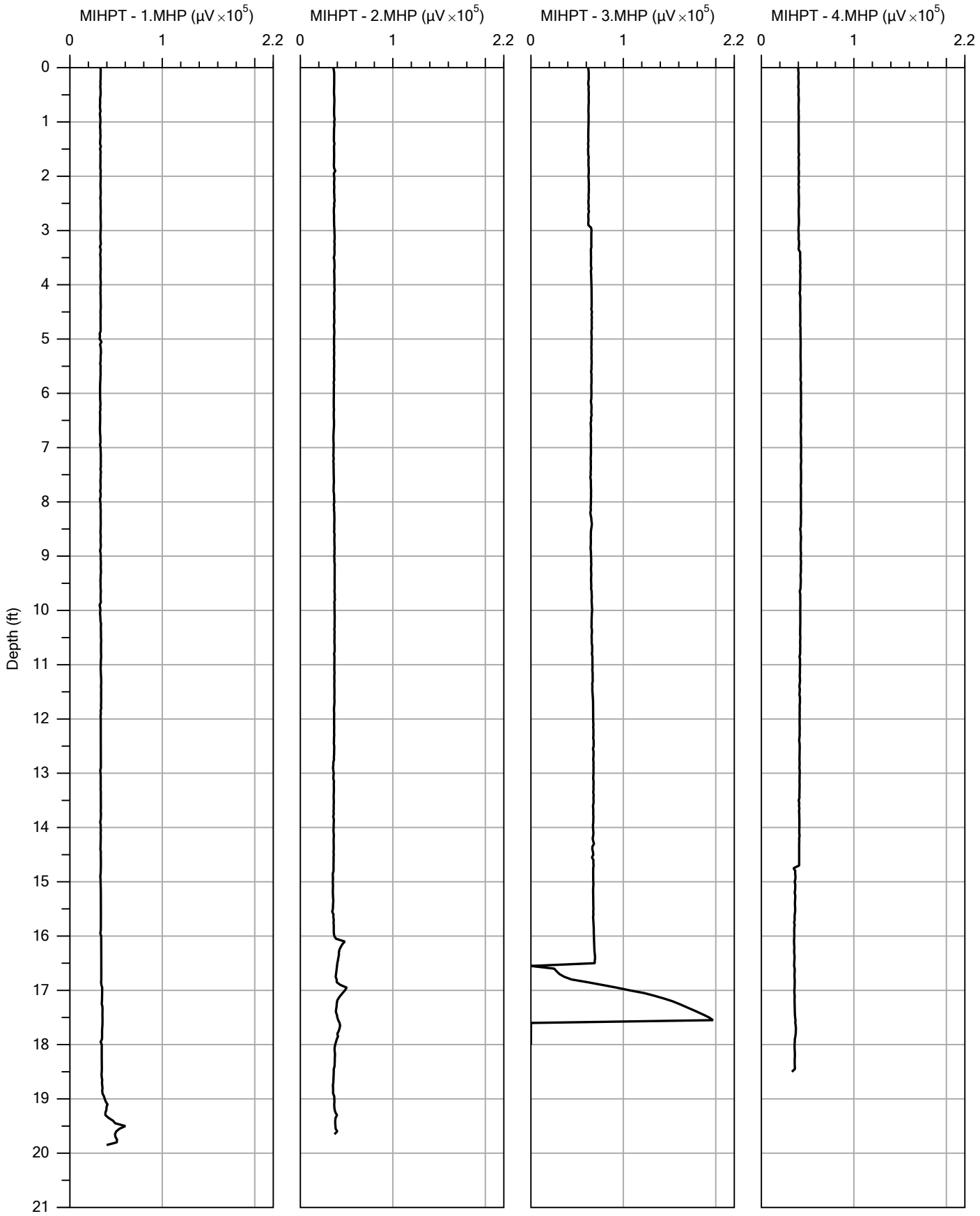
Post-Log EC Load Tests

Test	Target (mS/m)	Actual (mS/m)	% Diff	P/F
Low	55.0	55.4	0.8	PASS
High	290.0	300.9	3.7	PASS

********** USER NOTES **********

PROBE REFUSAL. Pre clear 0-5'.

Attachment 3

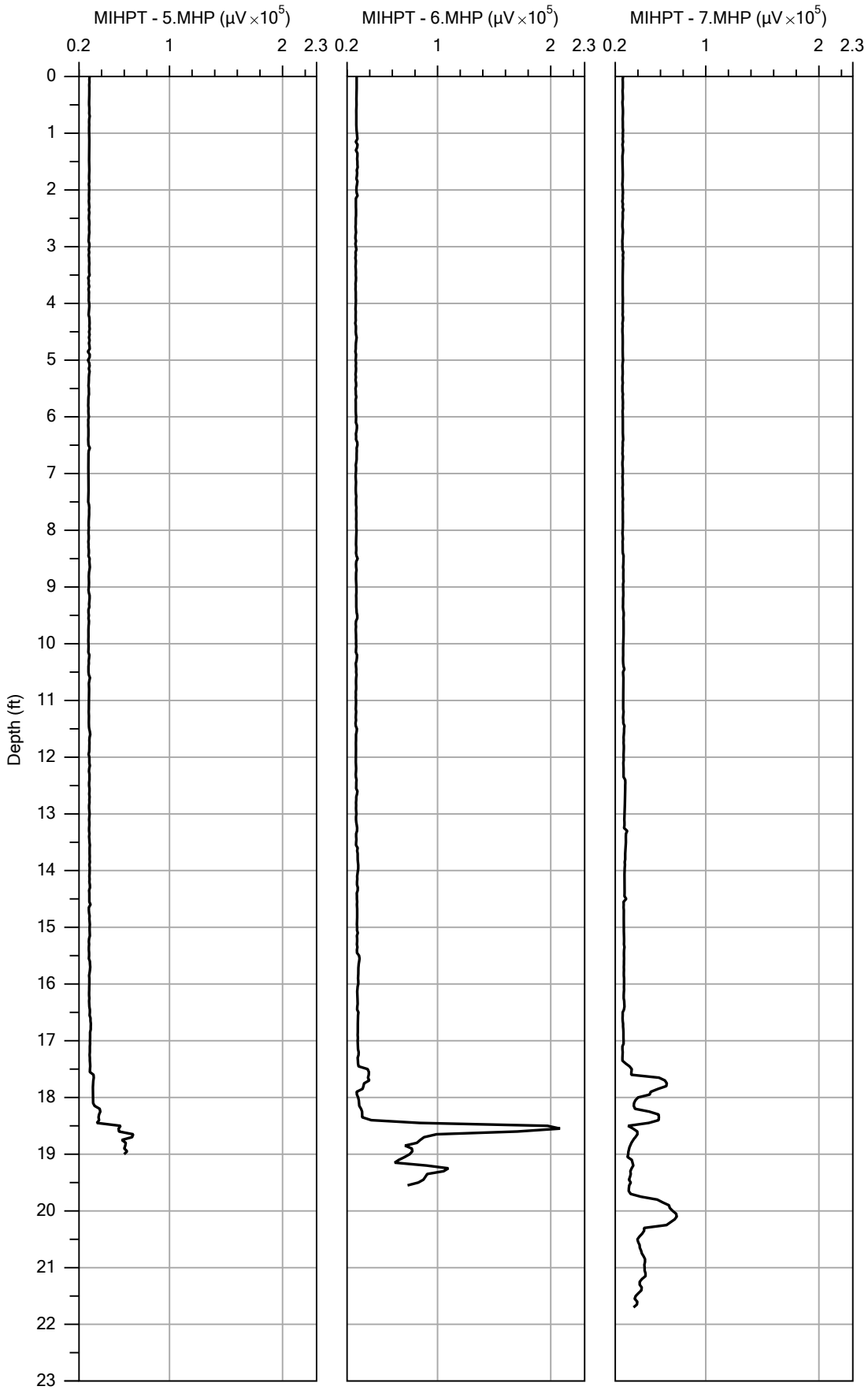


Direct Image® By Geoprobe Systems®

XSD Min

Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky
Project ID: 16135	Client: AECOM

MIHPT - 1.MHP	11/29/2016
MIHPT - 2.MHP	11/29/2016
MIHPT - 3.MHP	11/29/2016
MIHPT - 4.MHP	11/30/2016

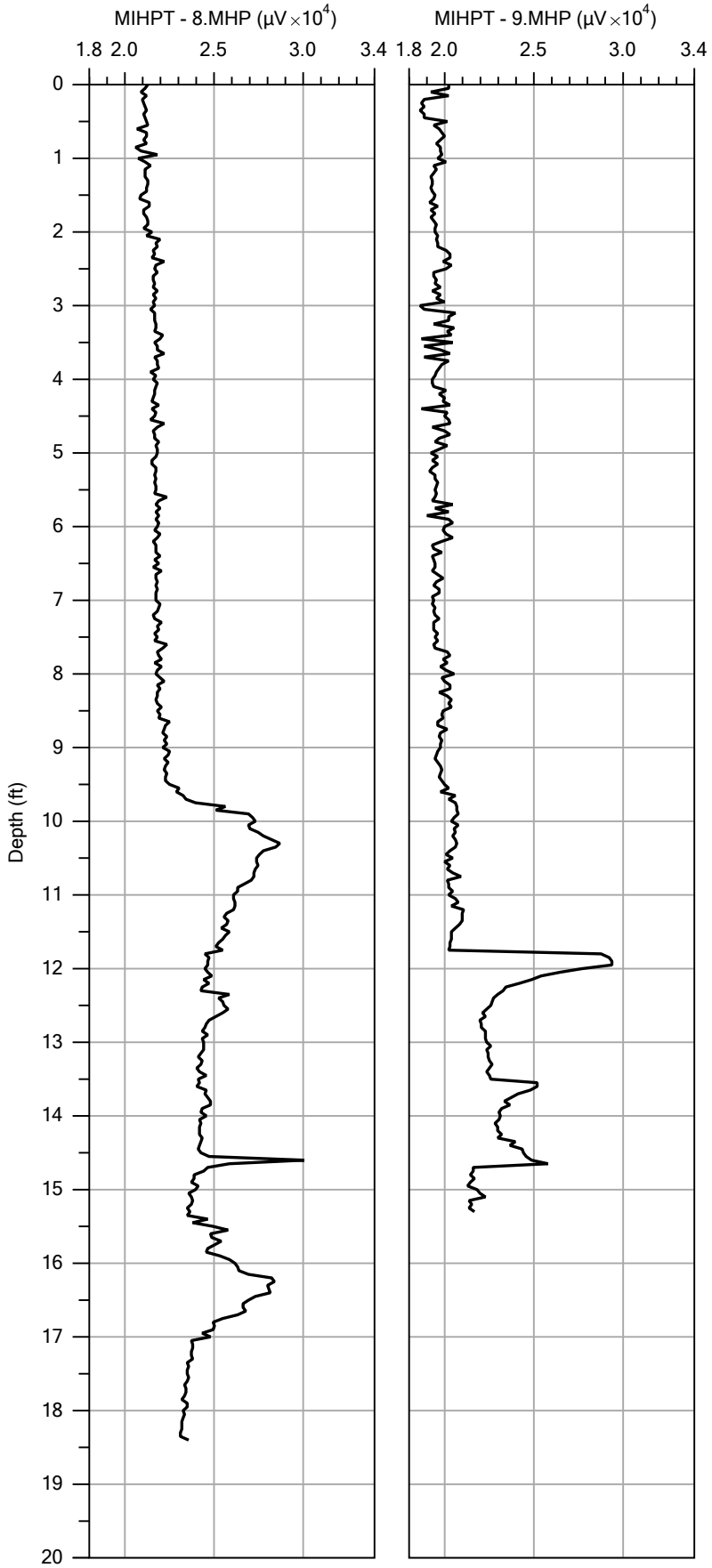


Direct Image® By Geoprobe Systems®

XSD Max

Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky
Project ID: 16135	Client: AECOM

MIHPT - 5.MHP	11/30/2016
MIHPT - 6.MHP	11/30/2016
MIHPT - 7.MHP	11/30/2016



Direct Image® By Geoprobe Systems®

XSD Max

Company: Parratt-Wolff, Inc.	Operator: Danylo Kulczycky	MIHPT - 8.MHP	11/30/2016
Project ID: 16135	Client: AECOM	MIHPT - 9.MHP	11/30/2016